

ADIO-PN (TIA Portal V16 Guide)

User Manual MTO-ADIOPNU1-V1.0-2202US

Thank you for purchasing an Autonics product.

This user manual contains information about the product and its proper use, and should be kept in a place where it will be easy to access.

Autonics

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Preface

Thank you for purchasing Autonics products.

Be sure to read and follow the **Safety Precautions** thoroughly before use.

This manual contains information about the product and how to use it properly, so keep it in a place where users can easily find it.

Manual Guide

- Use the product after fully reading the contents of the manual.
- The manual explains the product functions in detail and does not guarantee the contents other than the manual.
- Any or all of the manual may not be edited or copied without permission.
- The manual is not provided with the product.
- Download and use from our website (www.autonics.com).
- The contents of the manual are subject to change without prior notice according to the improvement of the product's performance, and upgrade notices are provided through our website.
- We put a lot of effort to make the contents of the manual a little easier and more accurate. Nevertheless, if you have any corrections or questions, please feel free to comment through our website.

Common Symbols in the Manual



Failure to follow instructions may result in serious injury or death.



Failure to follow instructions may result in injury or product damage.



Supplementary explanation of the function



Example of that function



Important information about the feature

1. ADIO-PN (TIA Portal V16 Guide)



- Be sure to see the product manual of the ADIO-PN (PROFINET) model and follow the precautions.
- This guide document describes the configuration and diagnostic information of the ADIO-PN (PROFINET) model based on TIA Portal V16 which is Siemens' project planning software.

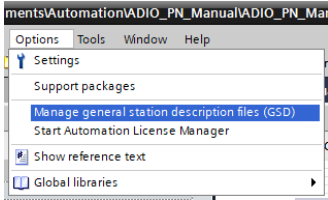
1.1. Install GSDML File

The GSDML file describes specific data of the PROFINET Slave required for the PROFINET project planning software, and defines slots and modules, process data, and valid values for the configuration of IO-Link communication.

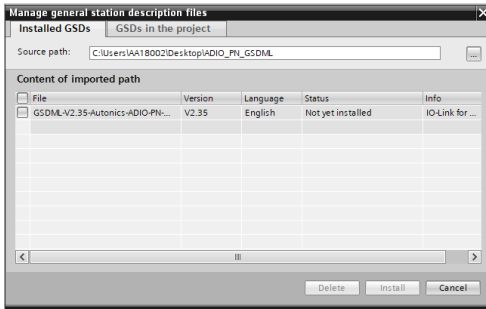
1. Download the ADIO-PN's GSDML file on the Autonics website.
2. Launch TIA Portal V16.
3. Install the GSDML file.

Installation of the GSDML file

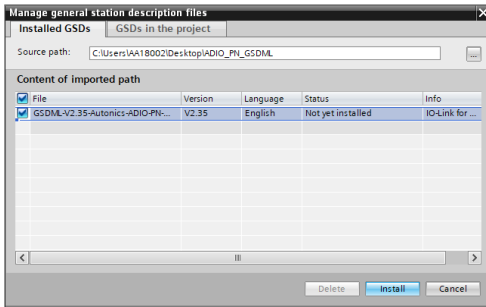
1. Select **Options » Manage general station description files (GSD)**.



2. Select a folder or source that contains the GSDML file.

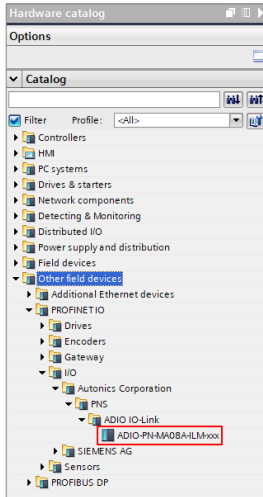


3. Select the GSDML file and click **Install**.

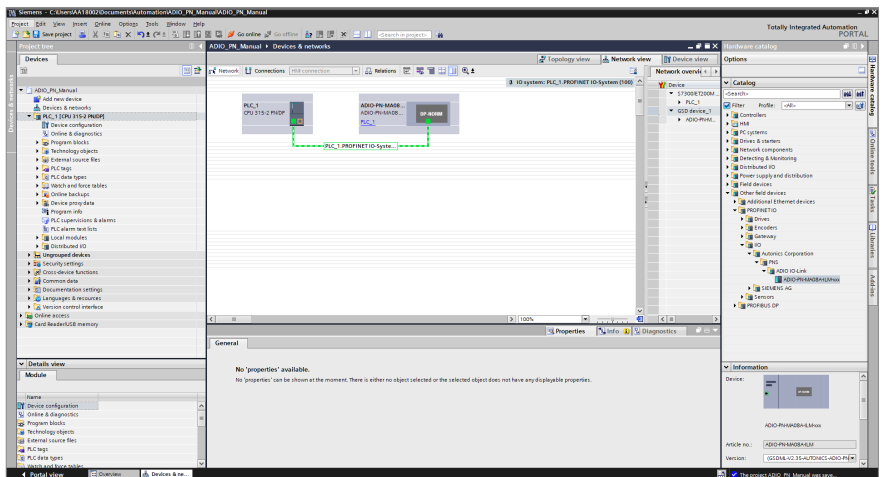


1.2. Integrate to the PROFINET Project

1. The ADIO-PN is created in the **Hardware catalog** after the installation of the GSDML file is complete.

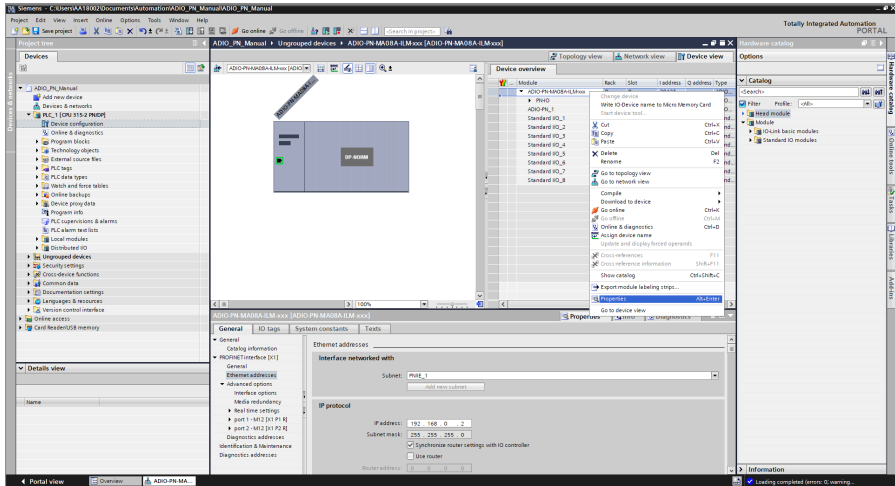


2. Drag and drop the ADIO-PN into the **Network view** and connect with PLC.

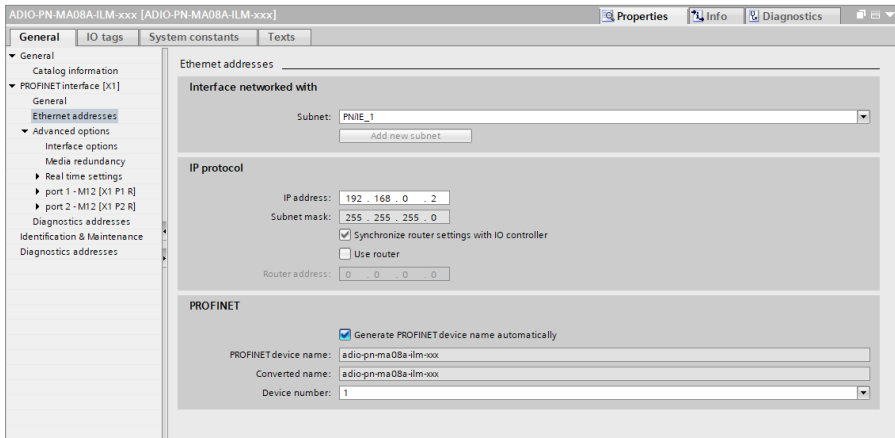


1.3. Device Name and PROFINET Address

Click the module on the left side of **Device view** or double-click the module of slot 0 in the **Device overview**, then the configuration parameters of the IO-Link Master are displayed.



You can configure the PROFINET device name and IP address in the **Ethernet addresses** below.



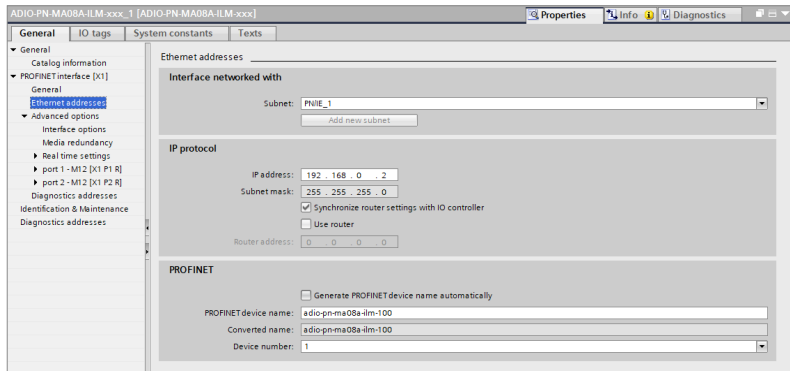
1.3.1. Set Device Name

Be sure to consider the number of rotary switches on the ADIO-PN to set a device name. Refer to the table below.

Rotary switches	Description	Value
000	The device name stored in the ADIO-PN's EEPROM	PROFINET device name
001 to 999	Set the device name the same as the number of rotary switches.	ADIO-PN-MA08A-ILM-□□□□

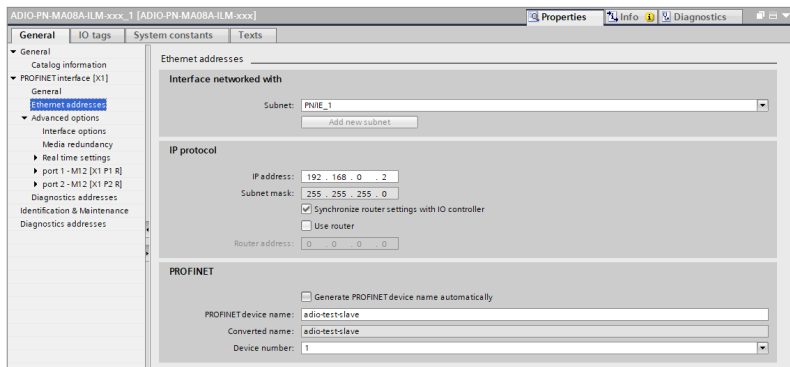
- **The rotary switches are set to the value of 001 to 999.**

Enter the number of rotary switches at the last position of the model name and download to the PLC.



- **The rotary switches are set to the value of 000.**

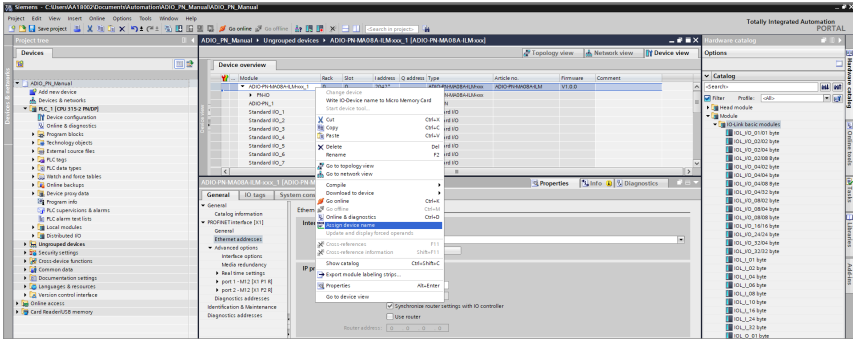
Enter a device name according to the PROFINET Device Name Rules.



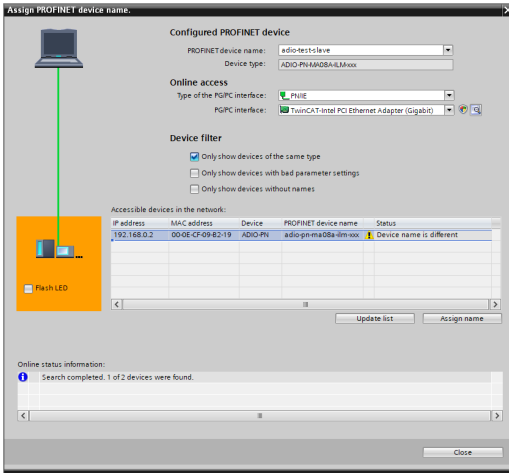
1.3.2. Assign Device Name

- The rotary switches are set to the value of 000.

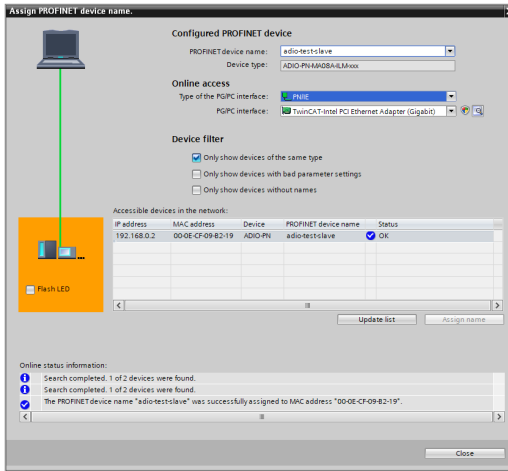
1. Right-click on the module of slot 0 in the **Device overview** and select **Assign device name**.



2. Select **Update list**.



3. When an available device is displayed, select **Assign name** to assign the device.
The device identification is processed via MAC address or Flash test.



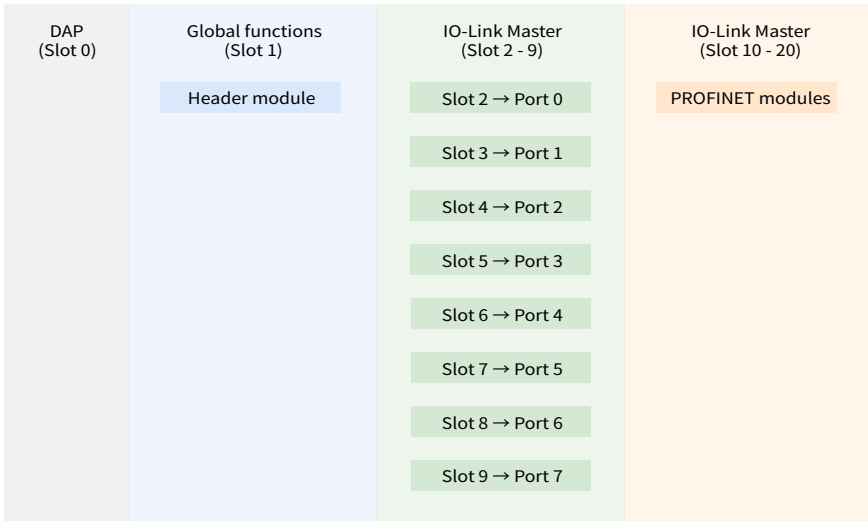
1.4. Configure I/O Port

The ADIO-PN as a modular device, consists of the header module and data modules.

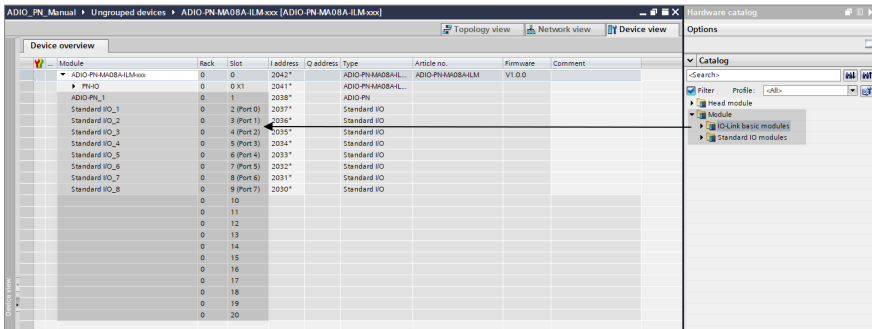
To configure the ADIO-PN in the PROFINET system, you need to assign the data modules to the suitable slot.

Refer to the figure below for the structure of slots in the ADIO-PN and its screen in the TIA Portal.

Structure of the slots



TIA Portal screen



Factory settings

Be sure to configure the slot 2 to 9 as the IO-Link or Standard IO modules corresponding to port 0 to 7 on the ADIO-PN. The factory settings of slots 2 to 9 are defined to the standard IO modules.

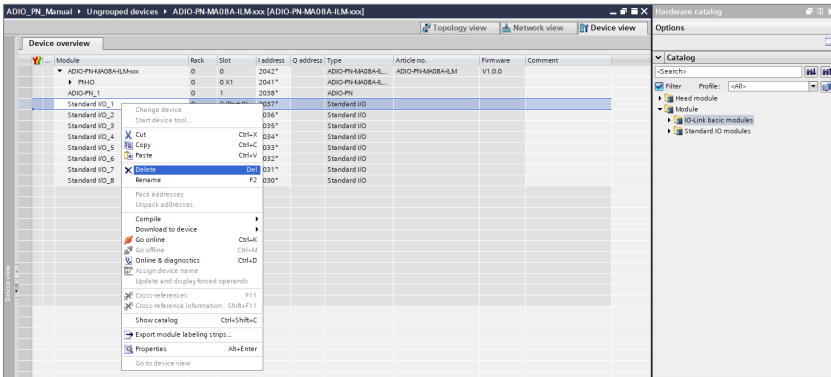
Module	Rack	Slot	I address	Q address	Type	Article no.	Firmware	Comment
ADIO-PN-MA08A-ILMxxx	0	0	2042*					
PN-IO	0	0 X1	2041*		ADIO-PN-MA08A-ILMxxx	ADIO-PN-MA08A-ILMxxx	V1.0.0	
ADIO-PN-1	0	1	2038*		ADIO-PN			
Standard IO_1	0	2 (Port 0)	2037*		Standard IO			
Standard IO_2	0	3 (Port 1)	2036*		Standard IO			
Standard IO_3	0	4 (Port 2)	2035*		Standard IO			
Standard IO_4	0	5 (Port 3)	2034*		Standard IO			
Standard IO_5	0	6 (Port 4)	2033*		Standard IO			
Standard IO_6	0	7 (Port 5)	2032*		Standard IO			
Standard IO_7	0	8 (Port 6)	2031*		Standard IO			
Standard IO_8	0	9 (Port 7)	2030*		Standard IO			
	0	10						
	0	11						
	0	12						
	0	13						
	0	14						
	0	15						
	0	16						
	0	17						
	0	18						
	0	19						
	0	20						



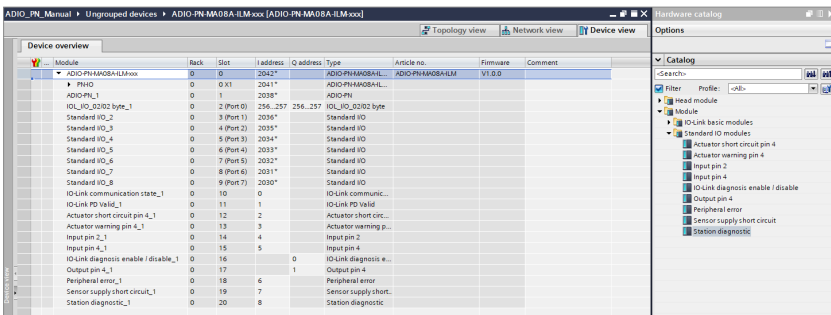
- For detailed information on the configuration of the IO-Link module, refer to 1.4.1, “IO-Link Mode”.
- For detailed information on the configuration of the standard IO modules, refer to 1.4.2, “Standard Input and Output Mode”.

Change the module

1. Select a module in the **Device overview**, right-click and then select **Delete**.



2. Select a desired module in the **Catalog** and double-click, or drag and drop into the suitable slot.



1.4.1. IO-Link Mode



Firstly check the process data length of the IO-Link device.

In general, you can find the related information on the instructions manual of the IO-Link device.

1. Select an IO-Link module suitable for the process data length of the IO-Link device in the **Catalog** and drag and drop into the desired slot.

The screenshot displays the TIA Portal software interface. The 'Devices' tree on the left shows the 'IO-Link' module selected. The 'Device overview' table in the center lists various modules, with 'IO-Link' highlighted. The 'Module parameters' dialog box is open, showing the 'IO-Link' tab. The 'Catalog' on the right shows the 'IO-Link' module selected. A red box highlights the 'IO-Link' module in the catalog, and a red arrow points to the 'IO-Link' module in the device overview table.

Module	Part	Slot	Address	Q address	Type
PS307-5	6ES7 307-1EA00-0AA0	0	2042		A...
PS307-5	6ES7 307-1EA00-0AA0	0	2041		A...
IO-Link	6ES7 307-1EA00-0AA0	0	2040		A...
IO-Link	6ES7 307-1EA00-0AA0	0	2039		A...
IO-Link	6ES7 307-1EA00-0AA0	0	2038		A...
IO-Link	6ES7 307-1EA00-0AA0	0	2037		A...
IO-Link	6ES7 307-1EA00-0AA0	0	2036		A...
IO-Link	6ES7 307-1EA00-0AA0	0	2035		A...
IO-Link	6ES7 307-1EA00-0AA0	0	2034		A...
IO-Link	6ES7 307-1EA00-0AA0	0	2033		A...
IO-Link	6ES7 307-1EA00-0AA0	0	2032		A...
IO-Link	6ES7 307-1EA00-0AA0	0	2031		A...
IO-Link	6ES7 307-1EA00-0AA0	0	2030		A...
IO-Link	6ES7 307-1EA00-0AA0	0	2029		A...
IO-Link	6ES7 307-1EA00-0AA0	0	2028		A...
IO-Link	6ES7 307-1EA00-0AA0	0	2027		A...
IO-Link	6ES7 307-1EA00-0AA0	0	2026		A...
IO-Link	6ES7 307-1EA00-0AA0	0	2025		A...
IO-Link	6ES7 307-1EA00-0AA0	0	2024		A...
IO-Link	6ES7 307-1EA00-0AA0	0	2023		A...
IO-Link	6ES7 307-1EA00-0AA0	0	2022		A...
IO-Link	6ES7 307-1EA00-0AA0	0	2021		A...
IO-Link	6ES7 307-1EA00-0AA0	0	2020		A...

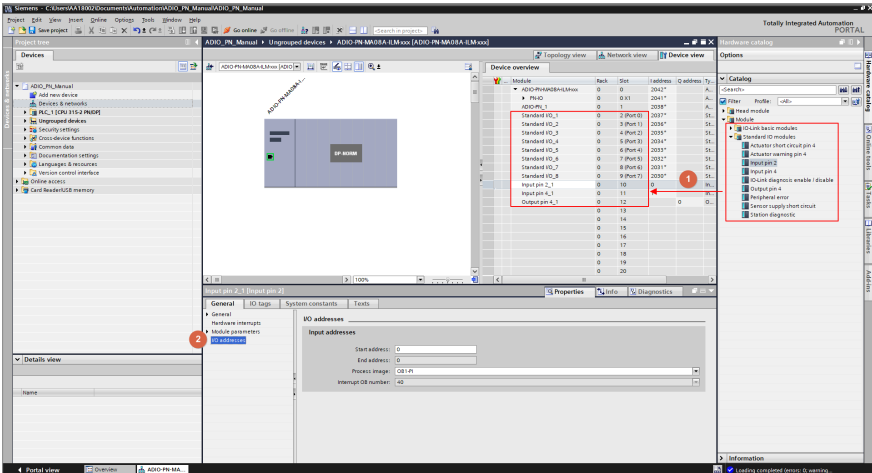
2. Double-click the IO-Link module to configure the IO-Link functions in the **Module parameters**.



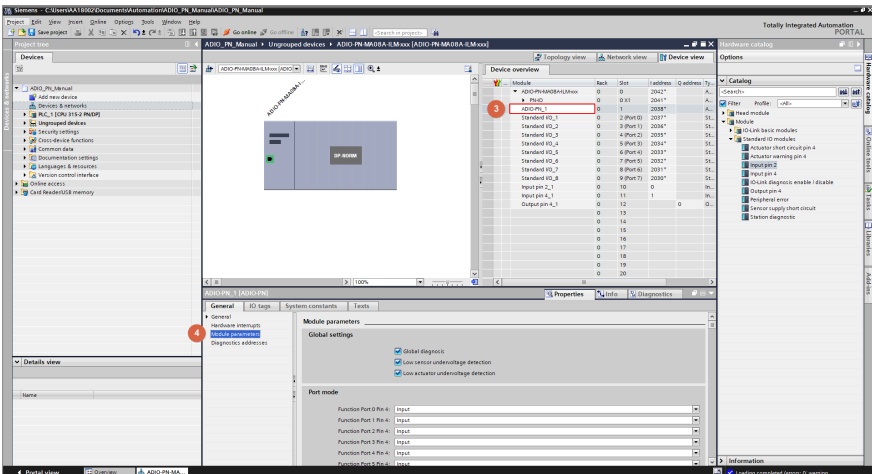
- For more information on the configuration method in TIA Portal, refer to 1.5, “Module Parameters”.
- For detailed information on the IO-Link functions, refer to 2.2.2, “Module Parameters: IO-Link”.

1.4.2. Standard Input and Output Mode

1. Select a Standard IO module in the **Catalog**, drag and drop into the desired slot.
Configure Input Pin 2 or 4 and Output Pin 4 modules additionally to set addresses for the process of input and output.



2. Double-click the header module of slot 1 to configure standard I/O functions in the **Module parameters**.





- For more information on the configuration method in TIA Portal, refer to 1.5, “Module Parameters”.
- For detailed information on the standard I/O functions, refer to 2.2.1, “Module Parameters: ADIO-PN”.

1.4.3. Addressing Modules

Double-click the module to change I/O addresses in the **I/O addresses**.

Enter I address (input address) or Q address (output address).

The screenshot displays the ADIO-PN software interface. The main window shows a 'Device overview' table with columns for Module, Rack, Slot, I address, Q address, and Type. The 'IOL_IIO_02/02 byte_1' module is selected, and its configuration is shown in the bottom panel under the 'I/O addresses' section.

Module	Rack	Slot	I address	Q address	Type
ADIO-PN-MA08A-ILM-xxx	0	0	2042*		ADIO-PN-MA08A-...
PH40	0	0 x1	2041*		ADIO-PN-MA08A-...
ADIO-PN_1	0	1	2038*		ADIO-PN
IOL_IIO_02/02 byte_1	0	2 (Port 0)	256_257	256_257	IOL_IIO_02/02 byte
Standard IIO_2	0	3 (Port 1)	2036*		Standard IIO
Standard IIO_3	0	4 (Port 2)	2035*		Standard IIO
Standard IIO_4	0	5 (Port 3)	2034*		Standard IIO
Standard IIO_5	0	6 (Port 4)	2033*		Standard IIO
Standard IIO_6	0	7 (Port 5)	2032*		Standard IIO
Standard IIO_7	0	8 (Port 6)	2031*		Standard IIO
Standard IIO_8	0	9 (Port 7)	2030*		Standard IIO
	0	10			
	0	11			
	0	12			
	0	13			
	0	14			
	0	15			
	0	16			
	0	17			
	0	18			
	0	19			
	0	20			

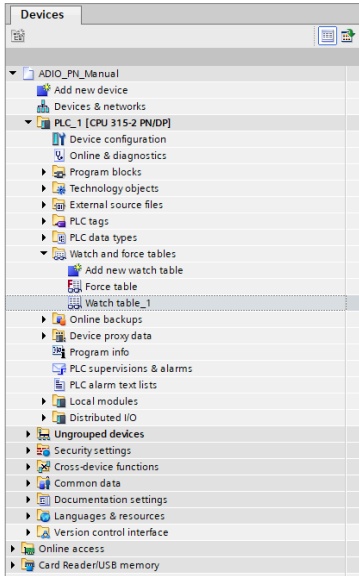
The 'I/O addresses' configuration panel for 'IOL_IIO_02/02 byte_1' shows the following settings:

- Input addresses:**
 - Start address: 256
 - End address: 257
 - Process image: None
 - Interrupt OB number: 40
- Output addresses:**
 - Start address: 256
 - End address: 257
 - Process image: None

1.4.4. Monitoring Modules

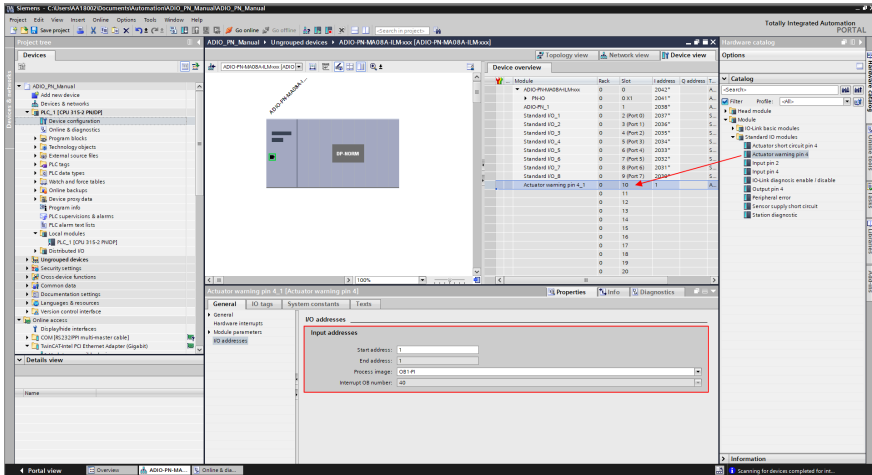
You can monitor the status of the module via the module address in the **Watch table**.

Double-click **Devices » Watch and force tables » Watch table**.

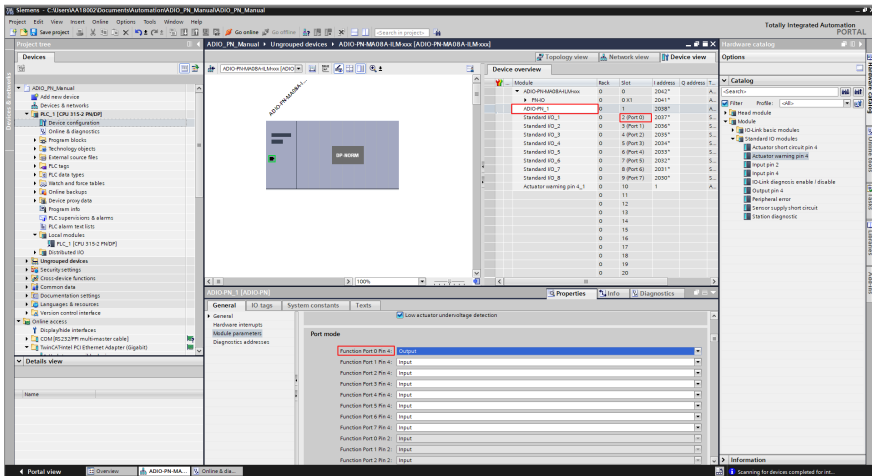


- The example of watch table: Actuator warning pin 4 module
- For detailed information on the modules, refer to 3, PROFINET Modules.

1. Assign the actuator warning pin 4 to the slot and enter the I address.

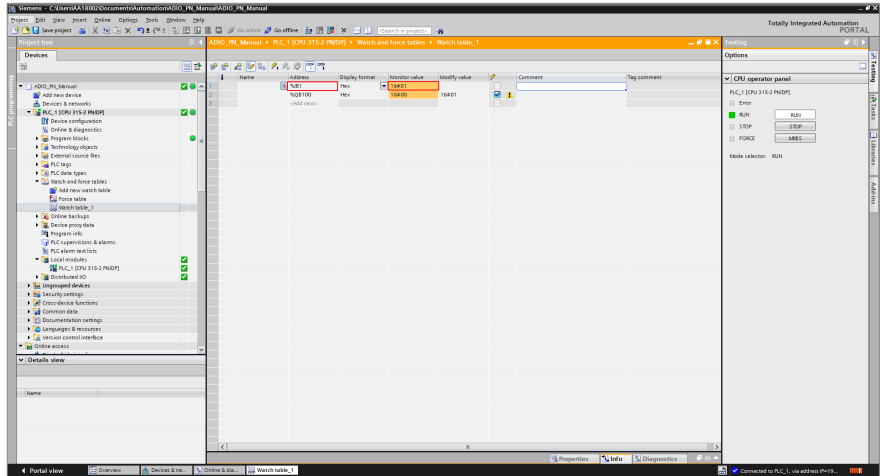


2. Select the header module and configure the pin 4 as the Output in the Module parameters.



3. Download to the PLC and go Online.
4. Enter the previous I address in the **Watch table** and select **OK**.

You can check the port number where the voltage is detected in the Monitor value.



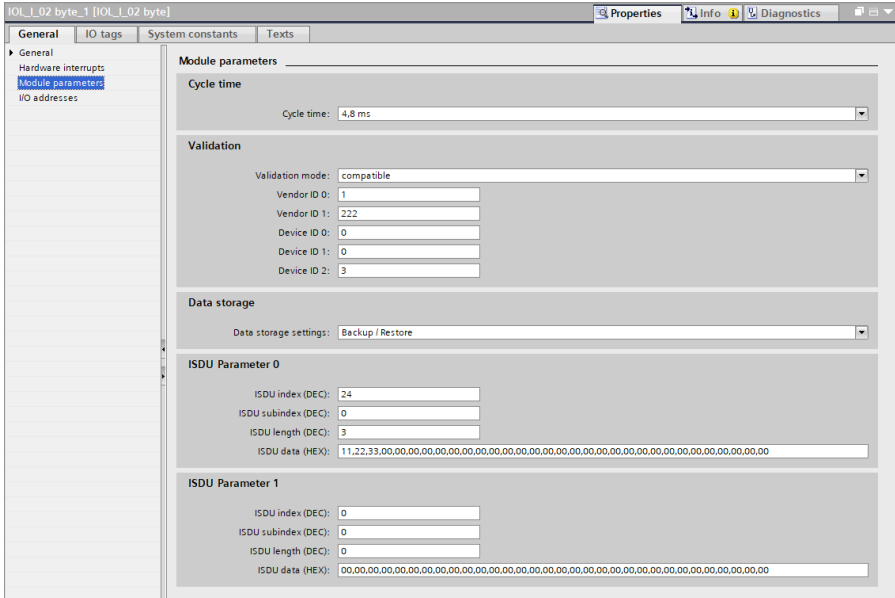
1.5. Module Parameters


1.5.1. IO-Link

Double-click the IO-Link module and select **Module parameters**.

You can configure the IO-Link functions to the corresponding port.

- For detailed information on the IO-Link functions, refer to 2.2.2, “Module Parameters: IO-Link”.



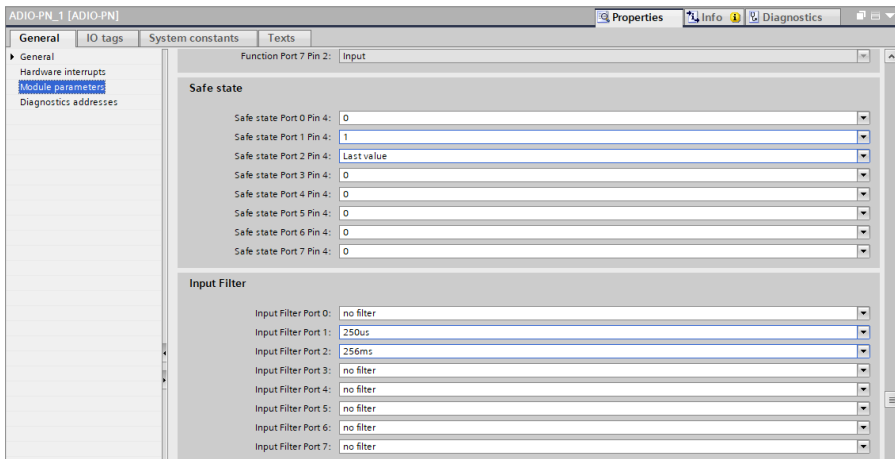
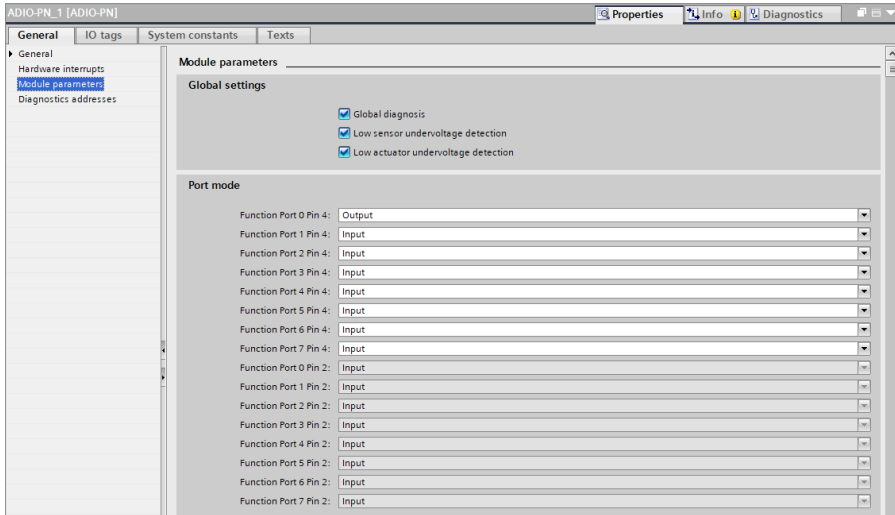
Cycle time	Select a value in the drop-down list.
Validation	<ol style="list-style-type: none">1. Select compatible in the drop-down list of the Validation mode.2. Enter the Vendor ID and Device ID of the IO-Link device.
Data storage	<ol style="list-style-type: none">1. Set the Validation function.2. Select DS mode in the drop-down list of the Data storage settings.
ISDU Parameter 0,1	<ol style="list-style-type: none">1. Enter the index, sub-index, data length, and data values of the IO-Link device.2. Select  to write.

1.5.2. Header (Slot:1) / SIO

Double-click the header module and select the **Module parameters**.

You can configure the global settings and standard I/O functions of the ADIO-PN.

- For detailed information on the functions of the header module, refer to 2.2.1, “Module Parameters: ADIO-PN”.



Global settings	Select all checkboxes.
Port mode	Select the input/output mode of pin 2/4 in the drop-down list.
Safe state	<ol style="list-style-type: none">1. Select pin 4 to Output mode in the Port mode.2. Select the output behaviour of the corresponding port in the drop-down list of the Safe state.
Input Filter	<ol style="list-style-type: none">1. Select pin2/4 to Input mode in the Port mode.2. Select an input filtering time in the drop-down list of the corresponding port.

1.6. Access ISDU Parameters

You can select the following two options to access the ISDU parameters of the connected IO-Link device. Be sure to consider the environmental conditions and use the suitable configuration method.

- **atIOLink**

atIOLink, Autonics' PDCT software, supports the read and write the ISDU parameters of IO-Link devices, data storage, and more. Refer to the atIOLink User Manual.

- **ISDU Parameter 0, 1**

Refer to 1.5, "Module Parameters".

- **Function Block**

Refer to 1.6.1, "Function Block".

1.6.1. Function Block



- The list of main parameters described in this chapter is shown in the table below and for reference only.
- For detailed information on using Function Block, refer to Siemens' IO-Link library in the link below.

[https://support.industry.siemens.com/cs/document/82981502/library-for-io-link-\(liolink\)?dti=0&lc=en-US](https://support.industry.siemens.com/cs/document/82981502/library-for-io-link-(liolink)?dti=0&lc=en-US)

- **The parameter list**

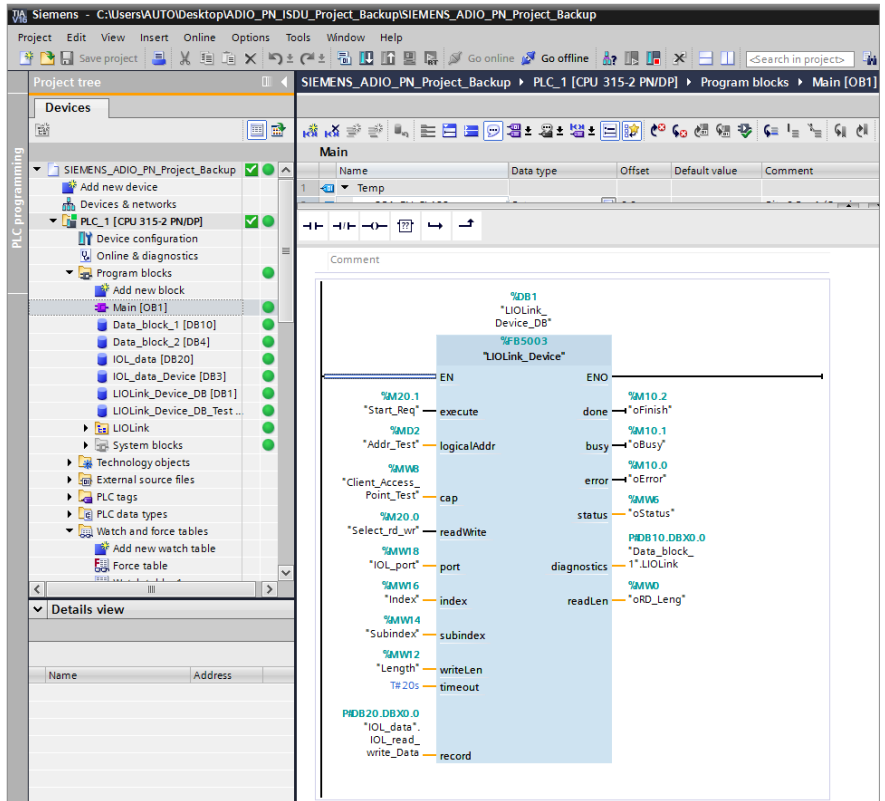
Name	Data type	Description and Values
LIOLink_Device	(Base block)	Supports reading and writing the acyclic data of the IO-Link device
Execute	Bool	FALSE → TRUE: trigger occurs
ReadWrite	Bool	FALSE: read, TRUE: write
Port	Int	Port number where the IO-Link device is running
Index	Int	Index of the IO-Link device parameter
Subindex	Int	Sub-index of the IO-Link device parameter
WriteLen	Int	Length of the data to be written
Done	Bool	TRUE: Command executed successfully
Error	Bool	TRUE: An error occurred.
Status	Word	16#0000 – 16#7FFF: FB status
Record	Array	Parameter data value of the IO-Link device

1. Create a list of tags related to the IO-Link device in the **Devices » PLC tags**.

The screenshot displays the Siemens TIA Portal software interface. The main window shows the 'Default tag table' for a PLC. The table lists various tags with their names, data types, addresses, and other properties. The tags are organized into a list, and the details pane at the bottom provides more information about the selected tag.

Name	Data type	Address	Resin	Access	VB81	Comment
Start_Aeq	Bool	MAC0.1				
Select_Hm_Drv	Bool	MAC0.0				
IO_Lock	Int	MAM18				
Index	Int	MAM16				
Subindex	Int	MAM14				
Length	Int	MAM12				
ofinish	Bool	MAM0.2				
ofibuy	Bool	MAM0.1				
oferror	Bool	MAM0.0				
ofstatus	Bool	MAM0				
ofIB_Lang	Int	MAM0				
tag_1	Bool	MAM0.0				
tag_2	Bool	MAM0.0				
Add_Test	Bool	MAM2				
Client_Access_Point_Test	Int	MAM8				
mode_Select	Int	MAM22				
diagnos	Bool	MAM0				
ofIB_Lang_Device	Int	MAM24				
ofstatus_Device	Bool	MAM06				
oferror_Device	Bool	MAM8.0				
ofIBuy_Device	Bool	MAM8.1				
ofofinish_Device	Bool	MAM8.2				
ofIO_Lock_Device	Int	MAM00				
Start_Aeq_De	Bool	MAM0.3				
Select_Hm_De	Bool	MAM0.4				
Length_De	Int	MAM0.4				
Start_Aeq_De(1)	Bool	MAM0.5				
ofstatus_Device(1)	Bool	MAM0.6				
Length_De(1)	Int	MAM06				
valid_memo	Int					

2. Mapping the Function Block in the **Devices** » **Program blocks**.



- When using the ADIO-PN as an IO-Link Master, enter the parameter values listed in the table below.

Name	Value
logicalAddr	I address value of the header module (slot 1)
cap (client access point)	255

3. Add the required parameters to the Watch table.

Name	Address	Display format	Monitor value	Modify value	Comment	Tag co...
1	Control					
2	%Q0	Hex	16401	16401		
3	%Q1	Hex	16400			
4	%Q2	Hex	16400			
5	Control IOL FB					
6	"select_io_nr"	%AQD.0	Bool	FALSE	FALSE	
7	"IO_gort"	%M18	DEC+-	2	2	
8	"index"	%M16	DEC+-	24	24	
9	"subindex"	%M14	DEC+-	0	0	
10	"length"	%M12	DEC+-	5	5	
11	"start_bit"	%AQD.1	Bool	TRUE	TRUE	
12	Output FB					
13	"rfinisk"	%M10.2	Bool			
14	"rfinry"	%M10.1	Bool			
15	"error"	%M10.0	Bool			
16	"status"	%M6	Hex			
17	! Please add					
18	"IO_Leng"	%M0	DEC+-			
19	Data IOL_DB					
20	"IOL_data" %IOL_read_write_Data[0]	%D20.D80	Hex	16422	16422	
21	"IOL_data" %IOL_read_write_Data[1]	%D20.D81	Hex	16420	16420	
22	"IOL_data" %IOL_read_write_Data[2]	%D20.D82	Hex	16432	16432	
23	"IOL_data" %IOL_read_write_Data[3]	%D20.D83	Hex	16401	16401	
24	"IOL_data" %IOL_read_write_Data[4]	%D20.D84	Hex	16402	16402	
25	"IOL_data" %IOL_read_write_Data[5]	%D20.D85	Hex	16400	16400	
26	"IOL_data" %IOL_read_write_Data[6]	%D20.D86	Hex			
27	"IOL_data" %IOL_read_write_Data[7]	%D20.D87	Hex			
28	"IOL_data" %IOL_read_write_Data[8]	%D20.D88	Hex			
29	"IOL_data" %IOL_read_write_Data[9]	%D20.D89	Hex			
30						
31						
32						
33	"Client_Access_Point_Test"	%M8	DEC+-	255	255	
34	"Data_Block_1" %IOLinkStartNumber	%D10.D056	DEC+-			State in...
35	"Data_Block_1" %IOLinkStatus	%D10.D810	Hex			Status o...
36	"Data_Block_1" %IOLinkSubFunctionStatus	%D10.D802	Hex			Status o...
37	"Addr_Test"	%AQ2	DEC+-	2038	2038	
38						
39						

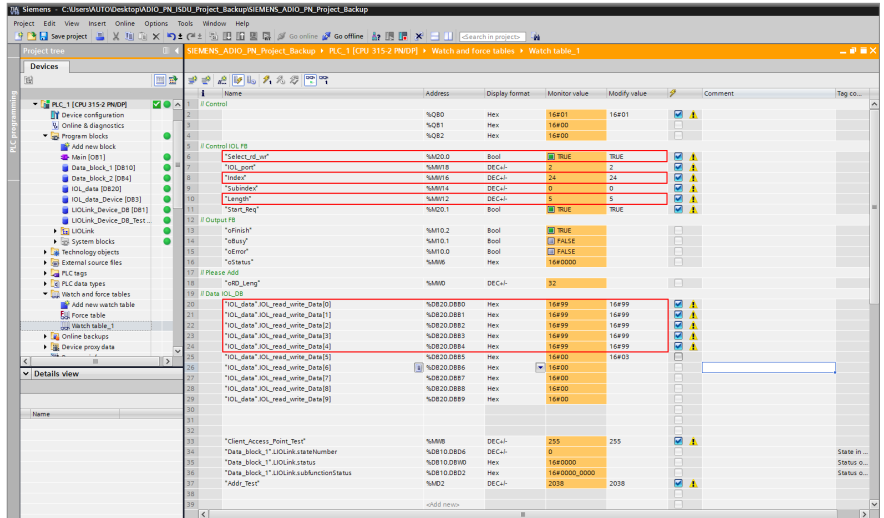
4. Enter the parameter index of the IO-Link device and excute the read.

In the figure below, the index of the application specific tag, 24 (0x18), was used.

Name	Address	Display format	Monitor value	Modify value	Comment	Tag co...
1	Control					
2	%Q0	Hex	16401	16401		
3	%Q1	Hex	16400			
4	%Q2	Hex	16400			
5	Control IOL FB					
6	"select_io_nr"	%AQD.0	Bool	FALSE	FALSE	
7	"IO_gort"	%M18	DEC+-	2	2	
8	"index"	%M16	DEC+-	24	24	
9	"subindex"	%M14	DEC+-	0	0	
10	"length"	%M12	DEC+-	5	5	
11	"start_bit"	%AQD.1	Bool	TRUE	TRUE	
12	Output FB					
13	"rfinisk"	%M10.2	Bool	TRUE		
14	"rfinry"	%M10.1	Bool	FALSE		
15	"error"	%M10.0	Bool	FALSE		
16	"status"	%M6	Hex	164000		
17	! Please add					
18	"IO_Leng"	%M0	DEC+-	32		
19	Data IOL_DB					
20	"IOL_data" %IOL_read_write_Data[0]	%D20.D80	Hex	16422	16422	
21	"IOL_data" %IOL_read_write_Data[1]	%D20.D81	Hex	16420	16420	
22	"IOL_data" %IOL_read_write_Data[2]	%D20.D82	Hex	16432	16432	
23	"IOL_data" %IOL_read_write_Data[3]	%D20.D83	Hex	16401	16401	
24	"IOL_data" %IOL_read_write_Data[4]	%D20.D84	Hex	16402	16402	
25	"IOL_data" %IOL_read_write_Data[5]	%D20.D85	Hex	16400	16400	
26	"IOL_data" %IOL_read_write_Data[6]	%D20.D86	Hex	16400	16400	
27	"IOL_data" %IOL_read_write_Data[7]	%D20.D87	Hex	16400	16400	
28	"IOL_data" %IOL_read_write_Data[8]	%D20.D88	Hex	16400	16400	
29	"IOL_data" %IOL_read_write_Data[9]	%D20.D89	Hex	16400	16400	
30						
31						
32						
33	"Client_Access_Point_Test"	%M8	DEC+-	255	255	
34	"Data_Block_1" %IOLinkStartNumber	%D10.D056	DEC+-	0		State in...
35	"Data_Block_1" %IOLinkStatus	%D10.D810	Hex	1640000		Status o...
36	"Data_Block_1" %IOLinkSubFunctionStatus	%D10.D802	Hex	1640000_2000		Status o...
37	"Addr_Test"	%AQ2	DEC+-	2038	2038	
38						
39						

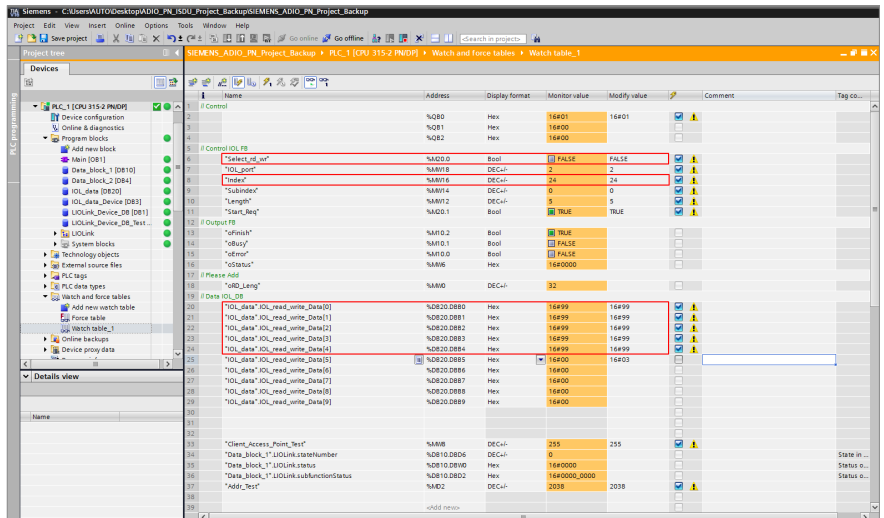
5. Enter the length and input value of the data to be written.

In the figure below, 0x99 was entered for 5-byte data (Data[0] ~ Data[4]) since the value of 5 is for the data length.



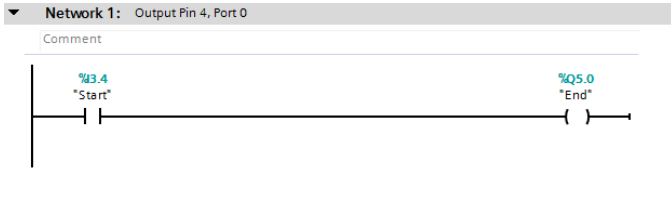
6. Execute the read again to check the value of the data.

Writing the parameter value has been normally applied.



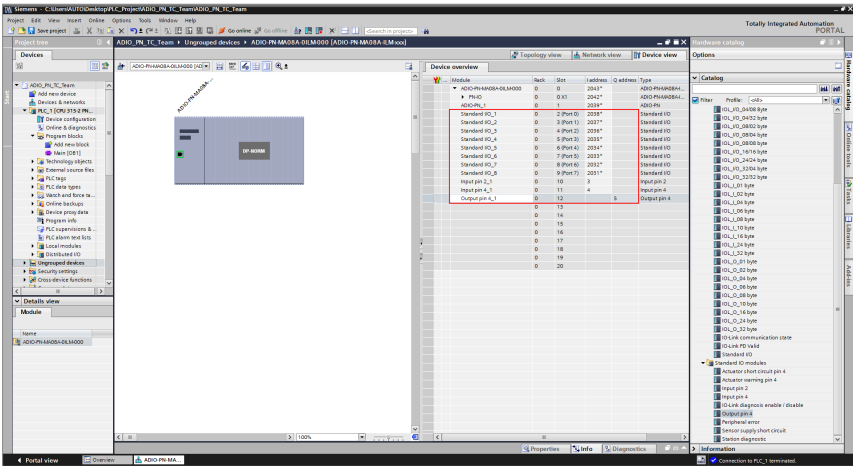
1.7. Standard I/O: Use Ladder Logic

This chapter explains how to create a Ladder logic, applying the input signal to the port 4 and transferring the output signal to the port 0 as shown in the figure below.

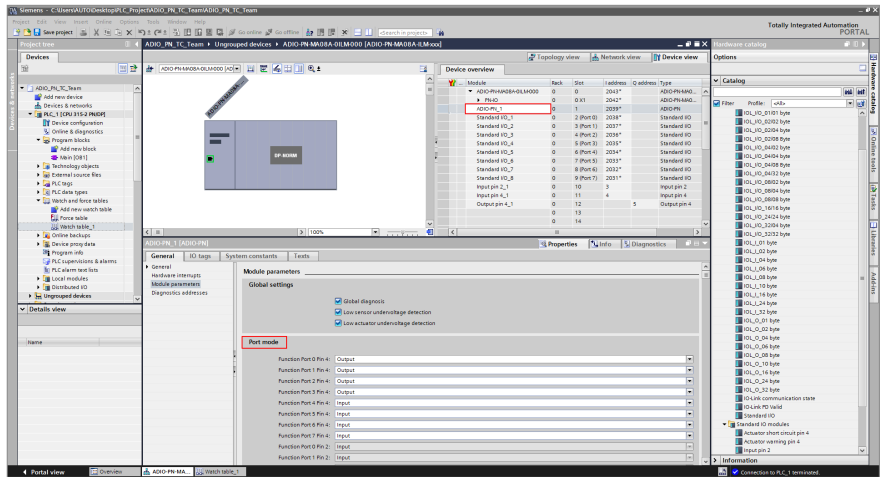


1. Assign the standard I/O, Input pin 2/4, and Output pin 4 modules to the desired slot and set the I/O address.

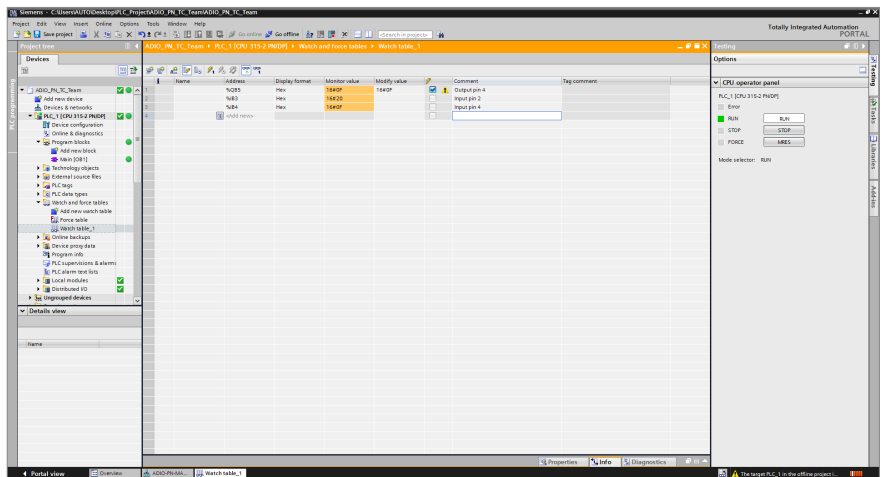
- o I address: input address, Q address: output address



- Double-click the header module and configure the input/output mode of the each port in the **Module parameters**. In the figure below, the Pin 4 from the port 0 to 3 was configured to the output mode.

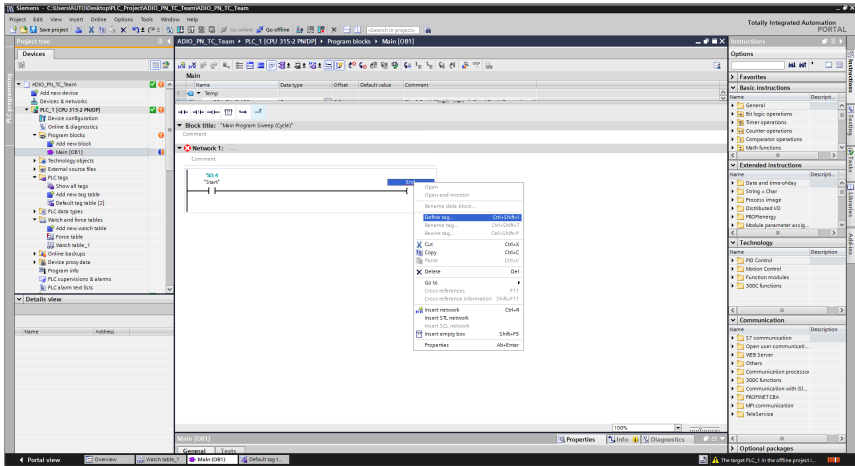
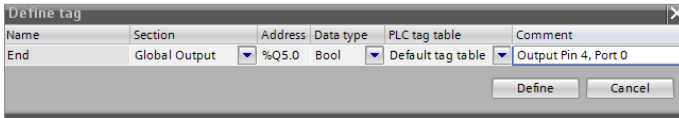


- Monitor the operating state of ports in the **Watch table**. The yellow LED lights up on the I/O port indicator 0 of the port 0 to 3 under the output.

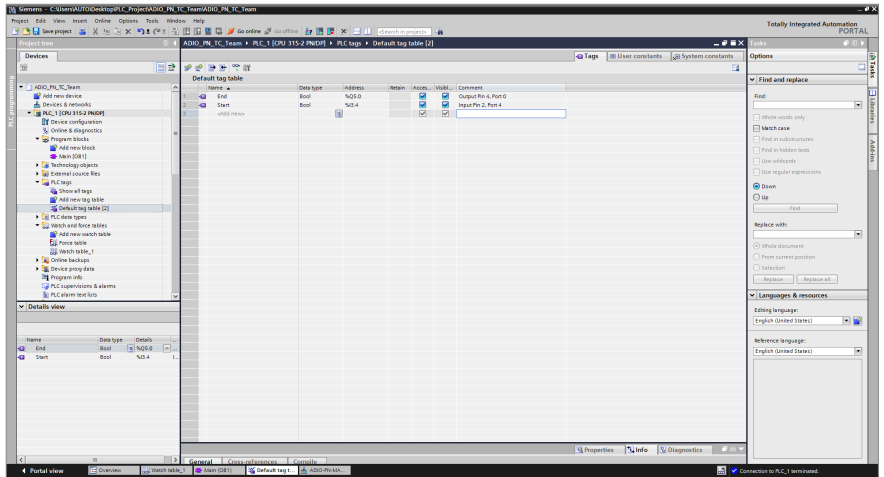


4. Create the tags with the module addresses from the previous step in the **Devices » Program blocks**.

- %I3.4 = %Input address. Port number
- %Q5.0 = %Output address. Port number

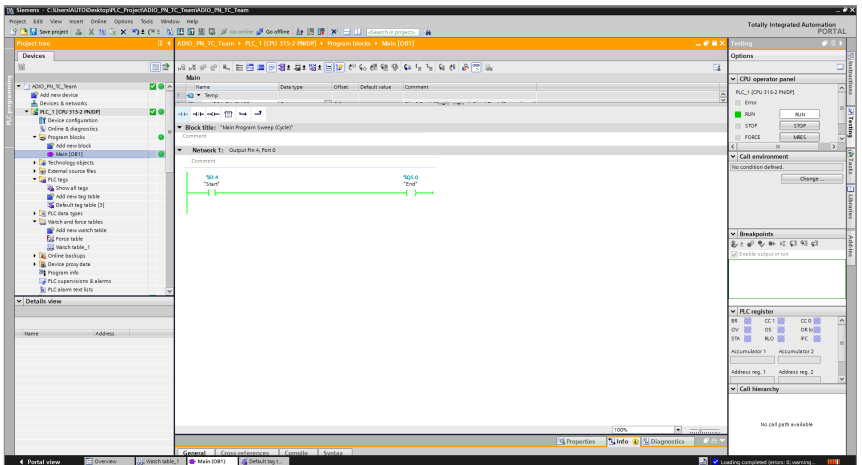
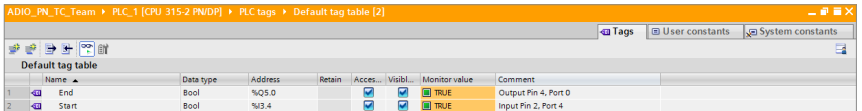


5. Checking and monitoring the added tags is available in the **Devices » PLC tags**.




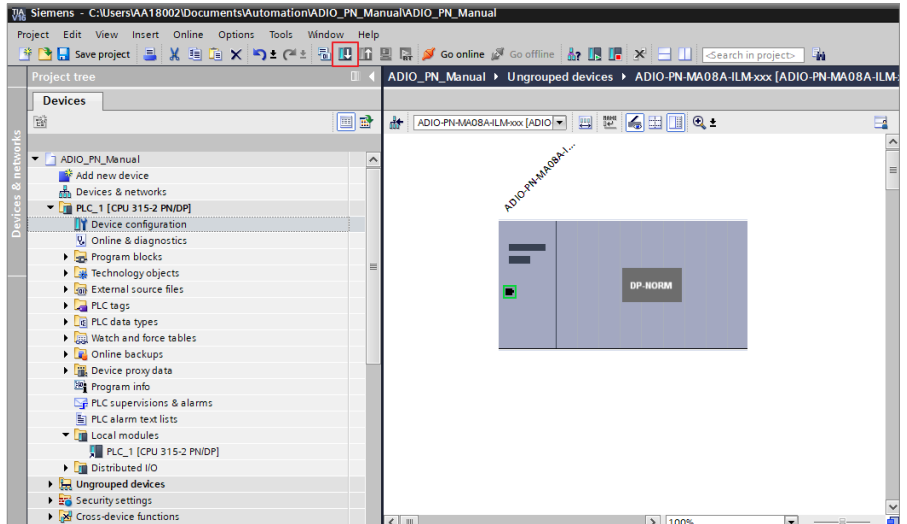
6. Check the Ladder logic depending on the input and output state.

- Input, output = True



1.8. Download the Program to a PLC

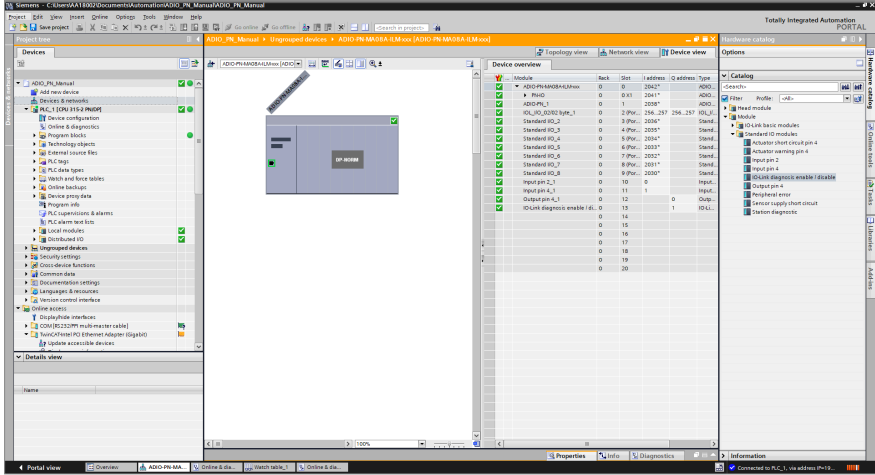
In the TIA Portal, click  (Download to device) at the top of the screen to write the configuration information to connected PLC.



1.9. Check the Operation Status

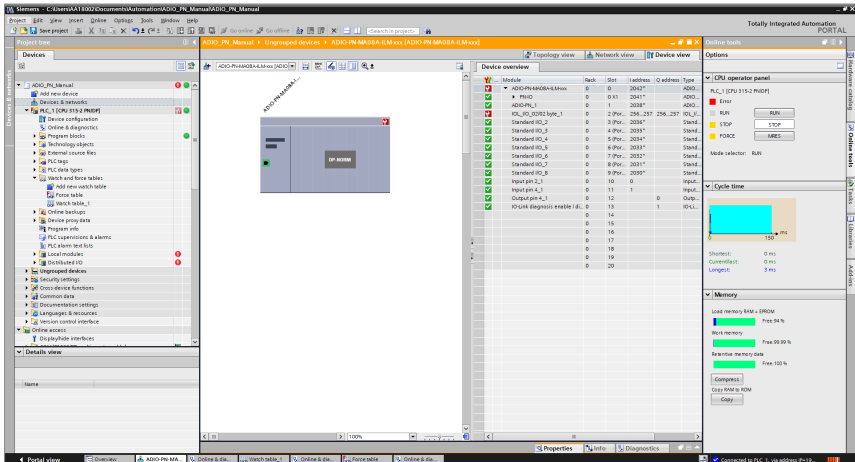
• The state of connection: normal

Green checkboxes are shown like the figure below.



• The state of connection: error

1. Red checkboxes are shown like the figure below.



2. Slot

2.1. Slot 0: DAP

Slot	Subslot	Name	Description
0		ADIO-PN-MA08A-ILM-□□□	Device Access Point (DAP)
	X1	PN-IO	PROFINET functions
	X1 P1	Port 1 - M12	Ethernet port functions
	X1 P2	Port 2 - M12	

2.2. Slot 1 to 20: Parameter Data

Slot	Name	Description
1	ADIO-PN_1	Available to configure the functions including the global settings, port mode, safe state, and input filter in the module parameters. → 2.2.1, “Module Parameters: ADIO-PN”
2	Port 0	Assign the standard I/O or IOL module of the PROFINET modules and select the operation mode of each I/O port to the standard I/O (SIO) or IO-Link. In case of the IO-Link mode, the module parameters support the cycle time, validation, data storage, and ISDU Parameter 0,1. → 2.2.2, “Module Parameters: IO-Link” → 3, PROFINET Modules
3	Port 1	
4	Port 2	
5	Port 3	
6	Port 4	
7	Port 5	
8	Port 6	
9	Port 7	
10 to 20	-	Available to check the process data, port status, and diagnostic information via the PROFINET modules. → 3, PROFINET Modules

2.2.1. Module Parameters: ADIO-PN

Parameter	Function	Description and Values
Global settings	Global diagnosis	When the global diagnosis is selected, the power supply state of the sensor or actuator and diagnostic messages are transferred to the PROFINET Master. • Diagnostic information → 4, Diagnostics
	Low sensor undervoltage detection	
	Low actuator undervoltage detection	
Port mode	Function Port n. Pin 4	Configure the operation mode of pin 4 (SIO). • Input or Output
	Function Port n. Pin 2	Pin 2 supports the digital input mode only. • Input
Safe state	Safe state Port n. pin 4 (Function Port n. Pin 4: Output)	Define the behaviour of output on each I/O port when the communication connection is interrupted between the PROFINET Master and the ADIO-PN. • 0: Switch the output signal to Low • 1: Switch the output signal to High • Last value: Keep the previous state
Input Filter	Input Filter Port n. (Function Port n. Pin 2/4: Input)	The processing time of the digital input signal can be set via this function. The digital input filtering time suppresses unwanted input signal changes or eliminates noise from input signals to prevent a data distortion or chattering. It can also be used as ON Delay/OFF Delay depending on the selected filter time. • no filter • 250 us to 256 ms

2.2.2. Module Parameters: IO-Link

The following parameters can be configured via the IOL module of the IO-Link basic modules.
For detailed information, refer to 3, PROFINET Modules.

Parameter	Function	Description and Values
Cycle time	Cycle time	Select cycle time of the IO-Link device. <ul style="list-style-type: none"> • Automatic: Automatically set to the fastest cycle time • 1.6 to 132.8 ms
Validation	Validation mode	Compare and verify a connected IO-Link device with a IO-Link device information stored in the IO-Link Master. <ul style="list-style-type: none"> • no validation: No validation is performed. • compatible: Compare Vendor ID and Device ID and then start the IO-Link communication only if they are matched.
	Vendor ID 0	Enter a Vendor ID of the IO-Link device.
	Vendor ID 1	
	Device ID 0	Enter a Device ID of the IO-Link device.
	Device ID 1	
Device ID 2		
Data storage	Data storage settings	The whole parameters of IO-Link device are stored/uploaded in the IO-Link Master (Backup), or apply/download last updated parameters to the compatible IO-Link device (Restore). Firstly, configure the Validation mode as the compatible to use the data storage. <ul style="list-style-type: none"> • disable • Restore: Apply the parameter values of DS to the IO-Link device. • Backup / Restore: <ol style="list-style-type: none"> 1) Empty DS data: Store the parameter values of the connected IO-Link device in the IO-Link Master. 2) Contained DS data: Apply the parameter values to the IO-Link device.
ISDU Parameter 0,1	ISDU index (DEC)	The parameter index of the IO-Link device
	ISDU subindex (DEC)	The Parameter sub-index of the IO-Link device
	ISDU length (DEC)	Size of ISDU data to be written
	ISDU data (HEX)	Value or data of ISDU to be written

3. PROFINET Modules

3.1. IO-Link basic modules

Module	Description and Values
IOL_I/O_x/x byte	Configure the operation mode of each I/O port to the IO-Link. Select a suitable size of the IO-Link input or output process data. <ul style="list-style-type: none">• IO-Link input and output: IOL_I/O_01/01 byte to IOL_I/O_32/32 byte• IO-Link input: IOL_I_01 byte to IOL_I_32 byte• IO-Link output: IOL_O_01 byte to IOL_O_32 byte
IO-Link communication state	It shows the port in the IO-Link communication. → 3.3, "Mapping: IO-Link basic modules"
IO-Link PD Valid	It shows the port with valid process data of the IO-Link. → 3.3, "Mapping: IO-Link basic modules"
Standard I/O	Configure the operation mode of each I/O port to the standard input and output mode. Be sure to assign the Input Pin 2, Input Pin 4, and Output Pin 4 from the standard IO modules additionally, since the input and output signals are shown on the separate modules. → 3.2, "Standard IO modules"

3.2. Standard IO modules

Module	Description and Values
Actuator short circuit pin 4	When the Function Port n. Pin 4 is Output, it shows short circuit state of each I/O port. <ul style="list-style-type: none"> • NPN: Short circuit between Pin 4 and Pin 1 (L+) • PNP: Short circuit between Pin 4 and Pin 3 (L-) → 3.4, “Mapping: Standard IO modules”
Actuator warning pin 4	When the Function Port n. Pin 4 is Output, it shows each I/O port that has no output signal but has voltage signal. → 3.4, “Mapping: Standard IO modules”
Input Pin 2	When the Function Port n. Pin 2 is Input, it shows each I/O port that has input signal on Pin 2. → 3.4, “Mapping: Standard IO modules”
Input Pin 4	When the Function Port n. Pin 4 is Input, it shows each I/O port that has input signal on Pin 4. → 3.4, “Mapping: Standard IO modules”
IO-Link diagnosis enable / disable	It shows disconnected IO-Link communication of each I/O port. If the global diagnosis is deactivated, this module will not be activated. → 2.2.1, “Module Parameters: ADIO-PN” → 3.4, “Mapping: Standard IO modules”
Output Pin 4	When the Function Port n. Pin 4 is Output, it shows each I/O port that has output signal on Pin 4. → 3.4, “Mapping: Standard IO modules”
Peripheral error	It shows the error state of each I/O port such as the Actuator short circuit pin 4 or Sensor supply short circuit. → 3.4, “Mapping: Standard IO modules”
Sensor supply short circuit	It shows each I/O port that has the short circuit to the supply voltage of the sensor. → 3.4, “Mapping: Standard IO modules”
Station diagnostic	It shows a fault that has occurred. → 3.5, “Mapping: Station diagnostic module”

3.3. Mapping: IO-Link basic modules

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Port 7	Port 6	Port 5	Port 4	Port 3	Port 2	Port 1	Port 0

IO-Link basic modules IO-Link communication state
IO-Link PDValid

3.4. Mapping: Standard IO modules

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Port 7	Port 6	Port 5	Port 4	Port 3	Port 2	Port 1	Port 0

Standard IO modules Actuator short circuit pin 4
Actuator warning pin 4
Input Pin 2
Input Pin 4
IO-Link diagnosis enable / disable
Output Pin 4
Peripheral error
Sensor supply short circuit

3.5. Mapping: Station diagnostic module

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
S: IOL	Actuator warning	S: UA	S: US	Reserved	No UA	UA low	US low

S: IOL (IO-Link short circuit) The short circuit occurred at Pin 4 (C/Q) and Pin 3 (L-) in the IO-Link mode.
 0: Normal
 1: Short circuit detected

Actuator warning An error occurred corresponding to the module of Actuator warning pin 4.
 0: Normal
 1: An error occurred

S: UA (Actuator short circuit) An error occurred corresponding to the module of Actuator short circuit pin 4.
 0: Normal
 1: An error occurred

S: US (Sensor supply short circuit) An error occurred corresponding to the module of the Sensor supply short circuit.
 0: Normal
 1: An error occurred

No UA No supply voltage of the actuator (< 10 VDC)
 0: Normal
 1: No actuator power

UA low Low supply voltage of the actuator (< 18 VDC)
 0: Normal
 1: Low-voltage detected

US low Low supply voltage of the sensor (< 18 VDC)
 0: Normal
 1: Low-voltage detected

4. Diagnostics

4.1. Channel Error Type and Diagnostic Messages

Error code (hex)	Message	Description
0x0001	Short circuit	In the IO-Link mode, the short circuit occurred at Pin 1 and 3, or Pin 3 and 4 on the I/O port.
0x0002	Undervoltage	Low supply voltage of the actuator (< 18 VDC)
0x0004	Overload	When the Function Port n. Pin 4 is Output, the overload occurs.
0x0006	Line break	The IO-Link communication is disconnected.
0x001B	Sensor has incorrect configuration (IO-Link device)	Invalid data length or Validation failed
0x0101	Actuator warning	When the Function Port n. Pin 4 is Output, an I/O port that has no output signal but has voltage signal is detected.

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Dimensions or specifications on this manual are subject to change and some models may be discontinued without notice.

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