

MODBUS/TCP Communication over Integrated PROFINET Interface of S7-300 and S7-400 CPU

Modbus/TCP PN CPU

FAQ • June 2013



Service & Support

Answers for industry.

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- Question
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<http://support.automation.siemens.com/WW/view/en/75330636>

Caution

The functions and solutions described in this article confine themselves predominantly to the realization of the automation task. Furthermore, please take into account that corresponding protective measures have to be taken in the context of Industrial Security when connecting your equipment to other parts of the plant, the enterprise network or the internet. Further information can be found in Entry ID 50203404.

<http://support.automation.siemens.com/WW/view/en/50203404>

Question

How do you use the blocks for MODBUS/TCP communication over the integrated PROFINET interface of S7-300 and S7-400 CPU in STEP 7 Professional V11/V12 (TIA Portal)?

Answer

The instructions and notes listed in this document provide a detailed answer to this question.

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- MODBUS/TCP communication over integrated PROFINET interface of S7-300 and S7-400 CPU

- V1.0 , Item ID: 75330636

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1 Introduction

The Modbus/TCP blocks for the S7-300 and S7-400 CPUs with integrated PROFINET interface are available for downloading in the form of a library: "Modbus_PN_CPU".

<http://www.siemens.com/s7modbus>

You can only install the "Modbus_PN_CPU" library on computers on which STEP 7 V5.4 or V5.5 is already installed. In order to use the blocks of the "Modbus_PN_CPU" library in STEP 7 Professional V11/V12 (TIA Portal) you must migrate the blocks in the TIA Portal.

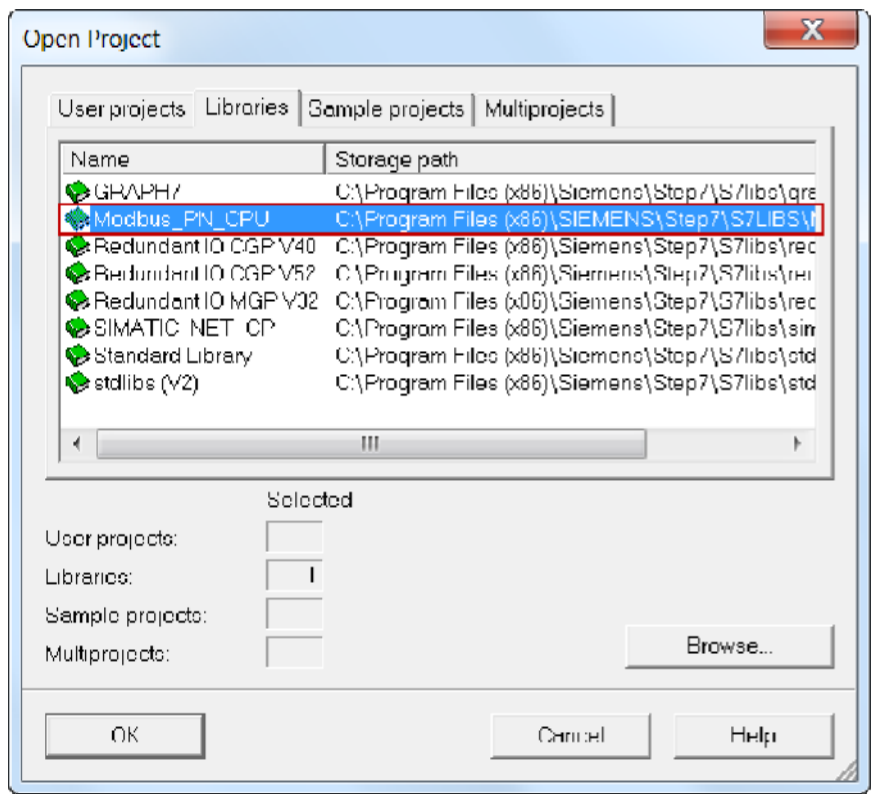
- 2 Migrate "MODBUS_PN_CPU" Library in STEP 7 V11/12 (TIA Portal)

2 Migrate "MODBUS_PN_CPU" Library in STEP 7 V11/12 (TIA Portal)

The instructions below describe how to migrate the blocks of the "MODBUS_PN_CPU" library to STEP 7 Professional V11/V12 (TIA Portal) to be able to use them there.

Table 2-1

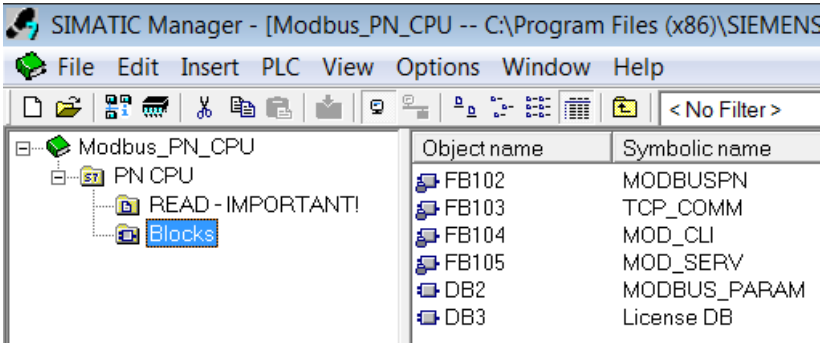
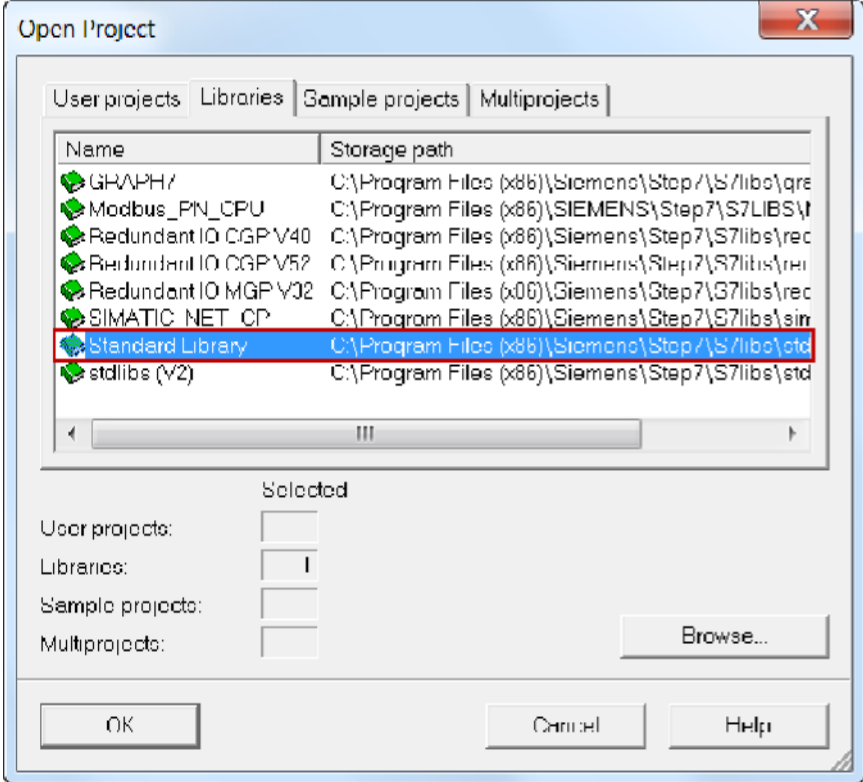
No.	Procedure
1.	You can only install the "Modbus_PN_CPU" library on a computer on which STEP 7 V5.4 or V5.5 is already installed.
2.	Create a new project in STEP 7 V5.4 or STEP 7 V5.5. Configure the hardware according to your hardware setup.
3.	<p>Open the "Modbus_PN_CPU" library with the "File > Open" menu. In the "Open Project" dialog you select the "Libraries" tab. Select the "Modbus_PN_CPU" library.</p> <p>If the "Modbus_PN_CPU" library is not displayed in the "Libraries" tab of the "Open Project" dialog, click the "Browse..." button. Select the "Modbus_PN_CPU" library in the "...\SIEMENS\Step7\S7LIBS" directory.</p>



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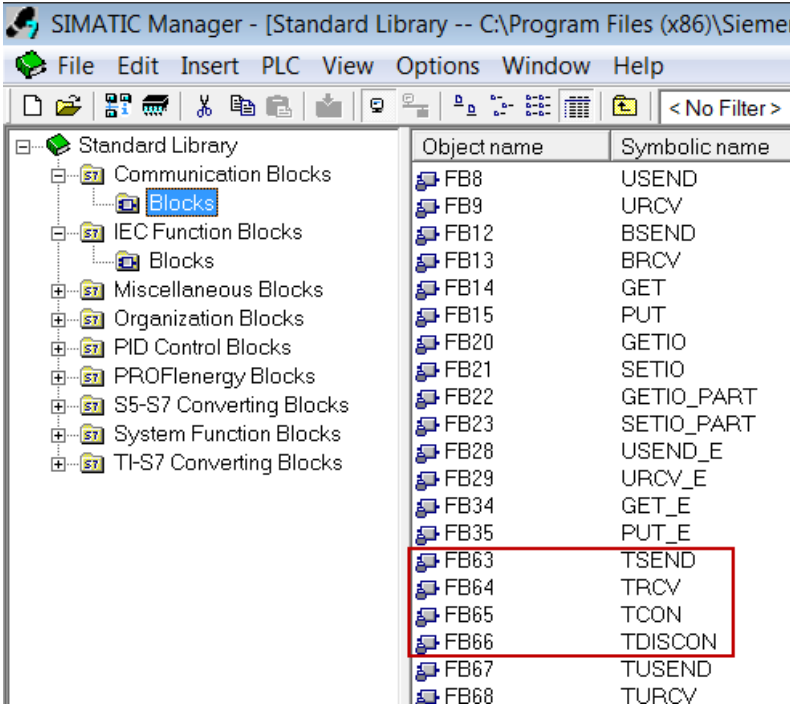
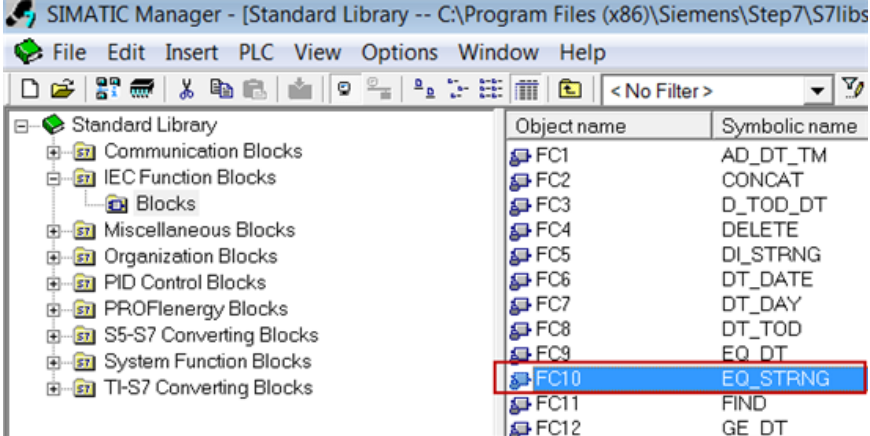
No.	Procedure														
4.	<p>Copy the blocks from the "Modbus_PN_CPU" and add them to the new project.</p>  <p>The screenshot shows the SIMATIC Manager interface. On the left, a tree view displays the 'Modbus_PN_CPU' library containing 'PN CPU', 'READ - IMPORTANT!', and 'Blocks'. On the right, a table lists objects and their symbolic names:</p> <table border="1" data-bbox="906 501 1321 712"> <thead> <tr> <th>Object name</th> <th>Symbolic name</th> </tr> </thead> <tbody> <tr><td>FB102</td><td>MODBUSPN</td></tr> <tr><td>FB103</td><td>TCP_COMM</td></tr> <tr><td>FB104</td><td>MOD_CLI</td></tr> <tr><td>FB105</td><td>MOD_SERV</td></tr> <tr><td>DB2</td><td>MODBUS_PARAM</td></tr> <tr><td>DB3</td><td>License DB</td></tr> </tbody> </table>	Object name	Symbolic name	FB102	MODBUSPN	FB103	TCP_COMM	FB104	MOD_CLI	FB105	MOD_SERV	DB2	MODBUS_PARAM	DB3	License DB
Object name	Symbolic name														
FB102	MODBUSPN														
FB103	TCP_COMM														
FB104	MOD_CLI														
FB105	MOD_SERV														
DB2	MODBUS_PARAM														
DB3	License DB														
5.	<p>Open the "Modbus_PN_CPU" library with the "File > Open" menu. In the "Open Project" dialog you switch to the "Libraries" tab and select the "Standard Library" library.</p>  <p>The screenshot shows the 'Open Project' dialog box. The 'Libraries' tab is selected, and a list of libraries is displayed. The 'Standard Library' is highlighted in blue. Below the list, there are checkboxes for 'User projects', 'Libraries', 'Sample projects', and 'Multiprojects'. The 'Libraries' checkbox is checked. At the bottom, there are 'OK', 'Cancel', and 'Help' buttons.</p>														

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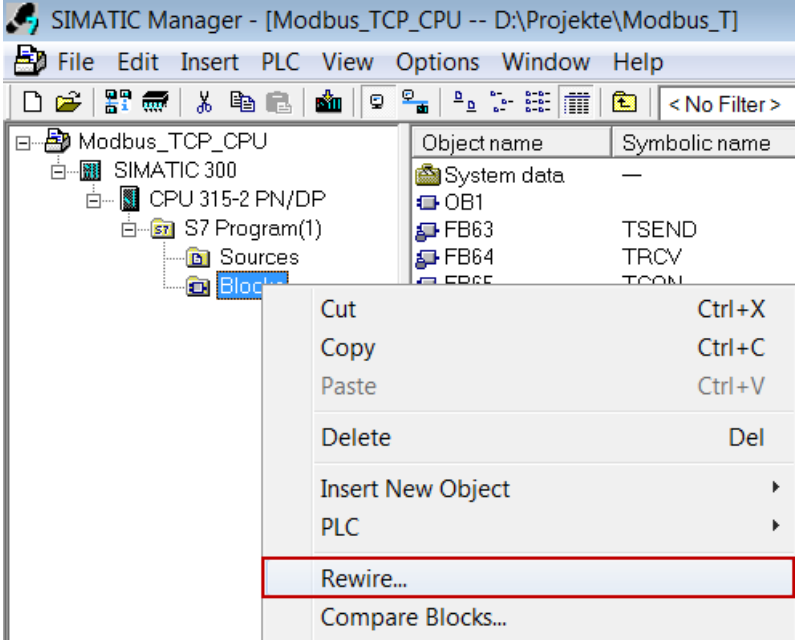
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No.	Procedure
6.	<p>Copy the following blocks from the library "Standard Library > Communication Blocks > Blocks" and add them to the new project.</p> <ul style="list-style-type: none"> • FB63 "TSEND" • FB64 "TRECV" • FB65 "TCON" • FB66 "TDISCON" 
7.	<p>Copy the FC10 "EQ_STRNG" block from the "IEC Function Blocks > Blocks" library and add it to the new project.</p> 

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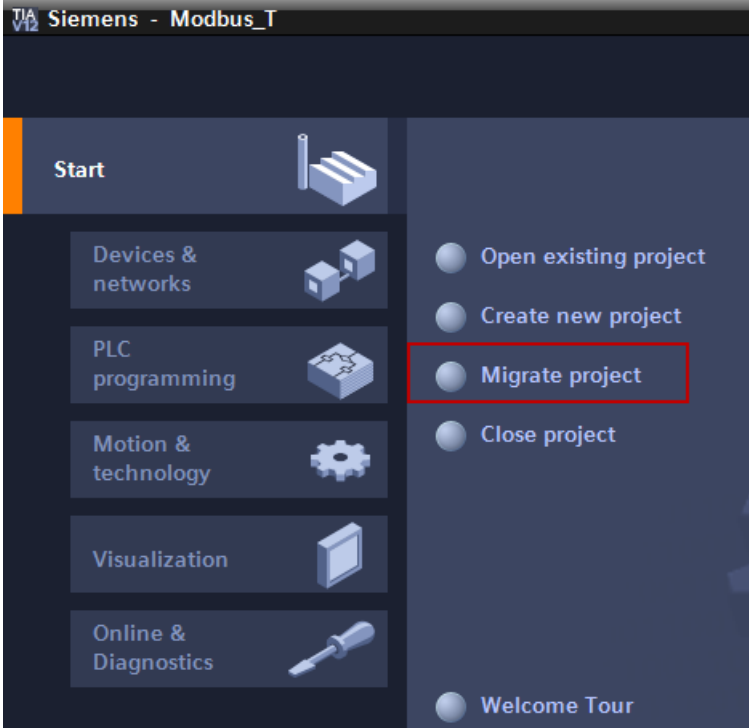
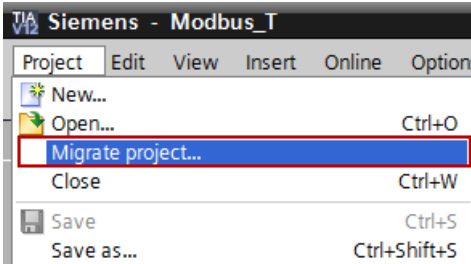
No.	Procedure												
8.	<p>If you change the numbers of the function blocks, use the "Rewire" function. It is no longer possible to rewire after migration.</p> <p>Right-click the block folder in the S7 program of the CPU. In the pop-up menu you select the "Rewire" function.</p>  <p>The screenshot shows the SIMATIC Manager interface. The project tree on the left shows 'Modbus_TCP_CPU' expanded to 'S7 Program(1)' and then 'Sources'. A context menu is open over the 'Sources' folder, with the 'Rewire...' option highlighted in red. The main window shows a table of objects with columns 'Object name' and 'Symbolic name'. The table contains the following data:</p> <table border="1" data-bbox="906 589 1294 752"> <thead> <tr> <th>Object name</th> <th>Symbolic name</th> </tr> </thead> <tbody> <tr> <td>System data</td> <td>—</td> </tr> <tr> <td>OB1</td> <td></td> </tr> <tr> <td>FB63</td> <td>TSEND</td> </tr> <tr> <td>FB64</td> <td>TRCV</td> </tr> <tr> <td>FB65</td> <td>TCON</td> </tr> </tbody> </table>	Object name	Symbolic name	System data	—	OB1		FB63	TSEND	FB64	TRCV	FB65	TCON
Object name	Symbolic name												
System data	—												
OB1													
FB63	TSEND												
FB64	TRCV												
FB65	TCON												
9.	<p>Create the Parameter DB using the Modbus TCP Wizard. The Modbus TCP Wizard is available for downloading at this link: MODBUS TCP Wizard</p> <p>Note The Modbus TCP Wizard is not available for TIA Portal projects. If you do not create the parameter DB before migration, you have to create it manually in the TIA Portal.</p>												
10.	Start STEP 7 Professional V11 / V12 (TIA Portal).												

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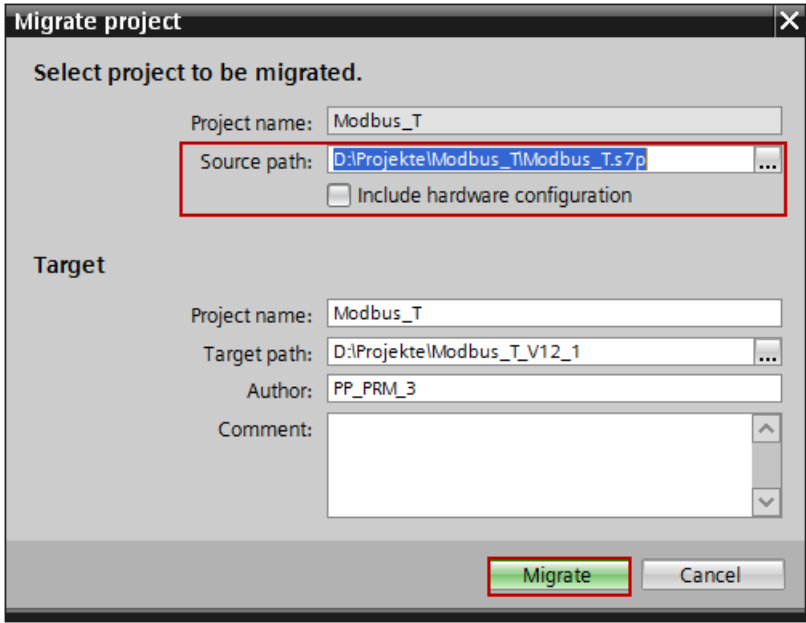
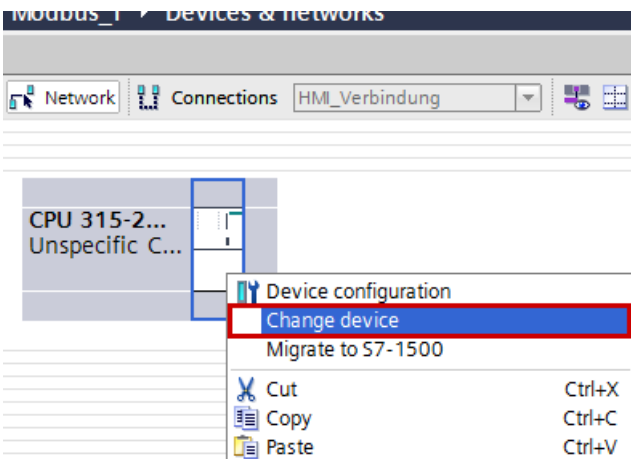
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No.	Procedure
11.	<p>Select "Migrate project" in the Portal view or the "Project > Migrate project..." menu in the Project view. The "Migrate project" dialog opens.</p>  

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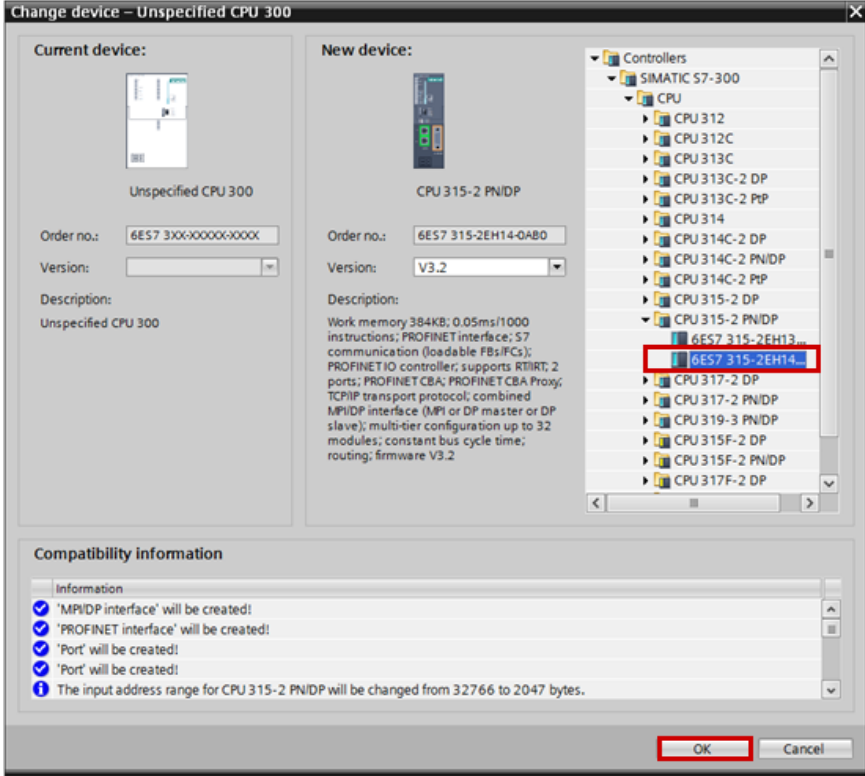
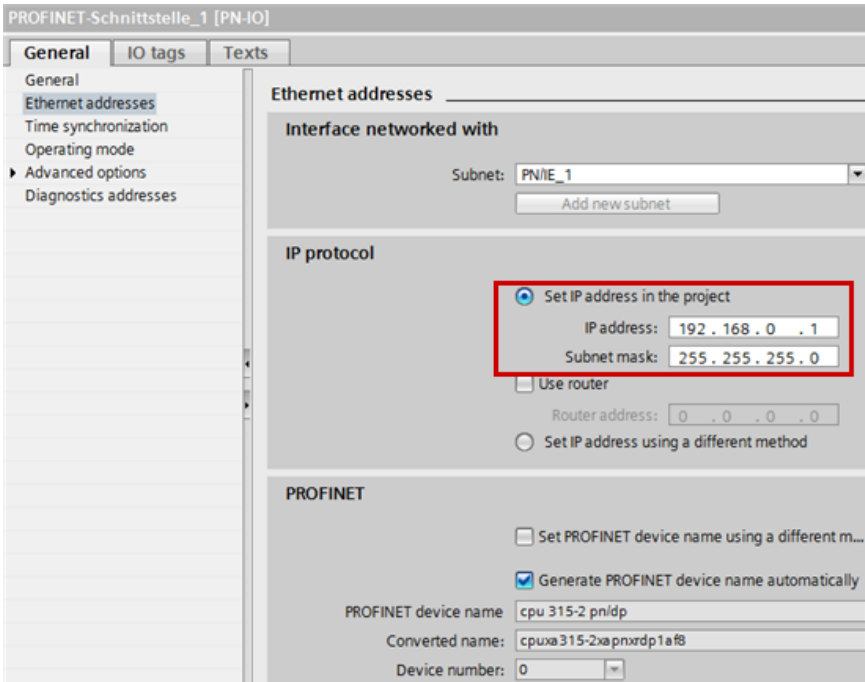
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No.	Procedure
12.	<p>In the "Migrate project" dialog you select the project to be migrated. Don't select the "Include hardware configuration" option. Specify the project name and target path of the TIA Portal project. Click the "Migrate" button to execute the migration.</p> 
13.	<p>Close the "Migrate project" dialog and open the migration log. You are informed that the associated SCL sources of the blocks FB102, FB103, FB104 and FB105 are missing. You can ignore this message.</p>
14.	<p>In addition you get the message "All PLCs have been replaced by unspecified CPUs". To clear this message you switch to the Network view and there you right-click the CPU. Select "Change device" in the pop-up menu. The "Change device" dialog opens.</p> 

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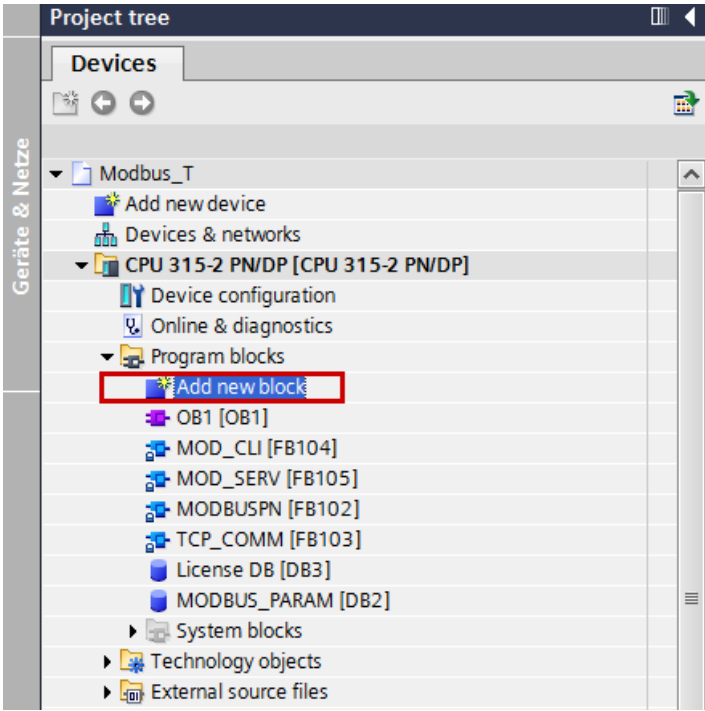
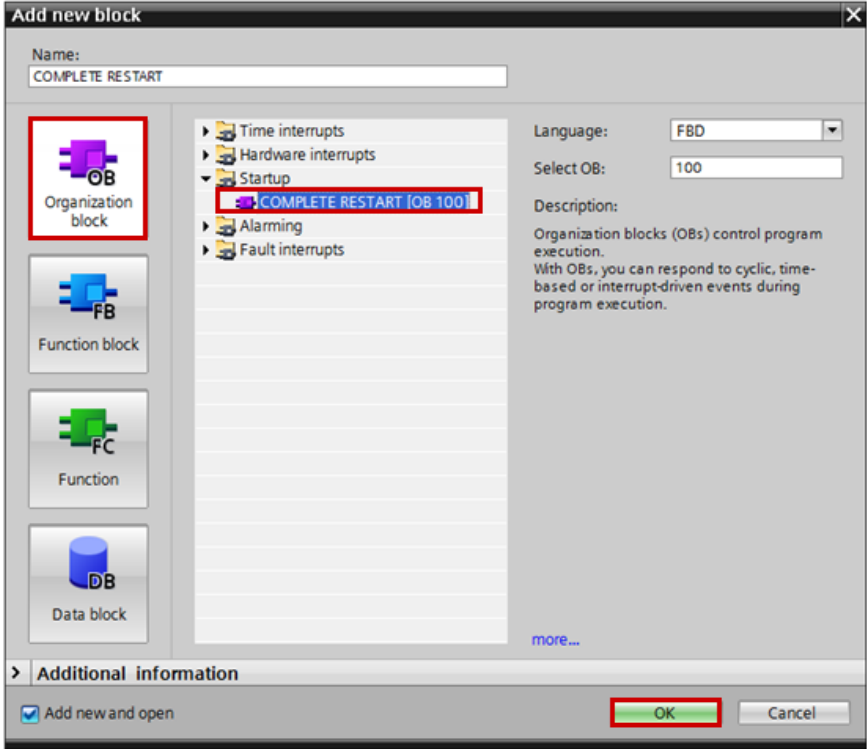
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No.	Procedure
15.	<p>In the "Change device" dialog you select the correct CPU according to your hardware setup, CPU 315-2 PN/DP, for example. Confirm the settings with "OK".</p> 
16.	<p>In the Device view you mark the PROFINET interface of the CPU 315-2 PN/DP. In the inspector window you assign a subnet to the PROFINET interface and enter the IP address and subnet mask of CPU 315-2 PN/DP in "Properties > General > Ethernet addresses".</p> 

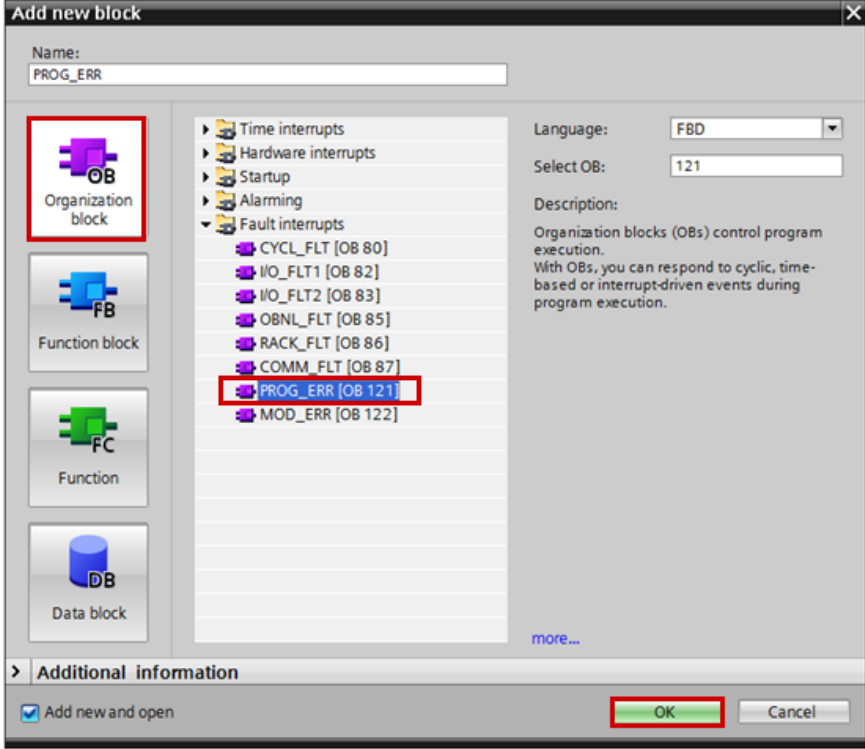
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No.	Procedure
17.	<p>In the project navigation you open the folder structure for the CPU 315-2 PN/DP. Here you open the "Program blocks" folder. Double-click the "Add new block" command. The "Add new block" dialog opens.</p>  <p>The screenshot shows the 'Project tree' window. Under the 'Devices' section, the 'CPU 315-2 PN/DP [CPU 315-2 PN/DP]' folder is expanded. The 'Program blocks' sub-folder is also expanded, and the 'Add new block' icon is highlighted with a red rectangle.</p>
18.	<p>In the "Add new block" dialog you click the "Organization block (OB)" button. Select the following Startup OB: OB100. Click the "OK" button to add OB100 to your project.</p>  <p>The screenshot shows the 'Add new block' dialog. On the left, the 'Organization block' icon is highlighted with a red rectangle. In the central list, the 'Startup' category is expanded, and 'COMPLETE RESTART [OB 100]' is highlighted with a red rectangle. The 'Name' field contains 'COMPLETE RESTART'. The 'Language' is set to 'FBD' and 'Select OB' is set to '100'. The 'Description' text is visible. At the bottom, the 'OK' button is highlighted with a red rectangle.</p>

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No.	Procedure
19.	<p>Double-click the "Add new block" command again. The "Add new block" dialog opens.</p> <p>Click the "Organization block (OB)" button. Select the following Fault interrupt OB: OB121. Click the "OK" button to add OB121 to your project.</p> 

Note

In STEP 7 V11 / 12 (TIA Portal) it is not permitted to add migrated know-how-protected blocks to a library. If you do this and add the library blocks to a project, this might damage the project.

It is not recommended to copy the blocks into another project, because this can lead to problems.

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