VEDA IN DRIVES

RD11 option ProfiNet

Operation Manual

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Operation Manual of PROFINET RD11 Series Expansion Card

1 Product Overview

Thank you for using VEDA-in DRIVES RD11 series frequency inverter and choosing RD11 PROFINET expansion card. The card is composed of two boards, RD11PN_CJ、RD11PN_CN, which are connected by communication line. The physical diagram of the two boards is shown in Figure 1.1

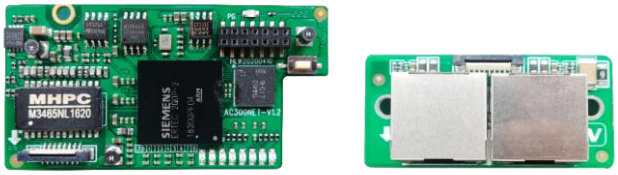


Figure 1.1 Hardware object diagram

2 Hardware layout and RJ45 interface

2.1 Hardware Layout

The hardware layout of RD11 option ProfiNet card is shown in Figure 2.1

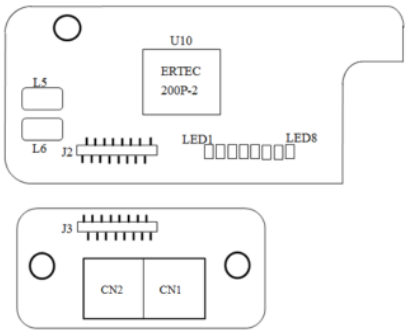


Figure 2.1 Hardware layout

The communication status of RD11 option ProfiNet card can be displayed by indicator light. The meaning of different status of each indicator is shown in Table 2.1

Table 2.1 description of indicator light

Indicator light	Indicator status	State description	Processing method
Power	Light on	The power supply is normal	-
	Light off	Abnormal power supply	Power on or replace the expansion card
Led1	Light on	RJ45 port is not started, and the power system is faulty	Check whether the network cable is connected correctly, and check whether the GSD version or configuration is wrong
	Light off	RJ45 port is started, and the power system is normal	-

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Led2	Flashing	Inverter fault	Check the frequency inverter fault type, and then do further processing
	Light off	The frequency inverter is normal	-
Led3	Flashing	Abnormal communication check between expansion card and frequency inverter	Check the version of frequency inverter PN card and software; Observe whether the card is inserted into the frequency inverter; replace the expansion card
	Light off	Normal	-
Led4	Flashing	The function of the expansion card to read and write the inverter is abnormal	Confirm whether the GSD file is correct; Check whether the selected address of PZD is correct
	Light off	Normal	-
Led5	Flashing (0.25s)	Abnormal connection of master station	Check the wiring of the master station
	Flashing (0.5s)	Abnormal connection of master station	The master station is connected to the slave station or is downloading PLC program
	Light off	Master slave communication is normal	-
Link0/1	The green light is on	The power supply of network cable is normal	-
	The green light is off	The power supply of network cable is abnormal	Check whether the communication line is plugged in properly
	The yellow light is on	Communication is normal	-
	The yellow light is flashing	Establishing communication	-

2.2 PROFINET RJ45 interface description

RD11PN1 is connected with PROFINET master station by standard Ethernet RJ45 socket. Its pin definition is consistent with that of standard Ethernet pin, both cross line and direct connection are available

Table 2.2 PROFINET communication terminal description

Terminal name	Explain
Network port CN1	The terminal has no direction and can be connected to the terminal near PLC. Facing RJ45, the right side is network port 1, and the left side is network port 2.
Network port CN2	

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3 Communication Configuration Description

RD11 option ProfiNet card supports RD11 series frequency inverters. The relevant function codes should be set for the RD11 option ProfiNet card to communicate with the frequency inverter normally

3.1 RD11 Communication Configuration

3.1.1 Description of RD11 Communication Configuration

Table 3.2.1 RD11 function code setting

Function code	Name	Setting range	Setting value	Meaning
F01.01	Operation command selection	0: Keyboard given 1: Terminal setting 2: RS485 3: Purchase card given 4: Terminal switching command given	3	The running command is given by card
F01.02	Frequency given source channel	0: Keyboard number given 1: Keyboard analog potentiometer setting … 10: Purchase card	10	Frequency command is given by card
F01.11	Upper limit frequency source selection	Select the given source of frequency inverter upper limit 0: Upper limit frequency given 1: Reservation 2: Voltage analog VS given 3: Current or voltage analog AI given 4: Current analog AS given 5: Terminal pulse PUL given 6: RS485 communication given 7: Purchase card	-	If you use card to limit the upper limit frequency, you need to set this to 7
F03.41	Torque command setting	0: Keyboard number 1: Keyboard potentiometer setting … 7: Purchase card	-	If the torque command is to be given by card, it is set to 7
F03.54	Speed limit selection of forward rotation in torque control	0: Set by function code F03.56 1: Reservation … 7: Purchase card * F03.56	-	If you need to limit the speed through the card, you need to set this to 7
F03.55	Speed limit selection of reverse rotation in torque control	0: Set by function code F03.57 1: Reservation … 7: Purchase card * F03.57	-	If you need to limit the speed through the card, you need to set this to 7
F03.56	Maximum forward speed when controlled by torque	0.0%～100.0%	-	Relative maximum output frequency (F01.10)

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F03.57	Maximum reverse speed when controlled by torque	0.0%～100.0%	-	Relative maximum output frequency (F01.10)
F12.32	Treatment of disconnection between PN card and inverter	0: No detection 1: Alarm and freely stop 2: Warn and continuously run		Treatment method of card after detection of disconnection with control board (Ebus4/A. buS)
F12.43	Master slave communication failure action	0: No detection 1: Alarm and freely stop 2: Warn and continuously run	-	Handling mode in case of master-slave communication failure (when PLC is disconnected from equipment or PLC is in stop state, Ebus3/A. buS is reported)
F12.50	Processing method of communication disconnection of expansion card (frequency inverter processing)	Ones place: EX-A breaking treatment Tens place: EX-B breaking treatment 0: No detection 1: Alarm and freely stop 2: Warn and continuously run	-	Processing mode selection in case of communication failure between card and frequency inverter,. (frequency inverter self detection, reporting Ebus1/A. buS)

3.1.2 Address Description of RD11 Communication Control Group

Table 3.2.2 Address description of RD11 communication control group

Address definition	Function description	Explanation of data significance	R/W characteristic
0x3100	Communication given frequency	0.01 Hz, e.g.: 5000 corresponds to 50Hz	R/W
0x3101	Communication command setting	0: No command 1: Forward running 2: Reverse running 3: Forward jog 4: Reverse jog 5: Slow down and stop 6: Freely stop 7: Fault reset 8: Run forbidden command 9: Run allow command	R/W
0x3104	Communication given upper limit frequency	Unit: 0.01Hz	R/W
0x3105	Communication torque setting	Unit 0.1%	R/W
0x3106	Maximum forward frequency limit of torque control	Unit 0.1%	R/W
0x3107	Maximum reverse frequency limit of torque control	Unit 0.1%	R/W
0x3108	Communication given PID setting value	Unit 0.1%	R/W
0x3109	Communication given PID feedback value	Unit 0.1%	R/W
0x310A	voltage setting of voltage frequency separation	Unit 0.1%	R/W
0x310B	Tension setting	0 ~ maximum tension	R/W
0x310C	Coil diameter setting	0 ~ maximum coil diameter	R/W
0x310D	Linear speed setting	0 ~ maximum linear speed	R/W
0x310E	Acceleration time 1	Set unit by function code F01.21	R/W
0x310F	Deceleration time 1	Set unit by function code F01.21	R/W

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0x3111	Torque current component	0 ~ 4000 (corresponding to 0.0% ~ 400.0%)	R/W
0x3112	Torque filtering time	0 ~ 6000 (corresponding to 0.000s-6.000s)	R/W
0x3113	Tension PID feedback	0 ~ 1000 (corresponding to 0.0% ~ 100.0%)	R/W
0x3114	Communication given torque limit in jog state	0 ~ 4000 (corresponding to 0.0% ~ 400.0%)	R/W
0x3115	Communication given torque limit in generation state	0 ~ 4000 (corresponding to 0.0% ~ 400.0%)	R/W

3.1.3 RD11 Communication Monitoring Function Code Or Address

Table 3.2.3 RD11 communication monitoring table

Parameter code (address)	Name	Explain		R/W
0x3102	Inverter status	Bit0	0: Shutdown state, 1: Running state	R
		Bit1	0: Non accelerated topic, 1: Accelerated state	
		Bit2	0: Non deceleration state, 1: Deceleration state	
		Bit3	0: Forward, 1: Reverse	
		Bit4	0: No fault, 1: Fault	
		Bit5	0: GPRS non lock, 1: GPRS lock	
		Bit6	0: No warning, 1: Warning	
		Bit7	0：No-ready，1：Ready	
		Bit8	0: No fault in communication with control board 1: Communication failure with control board	
0x3010	Fault code / warning code (address corresponding function is invalid)	please use c00.36		R
0x3018	External borrowing inverter output terminal (address corresponding function is invalid)	Bit0: y terminal status Bit1: relay status Bit2: extended Y1 status Bit3: extended relay status		R
0x3019	AO1 output (address corresponding function is invalid)	the analog output of external borrowing frequency converter is 0-10000		R
0x301A	AO2 output (address corresponding function is invalid)	0 ~ 10000		R
C00.00 (0x2100)	Given frequency	0.01Hz		R
C00.01 (0x2101)	Output frequency	0.01Hz		R
C00.02 (0x2102)	Output current	0.1A		R
C00.03 (0x2103)	Input voltage	0.1V		R
C00.04 (0x2104)	Output voltage	0.1V		R
C00.05 (0x2105)	Mechanical speed	1rpm		R
C00.06 (0x2106)	Given torque	0.1%		R

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C00.07 (0x2107)	Output torque	0.1%	R
C00.08 (0x2108)	PID given	0.1%	R
C00.09 (0x2109)	PID feedback	0.1%	R
C00.10 (0x210A)	Output power	0.1%	R
C00.11 (0x210B)	Bus voltage	0.1V	R
C00.12 (0x210C)	Module temperature 1	0.1℃	R
C00.13 (0x210D)	Module temperature 2	0.1℃	R
C00.14 (0x210E)	Input terminal X On state	-	R
C00.15 (0x210F)	Output terminal X on state	-	R
C00.16 (0x2110)	AI1 analog input value	0.00%（0.001V）	R
C00.17 (0x2111)	AI2 analog input value	0.00%（0.001V）	R
C00.18 (0x2112)	Retain	-	R
C00.19 (0x2113)	Pulse signal PUL input value	0.001kHz	R
C00.20 (0x2114)	Analog output AO1	0.01V/0.01mA/0.01kHz	R
C00.21 (0x2115)	Analog output AO2	0.01V/0.01mA/0.01kHz	R
C00.22 (0x2116)	Counter count value	1	R
C00.23 (0x2117)	Operation time of this power on	0.1 hour	R
C00.24 (0x2118)	Accumulated operation time of the machine	hour	R
C00.25 (0x2119)	Power level of frequency inverter	Kw(0.1Kw)	R
C00.26 (0x211A)	Rated voltage of frequency inverter	V	R
C00.27 (0x211B)	Rated current of frequency inverter	A（0.1A）	R
C00.28 (0x211C)	Software version	-	R
C00.29 (0x211D)	PG feedback frequency	0.01Hz	R
C00.30 (0x211E)	Timer timing time	Second, minute, hour	R
C00.31 (0x211F)	PID output value	0.1%（0.01%）	R
C00.32 (0x2120)	Sub version of inverter software	-	R
C00.33 (0x2121)	Encoder feedback angle	0.1°	R
C00.34 (0x2122)	Accumulated error of Z pulse	1	R
C00.35 (0x2123)	Z pulse count	1	R

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C00.36 (0x2124)	Warning code fault	0 ~ 63 fault number, 64 ~ 128 warning number	R
C00.37 (0x2125)	Accumulated power consumption (low level)	1 KWh	R
C00.38 (0x2126)	Accumulated power consumption (high level)	10000 KWh	R
C00.39 (0x2127)	Power factor angle	1°, 0.1°	R

3.2 Description of Communication Configuration between RD11 option ProfiNet Card and PROFINET Master Station

After the communication between the main station and the main station is set up correctly, the communication between the main station and the main station can be realized by setting the communication card with the main station. Taking RD11 as an example, after the communication between RD11 option ProfiNet card and RD11 inverter is realized, it is necessary to connect with PROFINET master station correctly. After setting relevant configuration, the communication between RD11 option ProfiNet card and master station can be realized.

3.2.1 PROFINET Wiring Diagram

PROFINET supports a variety of connection modes. Through reasonable use of switches, different networking modes can be realized, as shown in the figure below

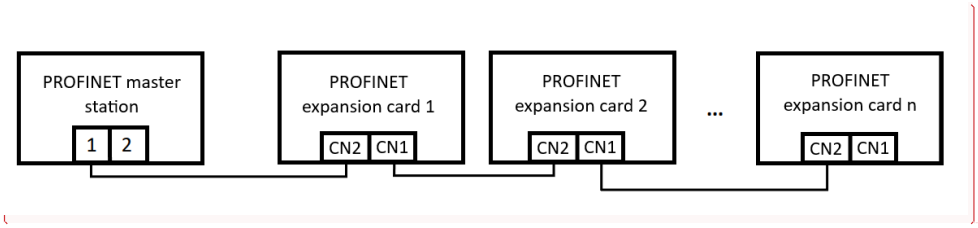


Figure 3.1 Schematic diagram of string connection

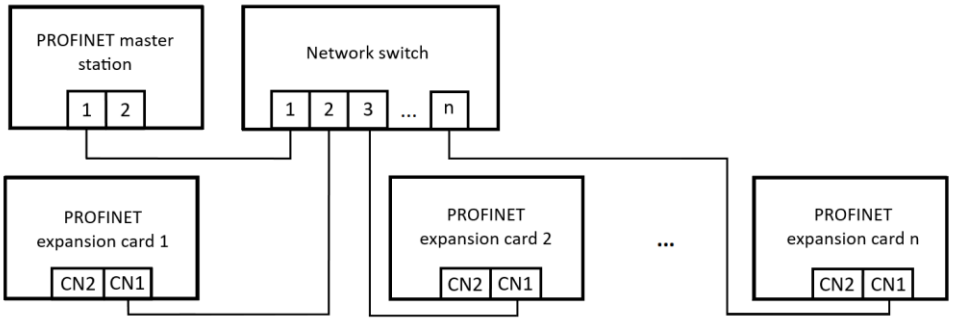


Figure 3.2 Schematic diagram of star connection

Добавлено примечание ([IC1]): Replace ac300

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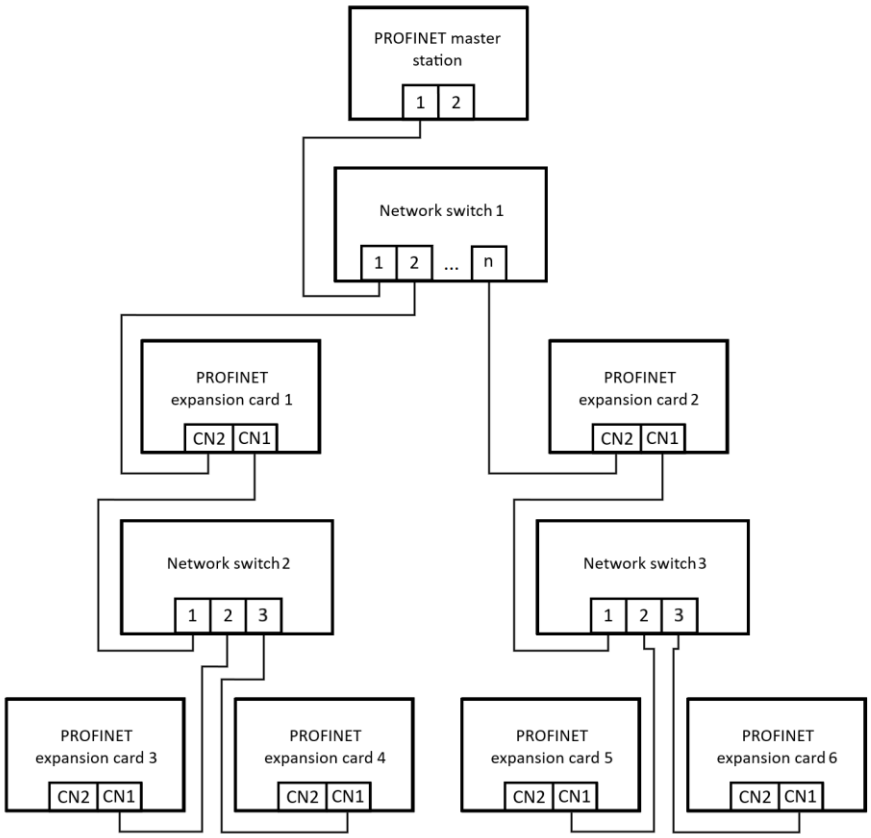


Figure 3.3. Schematic diagram of connection tree

3.2.2 communication description

RD11 option ProfiNet card requires customers to select different PZD lengths for transmission according to different requirements. Users can select the corresponding functions of each PZD in the configuration. The functions supported by each data format are shown in the table below

Table 3.3 data format description

Data type	Data length	Supported features
Standard telegram 1	PZD-2/2	Frequency inverter command and frequency setting Operation status and frequency feedback of frequency inverter
Standard telegram 2	PZD-4/4	Frequency inverter command and frequency setting 0 ~ 2 function parameters are written periodically Operation status and frequency feedback of frequency inverter 0 ~ 2 monitoring parameters are read periodically
Standard telegram 3	PZD-6/6	Frequency inverter command and frequency setting 0 ~ 4 function parameters are written periodically Operation status and frequency feedback of frequency inverter 0 ~ 4 monitoring parameters are read periodically

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Standard telegram 4	PZD-8/8	Frequency inverter command and frequency setting 0 ~ 6 function parameters are written periodically Operation status and frequency feedback of frequency inverter 0 ~ 6 monitoring parameters are read periodically
Standard telegram 5	PZD-10/10	Frequency inverter command and frequency setting 8 ~ 0 cycle write function Operation status and frequency feedback of frequency inverter 0 ~ 8 monitoring parameters are read periodically
Standard telegram 6	PZD-12/12	Frequency inverter command and frequency setting 0 ~ 10 function parameters are written periodically Operation status and frequency feedback of frequency inverter 0 ~ 10 monitoring parameters are read periodically

PZD is the process data. The master station of PZD can send instructions to the frequency inverter periodically and read the current status of the frequency inverter periodically. Each PZD can select configuration and select the parameters to be interacted between the master station and the slave station. PZD1 and PZD2 are fixed configuration and cannot be modified. The configuration of PZD3 ~ PZD12 can be changed according to the specific needs of users. The interactive data is shown in table 3.5

Table 3.4 Description of PZD interactive data

PZD（Master->Slave）		
PZD1	PZD2	PZD3～PZD12
Inverter command	Frequency command of frequency inverter	Other frequency inverter function parameters
PZD（Slave->Master）		
PZD1	PZD2	PZD3～PZD12
Inverter status	Frequency feedback of frequency inverter	Other monitoring parameters

Table 3.5 Description of data sent by master station

Master station sends data		
PZD1	Inverter control command 0: No command 1: Forward running 2: Reverse running 3: Forward jog 4: Reverse jog	5: Slow down and stop 6: Freely stop 7: Fault reset 8: Run forbidden command 9: Run allow command
PZD2	Frequency command of frequency inverter, unit: 0.01Hz	
PZD3-PZD12	It can be configured with different control parameters (0x3xxx group address) to issue periodic instructions to the frequency inverter	

Table 3.6 Description of data sent by slave station

Sending data from slave station		
PZD1	Bit0	0: Shutdown state, 1: running state
	Bit1	0: non accelerated state, 1: accelerated state
	Bit2	0: non deceleration state, 1: deceleration state
	Bit3	0: forward, 1: reverse
	Bit4	0: no fault, 1: fault
	Bit5	0: GPRS unlock, 1: GPRS lock status
	Bit6	0: no warning, 1: warning
PZD2	Frequency feedback of frequency inverter, unit: 0.01Hz	
PZD3-PZD12	It can be configured for different monitoring parameters (C00.xx group and part of 0x300 group address) to read data periodically from frequency inverter	

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4 PROFINET configuration

Importing a GSD file

In the "Options" tab, select "manage general station description file".

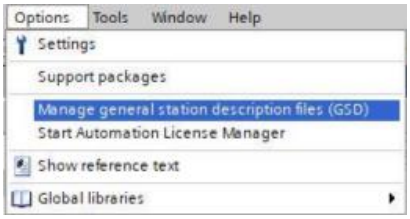


Figure 5.1. GSD import (1)

In the next window, select the GSD file and click the "Install" button.

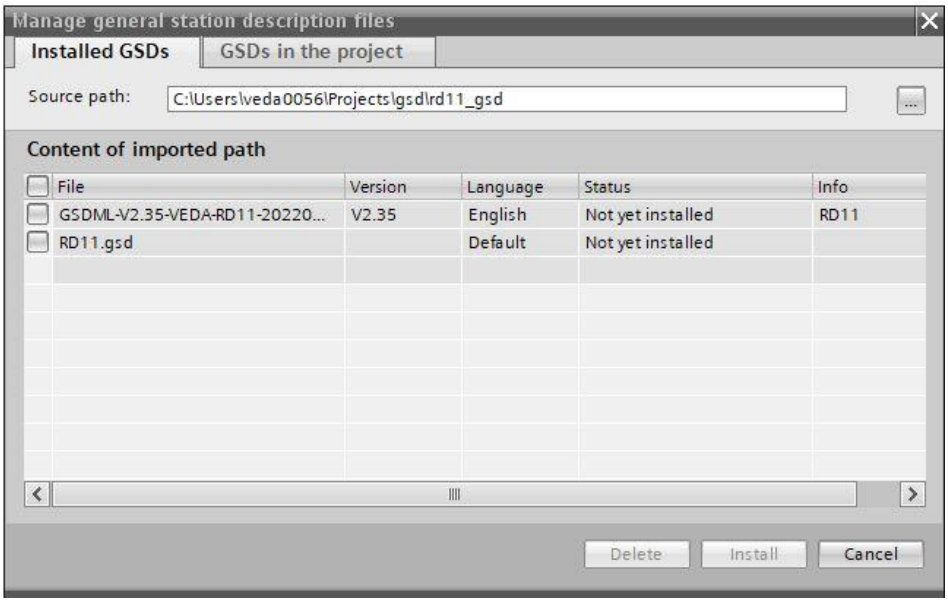


Figure 5.2. GSD import (2)

Setting up a Slave device

Select the "Devices and networks in the project" tab. Next, select "Standard, MRP" in the RD11 folder

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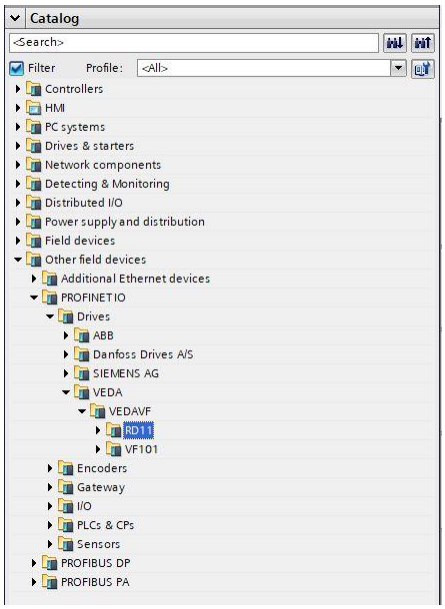


Figure 5.3. Setting up a slave device (1)

Select the Ethernet port of the RD11 and set in the "Assign IP adress" tab the IP-adress of the slave device

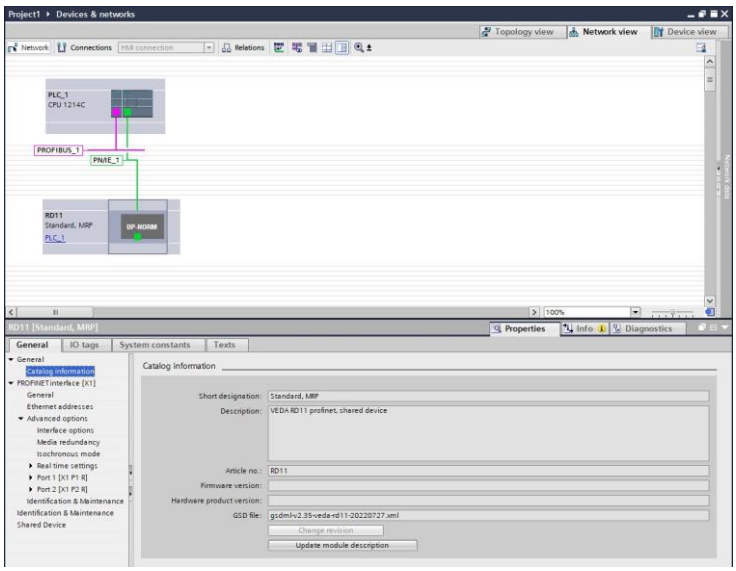


Figure 5.4. Setting up a slave device (2)

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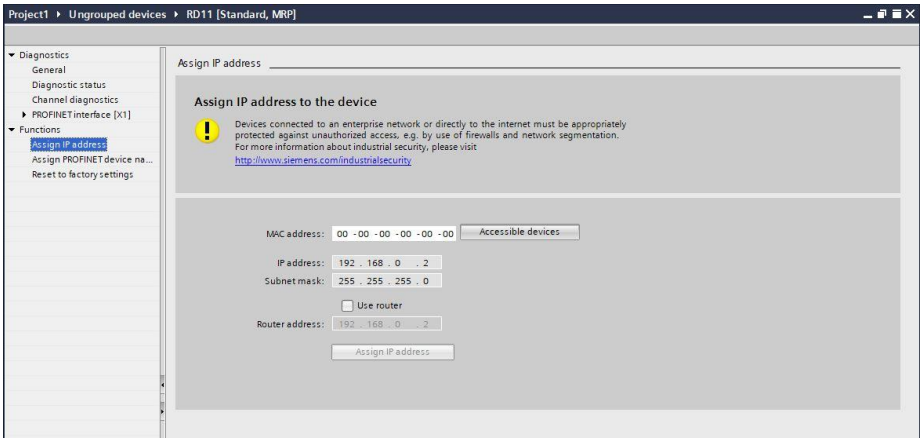


Figure 5.5. Setting up a slave device (3)

Data communication

Select the slave device, switch to the "device view" tab, expand the module in the right directory and select the transmitted data according to the number of parameters to send and receive. For example, to send four parameters from the master to the slave, select Standard telegram 2.

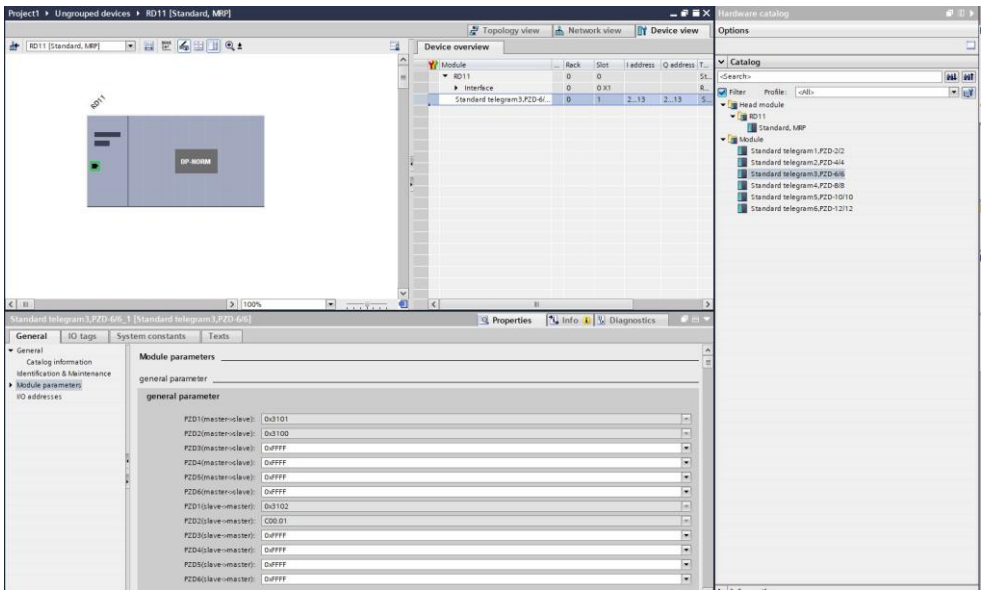


Figure 5.6. Setting up a data communication

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Setting the slave name

Select the slave device and click on the "online" tab and then "assign device name". Click "update list", the device name must match the name in "configures PROFINET device".

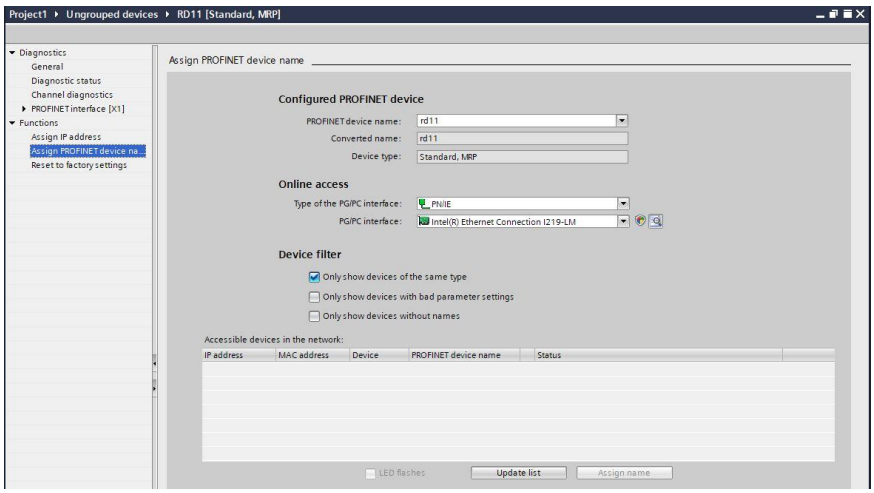


Figure 5.7. Setting the slave name

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