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MD580-SI-PN1 PROFINET I/O Communication Expansion Card

User Guide

Industrial Automation | New Energy Vehicle | Intelligent Elevator | Intelligent Robot | Digital Energy | Rail Transit

Data code 19012459A02

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Storage, use, and disposal of this product (including optional accessories) must comply with local laws and regulations.

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The product/system described in this documentation may be operated only by personnel qualified for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel can identify the risks of the product/system and prevent possible dangers.

Proper Use of the Product

Proper transportation, storage, assembly, installation, commissioning, operation, and maintenance are required to ensure the safe operation of the product without any problems. The required ambient conditions must be met. All operations must follow the guidelines provided in this documentation.

Preface

Introduction

The PROFINET IO Industrial Ethernet adapter module (hereinafter referred to as MD580-SI-PN1) complies with IEC61158-5 type 10 and IEC61158-6 type 10, the international PROFINET IO Industrial Ethernet standards. The MD580-SI-PN1 module is mainly applicable to the MD580 series AC drive. It enables the AC drive to work as a slave on the PROFINET IO industrial Ethernet and be controlled by a master on the PROFINET IO industrial Ethernet. This improves the communication efficiency and enriches the networking functions of the MD580.

This guide describes the applicable AC drives, technical specifications, interfaces, dimensions, installation, wiring, communication, and troubleshooting of this product.

Revision history

Date	Version	Revision
June 2026	A02	**Update:** Updated *"4.1 Electrical Connection" on page 17*. **Added:** • Added *"7.2 S2 System Redundancy Function" on page 40* and *"7.3 PN Card Online Commissioning" on page 47*. • Added *"1.1 Safety Precautions" on page 5*, *"1.2 Industrial Information Security" on page 9*, and *" Service and Support" on page 51*.
December 2024	A01	Made minor corrections.
December 2023	A00	First release.

Access to the guide

This guide is not delivered with the product. You can download the PDF version in the following ways:

- Visit https://www.inovance.com/global, and choose *Service&Support* > Support > Documentation Download.
- Scan the QR code on the product with your smart phone.
- Scan the QR code below to install the Inovance app, and search for MD580 in the app to obtain this guide.



Warranty disclaimer

Inovance provides warranty service within the warranty period (as specified in your order) for any fault or damage that is not caused by improper operation of the user. Maintenance will be charged after the warranty expires.

Even within the warranty period, maintenance can be charged for the following product damage:

- Damage caused by operations not following the instructions in the guide
- Damage caused by fire, flood, or abnormal voltage
- Damage caused by using the product for unintended functions
- Damage caused by using the product outside the specified scope
- Damage or secondary damage caused by force majeure (natural disaster, earthquake, and lightning strike)

When applicable, relevant maintenance fee will be charged according to the latest Price List of Inovance. If otherwise agreed upon, the agreed terms and conditions shall prevail.

For details, see the Warranty Card.

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1 Fundamental Safety Instructions

1.1 Safety Precautions

Safety disclaimer

- This chapter provides essential safety instructions for proper use of the product. Before using this product, read through the guide and comprehend all the safety instructions. Failure to comply with the safety instructions may result in death, severe injury, or equipment damage.
- "DANGER", "WARNING", and "CAUTION" signs in this guide are only supplements to the safety instructions, and do not reflect all safety instructions to be followed.
- Use this product according to the designated environment requirements. Damage caused by improper use is not covered by warranty.
- Inovance shall take no responsibility for any personal injury or property damage caused by improper use.

Safety levels and definitions



Indicates that failure to comply with the notice can result in death or severe personal injury.



Indicates that failure to comply with the notice may result in severe personal injury or death.



Indicates that failure to comply with the notice may result in minor or moderate injury or equipment damage.

Safety Precautions

- Drawings in the guide are sometimes shown without covers or protective guards. Install the covers or protective guards as specified, and then perform operations in accordance with the instructions.
- The drawings in the guide are shown for illustration only and may be different from the product you purchased.
- Operators must take mechanical protection measures to protect their safety. For example, they must wear safety shoes, safety clothing, safety glasses, protective gloves and sleeves, or other protective equipment.

Unpacking



- Do not install the product in the case of any damage, rust, or signs of use on the product or accessories upon unpacking.
- Do not install the product in the case of water seepage into the product or missing or damaged components upon unpacking.
- Do not install the product in the case of any discrepancy between the product you received and the product name on the packing list.



- Check whether the packing is intact and whether there is damage, water seepage, dampness, and deformation before unpacking.
- Unpack the package layer by layer. Do not strike the package violently.
- Check for damage, rust, or dents on the surfaces of the product and accessories upon unpacking.
- After unpacking, check the contents against the packing list to ensure that the equipment and accessories are in the correct quantities, and that all documentation is complete.

Installation



- This equipment must be operated only by trained and qualified electrical personnel. Non-professionals must not operate this equipment.
- Disconnect all external power supplies of the system before installing/disassembling the product. Failure to do so may result in electric shock, module fault or malfunction.



- Prevent metal filings and wire ends from dropping into the product during installation. Failure to comply may result in fire, fault and malfunction.
- Ensure there are no foreign matters on ventilation surface. Failure to comply may result in poor ventilation, which may cause fire, fault and malfunction.
- Ensure the module is connected to the respective connector securely and hook the module firmly. Improper installation may result in malfunction, fault or fall-off.



- Before installation, cut off the medium-voltage power supply the drive and the control power supply, and wait for at least 10 minutes until all the unit indicators turn off.
- Prevent metal filings and wire ends from dropping into the product during installation. Failure to comply may result in fire, fault and malfunction.
- Then, insert the expansion card into the drive and fasten the screws to prevent the signal socket between boards from being damaged by external signal cable tension.

Wiring



- Wiring must be carried out by personnel who have received the necessary electrical training and understood enough electrical knowledge.
- Before wiring, disconnect all the external power supplies of the system. Failure to comply may result in electric shock, module fault or malfunction.
- Insulate the cable terminals properly to ensure the insulation distance between cables will not be shortened after cables are connected to the terminal block. Failure to comply could result in electric shock or equipment damage.



- This equipment must be operated only by trained and qualified electrical personnel. Non-professionals must not operate this equipment.
- Disconnect all external power supplies of the system before installing/disassembling the product. Failure to do so may result in electric shock, module fault or malfunction.



- To prevent damage to the equipment, cut off the power supply before connecting the product to the power supply.
- After wiring is done, ensure that all cables are connected properly and no screws, washers or exposed cables are left inside the equipment. Failure to comply could result in electric shock or equipment damage.



- Before installation, cut off the medium-voltage power supply the drive and the control power supply, and wait for at least 10 minutes until all the unit indicators turn off.
- Prevent metal filings and wire ends from dropping into the product during installation. Failure to comply may result in fire, fault and malfunction.
- Then, insert the expansion card into the drive and fasten the screws to prevent the signal socket between boards from being damaged by external signal cable tension.

Power-on



- Before power-on, check that the equipment is installed and wired properly.
- After power-on, do not disassemble any unit or component of the equipment. Failure to comply can result in electric shock.



- Perform a trial run after wiring and parameter setting to ensure that the equipment operates safely. Failure to comply may result in personal injuries or equipment damage.
- Before power-on, check that the rated voltage of the equipment is consistent with that of the power supply. Failure to comply may result in a fire.
- Before power-on, check that no one is near the product. Failure to comply may result in death or personal injury.

Operation



- Maintenance & inspection must be carried out by personnel who have the necessary electrical training and experience.
- Do not touch the terminals while the power is on. Failure to comply may result in electric shock or malfunction.
- Disconnect all external power supplies of the system before cleaning the module or re-tightening screws on the terminal block or screws of the connector. Failure to comply could result in electric shock.
- Disconnect all external power supplies of the system before removing the module or connecting/removing the communication wiring. Failure to comply may result in electric shock or malfunction.



- The equipment must be operated only by professionals. Failure to comply can result in injury or death.
- Do not touch any connecting terminals or disassemble any unit or component of the equipment during operation. Failure to comply could result in electric shock.

Maintenance



- Equipment installation, wiring, maintenance, inspection, or parts replacement must be performed only by professionals.
- Perform routine and periodic inspection and maintenance on the equipment according to maintenance requirements and keep a maintenance record.



Do not use the gasoline, diluent, alcohol, acidic or alkaline detergent during cleaning to prevent product discoloration or damage.

Repair
 • Equipment installation, wiring, maintenance, inspection, or parts replacement must be performed only by professionals. • Do not repair the equipment with power-on. Failure to comply may result in electric shock. • Before inspection or repair, disconnect all the power supplies of the equipment and wait for at least the time specified on the warning label.
 • Submit a request for repair based on the warranty agreement. • Troubleshooting and repair of a faulty or damaged equipment must be performed by professionals based on the repair instructions, with the repair records kept properly. • Replace quick-wear parts of the equipment according to the replacement instructions. • Do not operate damaged equipment. Failure to comply may cause severe damage. • Recheck the wiring and reset the parameters after equipment replacement.

Disposal
 • Dispose of the retired equipment in accordance with applicable national regulations and standards. Failure to comply could result in property damage, personal injury, or death. • Recycle retired equipment in accordance with industry waste disposal standards to avoid environmental pollution.

1.2 Industrial Information Security

The product provides interfaces for network connection and data transmission. To protect factories, systems, machines, and networks from cyberattacks, it is essential to implement proper protection mechanism for industrial security.

Customers are responsible for providing and maintaining a secure connection between the product and their network or any other network to protect their factories, systems, machines, and networks from unauthorized access. Such systems or machines can be connected to an enterprise network or the Internet only when a secure connection is established and appropriate security measures (such as using antivirus software or installing firewalls) are in place.

Inovance continuously develops and improves its products and solutions to enhance safety. It is strongly recommended that you update the product promptly and always use the latest version.



Tampering with software (such as viruses, Trojans, and Worms) can lead to unsafe drive state, which can put the device in an unsafe operation state. This may result in death, serious injury, and property damage. Observe the following strictly.

- Always use the latest software version. If the product version is no longer supported or the latest version of the program is not applied, customers are at increased risk of cyber-attacks.
- Take proper protection measures (including but not limited to deploying antivirus software, firewall, WAF, IPS/IDS, situational awareness system, ID verification, and data encryption) to prevent files in the mobile storage device from being damaged by malware and protect products, networks, systems, and interfaces from unauthorized access, disturbance, intrusion, data disclosure, or information theft.
- Check all safety-related interfaces and settings after commissioning.

2 Product Information

2.1 Introduction

The PROFINET IO industrial Ethernet module (hereinafter referred to as MD580-SI-PN1 module) conforms to the PROFINET IO industrial Ethernet communication standard. The module is used on the MD580 series AC drive, so that the AC drive can work as a slave on the PROFINET I/O Industrial Ethernet and be controlled by a PROFINET I/O Industrial Ethernet master. This improves the communication efficiency and enriches the networking functions of the MD580.

Features:

- Up to 100 Mbps bus communication rate and short communication cycle.
- Provides flexible networking and supports almost all types of topologies: chain, bus, tree, and star.
- The distributed clock is adopted to effectively improves the timing accuracy of the data exchange which is realized through the pure hardware mechanism.
- Direct installation in the expansion slot of the MD580 AC drive without requiring an external power supply.



Figure 2-1 MD580-SI-PN1 card appearance

2.2 Applicable AC Drive

Card model	Card ordering code	Applicable AC Drive
MD580-SI-PN1	01040191	MD580

2.3 Technical Specifications

Item	Description
Ambient temperature for operation	-10℃ to +55℃
Ambient temperature for storage	-40℃ to +70℃
Ambient humidity	5% to 95% RH (without condensation)
Operating environment	Free from corrosive gases
Installation method	Fixed by snap-fit joint and screw
IP rating	IP20
Cooling method	Natural cooling

2.4 Outline dimensions

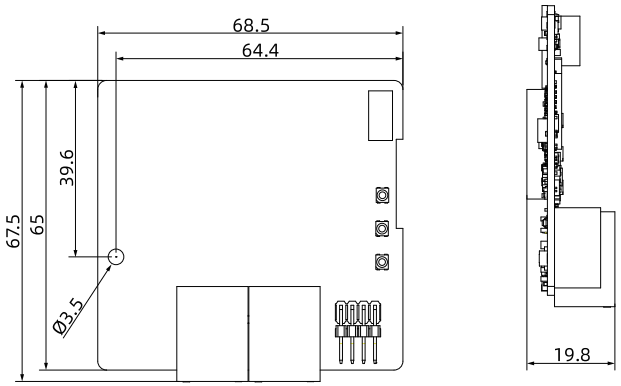


Figure 2-2 MD580-SI-PN1 card dimensions (unit: mm)

2.5 Terminal descriptions

Product description

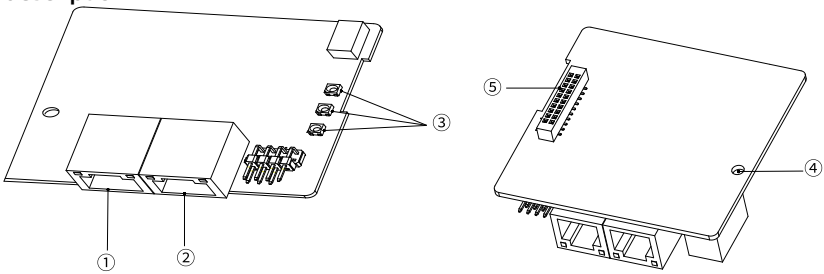
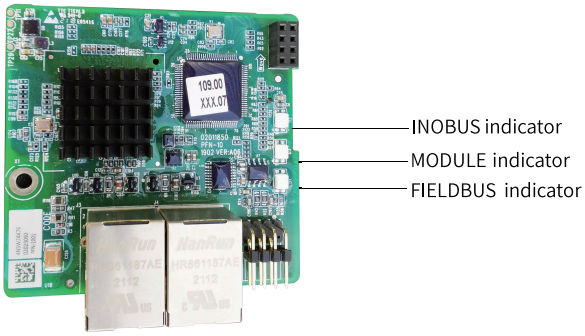


Figure 2-3 Product layout

No.	Name	Description
①	PROFINET IO communication terminal X1	Communication terminal 1
②	PROFINET IO communication terminal X2	Communication terminal 2
③	Status indicator	The indicators indicate running status of the module and bus.
④	Screw fixing hole	Used to secure the module to MD580 drive to ensure proper connection of the PE layer.
⑤	Slot terminal	Used for electrical connection with the MD580 drive.

Description of indicators

The MD580-SI-PN1 module provides three status indicators to indicate bus communication faults, as described below. The following figure shows the indicator positions.



Indicator	Fault	Description	Solution
INOBUS	Flashing green	Handshaking between the module and the MD580 fails.	Check that only one of n1-00 or n2-00 is set to 8. Check that n17-00 is set properly. Check that the MD580-SI-PN1 socket is intact.
MODULE	Flashing in green	The protocol stack is starting.	Please wait.
	Flashing red	The MAC address is incorrect.	The MD580-SI-PN1 module does not have an MAC address. Replace the module.
	Steady red	The protocol stack startup times out.	Power off and on again or replace it.
	Solid orange	MD580 parameters are set incorrectly.	Set the correct card slot in the background to activate the PN card. Set the station number to a non-zero value.
FIELDBUS	Flashing red	Master not found	Check that the cable is correctly connected. Check that the slave is configured. Check that a device name is assigned to the slave.
	Steady red	Communication with the master station is lost.	Check the cable connector.
	Flashing orange	Configuration error	Check that the GSDML configuration is correct.

3 Installation Instructions

Installation precautions

- Before installation or removal, ensure that the module is powered off to avoid damage to the module.
- Do not let the MD580-SI-PN1 module drop or be impacted to prevent module damage.
- Do not disassemble the MD580-SI-PN1 module to avoid damage to the module.
- Tighten the screws according to the required torque to avoid damage or loose fastening.

Tightening torque for screws and fasteners

The screws mentioned in this guide must be tightened according to the following tightening torque.

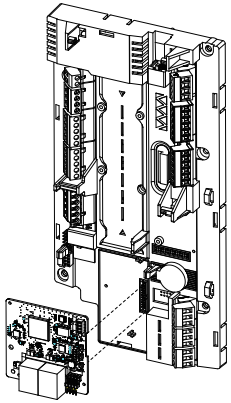
Table 3–1 Tightening torque of the grounding screw

Screw	Tightening torque
M3	0.55 N·m

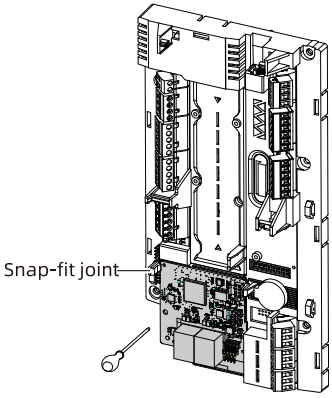
Installation Procedure

The MD580-SI-PN1 module can be installed in the expansion slot of the MD580. The installation steps are as follows:

1. Install the module to the expansion slot of the MD580.



2. Align the slot terminals of the module with the terminals on the control board and press firmly to ensure the snap-fit joints on both sides of the control board bracket securely fasten the module. Then, tighten the module's grounding screw using a #1 Phillips screwdriver.



3. Installation is done.

Removal procedure

1. Disconnect all power supplies, and unplug all cables connected to the module.
2. Remove the grounding screw of the module using a 1# Phillips screwdriver.
3. Unlatch the snap-fit joints on both sides of the MD580-SI-PN1 module, and pull the MD580-SI-PN1 module outward.

Note

- To meet EMC requirements and for reliable operation of the module, tighten the screws to ensure reliable grounding.
- Ensure that the MD580-SI-PN1 module is installed properly in the expansion slot of the MD580 for electrical connection.
- Maintenance work can be performed only by professionals.

4 Electrical Connection

4.1 Electrical Connection

The MD580-SI-PN1 uses a standard Ethernet RJ45 socket for connection to a PROFINET master. The pin signal definitions are the same as those of the standard Ethernet pins. It supports both crossover and straight-through cabling modes.

The MD580-SI-PN1 module supports a variety of topologies, including bus, star, ring, and tree topologies. When used with switches, the module can implement diversified networking modes.

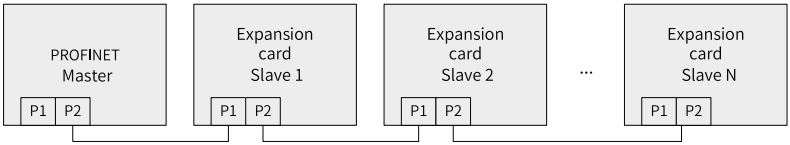


Figure 4-1 Bus topology

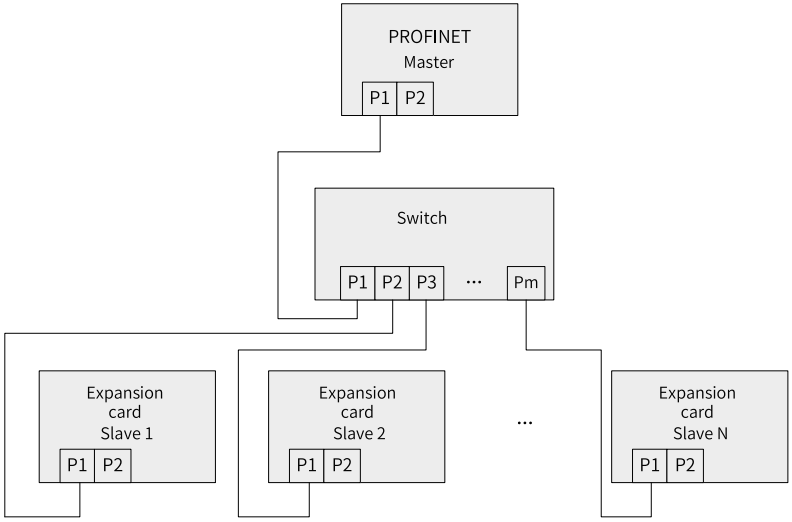


Figure 4-2 Star topology

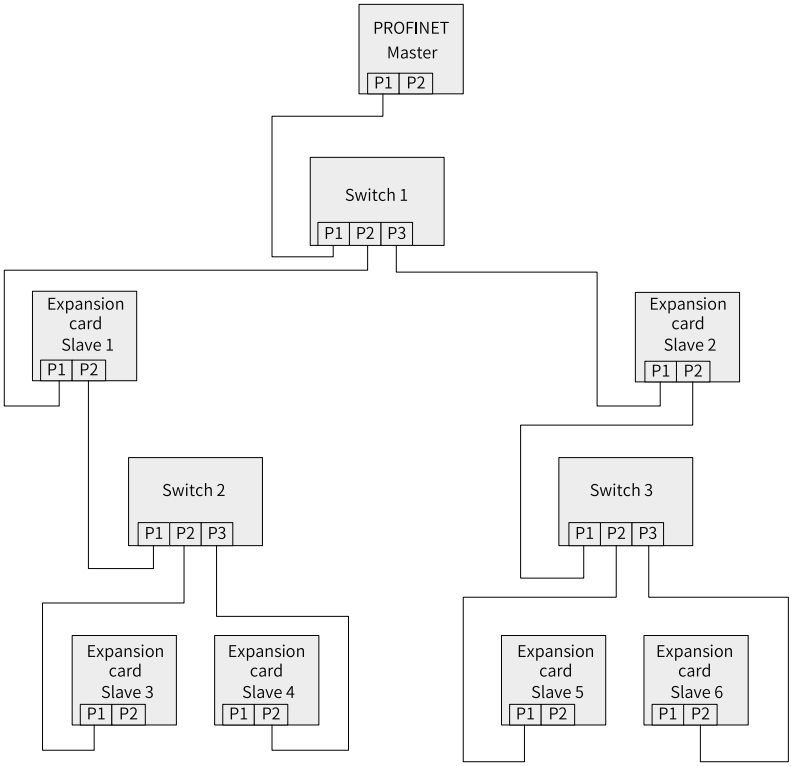


Figure 4-3 Tree topology

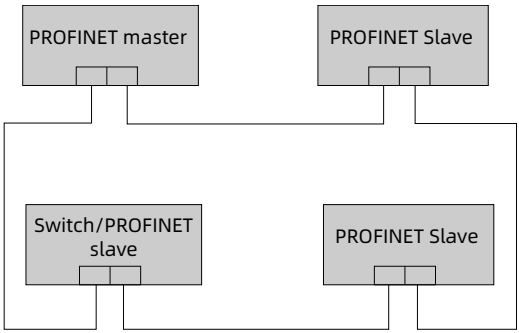


Figure 4-4 Ring topology

5 PROFINET IO Communication Protocol Description

5.1 Introduction

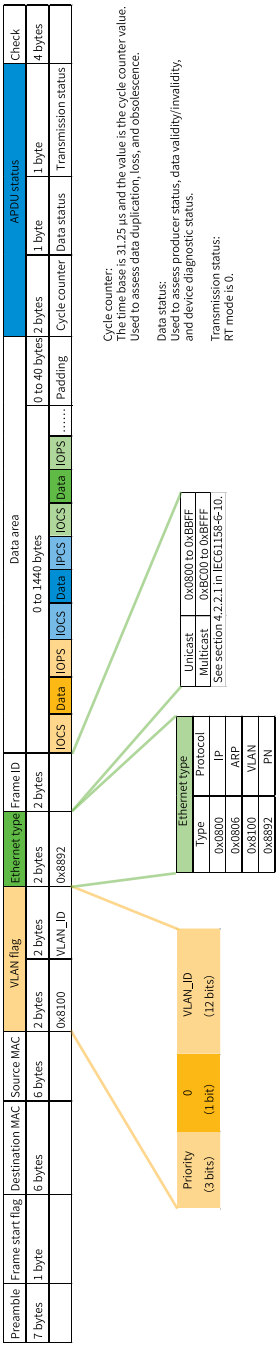
Data transmission format

For the MD580 series, you can select different PZD lengths for data transmission as needed. The supported transmission formats depend on the GSD file, and may vary across different versions of the installed GSD file. You can set the functions corresponding to each PZD during configuration.

The following table lists the functions supported by each data format.

Data type	Data length	Functions available
Standard telegram 1	PZD-2/2	Periodic writing of two function parameters Periodic reading of two function parameters
Standard telegram 2	PZD-4/4	Periodic writing of four function parameters Periodic reading of four function parameters
Standard telegram 3	PZD-6/6	Periodic writing of six function parameters Periodic reading of six function parameters
Standard telegram 4	PZD-8/8	Periodic writing of eight function parameters Periodic reading of eight function parameters
Standard telegram 5	PZD-10/10	Cyclic writing of 10 function parameters Cyclic reading of 10 function parameters
Standard telegram 6	PZD-12/12	Periodic writing of 12 function parameters Periodic reading of 12 function parameters
Standard telegram 7	PZD-16/16	Periodic writing of 16 function parameters Periodic reading of 16 function parameters
Supplementary telegram	PZD-2/6	Periodic writing of two function parameters Periodic reading of six function parameters

5.2 Communication Data Frame Structure

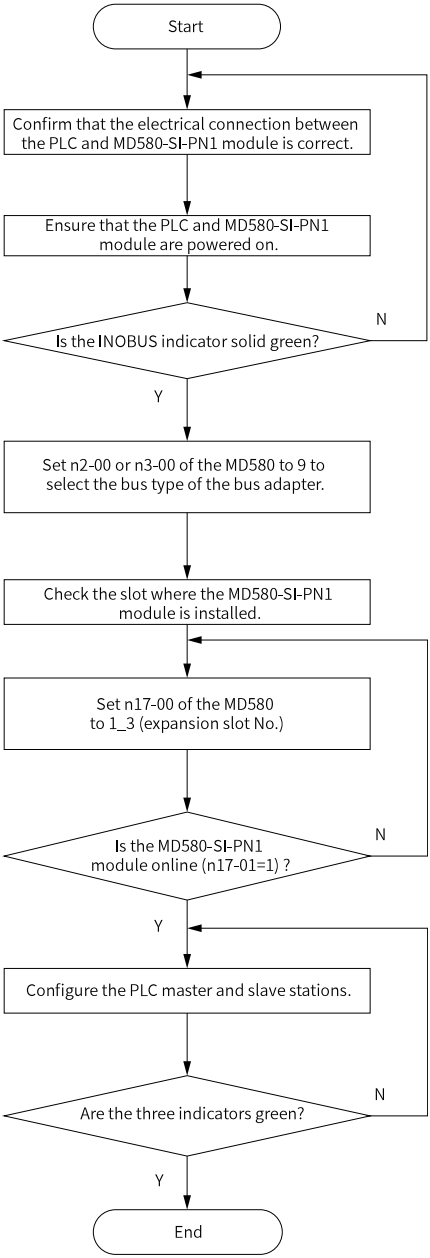


6 Parameter Configuration

6.1 Parameter configuration

Parameter configuration flow

After installing the MD580-SI-PN1 module to the MD580, you must complete communication configurations to enable the module to communicate with the MD580.


Start
Confirm that the electrical connection between the PLC and MD580-SI-PN1 module is correct.
Ensure that the PLC and MD580-SI-PN1 module are powered on.
Is the INOBUS indicator solid green?
N
Y
Set n2-00 or n3-00 of the MD580 to 9 to select the bus type of the bus adapter.
Check the slot where the MD580-SI-PN1 module is installed.
Set n17-00 of the MD580 to 1_3 (expansion slot No.)
Is the MD580-SI-PN1 module online (n17-01=1) ?
N
Y
Configure the PLC master and slave stations.
Are the three indicators green?
N
Y
End

Parameter configuration description

Param.	Name	Default value	Setpoint	Description
n2-00	Bus type for bus adapter A	0	8	Only one of the two parameters can be set to 8.
n3-00	Bus type for bus adapter B	0	8	
n17-00	Expansion slot selection	0	0: Disable 1: Expansion slot 1_1 2: Expansion slot 1_2 3: Expansion slot 1_3	Select a value according to the actual need. Generally, select the value 1.
n17-01	Status	0	0: Offline 1: Online	-

MAC address

The MD580-SI-PN1 module does not require a station number. Each MD580-SI-PN1 module has a unique MAC address for PLC identification.

You can view the MAC address through the parameter of the MD580 (see the appendix for the specific analysis method). In addition, the module supports the flashing function of the host controller, such as the LED flashing function of the TIA portal. The Module and Fieldbus indicators of the MD580-SI-PN1 module will flash three times simultaneously for indication.

Appendix

You can view the MD580 parameters through the background software or other methods. Make sure the MD580-SI-PN1 module is powered on and both the INOBUS and MODULE indicators are solid green.

You can view the MAC address through parameters of the MD580.

1. The parameters corresponding to MAC addresses include n17-03, n17-04, and n17-05.
2. The parameter is displayed in hexadecimal.

   Example:

Param.	n17-03	n17-04	n17-05
Parameter Display	n17-03 = 0x70CA	n17-04 = 0x4DFE	n17-05 = 0x0133
MAC address	70-CA-4D-FE-01-33		

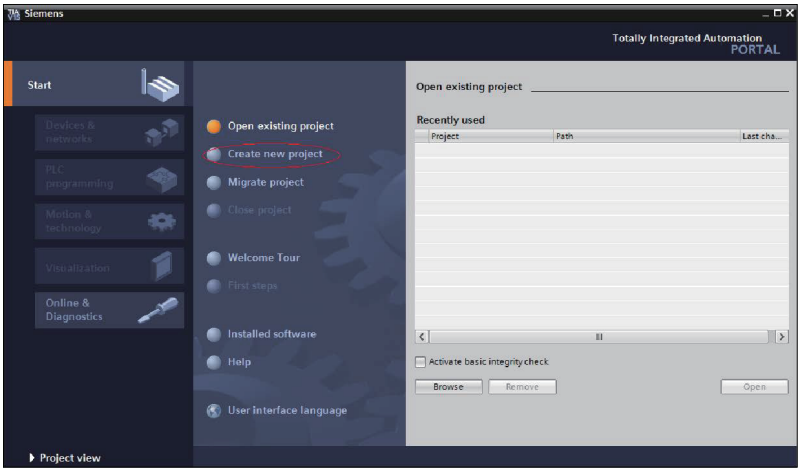
7 Communication Instances

7.1 Setting PROFINET I/O Communication Between an AC Drive and an S7-300 Controller

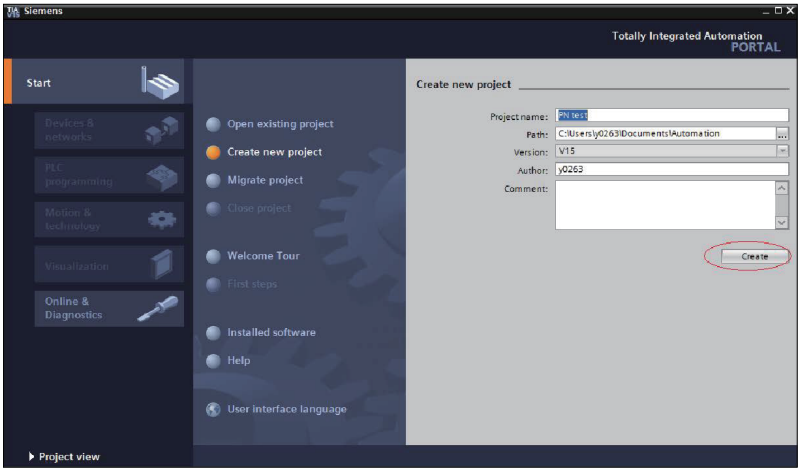
Configuring a slave on an S7-300 master

Before using the PROFINET master, you need to configure a GSDML file of the slave to add the corresponding slave device to the system of the master. If the file exists, skip step 2. You can obtain the GSDML file from Inovance or its agent. The steps are as follows.

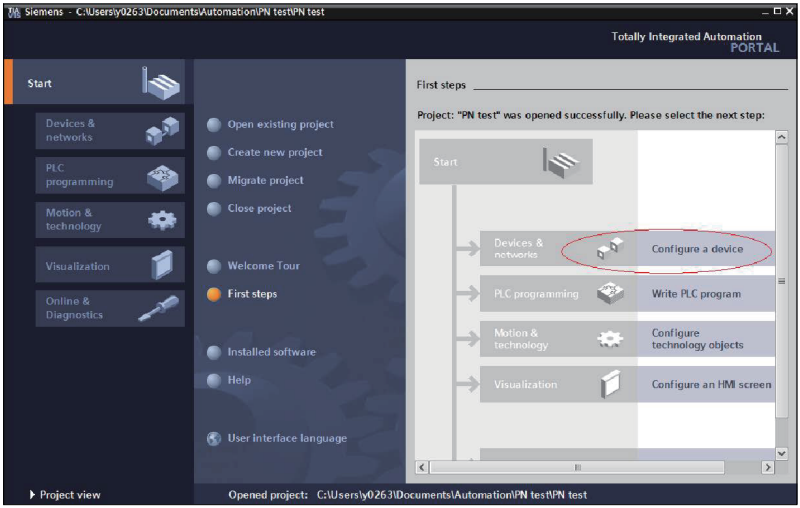
1. Create a project and add an S7-300 master to the project in PORTAL. Specifically, open PORTAL first. The following interface is displayed.



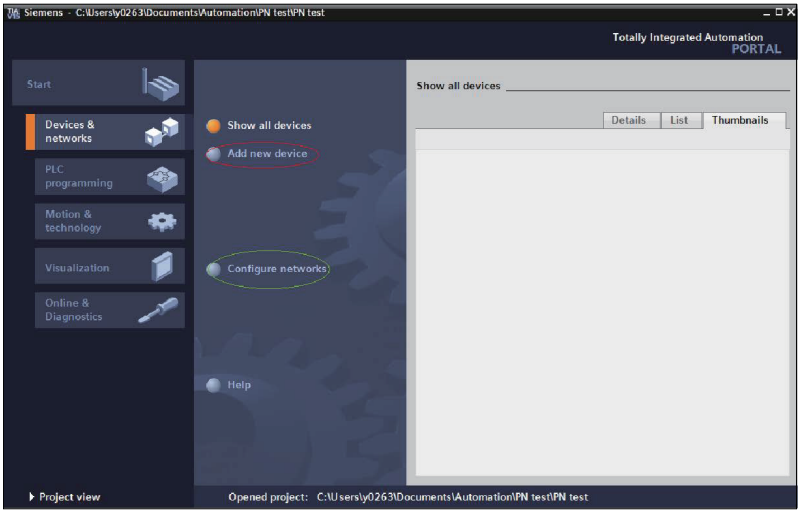
Click "Create new project", enter a project name and storage path, and click "Create".



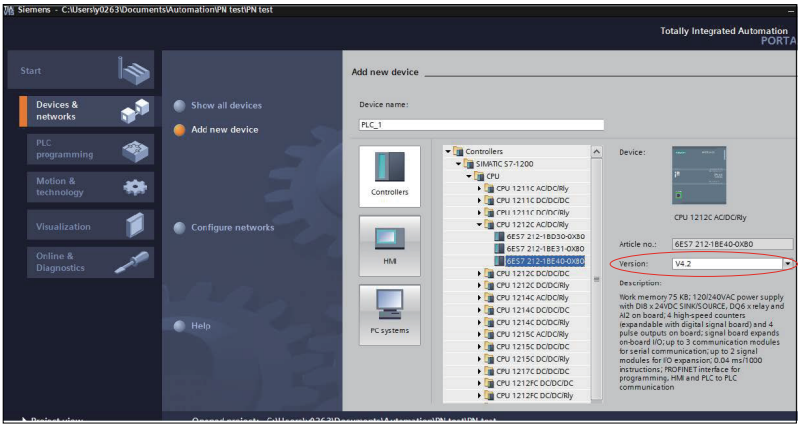
Click "Configure a device", as shown in the following figure.



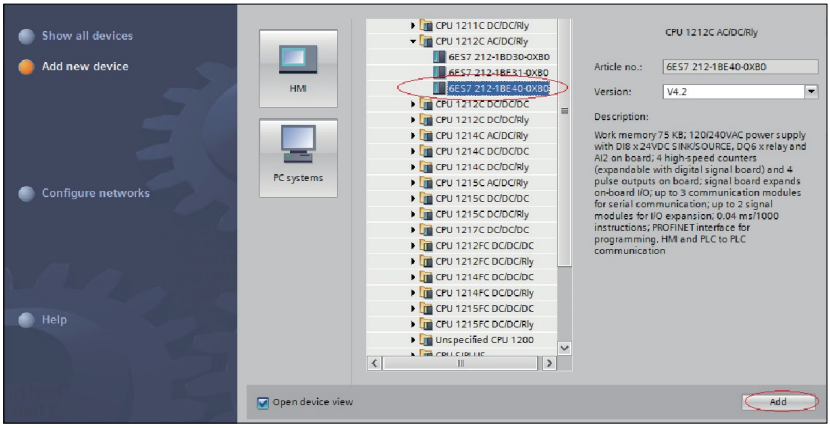
- For a new project, click "Add new device" (marked with a red circle in the following figure).
- For an existing project, click "Configure networks" (marked with a green circle in the following figure).



Select a PLC on the displayed page. Set the article number and firmware version of the PLC correctly. Incorrect settings will result in download failure.

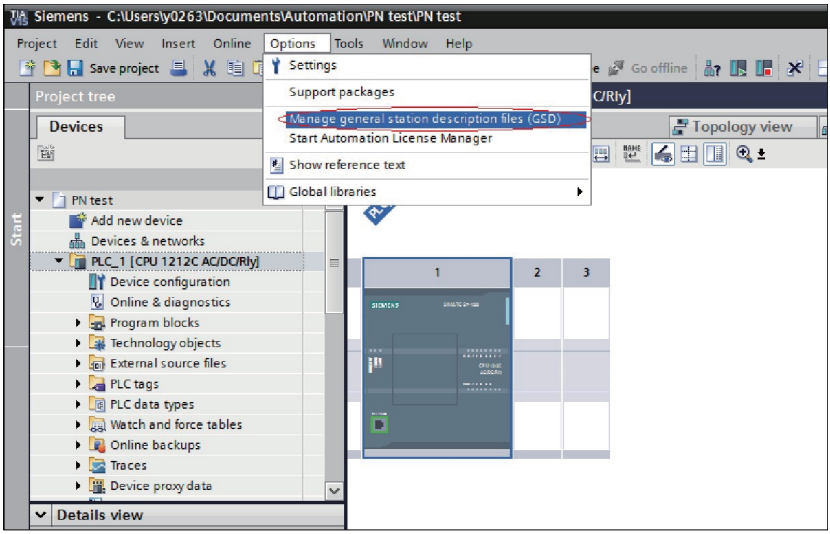


Click "Add" or double-click the selected master, as shown in the following figure.

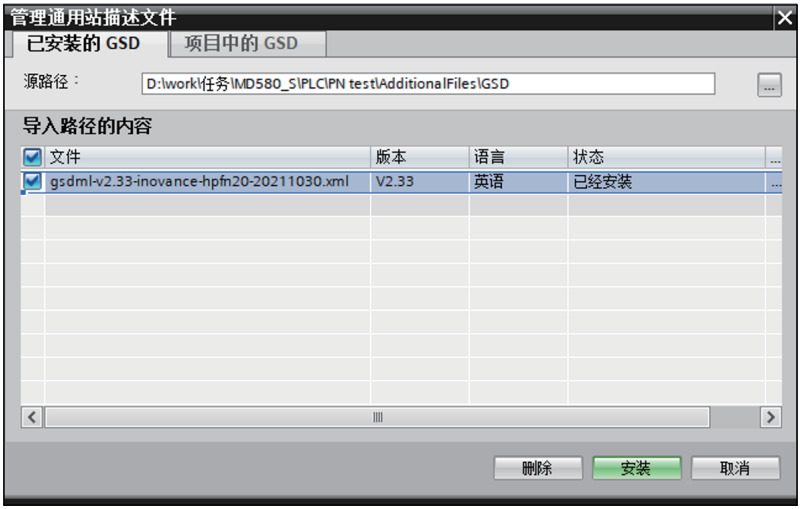


Now the master is established.

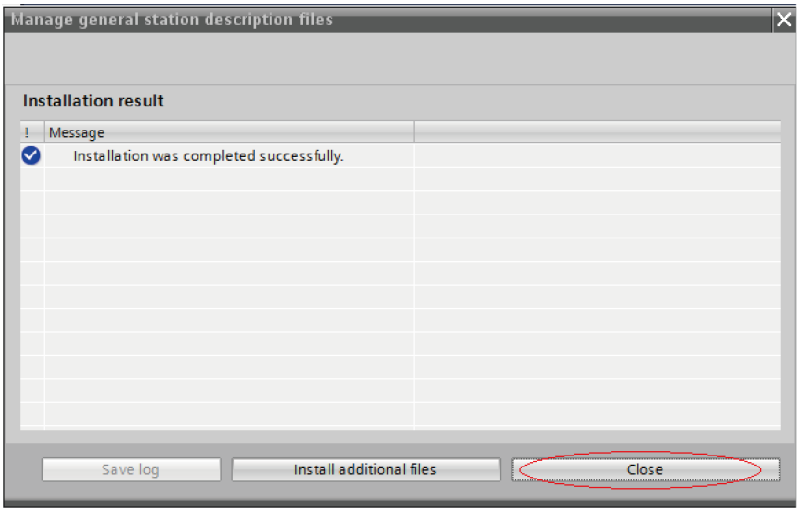
2. Install a GSDML file. (Skip this step if the GSDML file has been installed.) Specifically, choose "Options" > "Mange general station description files (GSD)".



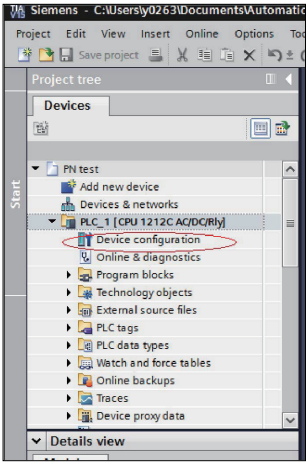
Select the storage path that does not contain any Chinese characters for the GSDML file, select the GSDML file to be installed, and click "Install".



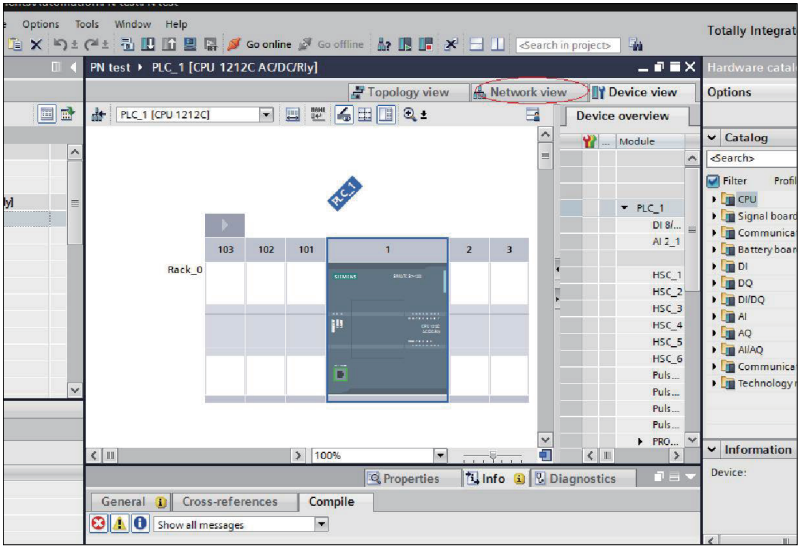
Wait until the installation is completed, and click "Close".



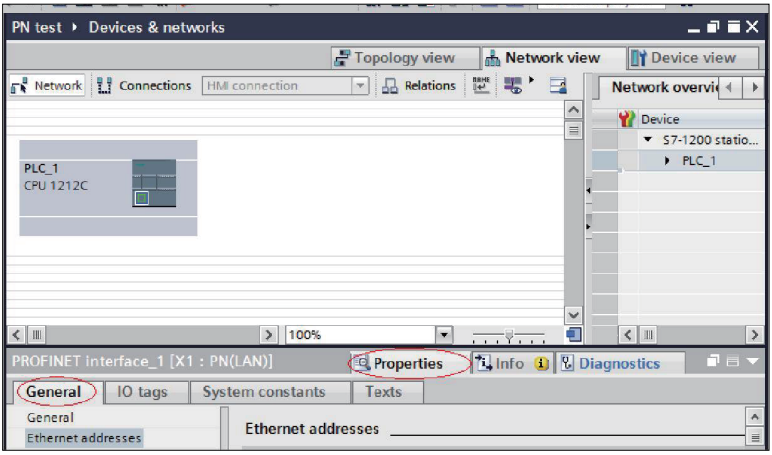
3. Configure the slave station.
   Click "Device configuration".



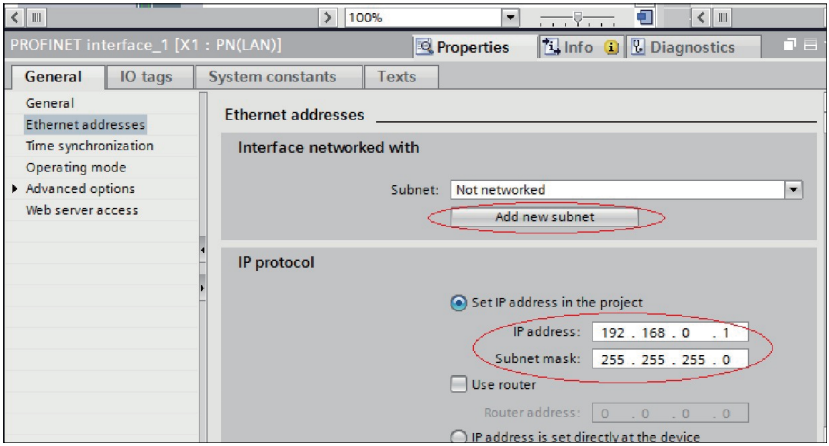
Select "Network view".



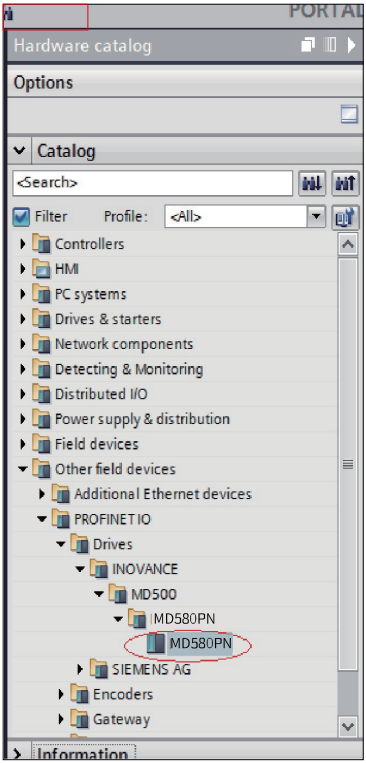
Select the Ethernet interface of the PLC, and choose "Properties" > "General".



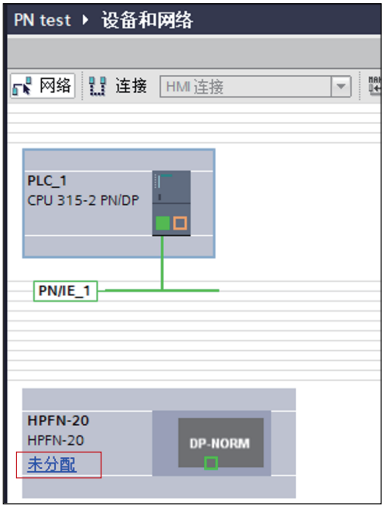
Set the IP address and subnet mask of the PLC master, and click "Add new subnet".



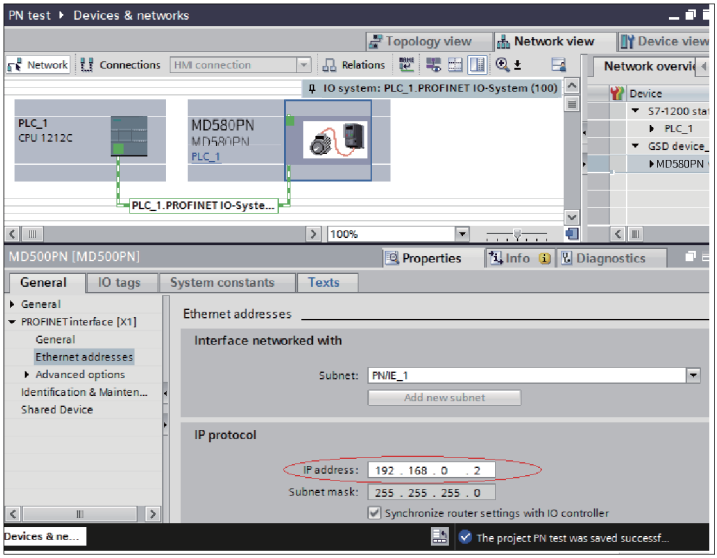
Locate HPFN-20 under "Hardware catalog" on the right, and double-click "HPFN-20".



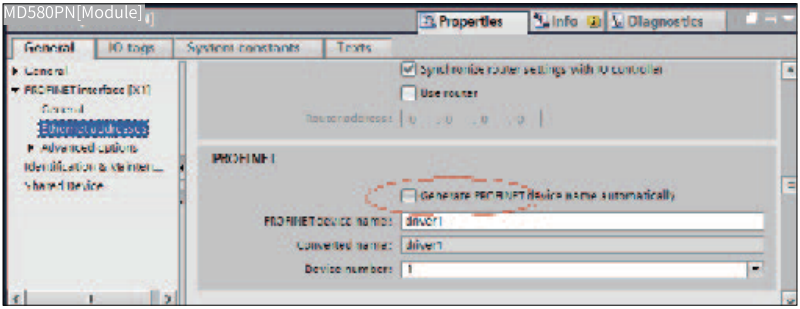
Click "Not assigned" to select the master system for the slave.



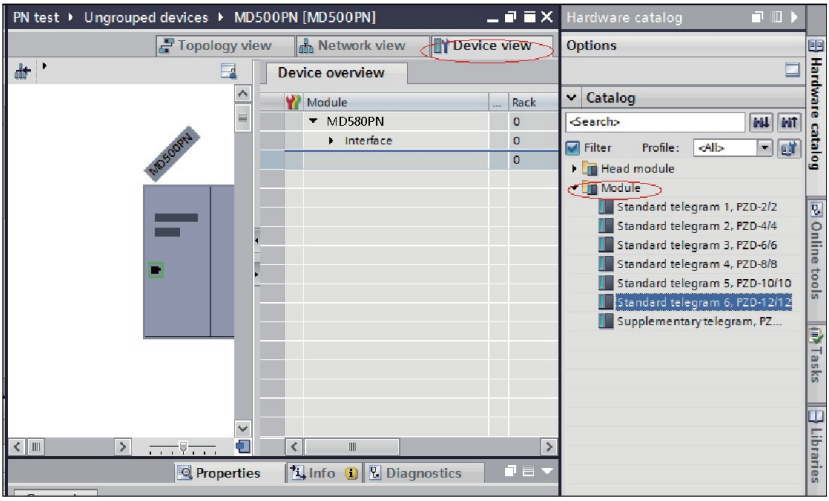
Select the slave station, and choose "Properties" > "General". Then choose "PROFINET interface [X1]" > "Ethernet addresses", and set the IP address.



Scroll down the screen to the "PROFINET" section. Deselect "Generate PROFINET device name automatically" and enter a name in the "PROFINET device name" field. (Alternatively, you can keep the option selected to allow the system to generate a device name automatically.)



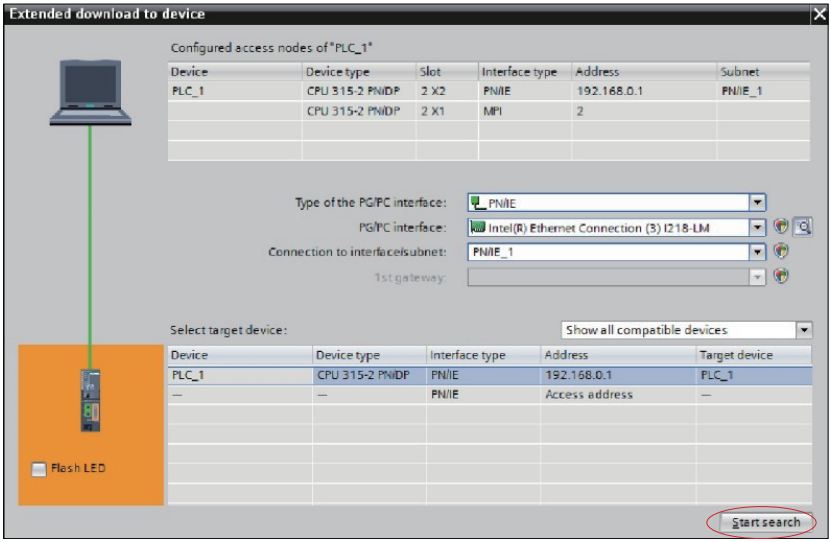
4. Configure data properties of the slave.
   Select the slave and switch to the "Device view". In the "Hardware catalog", navigate to "Module" and double-click the desired data length for the slave.



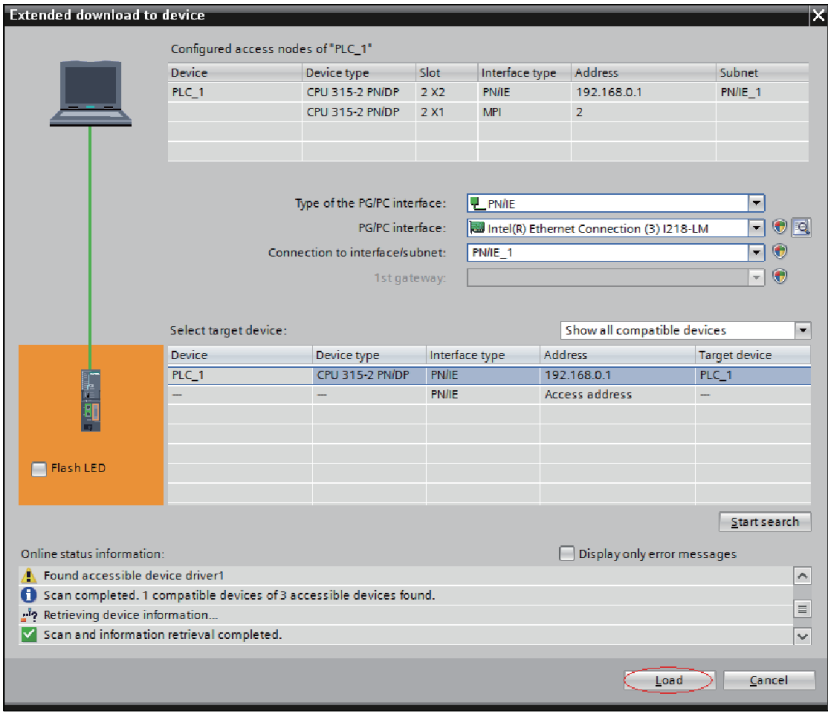
Switch to "Network view". If more slaves need to be added, repeat the preceding steps. If the configuration is the same, select and copy a configured slave and modify the IP address and device name (note that a different device name is required).

5. Configure PZD.
   You need to configure PZD mapping addresses on the MD580S AC drive (in parameter group n2 or n3).

6. Download the configuration.
   Save the network configuration. Set the IP address of the PC to the same network segment as that of the PLC. (Note that the IP address of the PC must be different from that of the slave station in the configuration. You can also enable the function of automatic IP address distribution for the PC.) Start compiling, click "Load", select the interface, and click "Start search".

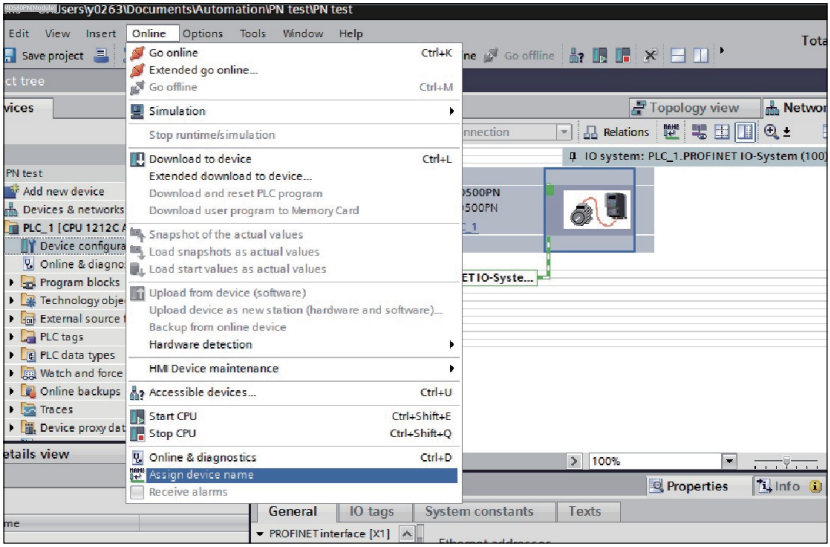


Select the device corresponding to the PLC from the search results, click "Load", and wait for the loading to be completed.

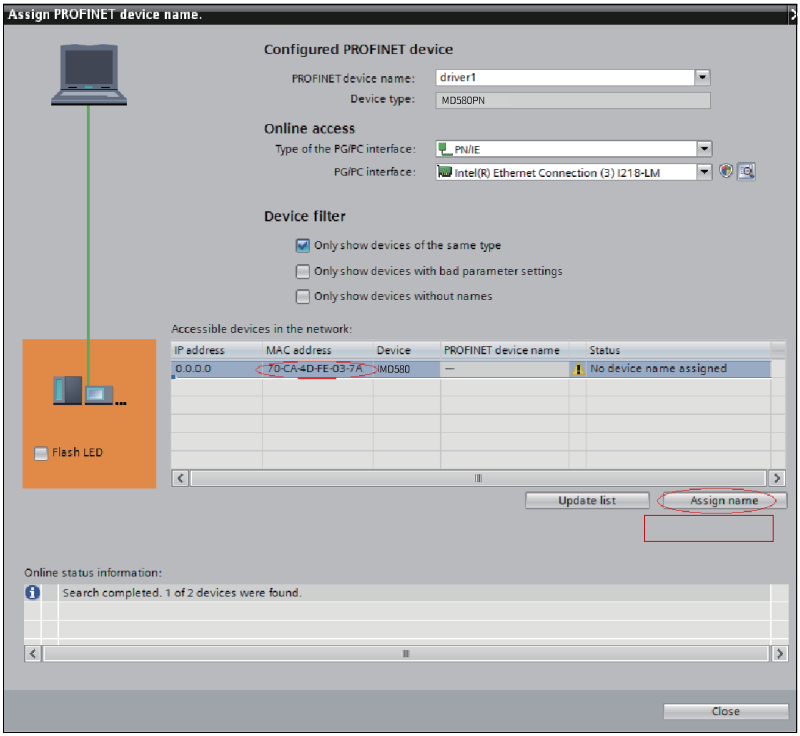


7. Assign a device name.

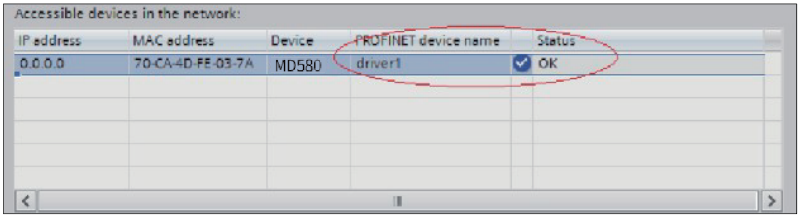
   After the loading, you need to assign device names for slaves not named. Select a slave, and choose "Online" > "Assign device name".



   On the displayed page, devices of the same type are listed. Search for the slave station by n17 group or select the slave station based on its unique MAC address. The MAC address of the MD580-SI-PN1 is marked on its housing. Then, click "Assign name".



The following screen is displayed when the device name is assigned successfully. The displayed "PROFINET device name" must be consistent with the name under "Configured PROFINET device" shown in the preceding figure. After assigning the device name, close the interface or select another device from the "PROFINET device name" drop-down list to assign device names for other stations.



The slave will save the assigned name, and the master identifies each slave based on the device name. (The MAC address is not intuitive to use. The process of assigning a device name is actually binding the device name with the MAC address.)

Note

- Each device name can be assigned only to one slave station in the network.
- After modifying the device name of a station in the configuration, the name must be assigned to the station again. (For any exception, see "Troubleshooting".)
- After modifying an IP address, download the modified configuration to the PLC to validate it. Name assignment is not required.

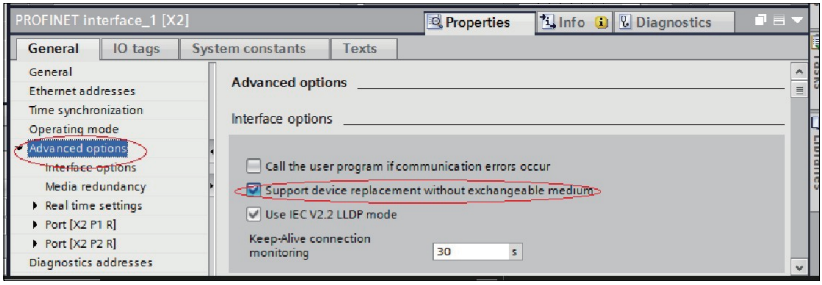
Now the PROFINET slave configuration is completed. You can write programs on the S7-300 master to control the AC drive.

Note

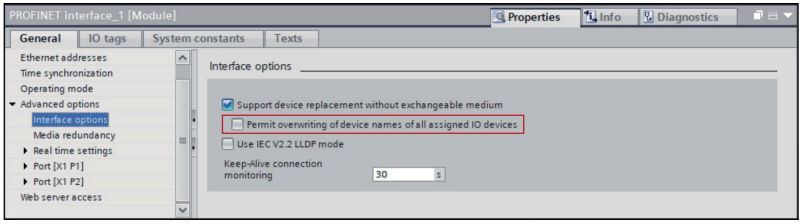
Reading or writing to slaves through the PLC is similar to that in the PROFIBUS DP communication.

Replacing a faulty device directly

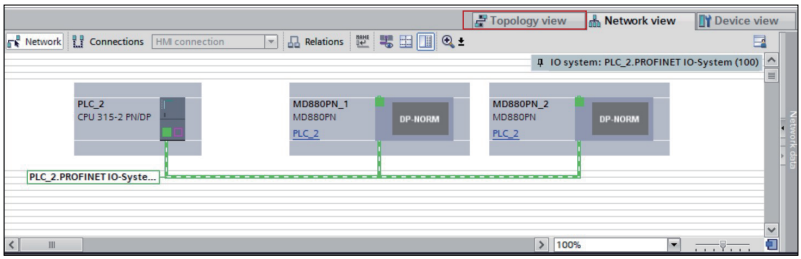
- Select the "Support device replacement without exchangeable medium" option and set the topology in PORTAL.
  On the hardware configuration page of PORTAL, select the PROFINET interface of the master. Choose "Properties" > "General" > "Advanced options" > "Interface options", and select "Support device replacement without exchangeable medium", as shown in the following figure.



For the S7-1200 or S7-1500 PLC, a sub-option "Permit overwriting of device names of all assigned IO devices" is available. If this sub-option is selected, the second prerequisite for direct replacement can be ignored.

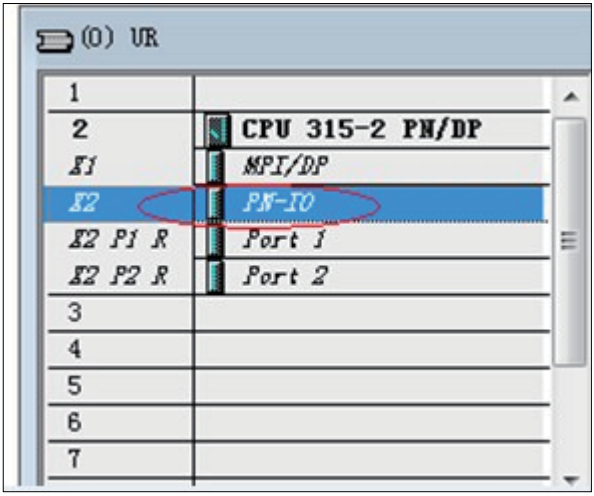


Then, switch to the "Topology view", as shown in the following figure.

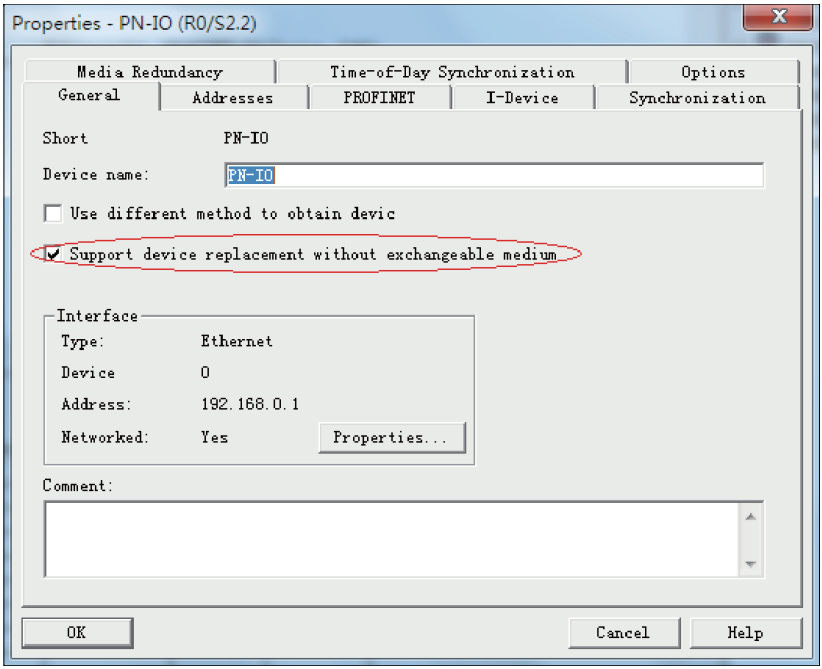


Set the topology. Then, compile the configuration and load it to the PLC.

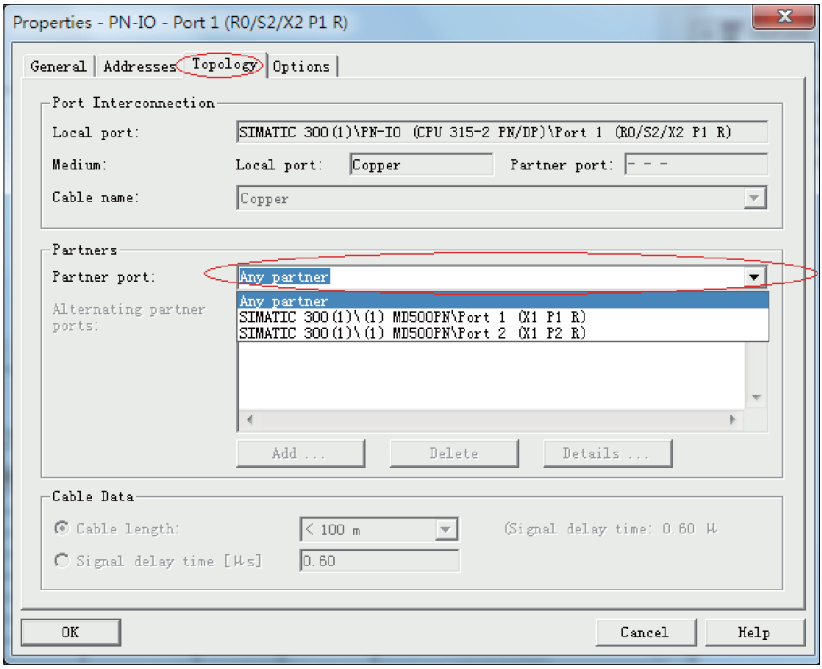
- Selecting the "Support device replacement without exchangeable medium" option and setting the topology in STEP7 Micro/WIN
  On the hardware configuration page, double-click "PN-IO", as shown in the following figure.



Select the option marked below, and click "OK".



Based on the actual network connections, double-click "Port 1" or "Port 2" of the PLC, and select the "Topology" tab page. In the "Partner port" drop-down list, select the slave port connected to the PLC (the default option is "Any partner", which must be changed to the actual connected port). Click "OK".



Click the corresponding port of the slave to set the topology with the same method. After setting all connected ports, compile the configuration and load it to the PLC.

Note

- After completing the preceding configuration, perform the following operations when any slave station needs to be replaced: 1) Disconnect the old station from the network and remove it. 2) Install a new station to which no device name is assigned to the same position as the old station. For the S7-1200 and S7-1500, the requirement that a new station does not have a name can be omitted. 3) Connect the new station to the network using the original cable. 4) Power on the new station. The PLC assigns a device name to the new station automatically.
- Ensure that the wiring mode and the topology are consistent with the original mode and topology.

7.2 S2 System Redundancy Function

To use the S2 system redundancy function for the MD580-SI-PN1, you need to update the expansion card to 309.07 or above. The AC drive software does not need to be updated. At the same time, the XML file needs to be updated. Supported XML files are "GSDML-V2.4-Inovance-MD580-SI-PN1-20250625.xml" and later versions.

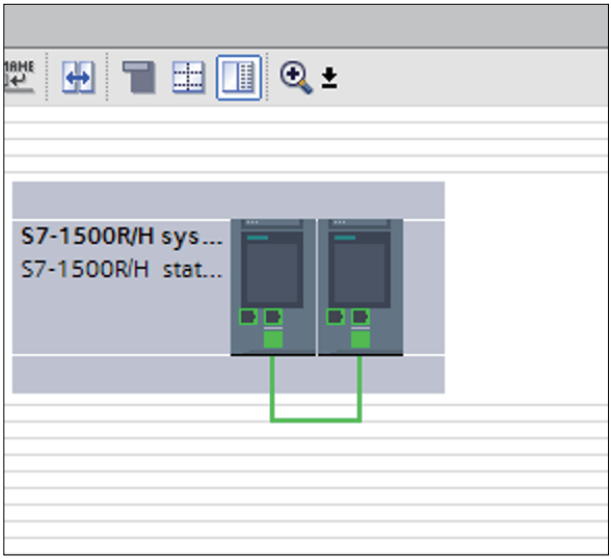
Note

Files with updated dates appended to the filename are also supported. Earlier XML files remain usable but the S2 redundancy function is not available.

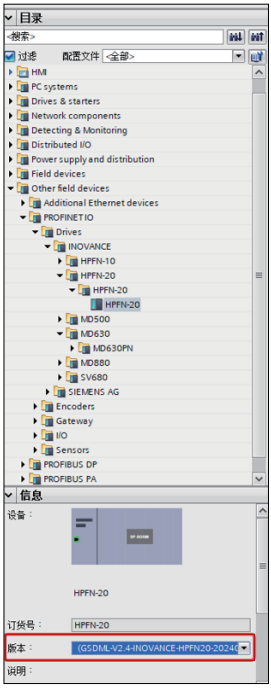
1. Follow the steps in *"7.1 Setting PROFINET I/O Communication Between an AC Drive and an S7-300 Controller" on page 24* to import the new XML file. Select a PLC master that supports S2 redundancy (S2 redundancy PLCs are always used in pairs. Adding one automatically brings in its pair).



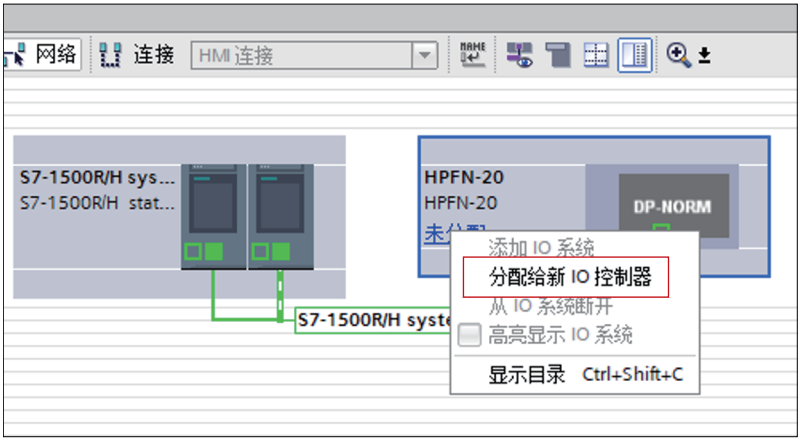
2. Ensure that the S2 redundant PLC is automatically configured as an MRP manager and cannot be changed.
   Switch to the topology view to confirm the connection topology of the two redundant PLCs. The connection between the two redundant PLCs must match the topology (mandatory).



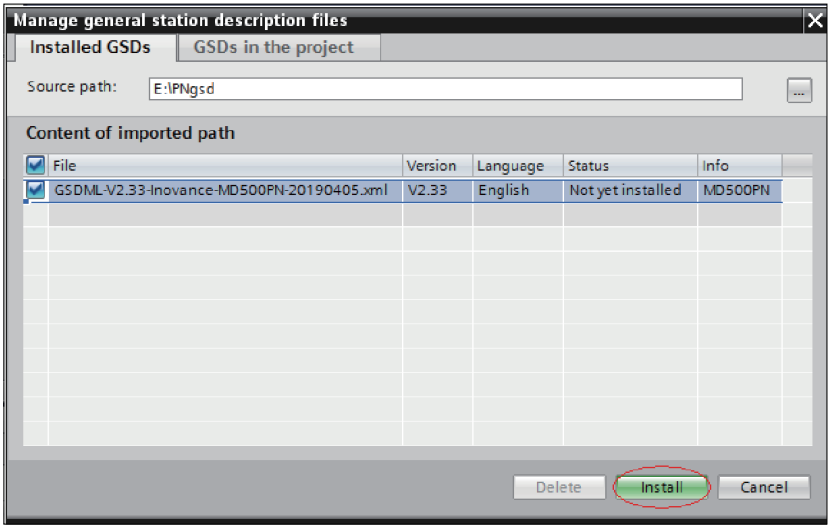
3. In the hardware catalog, locate the device HPFN-20 and check the XML version information (highlighted in red in the figure). It must match the installed XML that supports S2 redundancy. If not, select the correct version from the drop-down list.



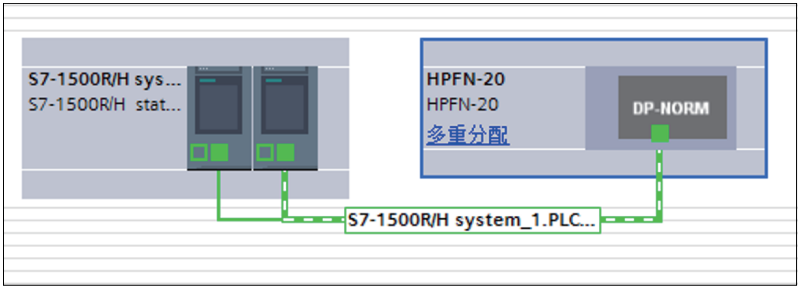
4. After adding a slave, right-click "Unassigned" of the slave and choose "Assign to New IO Controller", as shown in the figure below.



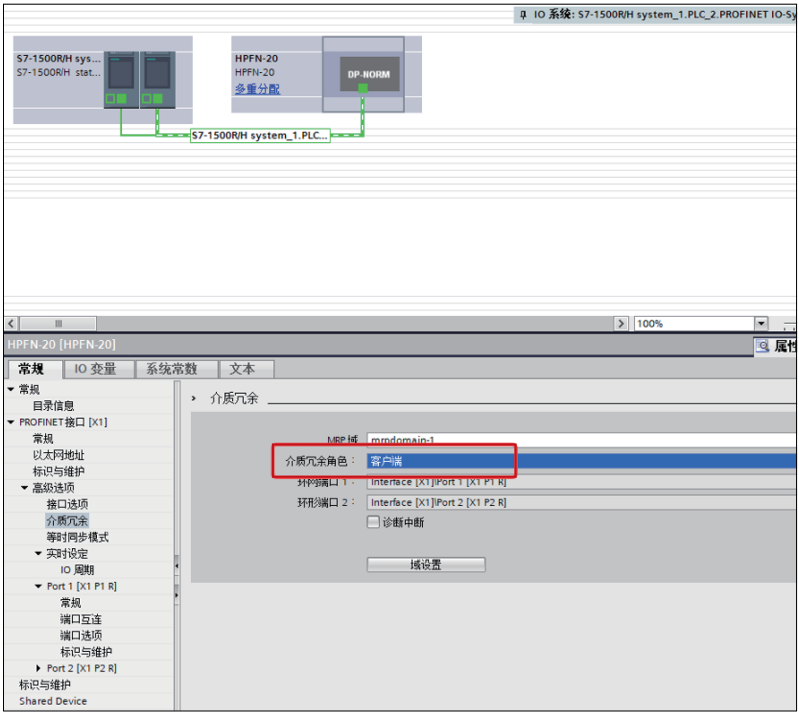
5. In the dialog box, check both interfaces and click "OK".



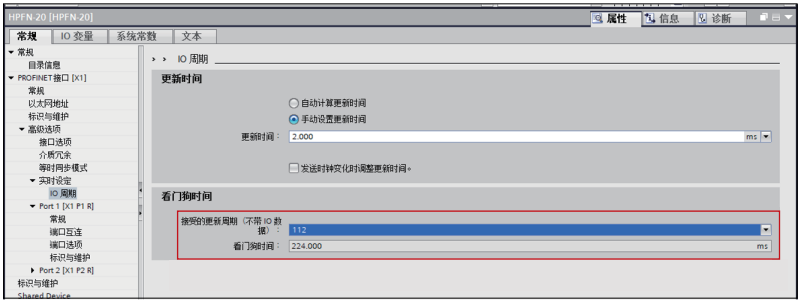
The following figure shows the correct configuration.



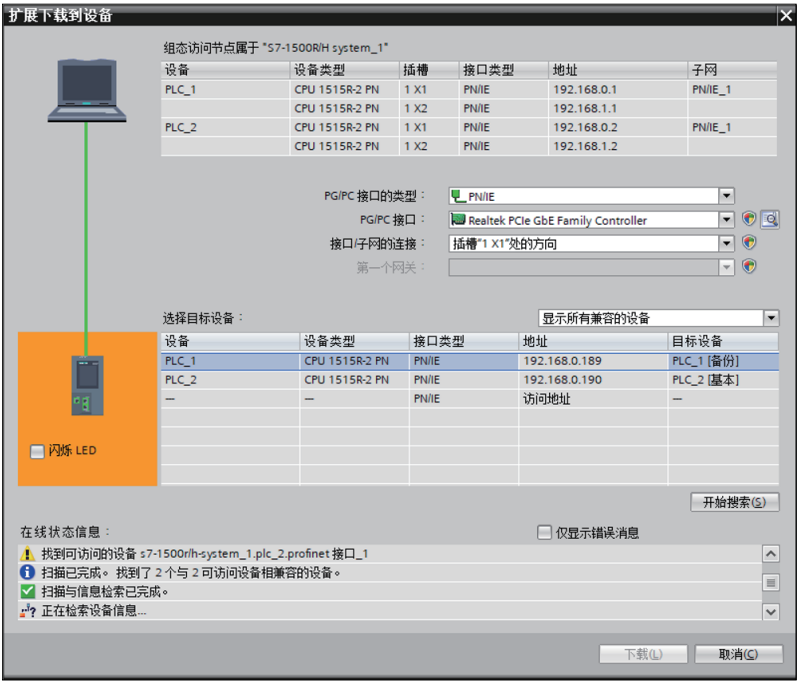
6. Select the slave. In "Media Redundancy", change "Media Redundancy Role" to "Client" (mandatory).



7. In "IO Cycle", modify the watchdog time to be greater than 222 ms (this value may vary slightly depending on the IO update cycle; follow TIA Portal prompt).



8. Select the appropriate message, compile it, and click "Download".



Note

If the PC is connected to port X1 of a redundant PLC, two PLCs can be detected. Select the primary PLC for downloading. The one with "Primary" in the lower-left corner of the PLC panel is the primary PLC and that with "Backup" is the slave PLC.

9. After downloading, connect the entire network into a ring network: Connect the master PLC's X1 free port to the HPFN-20, and connect the HPFN-20's free port back to the slave PLC's X1 free port. Except for the topology between master and slave PLCs, the connection order of other devices does not need to be checked.
10. After confirming the correct topology, power on the slave PLC or switch it to RUN (keep the master PLC in RUN). Wait for a while; the slave PLC will synchronize the master PLC's configuration and application. If correct, the indicators of both the master and slave PLCs will be green. If the master-slave topology is incorrect or the network is not a complete ring, synchronization will fail, and the PLC will report an error or fail to enter RUN.
11. When both PLCs are in RUN, if the master PLC is powered off or switched to STOP, the slave PLC automatically switches to the primary mode, and the network continues to operate normally.

7.3 PN Card Online Commissioning

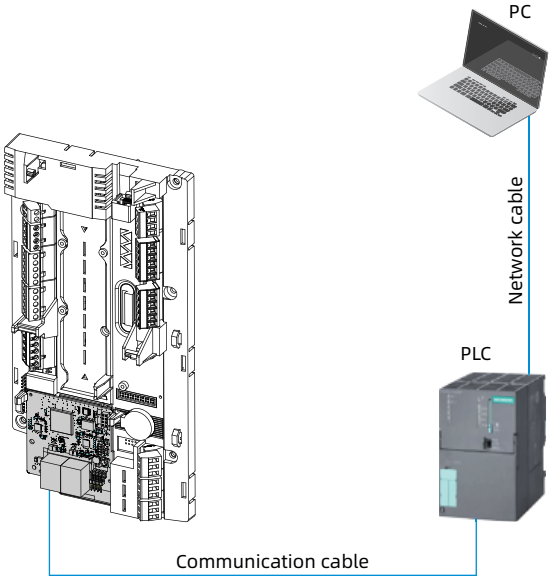


Figure 7-1 Commissioning network wiring

Table 7–1 PN commissioning parameter configuration

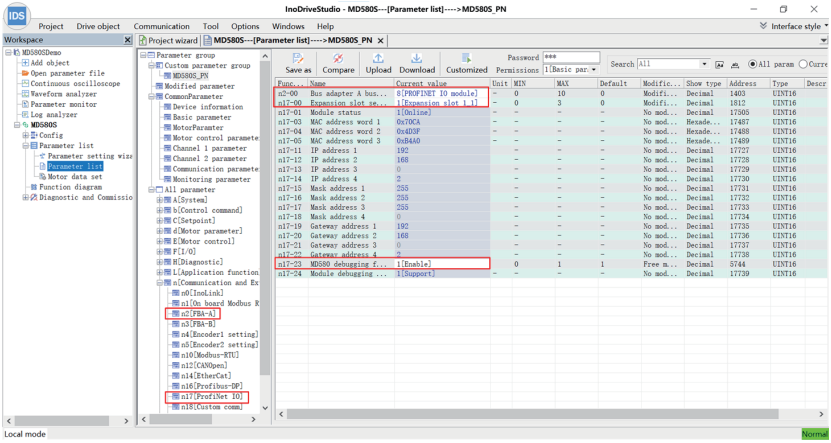
Param. No.	Param. Name	Default	Setting Range	Description
n17-23	MD580S commissioning function	1	0: Disabled 1: Enabled	-
n17-24	Module commissioning function status	0	0: Module not active 1: Supported 2: Not supported for communication modules 3: Disabled for MD580S 4: Not supported for communication modules and disabled for MD580S	The PN communication card support for the commissioning function and its activation status can be checked based on n17-24.

InoDriveStudio commissioning function use

1. Before using the commissioning function, complete the step "Configuring slaves on the S7-300 master" in *"7.1 Setting PROFINET I/O Communication Between an AC Drive and*

an S7-300 Controller" on page 24. Ensure that all MD580-SI-PN1 indicators are steady green and that communication between the master and slaves are established.

2. Set the n2-00 parameter in group n2 to 8 [PROFINET IO module]. For the PROFINET IO module in group n17, set n17-00 to the corresponding expansion slot, enable n17-23 [MD580S commissioning function], and check whether n17-24 displays "Supported" (indicating that PN commissioning is supported). See the figure below.



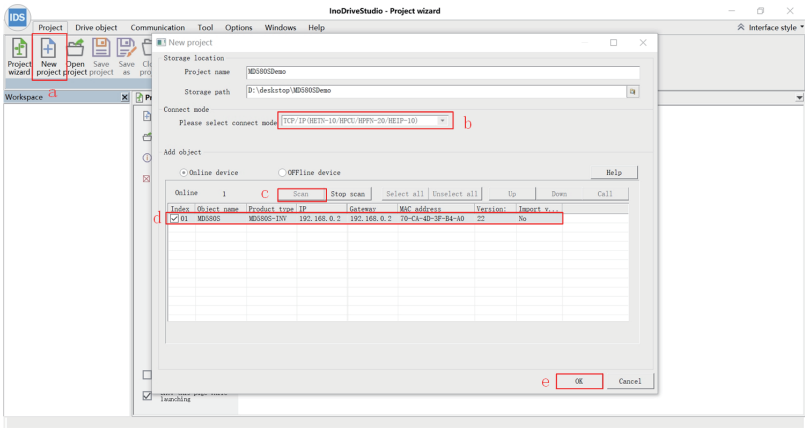
a. Use the software tool InoDriveStudio to recreate a project.

b. Select the TCP/IP (HETN-10/HPCU/HPFN-20/HEIP-10) connection mode.

c. Click "Scan".

d. Confirm the device information.

e. Click "OK" to access the background commissioning screen, as shown in the figure below.



8 Troubleshooting

The following table describes the faults that may occur during the use of this expansion card with the AC drive.

<table>
<tr><th colspan="2">Description</th><th>Solution</th></tr>
<tr><td colspan="2">After the AC drive is powered on, all the indicators on the expansion card remain off.</td><td>1. Check that the expansion card is properly installed.
2. Replace the expansion card.</td></tr>
<tr><td colspan="2">After the AC drive is powered on, the MODULE indicator is red and blinking.</td><td>The MAC address is incorrect. Change the expansion card.</td></tr>
<tr><td colspan="2">After the AC drive is powered on, the MODULE indicator is red and steady on.</td><td>The expansion card is abnormal. Power on the AC drive again or replace the expansion card.</td></tr>
<tr><td colspan="2">After the AC drive is powered on and stabilized, the MODULE indicator is orange and steady on.</td><td></td></tr>
<tr><td rowspan="2">Connection fails after the configuration is downloaded.</td><td>After configuration loading, the INOBUS and MODULE indicators on the PN card are green and steady on, and the FIELDBUS indicator is red and blinking.</td><td>1. Check that the cable is properly connected.
2. Check that the upstream PN node works properly.
3. Check whether a device name is assigned to this node through the PLC.
4. Check that the GSDML file used for the configuration is correct.</td></tr>
<tr><td>After configuration loading, the INOBUS and MODULE indicators on the PN card are green and steady on, and the FIELDBUS indicator is orange and blinking.</td><td>Check that the GSDML file used is correct.</td></tr>
<tr><td colspan="2">After configuration loading and successful connection, the PLC often enters the STOP state automatically.</td><td>1. Check if the cable is securely connected.
2. Add the OB82, OB83, OB86, and OB122 function blocks to the PLC.</td></tr>
</table>

Description		Solution
After configuration loading, the PLC communication indicator keeps blinking in red and the AC drive reports communication failure.	The AC drive reports fieldbus adapter communication timeout, and the FIELDBUS indicator on the PN card turns red and green alternately.	1. Check the cable connection. 2. Check whether a non-PN device is using the IP address of the PN node. 3. Check if a ring network is connected, but the "Media Redundancy Manager" is not set in the PLC configuration or the node is not set as a device in the ring network.
After the connection is successful, all indicators on the PLC are ON in green, but data cannot be written into or read from the AC drive.	No data can be written/read.	Check whether the operated address is correct. For example, if both the I and Q addresses of the station are 520 to 531 (note that they may start from different numbers), the PZD1 and PZD2 data written to the drive are stored in QW520 and QW522, respectively. For S7-300 or S7-400 PLCs, PQW is required. If SFC15 is used, check whether RET_VAL of the SFC15 block is 0. If not, an invocation error has occurred. Resolve the error and invoke the function block again.
	PZD writing/ reading fails starting from a certain PZD.	Check whether the message type supports this PZD.
	-	Check the logic relations. Check whether the same PZD is assigned with values for multiple times in a certain logic relation (check whether the value given by the PLC is correct under the logic relation in the monitoring table of the PLC).

Service and Support

Should you encounter a safety accident during the use or operation of the product, or face challenges in operating and maintaining the equipment, which remain unresolved after the relevant documentation is consulted, we provide multiple channels to ensure prompt resolution:

- Channel #1: Contact service@inovance.com.



- Channel #2: Visit https://www.inovance.com/global to access document downloads, after-sales support, spare parts ordering, repair applications, and authenticity verification services.
- Channel #3: Download My Inovance app (https://zshc-eu.inovance.com/download-pc/) where you can access products info and documentation, and query product parameters.
- Channel #4: For equipment installation and commissioning, out-of-warranty troubleshooting, on-site production support, spare parts purchase, repair, and other services, visit My Inovance App - Service Mall to place an order (Link: *https://zshc.inovance.com/download* or search from App Store on smartphone).

We are committed to providing you with quick and professional technical support, and we look forward to your satisfaction and trust.

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www.inovance.com

Add.: Inovance Headquarters Tower, High-tech Industrial Park,
Guanlan Street, Longhua New District,
Shenzhen 518000, P.R. China
Tel: (0755) 2979 9595 Fax: (0755) 2961 9897

Suzhou Inovance Technology Co., Ltd.

www.inovance.com

Add.: No. 52, Tian E Dang Road, Wuzhong District, 215104,
Suzhou City, Jiangsu Province, P.R. China
Tel: (0512) 6637 6666 Fax: (0512) 6285 6720