PROFINET Communication Card

Version 1.0, Edit date 8/24



Safety precautions

The extension card can be installed and operated only by people who have taken part in professional training on electrical operation and safety knowledge, obtained the certification, and been familiar with all steps and requirements for installing, performing commissioning on, operating, and maintaining the device, and are capable of preventing all kinds of emergencies.

Before installing, removing, or operating the communication card, read the safety precautions described in this manual and the variable-frequency drive (VFD) operation manual carefully to ensure safe operation.

For any physical injuries or damage to the device caused due to your neglect of the safety precautions described in this manual and the VFD operation manual, our company shall not be held liable.

- You need to open the housing of the VFD when installing or removing the communication card. Therefore, you must disconnect all power supplies of the VFD and ensure that the voltage inside the VFD is safe. For details, see the description in the VFD operation manual. Severe physical injuries or even death may be caused if you do not follow the instructions.
- Store the communication card in a place that is dustproof and dampproof without electric shocks or mechanical pressure.
- The communication card is electrostatic sensitive. Take measurements to prevent electrostatic discharge when performing operations involving it.
- Tighten the screws up when installing the communication card. Ensure that it is firmly fixed and properly grounded.

Contents

Product confirmation2
PROFINET communication card2
2.1 Overview
2.2 Features2
2.3 Electrical wiring
2.4 Communication4
2.4.1 Packet format4
2.4.2 PROFINET I/O communication4
2.5 Example of PLC communication10
2.5.1 Parameter configuration10
2.5.2 Create a new project12
2.5.3 Add GSD files13
2.5.4 Configure the basic information of the project13
2.5.5 Assign the device name of the IO device (UNITRONICS communication card)17
2.5.6 Save, compile, and download18
2.5.7 VFD parameter watching19

Product confirmation

Check the following after receiving a communication extension card product:

- Whether the communication card is damaged.
- Whether the received communication card is the one you purchase according to the bar code label on the PCB.
- Whether all the following items are contained in the product package:
- One communication card, one tie wrap, one tie, one M3 screw, and one manual
- If the communication card is damaged, a wrong model is delivered, or some items are missing, contact the supplier in a timely manner.
- Confirm the environmental requirements for application.

Table 0-1 Environmental requirements

Item	Requirement
Operation temperature	-10–+50°C
Storage temperature	-20–+60°C
Relative humidity	5%–95%
Other weather conditions	No condensation, ice, rain, snow, or hail; solar radiation < 700 W/m ²
Air pressure	70–106 kPa
Vibration and impact	5.9m/s ² (0.6g) at the sine vibration of 9 Hz to 200 Hz

PROFINET communication card

2.1 Overview

- 1. Thanks for choosing UNITRONICS PROFINET communication cards. This manual describes the function specifications, installation, basic operation and settings, and information about the network protocol. To ensure that you install and operate the product properly, read this manual and the communication protocol section in the VFD operation manual carefully before you use the product.
- 2. This manual only describes how to operate the PROFINET communication card and the related commands but does not provide details about the PROFINET protocol. For more information about the PROFINET protocol, read the related specialized articles or books.
- This communication card is defined as a PROFINET slave station communication card and is used on a VFD that supports PROFINET communication (B7 Series).
- 4. The communication card supports the linear network topology and star-shaped network topology.
- 5. The communication card supports 32 inputs/outputs to read and write process data, read state data, and read and write function parameters of a VFD.

2.2 Features

1. Supported functions

- Supports the PROFINET protocol, and supports PROFINET I/O devices
- > Provides two PROFINET I/O ports and supports the 100 M full-duplex operation
- Supports the linear network topology and star-shaped network topology.

2. Supported communication types

Standard Ethernet channels:

Standard Ethernet channels are non real-time communication channels that use the TCP/IP protocol, and are mainly used for device parameterization and configuration and to read diagnosis data.

Real-time (RT) communication channels:

RT channels are optimized channels for real-time communication. They take precedence over TCP (UDP)/IP, which ensures that various stations on a network perform data transmission with high time requirements at a certain interval. The bus period may reach the precision of millisecond. These channels are used to transmit data such as process data and alarm data.

Isochronous real-time (IRT) communication channels

IRT channels are implemented through the built-in Switch-ASIC IRT chip. IRT communication can further shorten the processing time of the communication stack software, synchronizing data transmission of the program and device. The transmission delay is less than 1 ms, and the jitter is less than 1 µs. The typical application is motion control.

3. Communication ports

Standard RJ45 ports are used in PROFINET communication. The communication card provides two RJ45 ports with no transmission direction defined, and therefore you can insert a cable into the port

without regard to its direction. Figure 0-1 shows the ports, and Table 0-1 describes the functions of the ports.



Figure 0-1 Two standard RJ45 ports

Table 0-1 Standard RJ45 port pins

Pin	Name	Description
1	TX+	Transmit Data+
2	TX-	Transmit Data-
3	RX+	Receive Data+
4	n/c	Not connected
5	n/c	Not connected
6	RX-	Receive Data-
7	n/c	Not connected
8	n/c	Not connected

4. State indicators

PROFINET communication card provides nine LED indicators to indicate its states. Table 0-2 describes the state indicators.

LED	Color	State	Description
LED1	Green		3.3 V power indicator
		On	Not connected through a network cable
LED2 (Bus state indicator)	Red	Blinking	Connected to the PROFINET controller through a network cable, but no communication established
		Off	Communication established with the PROFINET controller
LED3	Deal	On	PROFINET diagnosis enabled
(System fault indicator)	Red	Off	PROFINET diagnosis disabled
		On	TPS-1 communication stack started
LED4 (Slave ready indicator)	Green	Blinking	TPS-1 waits for the initialization of MCU
(Slave ready indicator)		Off	TPS-1 communication stack not started
LED5 (Maintenance state indicator)	Green		Defined by the manufacturer, depending on the characteristics of the device
LED6/7	Green	On	PROFINET communication card connected to the PC/PLC through a network cable
(Network port state indicator)		Off	PROFINET communication card not connected to the PC/PLC
LED8/9	Graen	On	PROFINET communication card communicating with the PC/PLC
(Network port communication indicator)	Green	Off	PROFINET communication card not communicating with the PC/PLC

Table	0-2	State	indicators
-------	-----	-------	------------

2.3 Electrical wiring

PROFINET communication card provides standard RJ45 ports and supports the linear and star

topologies. Figure 0-2 and Figure 0-3 show the electrical wiring diagrams for different topologies.

Use CAT5, CAT5e, and CAT6 network cables for electrical wiring. When the communication distance is greater than 50 meters, use high-quality network cables that meet the national standards.



Figure 0-2 Electrical wiring diagram for a linear topology

Note: For the star-shaped network topology, you need to use a PROFINET switch.



Figure 0-3 Electrical wiring diagram for a star topology

2.4 Communication

2.4.1 Packet format

Table 0-3 describes the structure of an RT frame (non-synchronous).

Table 0-3 Structure of	f an RT	frame
------------------------	---------	-------

Data header	Ethernet type	VLAN	Ethernet type			Period counter	Data state	Transmission state	FCS
	2 bytes	2 bytes	2 bytes	2 bytes	36–1440 bytes	2 bytes	1 byte	1 byte	4 bytes
	0x8100		0x8892						
	VLAN flag					APDUs	tate		
Data head	Data header								
7-byte preamble 1-byte synchronization information 6-byte source MAC address 6-byte destination MAC address									

Table 0-4 describes the structure of the IRT frame (synchronous).

Table 0-4 Structure of an IRT frame

Data header				Ethernet type	VLAN	Ethernet type	Frame identifier	IRT user data	FCS
7-byte preamble	1-byte synchronization	source MAC	6-byte destination MAC address	2 bytes	2 bytes	2 bytes	2 bvtes	36–1440 bytes	4 bytes

2.4.2 PROFINET I/O communication

The PROFINET communication card supports 16-word input/output. Figure 0-4 shows the packet format for transmitting data with a VFD.

-	Parameter dentification (PKW)					P	rocess d (PZD) Distributa	
P۴	KW1	PKW2	PKW3	PKW4			PZD3 PZD3	PZD12 PZD12

Figure 0-4 Packet structure

By using the 32 inputs/outputs, you can set the reference parameters of the VFD, monitor the status values, transmit control commands, monitor the running state, and read/write the function parameters of the VFD. For specific operations, see the following description.

Parameter zone:

PKW1—Parameter identification

PKW2—Array index number

PKW3—Parameter value 1

PKW4—Parameter value 2

Process data:

CW-Control word (transmitted from the master to a slave. For description, see

Table 0-5)

SW—Status word (transmitted from a slave to the master. For description, see Table 0-7.)

PZD—Process data (defined by users)

(When the process data is output by the master to a slave, it is a reference value; and when the process data is input by a slave to the master, it is an actual value.)

PZD zone (process data zone): The PZD zone in a communication packet is designed for controlling and monitoring a VFD. The master and slave stations always process the received PZD with the highest priority. The processing of PZD takes priority over that of PKW, and the master and slave stations always transmit the latest valid data on the interfaces.

CWs and SWs

Using CWs is the basic method of the fieldbus system to control VFDs. A CW is transmitted by the fieldbus master station to a VFD device. In this case, the adapter module functions as a gateway. The VFD device responds to the bit code information of the CW and feeds state information back to the master through an SW.

Reference value: A VFD device may receive control information in multiple channels, including analog and digital input terminals, VFD control panel, and communication modules such as RS485 To enable the control over VFD devices through PROFINET, you need to set the communication module as the controller of the VFD device.

Actual value: An actual value is a 16-bit word that includes information about VFD device operation. The monitoring function is defined through VFD parameters. The conversion scale of an integer transmitted as an actual value from the VFD device to the master depends on the set function. For more description, see the related VFD operation manual.

Note: A VFD device always checks the bytes of a CW and reference value.

Task packet (master station -> VFD)

CW: The first word in a PZD task packet is a VFD CW. You can select the expression method according

to P15.43. Table 0-5 and Table 0-6 describe the control words (CWs) of the B7 series VFD.

Bit	Name	Value	Description
		1	Forward running
		2	Reverse running
		3	Forward jogging
		4	Reverse jogging
0–7	Communication-based control command	5	Stop
	Command	6	Coast to stop (emergency stop)
		7	Faultreset
		8	Jogging to stop
		9	Decelerate to stop
8	Enable writing	1	Enable reading and writing (PKW1-PKW4)
0.40		00	Motor 1
9–10	Motor group setting	01	Motor 2
	O control occide and the bin of	1	Enable torque/speed control switching
11	Control mode switching	0	Disable switching

Table 0-5 B7 se	eries VFD CWs expres	ssed in decimal format
-----------------	----------------------	------------------------

Bit	Name	Value	Description
12	Reset power consumption to	1	Enable
12	zero	0	Disable
40		1	Enable
13	Pre-excitation	0	Disable
4.4	DQ hashin a	1	Enable
14	DC braking	0	Disable
45		1	Enable
15	Heartbeat reference	0	Disable

Table 0-6 B7 series VFD CWs expressed in binary format

Bit	Name	Description	Priority
0	Forward running	0: Decelerate to stop 1: Forward running	1
1	Reverse running	0: Decelerate to stop 1: Reverse running	2
2	Faultreset	0: Disable 1: Enable	3
3	Coast to stop	0: Disable 1: Enable	4
4	Forward jogging	0: Disable 1: Enable	5
5	Reverse jogging	0: Disable 1: Enable	6
6	Jogging to stop	0: Disable 1: Enable	7
7	/	Reserved	
8	Enable reading and writing (PKW1- PKW4)	0: Disable 1: Enable	
9	/	Reserved	
10	Decelerate to stop	0: Disable 1: Enable	0: Top priority
11–15	/	Reserved	

Reference value (REF): The second to twelfth words in a PZD task packet are the main settings. The

main frequency settings are provided by the main setting signal source. Table 0-7 describes the settings of B7 series VFD.

Function code	Word	Value range	Default value
P16.32	Received PZD2	0: Invalid	0
P16.33	Received PZD3	1: Set frequency (0–Fmax, unit: 0.01 Hz) 2: PID reference (-1000–1000, in which 1000 corresponds to 100.0%)	0
P16.34	Received PZD4	3: PID feedback (-1000–1000, in which 1000 corresponds to 100.0%) 4: Torque setting (-3000–+3000, in which 1000 corresponds to 100.0% of the rated	0
P16.35	Received PZD5	current of the motor) 5: Setting of the upper limit of forward running frequency (0–Fmax, unit: 0.01 Hz)	0
P16.36	Received PZD6	6: Setting of the upper limit of reverse running frequency (0–Fmax, unit: 0.01 Hz) 7: Upper limit of the electromotive torque (0–3000, in which 1000 corresponds to	0
P16.37	Received PZD7	100.0% of the rated current of the motor) 8: Upper limit of the brake torque (0–3000, in which 1000 corresponds to 100.0% of	0
P16.38	Received PZD8	the rated current of the motor) 9: Virtual input terminal command, 0x000–0x3FF (bit9–bit0	0
P16.39	Received PZD9	correspond to S8/S7/S6/S5/HDIB/HDIA/S4/S3/S2/S1 in sequence)	0
P16.40	Received PZD10	10: Virtual output terminal command, 0x00–0x0F (bit3–bit0 correspond to RO2/RO1/HDO/Y1 in sequence)	0
P16.41	Received PZD11	11: Voltage setting (for V/F separation) (0–1000, in which 1000 corresponds to 100.0% of the rated voltage of the motor)	0
P16.42	Received PZD12	12: AO1 output setting 1 (-1000-+1000, in which 1000 corresponds to 100.0%) 13: AO2 output setting 2 (-1000-+1000, in which 1000 corresponds to 100.0%)	0

Table 0-7 Settings of B7 series VFD

Function code	Word	Value range	Default value
		14: MSB of position reference (signed number)	
		15: LSB of position reference (unsigned number)	
		16: MSB of position feedback (signed number)	
		17: LSB of position feedback (unsigned number)	
		18: Position feedback setting flag (position feedback can be set only after this flag is set to 1 and then to 0)	
		19: Function code mapping (PZD2–PZD12 correspond to P14.49–P14.59	
		respectively.)	
		20-31: Reserved	

Response packet (VFD -> master station)

SW: The first word in a PZD response packet is a VFD SW. You can select the expression method according to P15.43.

Table 0-8 and Table 0-9 describe the control words (CWs) of the B7 series VFD.

Bit	Name	Value	Description
		1	Forward running
		2	Reverse running
0–7	Running state	3	Stopped
		4	Faulty
		5	POFF
0	Dura valta za antekileka el	1	Ready to run
8	Bus voltage established	0	Not ready to run
0.40		0	Motor 1
9–10	Motor group feedback	1	Motor 2
		1	Synchronous motor
11	Motor type feedback	0	Asynchronous motor
10		1	Overload pre-alarm generated
12	Overload pre-alarm feedback	0	No overload pre-alarm generated
		0	Keypad-based control
10 11	Dun/Ston mode	1	Terminal-based control
13 - 14	Run/Stop mode	2	Communication-based control
		3	Reserved
45		1	Heartbeat feedback
15	Heartbeat feedback	0	No heartbeat feedback

Table 0-8 B7 series VFD SWs expressed in decimal format

Table 0-9 B7 series VFD SWs expressed in binary format

Bit	Name	Description	Priority
0	Forward running	0: Disable 1: Enable	1
1	Reverse running	0: Disable 1: Enable	2
2	Stopped	0: Disable 1: Enable	3
3	Fault	0: Disable 1: Enable	4
4	POFF	0: Disable 1: Enable	5
5	Pre-excited	0: Disable 1: Enable	6
6–15	/	Reserved	

Actual value (ACT): The second to twelfth words in a PZD task packet are the main actual values. The

main actual frequency values are provided by the main actual value signal source. Table 0-10 lists the actual status values of the B7 series VFD.

Function code	Word	Value range	Default value
P16.43	Transmitted PZD2	0: Invalid	0
P16.44	Transmitted PZD3	1: Running frequency (×100, Hz) 2: Set frequency (×100, Hz)	0
P16.45	Transmitted PZD4	3: Bus voltage (×10, V)	0
P16.46	Transmitted PZD5	4: Output voltage (×1, V)	0
P16.47	Transmitted PZD6	5: Output current (×10, A) 6: Actual output torque (×10, %)	0
P16.48	Transmitted PZD7	7: Actual output power (×10, %)	0
P16.49	Transmitted PZD8	8: Rotating speed of the running (×1, RPM)	0
P16.50	Transmitted PZD9	9: Linear speed of the running (×1, m/s) 10: Ramp frequency reference	0
P16.51	Transmitted PZD10	11: Fault code	0
P16.52	Transmitted PZD11	12: Al1 value (×100, V) 13: Al2 value (×100, V)	0
P16.53	Transmitted PZD12	 14: Al3 value (×100, V) 15: HDIA frequency (×100, kHz) 16: Terminal input state 17: Terminal output state 18: PID reference (×100, %) 19: PID feedback (×100, %) 20: Rated torque of the motor 21: MSB of position reference (signed number) 22: LSB of position reference (unsigned number) 23: MSB of position feedback (signed number) 24: LSB of position feedback (unsigned number) 25: Status word 26: HDIB frequency value (×100, kHz) 	0

Table 0-10 Actual status values of Goodrive350 series VFD

PKW zone

PKW zone (parameter identification flag PKW1—numerical zone): The PKW zone describes the processing mode of the parameter identification interface. A PKW interface is not a physical interface but a mechanism that defines the transmission mode (such reading and writing a parameter value) of parameter between two communication ends.

Parameter identification (PKW)				Proces	ss data	
PKW1	PKW2	PKW3	PKW4		PZD2 PZD2	
Request No. Response No.	Parameter address	Parameter value error No.	Parameter value			

Figure 0-5 Parameter identification zone

In the periodic communication, the PKW zone consists of four 16-bit words. The following table describes the definition of each word.

First word PKW1 (16 bits)					
Bits 15–00	Bits 15–00 Task or response identification flag 0–7				
	Second word PKW2 (16 bits)				
Bits 15–00	Bits 15–00 Basic parameter address 0–247				
	Third word PKW3 (16 bits)				
Bits 15–00	Value (most significant word) of a parameter or error code of the returned value	00			
Fourth word PKW4 (16 bits)					
Bits 15–00Value (least significant word) of a parameter0–65535					

Note: If the master station requests the value of a parameter, the values in PKW3 and PKW4 of the packet that the master station transmits to the VFD are no longer valid.

Task request and response: When transmitting data to a slave, the master uses a request number, and the slave uses a response number to accept or reject the request.

	Request No. (from the master to a slave)	Response signal	
Request No.	Function	Acceptance	Rejection
0	No task	0	
1	Requesting the value of a parameter	1, 2	3
2	Modifying a parameter value (one word) [modifying the value only on RAM]	1	3 or 4
3	Modifying a parameter value (two words) [modifying the value only on RAM]	2	3 or 4
4	Modifying a parameter value (one word) [modifying the value on both RAM and EEPROM]	1	3 or 4
5	Modifying a parameter value (two words) [modifying the value on both RAM and EEPROM]	2	3 or 4

Table 0-11 Task identification flag PKW1

Note: The requests #2, #3, and #5 are not supported currently.

Table ()-12	Response	identification	flag	PKW1
	, iz	1 Coponisc	achancation	nug	1 1 1 1 1 1 1

Response No. (from a slave to the master)				
Response No.	Function			
0	No response			
1	Transmitting the value of a parameter (one word)			
2	Transmitting the value of a parameter (two words)			
3	The task cannot be executed and one of the following error number is returned: 1: Invalid command 2: Invalid data address 3: Invalid data value 4: Operation failure 5: Password error 6: Data frame error 7: Parameter read only 8: Parameter cannot be modified during VFD running 9: Password protection			

PKW examples

Example 1: Reading the value of a parameter

You can set PKW1 to 1 and PKW2 to 0A to read a frequency set through keypad (the address of the frequency set through keypad is 10), and the value is returned in PKW4. The following data is in hexadecimal format.

Request (master station -> VFD)

	PK	W1	PK	W2	PK	W3	PK	W4	C	W	ΡZ	D2	ΡZ	D3	 PZI	D12
Request	00	01	00	0A	00	00	00	00	xx	xx	xx	хх	xx	xx	 хх	xx
			<u> </u>		-			neter est fo		ess ding p	param	eter \	/alues	6		

Response (VFD -> master station)



Example 2: Modifying the value of a parameter (on both RAM and EEPROM)

You can set PKW1 to 4 and PKW2 to 0A to modify a frequency set through keypad (the address of the frequency set through keypad is 10), and the value to be modified (50.00) is in PKW4.

Request (master station -> VFD)



- 0004: Parameter value to be modified

Response (VFD-> master station)

	PK	W1	PK	W2	PK	W3	PK	W4	C	W	ΡZ	D2	ΡZ	D3	 PZI	D12
Response	00	01	00	0A	00	00	13	88	xx	хх	xx	xx	xx	xx	 хх	xx
	$\overline{}$	لے														

0001: Response (parameter value updated)

PZD examples: The transmission of the PZD zone is implemented through VFD function code settings. For the function codes, see the related UNITRONICS VFD operation manual.

Example 1: Reading the process data of a VFD

In this example, PZD3 is set to "8: Rotating speed of the running" through the VFD parameter P15.14. This operation sets the parameter forcibly. The setting remains until the parameter is set to another option.

Response (VFD -> master station)

	PK	W1	PK	W2	PK	W3	PK۱	N4	C١	N	PZI	D2		D3	 PZ	012
Response	хх	хх	ΧХ	ХХ	ХХ	ХХ	ХХ	ХХ	ХХ	ХХ	ХХ	ХХ	00	0A	 ХХ	XX

Example 2: Writing process data to a VFD device

In this example, PZD3 is set to "2: PID reference" through the VFD parameter P15.03. The parameter specified in each request frame is updated with the information contained in PZD3 until another parameter is specified.

Request (master station -> VFD)

	PK	W1	PK	W2	PK	W3	PK\	N4	C١	N	PZI	D2	PZ	D3	 PZI	
Response	XX	ХХ	хх	хх	ХХ	XX	ХХ	XX	ХХ	XX	ХХ	XX	00	00	 XX	XX

Subsequently, the information contained in PZD3 is used as tractive force reference in each request frame until another parameter is specified.

2.5 Example of PLC communication

This example shows how to use a Siemens S7-1200 series PLC to communicate with the PROFINET adapter module (through using the TIA Portal V13 PC software as the configuration tool).

2.5.1 Parameter configuration

Connect the PLC to the PC with a standard network cable, and set the computer IP (e.g. 192.168.0.100) in the PC network settings. Set the IP and name of the PLC.

1) Open the "TIA PORTAL V13" software, and click "Online & Diagnostics" --> "Accessible Devices" on the left. Select "PN/IE" in the drop-down list of "Type of the PG/PC interface", select the Ethernet port in

the "PG/PC Interface", and finally click "Refresh" to scan the connected PLC devices, as shown in the following figure.



2) If the connection between the PLC and PC is normal, after scanning is completed, the PLC device will appear in the device bar, as shown in the red box of the following figure. The device bar displays the device, device type and device MAC address. Then click the "Show" button in the lower right corner to enter the device settings.

Accessible devices				_	×
	Type Accessible nodes of the se	e of the PG/PC interfac PG/PC interfac		ntel PCI Ethernet Ad	apter (Gigabit) 💌 👻 🔇
			1	1	1
	Device	Device type	Туре	Address	MAC address
	PLC_1	CPU 1215C DC/D	PN/IE	192.168.0.23	AC-64-17-13-9F-DF
1 a					
Flash LED					
Online status informatior	n:				<u>R</u> efresh
Scan and informatio	n retrieval completed.				•
Display only problem	reports				~
					<u>Show</u> <u>C</u> ancel

3) Click "Online & Diagnostics" in the device tree, click "Assign IP Address" under the "Functions" on the right of the menu bar, and set the IP address and subnet mask of the PLC shown in the red box marked ③, to ensure that the IP address of the PC and the IP address of the PLC are in the same network segment, as shown in the following figure.

Project tree	Online access TwinCAT-Inte	el PCI Ethernet Adapter (Gigabit) 🔸 PLC_1 [192.168.0.23]	_ # # ×
Project tree Project tree Projec	Online access TwinCAT-Inte Diagnostics Functions Settime Firmware update Assign name Reset to factory settings	IPCI Ethernet Adapter (Gigabit) → PLC_1 [192.168.0.23] Assign IP address MAC address: RC -64 -17 -13 -9F -DF Accessible devices IP address: 192.168.0.23 Subnet mask: 225.255.0	_ # = X
Contract State Services Contract State Services Contract Services Contrecontract Services Contrecontract Services Contrecontract	2	Use router Router address: 0 0 0 0 0 0 Assign IP address	

4) Set the IP address of the PLC to "192.168.0.1" and subnet mask to "255.255.255.0" (you can check "Use router", that is, the router assigns IP). Click the "Assign IP address" button after the setting is completed, as shown in the following figure.

Diagnostics	Assign IP address
 Functions 	
Assign IP address	
Set time	
Firmware update	MAC address: AC - 64 - 17 - 13 - 9F - DF Accessible devices
Assign name	
Reset to factory settings	IP address: 192 . 168 . 0 . 1
	Subnet mask: 255 . 255 . 0
	Use router
	Router address: 0 . 0 . 0 . 0
	Assign IP address

5) Click "Assign Name", and mark the PLC name in the position shown in the red box marked ②, such as "PLC1215C". Click the "Assign Device Name" button, as shown in the following figure.

Diagnostics	COL	iligurea PROFINET ae	evice		-
✓ Functions		PROFINET device name:	PLC1215C		
Assign IP address		Type:	\$7-1200		
Set time					1
Firmware update					
Assign name					
Reset to factory settings					
	Dev	vice filter			
		Only show devices of	the same type		
		Only show devices wi	ith bad parameter se		
		Only show devices wi	ithout names		
•					
()	re Teilnehmer im Netzwerk:				
\$5	s MAC address	Туре	Name	Status	
					_
		D flashes	Update	Assign name	1
	<				

2.5.2 Create a new project

Double click the TIA PORTAL V13 icon to open the TIA PORTAL V13 project tool. Click the "Create new project" button to create a new project, add project name, project storage path, author, comment and other related information, and click the "Create" button to create a new project, as shown in the following figure.

					PORTAL
Start			Create new	project	
	ئۇر	Open existing project			D:Protal V13IV15_workspace
		🥚 Create new project			Administrator
		Migrate project		Comment:	
		Close project			×
					Create
		Welcome Tour			
Online & Diagnostics	1	First steps			
		Installed software			
		Help			
		011001			
		🚱 User interface language			
		01100			

After creating a new project, double click "Open the project view", as shown in the following figure.

VA Si	iemens - Project1							_ # X
								Totally Integrated Automation PORTAL
s	itart			First steps				
	Devices & networks	*	Open existing project	Project: "Projec	:t1" was opened succ	essfully. I	Please select the next step:	
		♦	 Create new project Migrate project 	Start				
	Motion & technology		Close project					
			Welcome Tour			Q.Q.	Configure a device	
	Online & Diagnostics	1	First steps			Ŷ	Write PLC program	
					Motion & technology	100	Configure technology objects	
			Installed software Help	⊢		Ø	Configure an HMI screen	
			🚱 User interface language		Project view		Open the project view]
	Project view		Opened project: D:)Protal V13/V15		410-1-14			

2.5.3 Add GSD files

In the project view, click "Options" on the toolbar, select the "Manage general station description files (GSD)" option from the drop-down list, and a box pops up, as shown in the following figure. Enter the file directory where the UNITRONICS GSD file is located in the source path, select the GSD file, and click the "Install" button to start the installation.

Install genera	l station description file				×
Source path:	C:\Users\Administrator\Desktop				
Content of i	mported path				
File		Version	Language	Status	
GSDML-	Jame	11/10/2017	English	Not yet installed	
<		III			>
				Install Can	cel

After the installation was completely successful, a prompt pops up, indicating that the GSDML file has been installed successfully, as shown in the following figure.

Instal	l general station description file	×
Inst	allation result	
	Message Installation was completed successfully.	
	······································	
		_

2.5.4 Configure the basic information of the project1) Enter the "Devices & networks" view interface.

In the project view, select and double click "Devices & networks" in the project tree on the left to enter the "Network overview" view interface, as shown in the following figure.

W3 :	Siemens - Project1		_ # X
Pro	ject Edit View Insert Online Optio	s Tools Window Help	otally Integrated Automation
2	🎦 🖫 Save project 🚇 🐰 🗉 🖹 🗙	히 ± (주 호 패 집 묘 묘 묘 정 Go online & Go offline 🛔 명 표 🗶 🖃 🛛	PORTAL
		✓ Project1 > Devices & networks	🕻 Hardware catalog 🛛 🗊 🕨 🕨
	Devices	🚰 Topology view 🔒 Network view 📑 Device view	Options
	1 O O	👔 💦 Network 🔢 Connections HM connection 💌 🐫 🗒 🖞 100% 💌 🔤 🚺 Network overvit 4	Options Land ↓ Catalog ↓ Catalog ↓ Catalog ↓ Controllers
ž		Device	✓ Catalog
2	 Project1 		Search> Nu MT
Ĕ.	Add new device	=	Filter at
100	networks & networks		Controllers
ų,	Common data		HM
å	Courrentation settings	-	
	▶ 🐻 Languages & resources		C systems Drives & starters Drives & starters Metwork components Detecting & Monitoring Distributed NO Distributed NO Distributed NO
	Display/hide interfaces		Network components
	USB [S7USB]		Detecting & Monitoring
	DISE [57038] D		Distributed I/O
	TwinCAT-Intel PCI Ethernet Adapt		Field devices
	Pupdate accessible devices		Other field devices
		×	
1	< III >		Other field devices
	✓ Details view		le la
	Name		
			i i i i i i i i i i i i i i i i i i i
			Libraries
			S.
			4
		🖳 Properties 🚺 🗓 Diagnostics 📑 🖛	> Information
	Portal view Overview	Devices & ne	oject1 created.

2) Add Project device and PROFINET network.

(1) Add PLC S7-1215C to the "Devices & networks" view.

In the "Hardware catalog" on the right sidebar, select "Controller" \rightarrow "SIMATIC S7-1200" \rightarrow "CPU" \rightarrow "CPU 1215C AC/DC/Rly" \rightarrow "6ES7 215-1BG40-0XB0", and double click the "6ES7 215-1BG40-0XB0" icon or drag it to the project, as shown in the following figure.

1	Project1 > Devices & networks			_ = = ×	Hardware catalog		
	5	Topology view	Network view	Device view	Options		
ł	💦 Network 🔛 Connections HMI connection 💌 🐫	¦≣ @(±'		Network overvie 4			Hardware catalog
l			~	Y Device	✓ Catalog		d a
				 S7-1200 station 	«Search»	t igit	
	PLC_1		=	▶ PLC_1	Filter		' 2
l	CPU 1215C				Controllers		
					✓ Im SIMATIC \$7-1200	r.	1
					✓ ☐ CPU		
l					CPU 1211C AC/DC/Rly		Online tools
					CPU 1211C DC/DC/DC		Ĩ.
					CPU 1211C DC/DC/Rly		ne
					CPU 1212C AC/DC/Rly		too
					CPU 1212C DC/DC/DC		s
			<u></u>		CPU 1212C DC/DC/Rly	=	
1			1		CPU 1214C AC/DC/Rly		
					CPU 1214C DC/DC/DC	_	📑 Tasks
					CPU 1214C DC/DC/Rly	_	ks
					CPU 1215C AC/DC/Rly		
					- CPU 1215C DC/DC/DC	_	
1					6ES7 215-1AG31-0XB0		F
					6ES7 215-1AG40-0XB0		Libraries
					 L CPU 1215C DC/DC/Rly CPU 1217C DC/DC/DC 		es
					Unspecified CPU 1200		
					Communications modules		
					► SIMATIC \$7-1500		
					SIMATIC \$7-300		
			× -		SIMATIC \$7-400		
	< III		> 🗉	<	SIMATIC ET 200 CPU	~	
		Q Properties	🗓 Info 🥫 🗓 Diag	nostics	> Information		

(2) Add the UNITRONICS communication card to the "Devices & networks" view.

In the "Hardware Catalog", click "Other field devices" \rightarrow "Profinet IO" \rightarrow "I/O" \rightarrow "UNITRONICS" \rightarrow "UNITRONICS Profinet Adapter" \rightarrow "UNITRONICS Profinet Adapter V1.0", and double click the "UNITRONICS Profinet Adapter V1.0" icon or drag it to the view of "Devices & networks". The communication card is displayed as "Not assigned", as shown in the following figure.

Click the "Not assigned" option of "UNITRONICS Profinet Adapter V1.0" and select the IO controller "PLC_1. PROFINET IO-System", then CPU and UNITRONICS Profinet in the network view are connected to the same Profinet subnet, as shown in the following figure.



(3) Add the UNITRONICS I/O sub-module to the project.

Double click the "UNITRONICS Profinet Adapter V1.0" icon in the "Devices & Networks" view to enter the "Device view" interface, as shown in the following figure.



Click the "Hardware Catalog" on the right \rightarrow "Module", double click the "32 Byte IN/OUT" module or drag it to the blank space in the "Device view", and the "32 Byte IN/OUT" module is added to the project, as shown in the following figure.

ect Edit View Insert Onl 🎦 🔚 Save project 🔜 💥 🕃			🖳 📮 💋 Go online 💋 Go offli	ine 🔥 🖪 🛛	:*==			Totally Integrated A	utomation PORTA
roject tree	04		DC/DC/DC] > Distributed I/O			TPS-1 _	₽∎×	Hardware catalog	P 10)
Devices				F Topology	view 👗 Network view	Device	view	Options	
900	a	de 195-1	💌 🖽 🛋 @ ± '	i 🖬 🔲	Device overview				
				_	W Module	Rack	Slot	✓ Catalog	
Project1	^				 TPS-1 	0	0	<search></search>	ini ini
Add new device					✓ PNHO	0	0 X1	Filter	
📩 Devices & networks		4		=	Port 1 - RJ45	0	0 X1	Head module	
PLC_1 [CPU 1215C DC/DC	DC]	Sec. 1	V		Port 2 - RI45	0	0.81	Module	
🕨 🙀 Common data	-				32 Byte INIOUT 1	0	1	Module Module Module	
Documentation settings			_						
Languages & resources		i i i						2 Byte IN/OUT	
Gonline access								4 Byte IN/OUT	
Y Display/hide interfaces			DP-NORM					8 Byte IN/OUT	
USB [S7USB]	100							12 Byte IN/OUT	
PLCSIM V5.x [PNIE]	88							16 Byte IN/OUT	
TwinCAT-Intel PCI Ethernet	Adapt 🐻			1				24 Byte IN/OUT	
A? Update accessible dev		_						32 Byte IN/OUT	
	>			-					
Details view									
Name									
				~					
		< III		> 🔁	< III		>		
				Reper	ties 🛛 🗓 Info 🔋 🗓 Diag	mostics		> Information	

(4) Simple configuration of S7-1215C and UNITRONICS Profinet parameters.

<1> Configure parameters of PLC S7-1215C.

Double click the "Devices & Networks" option to enter the view interface of "Devices & Networks".

Double click the "PLC S7-1215C" icon in the interface to enter the "Device view" interface of the PLC. Double click the network interface position in the PLC icon to enter the properties editing interface bar of

"PROFINET interface_1".

Click the "Ethernet addresses" option in the "General" list to set the PLC address and name (In this example, IP address of the PLC is 192.168.0.1 and PLC name is PLC1215C).

Operations are shown in the following figure.



<2> Configure parameters of the UNITRONICS Profinet communication card.

Double click the "Devices & Networks" option to enter the view interface of "Devices & Networks".

Double click the "UNITRONICS Profinet Adapter V1.0" icon in the interface to enter the "Device view" interface of the communication card.

Double click the network interface position in the UNITRONICS Profinet communication card icon to enter the properties editing interface bar of PROFINET interface.

Click the "PROFINET interface [X1]" option in the "General" list, and click the "Ethernet addresses" option. Configure parameters of the UNITRONICS PROFINET communication card according to the parameters shown in the following figure such as IP address and device name of the communication card (in this example, IP address of the communication card is 192.168.0.2 and the name is unitronics1).

Operations are shown in the following figure.

🎦 🔜 Save project 🏭 🐰 🔃 🕞 1 roject tree					PROFINET IO-System (100): PN/IE	_1 → TPS-1#		Hardw 🗗 🗉 🕽
Devices					Topology view	A Network view Y Device vie	w	Options
900	2	de TPS-1	• • 6	🗎 🍳 🛓 100%	• 4	Device overview		E
					^	W Module	Rac	✓ Catalog
Project1	^				=	▼ TPS-1	0	Search> NI N
Add new device	- 5			DP-NORM		► PN-IO	0	Filter
Devices & networks PLC_1 [CPU 1215C DC/DC/DC]			25			32 Byte IN/OUT_1	0	• 📑 Head module
Common data	- 4							- Module
Documentation settings					×			
🕨 🐻 Languages & resources		<			> 🛃	C 11	>	2 Byt 4 Byt
De Online access		TPS-1 [Module]			Q Properties	Diagnostics	-	4 Byt 8 Byt
Display/hide interfaces USB [S7USB]	_	General IO tags Sy	stem constan	ts Texts				12 Byt.
OSB (\$705B) PLCSIM V5.x [PN/IE]	24	General			 Set IP address in the project 		^	16 Byt.
TwinCAT-Intel PCI Ethernet Adapt	1000	PROFINET interface [X1]			IP address: 192 . 168 . 0	.2		📕 24 Byt
A Update accessible devices	×	General			Subnet mask: 255 . 255 . 2	55 0		32 Byt.
	>	Ethernet addresses Advanced options		de la companya de la	Use router			
Details view	_	Hardware identifier			Router address: 0 .0 .0			
		Identification & Maintenance			IP address is set directly at the devi			
Name	-	Module parameters	5		O a state of a state of a		14	
		Hardware identifier	PROFINE	т				
		Shared Device						
					Generate PROFINET device name aut	tomatically		
				ROFINET device name	unitronics1		18	
				Converted name:	unitronics1		17	
				Device number:	1			
								< = :

2.5.5 Assign the device name of the IO device (UNITRONICS communication card)

After the CPU and UNITRONICS Profinet communication card are successfully connected to the PC through the network cable, click "Online access" on the left to find the network card corresponding to the PC that is connected to the PLC and communication card.

In all displayed devices, find the UNITRONICS communication card device and click it, such as emc (192.168.0.2) device, as shown in the following figure (**Note:** When the communication card is used for the first time, there is no device name, and only the default IP can be scanned).

Double click "Online & Diagnostics" to enter the online diagnostics state.

Click "Functions" \rightarrow "Assign name" to enter the "Assign name" interface.

Enter the communication card name in "PROFINET device name", and click "Assign Name" in the lower right corner to confirm.

Note: The name of the PROFINET communication card set online must be consistent with that set in the configuration project, otherwise PROFINET communication cannot be carried out between the devices.

The operation steps are shown in the following figure.



2.5.6 Save, compile, and download

Download the project configuration information to the PLC S7-1215C after the entire project configuration is completed.

Click "Save Project" to save the entire project.

Right click "PLC_1 [CPU 1215C AC/DC/Rly]" \rightarrow left click "Compile" \rightarrow "Hardware and software (change only)" to compile the entire project.

Click the "Download to device" icon to download the project configuration to the PLC controller.

Operations are shown in the following figure.

M Siemens - Project1												
Project E <mark>dit View Insert O</mark> nline C	ptions To	ools Window	Help									Totally Integ
📑 🎦 🔚 Save project 进 🐰 💷 🗊	×⊳≞	CH 🖬 🖥		🚿 Go online 🔏 (Go offline 🛛 🛔 🖪	E × 🖃	1					
Project		Project1 →	Devices & netv	vorks								_ # = >
Devices						[🚰 Topology	view	🔥 Ne	twork vi	ew 🛐	Device view
1900	1	Network	Connections	HM connection		± 100%					Netwo	ork overvie 🕢
2						I IO syste	m: PLC_1.PROFI	NETIC)-System (100) ^		
- Project1	^					+ 10 3/310			, system (1 D	 S7-1200 station
Add new device												 S7-1200 station PLC_1
Devices & networks		PLC_1	-	TPS-1								GSD device 1
PLC_1 [CPU 1215C DC/DC/DC]		CPU 1215C		UNITRONICS	DP-NORM							TPS-1
2 Device configuration	-		_	PLC_1								·
Online & diagnostics											÷	
Program blocks			PLC 1	PROFINET IO-Syste						- 1	-	
Technology objects			POC.	PROFINET IO-Syste						_	•	
External source files										_		
PLC tags										_		
E PLC data types										_		
Watch and force tables		1										
Traces		1										
Program info		1								~		
Device proxy data		<								> 🗉	< =	
Text lists							Report	ios	🚺 Info		Diagnostic	
Local modules		-	Y	1			- riopen	ies.	1.54 1110		Diagnostic	,
Distributed I/O		General	Cross-refere	compile	,							
Common data		Compiling co	mpleted (errors: 0); warnings: 1)								
Documentation settings	~	I Path		Description				Go to	?	Errors	Warnings	Time
✓ Details view		11	 PLC_1 					~		0	1	10:02:30 AM
		1	 PROFIN 					~		0	1	10:02:30 AM
		4		The device r	eplacement without e	exchangeable r	nedium functio.	~	?	0	1	10:02:30 AM
Name			gram blocks					~		0	0	10:02:30 AM
		0			s compiled. All blocks					0	0	10:02:30 AM
		<u>.</u>		Compiling c	ompleted (errors: 0; w	varnings: 1)				0	1	10:02:30 AM
		<										>

In the download dialog box, search for the connected PLC device, as shown in the following figure. Select the "PN/ IE_1" option in the drop-down list of "Connection to interface/subnet". Click the "Start search" button in the lower right corner to start scanning and detecting PLC devices in the subnet.

	Device	Device type	Slot	Туре	Address	Subnet
	PLC_1	CPU 1215C DC/D	1 X1	PN/IE	192.168.0.1	PN/IE_1
		Type of the PG/PC inte PG/PC inte Connection to interface/su Iscoger	ubnet:	PN/IE WITWINCAT PN/IE_1	-Intel PCI Ethernet Ad	apter (Gigabit)
	Compatible dev	ices in target subnet:			Sł	now all compatible dev
	Device	Device type	Туре		Address	Target device
	-	-	PN/IE		Access address	-
Flash LED						
						<u>S</u> tart se
	on:					<u>S</u> tart se
Flash LED	on:					<u>S</u> tart se
Flash LED	on:					<u>S</u> tart se

After searching is completed, the PLC S7-1215C that is connected to the PC will be displayed in the list of "Compatible devices in target subnet", as shown in the following figure.

Select the PLC to be	downloaded in t	he following figu	ire, and	click the	"Download"	button t	o download
the configuration infor	mation and PLC	program to the s	elected	PLC.			

Extended download to	device							×
	Configured access nod	les of "PLC_1"						
-	Device	Device type	Slot	Туре	Address		Subnet	
	PLC_1		1 X1	PN/IE	192.168.0.1		PN/IE_1	
		Type of the PG/PC inte	rface:	PN/IE			-	
		PG/PC inte			tel PCI Ethernet Ada	oter (Gigab		و ج
	Conn	ection to interface/su	bnet:	PN/IE_1				•
		1st gat	eway:					•
	Compatible devices in	target subnet:			🛃 Sho	w all comp	patible dev	vices
	Device	Device type	Туре		ddress	Target de	wice	_
	PLC_1	CPU 1215C DC/D			192.168.0.1	PLC_1		
P			PN/IE	· · · · · · · · · · · · · · · · · · ·	lecess address			
00								
Flash LED								
							-	
							<u>S</u> tart se	arch
Online status information								
Scan and information	n retrieval completed.							^
								~
Display only problem	reports							
						oad	Cano	ei

2.5.7 VFD parameter watching

Click "Watch and force tables" in the left menu bar, and double click "Add new watch table" in the dropdown menu, as shown in the following figure.

	1									_ # #×	Hardware catalog	
Devices						🛃 Topology view	w 🔒 Netv	work view	Dev	ice view	Options	
300	2	Network	Connections	HMI connection		68 . 3	Network ov	verview		< >		0
			9	IO system: PLC_1	PROFINETIC	D-System (100)	V Device			Туре	✓ Catalog	
Project1	^					=		1200 station	41	\$7-1200 sta	Search>	itig it
Add new device								PLC_1		CPU 1215C	Filter	(200) (2
📥 Devices & networks		PLC_1 CPU 1215C	The second se	TPS-1 UNITRONICS		-		device_1		GSD device		
- PLC_1 [CPU 1215C DC/DC/DC]		CP0 1215C			CP	-NORM		TPS-1			Controllers	
Device configuration	1			PLC_1							▶ 🛅 HM	
😵 Online & diagnostics		-									PC systems Drives & starters	
Program blocks	H		PLC 1	PROFINET IO-Syste		1					Network component	
Technology objects						-					Detecting & Monitori	
External source files											Distributed I/O	ng
PLC tags											Field devices	
PLC data types											Other field devices	
▼ Watch and force tables	-										PROFINET IO	
Add new watch table											Drives	
Force table						~			10		Encoders	
Traces		< =				> 🔁	<			>	Gateway	
Program into Bevice proxy data						Properties	1 Info	& Diag	nostics		- 10	
Text lists		General	Cross-refer	ences Comp	ile			1.000.000.000			- UNITRONICS	
Local modules		General	Clossielen	ences comp	ie.						- UNITRONICS Profinet.	
Distributed I/O											UNITRONICS Profin	et Adapter V1.
- P4	~	I Message								Go to ?	Ident Systems	
Details view		• PL				because it is up-to-da				^	Sensors	
		0		s not been loaded, b			te.				PROFIBUS DP	
Name		8	Hardware config		ecouse it is u	ip-to-oate.						
						tel PCI Ethernet Adapte	(Cinchis) Equ	nd 7 davisa/s) on the			
		U Scen				terro Eulemet Adapte	a (digabit). Fou	nu z uevice(s) on the	12		
		Loadi	on completed (as	rrors: 0; warnings: 0)								

Create target watch variables—PZD, PKW, control word and status word variables of the VFD in the newly created watch table, as shown in the following figure.

	🛛 🔍 Proje	:t1 → PLC_1 [CPU	1215C DC/DC/DC] → Wa	atch and force table	s 🕨 Watch table	e_1	_ • •	X Testing	
Devices								Options	
900	🔿 🌶	🖉 🕪 🗠 🔊, %							
	la	ne Addi	ess Display forma	at Monitor value	Modify value	9	Comment	✓ CPU operator panel	
Project1	A 1	%QV	/2 Hex				PKW1 (PLC send)		
Add new device	2	%QV	V4 Hex				PKW2(PLC send)	No online connection	
h Devices & networks	3	%QV	V6 Hex				PKW3(PLC send)		
PLC_1 [CPU 1215C DC/DC/DC]	4	%QV	/8 Hex				PKW4(PLC send)		
Device configuration	5	%QV	/10 Hex				CW		
🗓 Online & diagnostics	6	%QV	/12 Hex				PZD2(PLC send)		
🕨 🔙 Program blocks	≡ 7	%QV	/14 Hex				PZD3(PLC send)		
🕨 🙀 Technology objects	8	%QV	/16 Hex				PZD4(PLC send)		
External source files	9	%QV	/18 Hex				PZD5(PLC send)		
🕨 🔁 PLC tags	10	%QV					PZD6(PLC send)		
PLC data types	11	%QV					PZD7(PLC send)		
 Watch and force tables 	- 12	%QV	V24 Hex				PZD8(PLC send)		
Add new watch table	13	%QV	V26 Hex				PZD9(PLC send)		
Force table	14	%QV					PZD10(PLC send)		
Watch table_1	15	%QV					PZD11(PLC send)		
Traces	16	%QV	/32 Hex				PZD12(PLC send)		
📴 Program info	17								
Device proxy data	18								
Text lists	19								
Local modules	✓ 20	<ado< td=""><td>new></td><td></td><td></td><td></td><td></td><td></td><td></td></ado<>	new>						
Details view	<							>	
						[7] a			
Name				🔍 Prop	erties 🚺 🚺 Inf	• <u>8</u> 0	liagnostics		
	Ge	neral Cross-re	ferences Compile						

		Project1 > PLC_1						. 🖬 🖬 🗙	Testing 📑 🛙
Devices									Options
00	1	🥩 🔮 🚺 🗛 :	1 16 27 99 99						
		Address	Display format	Monitor value	Modify value	9	Comment		✓ CPU operator panel
Project1	× ^	%IW2	Hex	16#0000			PKW1 (PLC receive)		
Add new device		2 %IW4	Hex	16#0000			PKW2(PLC receive)		PLC_1 [CPU 1215C DC/DC/DC]
h Devices & networks		\$ %IW6	Hex	16#0000			PKWB(PLC receive)		RUN / STOP RUN
PLC_1 [CPU 1215C DC/DC/DC]	~	4 %IW8	Hex	16#0000			PKW4(PLC receive)		ERROR STOP
Device configuration		\$ %IW10	Hex	16#0004			SW		
Q Online & diagnostics		6 %IW12	Hex	16#0000			PZD2(PLC receive)		MAINT MRES
Program blocks	• =	%IW14	Hex	16#0000			PZD3(PLC receive)		
Technology objects		8 %IW16	Hex	16#0000			PZD4(PLC receive)		
External source files		9 %IW18	Hex	16#0000			PZD5(PLC receive)		
PLC tags	•	0 %IW20	Hex	16#0000			PZD6(PLC receive)		
PLC data types		1 %IW22	Hex	16#0000			PZD7(PLC receive)		
▼ → Watch and force tables		2 %IW24	Hex	16#0000			PZD8(PLC receive)		
Add new watch table		3 %IW26	Hex	16#0000			PZD9(PLC receive)		
Force table		4 %IW28	Hex	16#0000			PZD10(PLC receive)		
Watch table_1		5 %IW30	Hex	16#0000			PZD11(PLC receive)		
Watch table_2		6 %IW32	Hex	16#0000			PZD12(PLC receive)		
Traces		7							
Program info		18 <add new<="" td=""><td>></td><td></td><td></td><td></td><td></td><td></td><td></td></add>	>						
Device proxy data									
Text lists	×								
	_ ~								
Details view		<						>	
					Q Properties	1 Info	1 Diagnostics		
Name					roperties	1 1 I I I I	U Diagnostics		

After the watch variables are created, click the "Watch all" button in the watch table to monitor the values of all variables, and click the "Modify parameters" button in the watch table to modify the parameters of the target variable, so as to watch the VFD through the PLC.