

Profinet Communication Expansion card model and specifications

1.1 Expansion card model

Item	Model	Description
1	EN-PN01	Profinet expansion card for ESQ-500 & ESQ-600

1.2 Expansion card Outline and terminal definition description

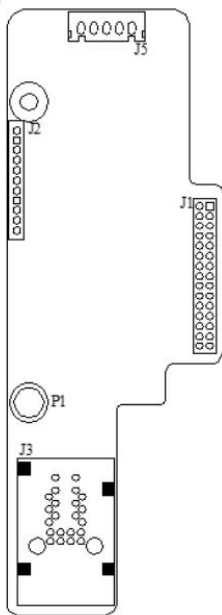


Figure a: EN-PN01 Figure 1-1Outline

(1) EN-PN01 terminal definition description

Terminal number	Name	Description	Note
J1	expansion card interface	connection port of expansion card and main control board	
J2	Debug port 1	For factory debugging	
J3	Communication network port	Profinet Communication network port	
J5	Debug port 2	For factory debugging	

1.3 Communication format

Type of data	Data length	Support function
Standard telegram 1	PZD-2/2	Inverter command, frequency setting, inverter status, operating frequency
Standard telegram 2	PZD-4/4	Inverter command, frequency setting, 2 periodic writes, Inverter status, operating frequency, 2 periodic reads
Standard telegram 3	PZD-6/6	Inverter command, frequency setting, 4 periodic writes, inverter status, operating frequency, 4 periodic reads
Standard telegram 4	PZD-8/8	Inverter command, frequency setting, 6 periodic writes, inverter status, operating frequency, 6 periodic reads
Standard telegram 5	PZD-10/10	Inverter command, frequency setting, 8 periodic writes, inverter status, operating frequency, 8 periodic reads
Standard telegram 6	PZD-12/12	Inverter command, frequency setting, 10 periodic writes, inverter status, operating frequency, 10 periodic reads
Supplementary telegram	PZD-2/6	Inverter command, frequency setting, inverter status, operating frequency, 4 periodic reads

2 Expansion card installation instructions

(1) Installation of the expansion card of the inverter in the power range of 15KW and below

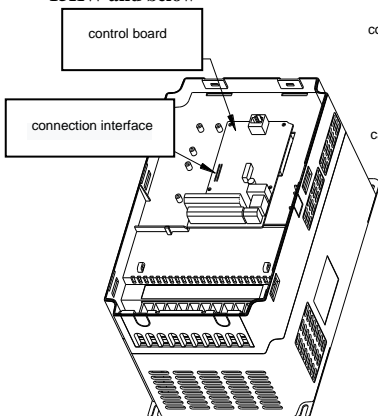


Figure a

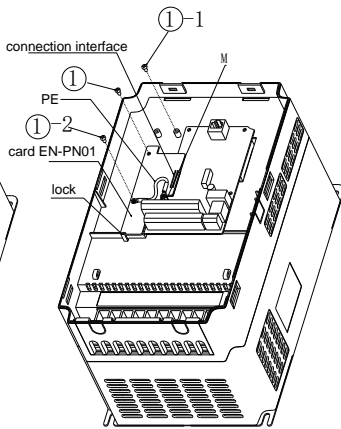


Figure b

Installation steps:

Step 1: First disassemble the keyboard and lower cover, and then disassemble the upper cover. After disassembly, as shown in Figure a;

Step 2: Insert the board-level docking socket (bit number J1) on the expansion card into the expansion card interface (bit number: CN2) on the inverter control board, and fix it with PB3*6 tapping screws, as shown in Figure b As shown in "①";

Step 3: Remove the M3 screw that fixes the main control board at the "M" shown in Figure e, and then install the M3*13 stud at this position.

Step 4: Place the ground connection line at the "ground connection line" shown in Figure b, and fix one end of the ground connection line with a PB3*6 tapping screw as shown in Figure b "①-2", and the other end with M3 The screws are fixed on the M3*13 studs. At this time, pay attention to the direction of the terminals.

Step 5: After installing the top cover, the customer can connect. After all the wiring is completed, install the lower cover and keyboard to power on and use.

(2) Installation of the expansion card of the inverter for the power range bigger than 18.5KW

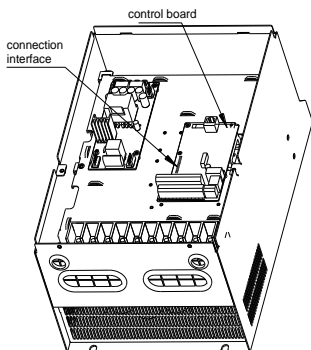


Figure c

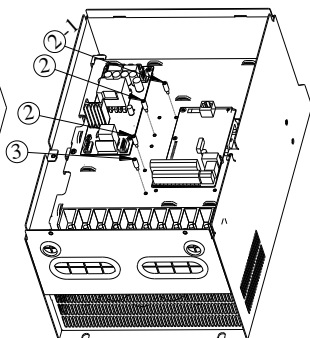


Figure d

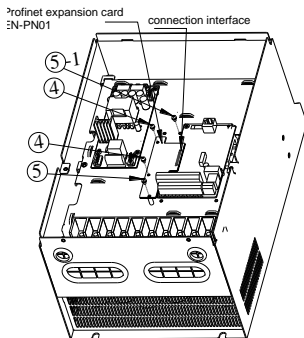


Figure e

Installation steps:

Step 1: First disassemble the keyboard, keyboard cable, and lower cover, and then disassemble the upper cover. After disassembly, as shown in Figure c;





Step 2: Install M3*13 iron studs according to the positions indicated by "②" on Figure d, and install M3*13 plastic studs at the positions of "③";

Step 3: Insert the board-level docking socket (bit number or J1) on the expansion card into the expansion card interface (bit number: CN2) on the inverter control board, as shown in Figure e;

Step 4: Fix it with M3*6 combination screws according to the positions indicated by "④" on Figure d.

Step 5: After inserting the keyboard cable and installing the top cover, the customer can connect. After all the wiring is completed, install the lower cover and keyboard to power on and use.

Screw Installation instructions

No.	Name	Spec	Quantity	Picture
① ①-1 ①-2	Self-tapping screws	PB3*6	3PCS	
② ②-1	Iron stud	M3*13	3PCS	
③	Plastic stud	M3*13	1PCS	
④	Combination screw	M3*6	2PCS	



Note

When installing the expansion card, please make sure that the pins of the expansion card are completely aligned with the interface on the control board before you can press it down with force.

3 Inverter parameter address list

3.1 EN-PN01 Inverter parameter address list

Parameter number	Decimal address	Hexadecimal address	Parameter number	Decimal address	Hexadecimal address
F00.00	0	0x0000	F00.10	10	0x000A
...
F00.09	9	0x0009	F00.15	15	0x000F
F00.16	16	0x0010	F00.26	26	0x001A
...	...	...	F00.27	27	0x001B
F00.25	25	0x0019			
F01.00	256	0x0100	F01.10	266	0x010A
...
F01.09	265	0x0109	F01.15	271	0x011F
F01.16	272	0x0120	F01.26	282	0x012A
...
F01.25	281	0x0129	F01.29	285	0x012D
F02.00	512	0x200	F02.10	522	0x20A
...
F02.09	521	0x209	F02.15	527	0x20F
F02.16	528	0x210	F03.00	768	0x300
...
F02.25	537	0x219	F03.09	777	0x309
F02.26	538	0x21A			
F03.10	778	0x30A	F04.00	1024	0x400
...
F03.13	781	0x30D	F04.09	1033	0x409
F04.10	1034	0x40A	F04.16	1040	0x410
...
F04.15	1039	0x40F	F04.25	1049	0x419
F04.26	1050	0x41A	F04.32	1056	0x420
...
F04.31	1055	0x41F	F04.41	1065	0x429
F04.42	1066	0x42A	F05.00	1280	0x500
F04.43	1067	042B	...	...	...
			F05.09	1289	0x509
F05.10	1290	0x50A	F05.16	1296	0x510

...
F05.15	1295	0x50F	F05.25	1305	0x519
F05.26	1306	0x51A	F05.32	1312	0x520
...
F05.31	1311	0x51F	F05.39	1319	0x527
F06.00	1536	0x600	F06.10	1546	0x60A
...
F06.09	1545	0x609	F06.15	1551	0x60F
F06.16	1552	0x610	F07.00	1792	0x700
...
F06.21	1557	0x615	F07.09	1801	0x709
F07.10	1802	0x70A	F07.16	1808	0x710
...	...	...	F07.17	1809	0x711
F07.15	1807	0x70F			
F08.00	2048	0x800	F08.10	2058	0x80A
...
F08.09	2057	0x809	F08.15	2063	0x80F
F08.16	2064	0x810	F08.26	2074	0x81A
...
F08.25	2073	0x819	F08.31	2079	0x81F
F09.00	2304	0x900	F09.10	2314	0x90A
...
F09.09	2313	0x909	F09.15	2319	0x90F
F09.16	2320	0x910	F09.26	2330	0x91A
...
F09.25	2329	0x919	F09.31	2335	0x91F
F09.32	2336	0x920	F09.42	2346	0x92A
...
F09.41	2345	0x929	F09.47	2351	0x92F
F09.48	2352	0x930	F10.00	2560	0x0A00
...
F09.50	2354	0x932	F10.09	2569	0x0A09
F10.10	2570	0x0A0A	F10.16	2576	0x0A10
...
F10.15	2575	0x0A0F	F10.25	2585	0x0A19
F10.26	2586	0x0A1A	F10.32	2592	0x0A20
...
F10.31	2591	0x0A1F	F10.41	2601	0x0A29

F10.42	2602	0x0A2A	F11.00	2816	0x0B00
...
F10.45	2605	0x0A2D	F11.09	2825	0x0B09
F11.10	2826	0x0B0A	F11.16	2832	0x0B10
...
F11.15	2831	0x0B0F	F11.25	2841	0x0B19
F11.26	2842	0x0B1A	F12.00	3072	0x0C00
...
F11.29	2845	0x0B1D	F12.09	3081	0x0C09
F12.10	3082	0x0C0A	F13.00	3328	0x0D00
...
F12.14	3086	0x0C0E	F13.09	3337	0x0D09
F13.10	3338	0x0D0A	F14.00	5120	0x0E00
...
F13.14	3342	0x0D0E	F14.09	3585	0x0E09
F14.10	3586	0x0E0A	F14.16	3592	0x0E10
...
F14.15	3591	0x0E0F	F14.25	3601	0x0E19
F14.26	3602	0x0E1A	F15.00	3840	0x0F00
...
F14.30	3606	0x0E1E	F15.09	3849	0x0F09
F15.10	3850	0x0F0A	F15.16	3856	0x0F10
...
F15.15	3855	0x0F0F	F15.22	3862	0x0F16
F16.00	4096	0x1000	F16.10	4106	0x100A
...
F16.09	4105	0x1009	F16.13	4109	0x100D
F17.00	4352	0x1100	F17.10	4362	0x110A
...
F17.09	4361	0x1109	F17.15	4367	0x110F
F17.16	4368	0x1110	F18.00	4608	0x1200
...
F17.20	4372	0x1114	F18.09	4617	0x1209
F18.10	4618	0x120A	F18.16	4624	0x1210
...
F18.15	4623	0x120F	F18.24	4632	0x1218
F19.00	4864	0x1300	F19.10	4874	0x130A
...

F19.09	4873	0x1309	F19.15	4879	0x130F
F19.16	4880	0x1310	F19.26	4890	0x131A
...
F19.25	4889	0x1319	F19.31	4895	0x131F
F19.32	4896	0x1320	F19.42	4906	0x132A
...
F19.41	4905	0x1329	F19.44	4908	0x132C
F20.00	5120	0x1400	F20.10	5130	0x140A
...
F20.09	5129	0x1409	F20.15	5135	0x140F
F20.16	5136	0x1410	F21.00	5376	0x1500
...
F20.22	5142	0x1416	F21.09	5385	0x1509
F21.10	5386	0x150A	F21.16	5392	0x1510
...
F21.15	5391	0x150F	F21.21	5397	0x1515
F22.00	5632	0x1600	F22.10	5642	0x160A
...
F22.09	5641	0x1609	F22.15	5647	0x160F
F22.16	5648	0x1610	F23.00	5888	0x1700
F22.17	5649	0x1611	...	...	...
			F23.09	5897	0x1709
F23.10	5898	0x170A	F23.16	5904	0x1710
...	...	...	F23.17	5905	0x1711
F23.15	5903	0x170F			
F24.00	6144	0x1800	F24.10	6154	0x180A
...
F24.09	6153	0x1809	F24.12	6156	0x180C
F25.00	6400	0x1900	F25.10	6410	0x190A
...
F25.09	6409	0x1909	F25.15	6415	0x190F
F25.16	6416	0x1910	F25.26	6426	0x191A
...
F25.25	6425	0x1919	F25.29	6429	0x191D
F26.00	6656	0x1A00	F26.10	6666	0x1A0A
...
F26.09	6665	0x1A09	F26.15	6671	0x1A0F
F26.16	6672	0x1A10	F26.17	6673	0x1A11

Operation command word	12288	0x3000			
Serial port value setting	12289	0x3001	Inverter status	12290	0x3002
Alarm code	12291	0x3003	C-00	12292	0x3004
C-01	12293	0x3005	C-02	12294	0x3006
C-03	12295	0x3007	C-04	12296	0x3008
C-05	12297	0x3009	PID communication set value	12298	0x300A
Torque communication setting value	12299	0x300B	Communication on AO1 set value	12300	0x300C
Communication on AO2 set value	12301	0x300D	Communication on EAO1 set value	12302	0x300E
Communication on EAO2 set value	12303	0x300F	Communication on DO set value	12304	0x3010
Communication on EDO set value	12305	0x3011	Communication on output terminal Desired Value	12306	0x3012
Set value of communication on virtual input terminal	12307	0x3013	Positive torque limit frequency	12308	0x3014
Anti-torque limit frequency	12309	0x3015	PID feedback voltage	12310	0x3016

name of the variable	contact address	Read and write attributes	Meaning of command data or response value
Operation command w or d	0x3000	Read and write	1: Reserved 2: Jog stop command 3: Forward jog operation 4: Reverse jog operation 5: Run 6: shutdown 7: Forward running 8: fault reset 10: Reserved
Serial p or t value setting	0x3001	Read and write	F01.02 hundreds=0: 5000 represent 50.00Hz F01.02 hundreds=1: 10000represent F01.11
Inverter status	0x3002	Read Only	BIT0: Bus voltage establishment BIT1: Normal running command is valid BIT2: Jog operation command is valid BIT3: In operation BIT4: current running direction is reverse BIT5: direction of operation command is reverse BIT6: decelerating and braking BIT7: accelerating BIT8: decelerating BIT9: Alarm BIT10: failure BIT11: Current limit BIT12: Failure self-recovery BIT13: Auto-tuning BIT14: Free stop state BIT15: Speed tracking start
Alarm code	0x3003	Read Only	0: No alarm 1~50: indicates the current alarm code
C-00	0x3004	Read Only	monitoring parameters1
C-01	0x3005	Read Only	monitoring parameters2
C-02	0x3006	Read Only	monitoring parameters3
C-03	0x3007	Read Only	monitoring parameters4
C-04	0x3008	Read Only	monitoring parameters5
C-05	0x3009	Read Only	monitoring parameters6
PID communication	0x300A	Read and	Range: 0~1000 (1000 represents 10.00V)

given value		write	
Torque communication setting value	0x300B	Read and write	Range: 0~2000 (2000 represents 200.0% rated motor torque)
communication AO1 given value	0x300C	Read and write	Range: 0~4000 (4000 represents 10.00V or 20.00mA)
communication AO2 given value	0x300D	Read and write	Range: 0~4000 (4000 represents 10.00V or 20.00mA)
communication EAO1 given value	0x300E	Read and write	Range: 0~4000 (4000 represents 10.00V or 20.00mA)
communication EAO2 given value	0x300F	Read and write	Range: 0~4000 (4000 represents 10.00V or 20.00mA)
Communication DO given value	0x3010	Read and write	Range: 0~4000 (4000 represents 10.00V or 20.00mA)
communication EDO given value	0x3011	Read and write	Range: 0~4000 (4000 represents 10.00V or 20.00mA)
Communication output terminal set value	0x3012	Read and write	BIT0: Y1 BIT1: Y2 BIT2: Y3 BIT3: Y4 BIT4: RLY1 BIT5: EY1 BIT6: EY2 BIT7: EY3 BIT8: EY4 BIT9: ERLY1 BIT10: ERLY2
Set value of communication virtual input terminal	0x3013	Read and write	BIT0: CX1 ... BIT7: CX8
Positive torque limit frequency	0x3014	Read and write	Range: 0~60000 (60000 represents 600.00Hz)
Anti-torque limit frequency	0x3015	Read and write	Range: 0~60000 (60000 represents 600.00Hz)
PID feedback voltage	0x3016	Read and write	Range: 0~4000 (4000 represents 600.00Hz)
Reserved		/	

4. Debugging of expansion card

4.1 Function parameter setting

(1) ESQ-500/600 Function parameter setting

Function Code	Name	Setting Range	Set Value
F05.00	Protocol selection	0: Modbus protocol 1: reserved 2: Profibus-DP/Profinet protocol (extension valid) 3: CanLink protocol (extension valid) 4: CANopen protocol (extension valid) 5: Free protocol 1 (can realize the modification of all functional parameters of ESQ-500/600) 6: Free protocol 2 (only the modification of ESQ-500/600 part of the functional parameters can be realized) Note: Select 2, 3, 4 communication requires expansion card	2
F05.03	Local address	1~247	User settings



Note

After the above parameters are set, the inverter needs to be powered off and restarted.

4.2 Debug operation steps

(1) Open the Botu software and create a new project, take Botu V15 as an example.

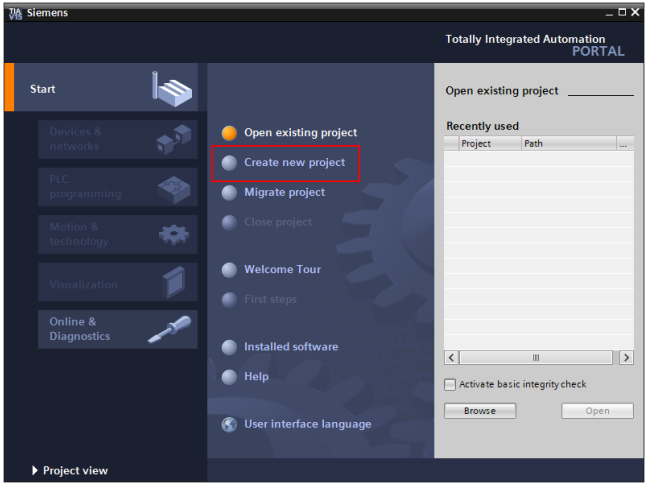


Figure 4-1

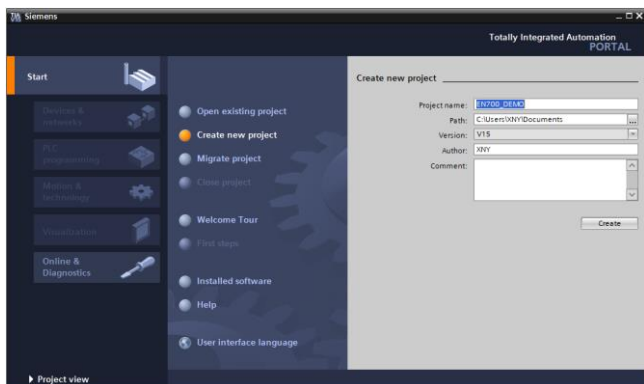


Figure 4-2

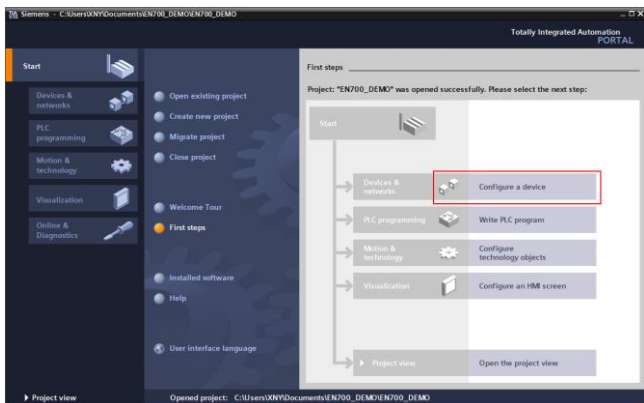


Figure 4-3

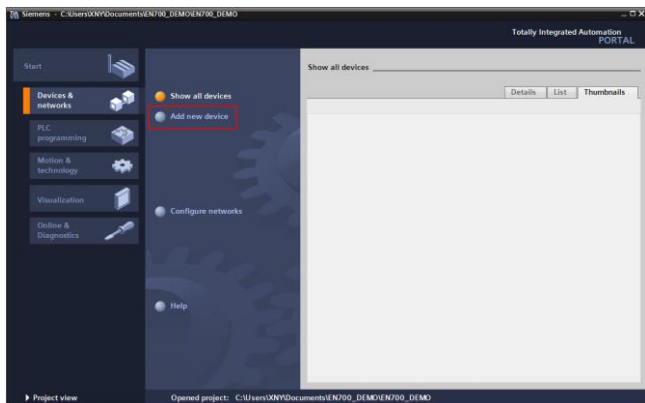


Figure 4-4

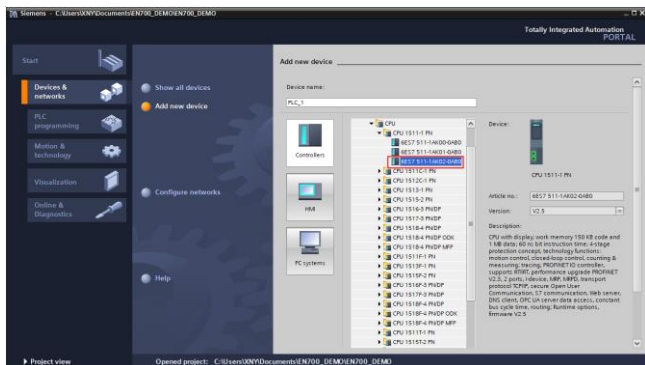


Figure 4-5

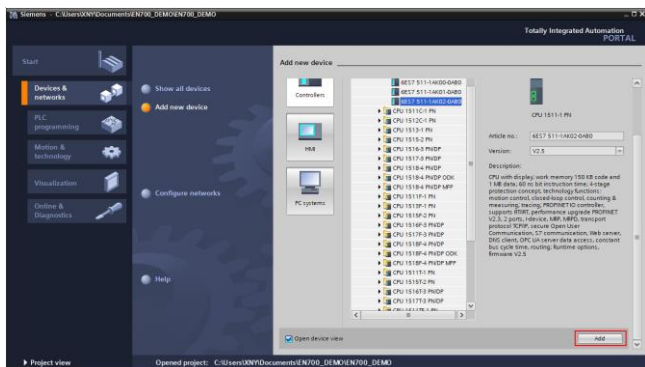


Figure 4-6

(2) Install GSDML- V2.31-EN600-20200421.xml

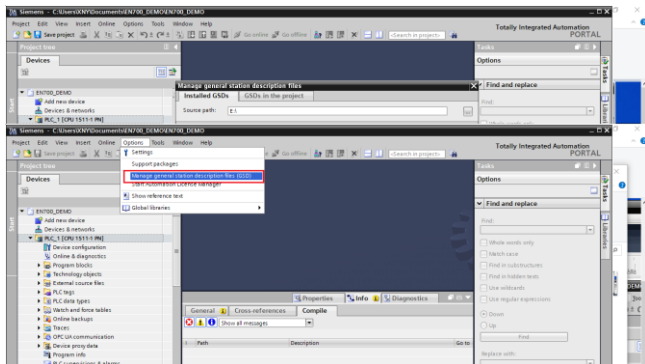


Figure 4-7

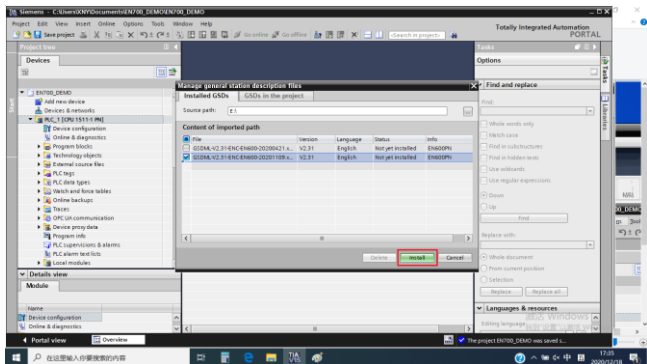


Figure 4-8

(3) Hardware configuration files settings, double-click "device configuration", as shown in Figure 4-9

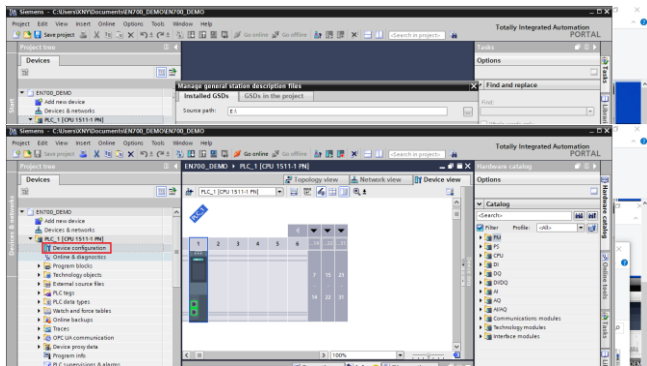


Figure 4-9

(4) Switch to topology attempt, as shown in Figure 4-10

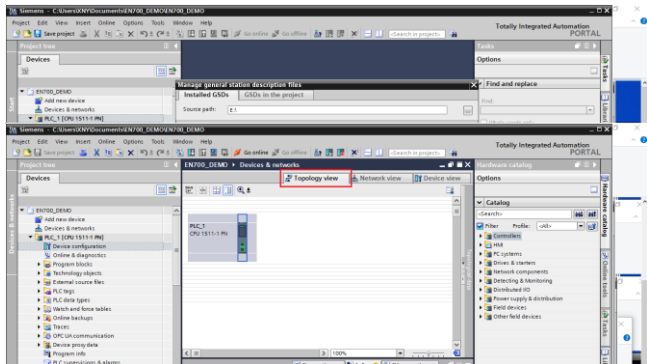


Figure 4-10

(5) Double-click "EN600PN" to add the EN600 Profinet device to the device configuration. Figure 4-11

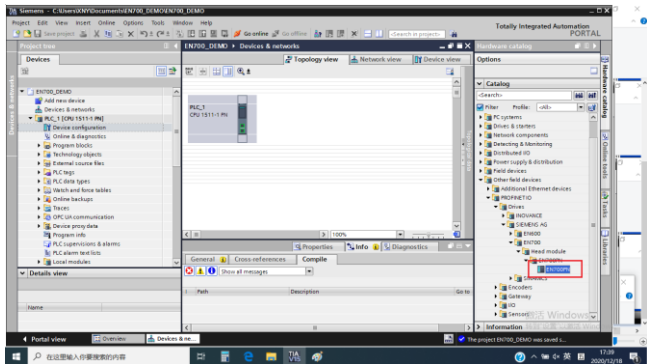


Figure 4-11

(6) Profinet master station network parameter setting

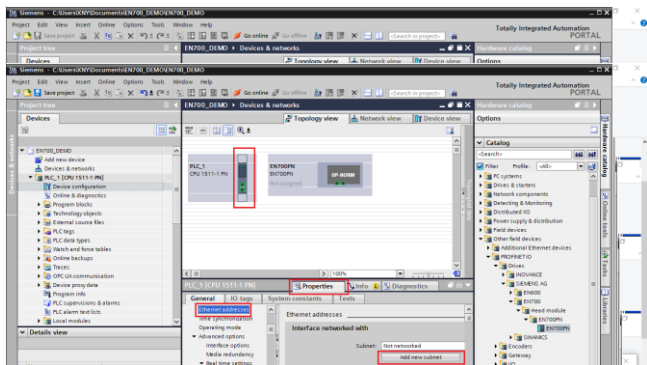


Figure 4-12

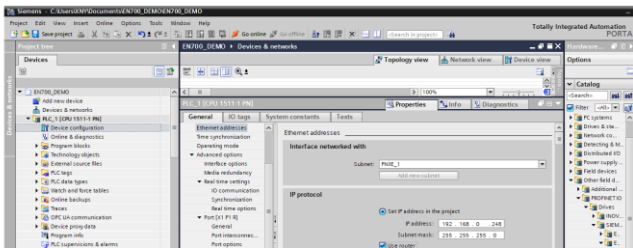


Figure 4-13

(7) EN600 Profinet network parameter settings

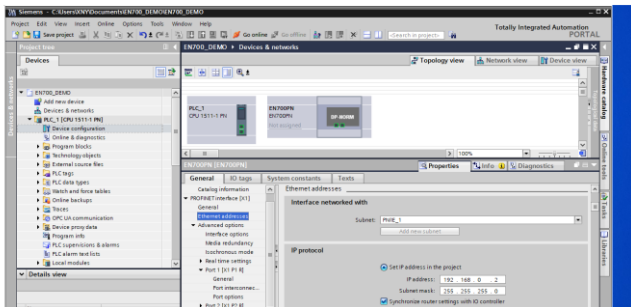


Figure 4-14

(8) Add EN600 Profinet equipment to the Profinet master station network

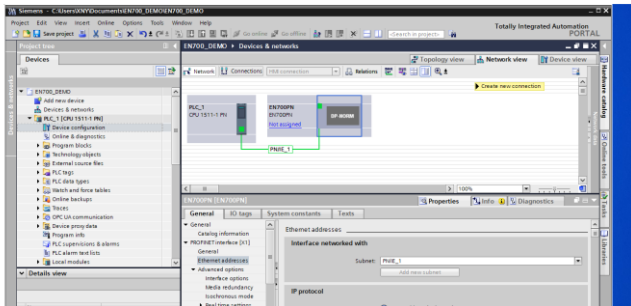


Figure 4-15

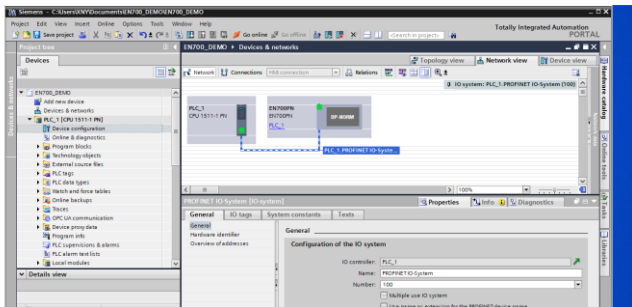


Figure 4-16

(9) Detect current network equipment

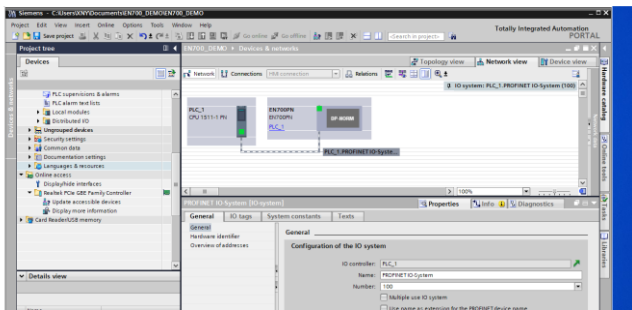


Figure 4-17

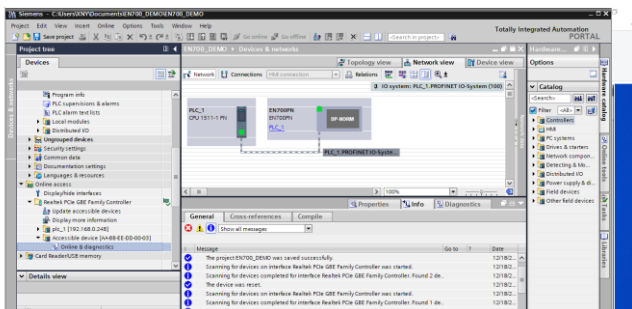


Figure 4-18

(10) Assign EN600 Profinet communication card IP and device name

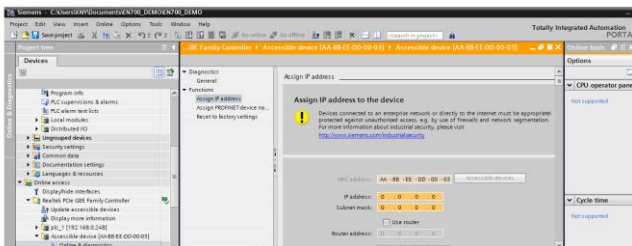


Figure 4-19

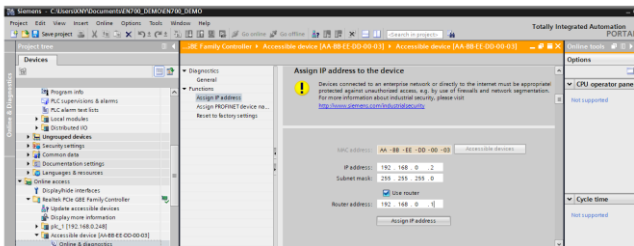


Figure 4-20

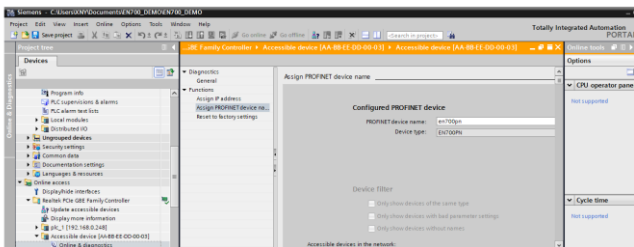


Figure 4-21

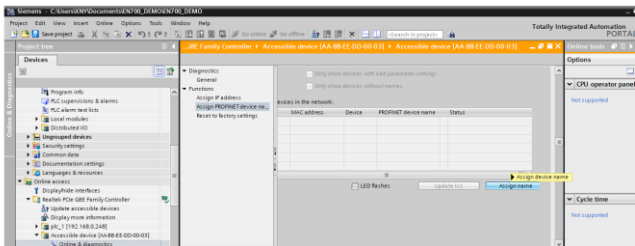


Figure 4-22

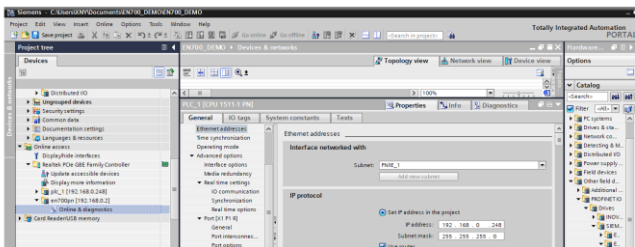


Figure 4-23

(11) Set the Profinet communication format and switch to "Network View Figure"

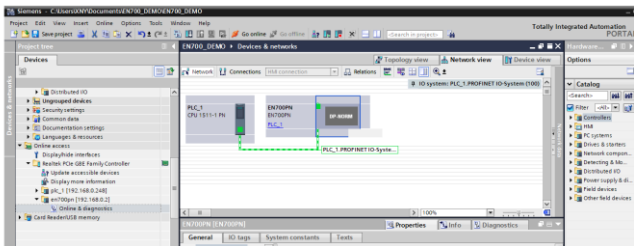


Figure 4-24

(12) Switch to "Device View Figure"

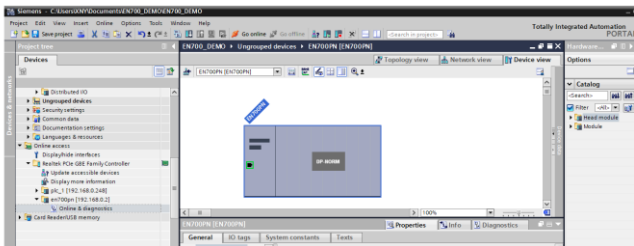


Figure 4-25

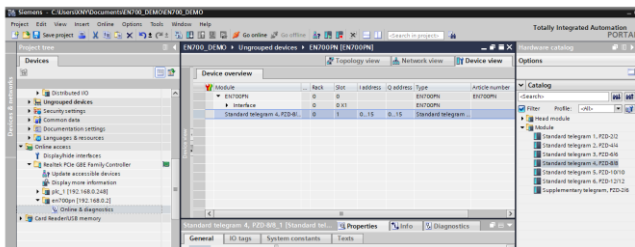


Figure 4-26

(13) According to the requirements of the control equipment, set the parameter addresses that need to be monitored and set, among which PZD1 and PZD2 have been solidified in the communication card without setting.

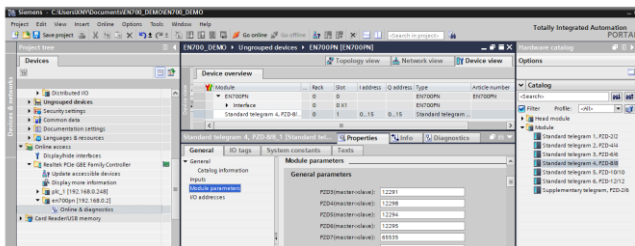
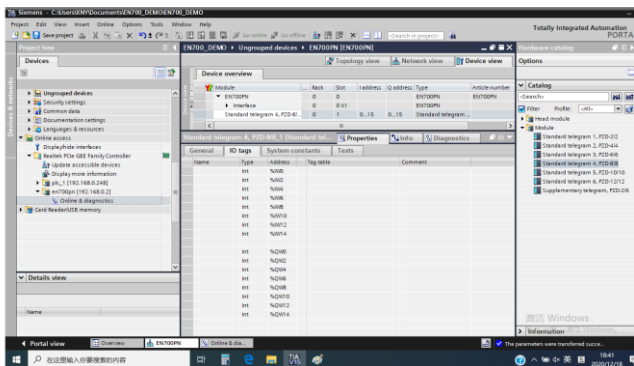


Figure 4-27

(14) As shown in Figure 4-28, you can see the IO variable address allocated by the BoFigure software for this device, and the EN600 inverter can be controlled by reading and setting the corresponding address.



(16) Download hardware configuration

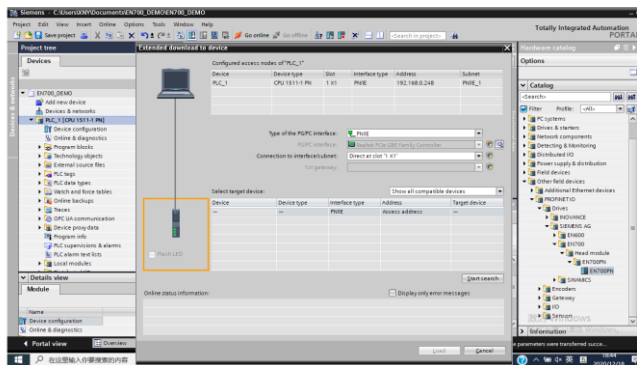


Figure 4-30

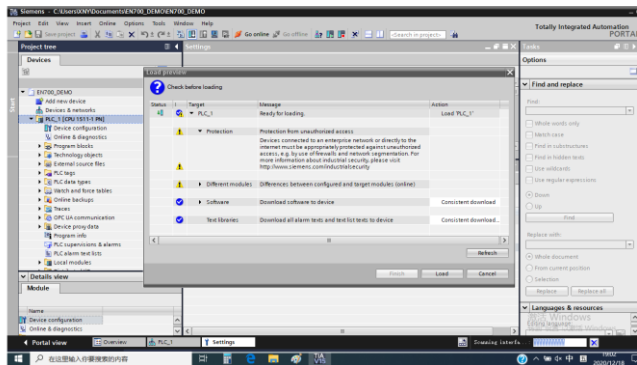


Figure 4-31

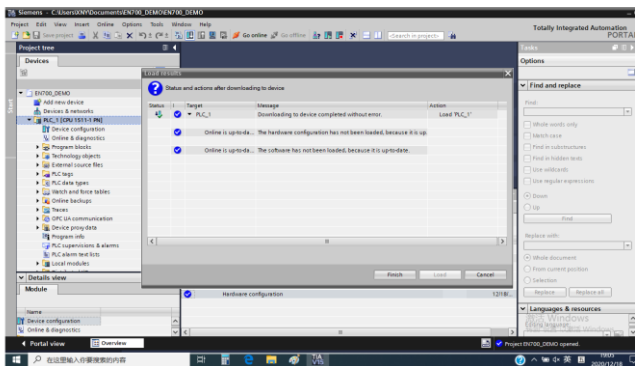


Figure 4-33

(17) Monitor and debug the inverter, add a monitoring table.

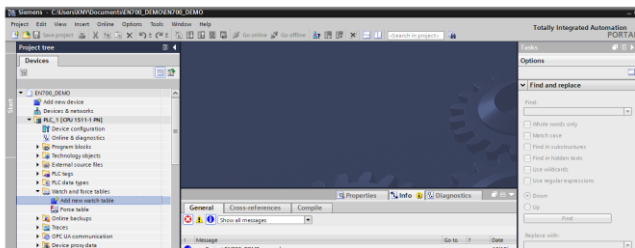


Figure 4-34

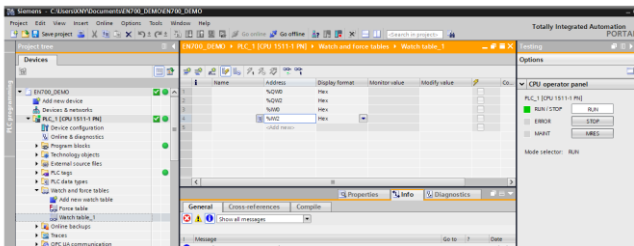


Figure 4-35

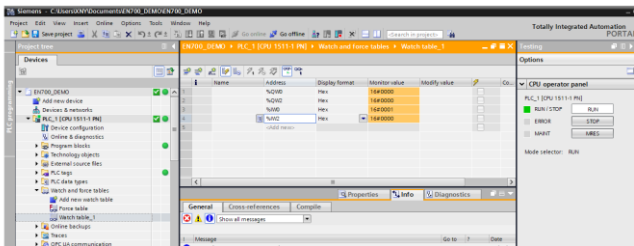


Figure 4-36

(18) Run the inverter, the frequency is 50.00Hz

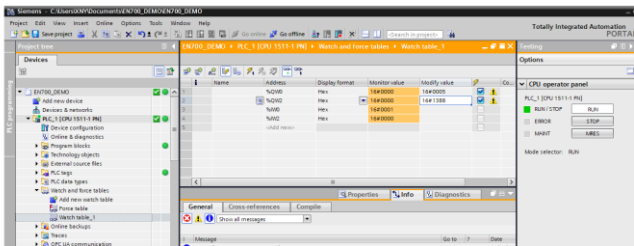


Figure 4-37

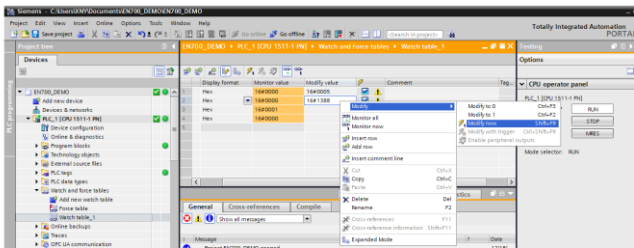


Figure 4-38

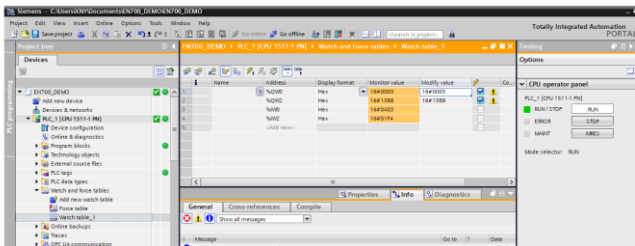


Figure 4-39

(19) Stop, as shown in Figure 4-40

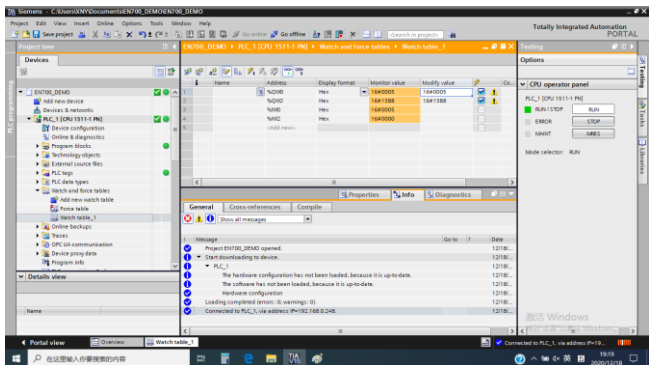


Figure 4-40