SIEMENS

FAQ • 02/2015

Modbus/TCP Communication via IE CP

SIMATIC Modbus/TCP CP, SIMATIC S7-300/S7-400

http://support.automation.siemens.com/WW/view/en/75312612

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1 Introduction

The Modbus/TCP blocks for the Industrial Ethernet CPs of S7-300 and S7-400 are available for downloading in the form of a library: "Modbus_TCP_CP".

http://support.automation.siemens.com/WW/view/en/103474603

You can only install the "Modbus_TCP_CP" library on PCs on which STEP 7 V5.4 or V5.5 is already installed. In order to use the blocks of the "Modbus_TCP_CP" library in STEP 7 Professional V11/12/V13 (TIA Portal) you must migrate the blocks to the TIA Portal.

This document describes how to migrate the library blocks of "Modbus_TCP_CP" V4.3 and "Modbus_TCP_CP" V5.0.

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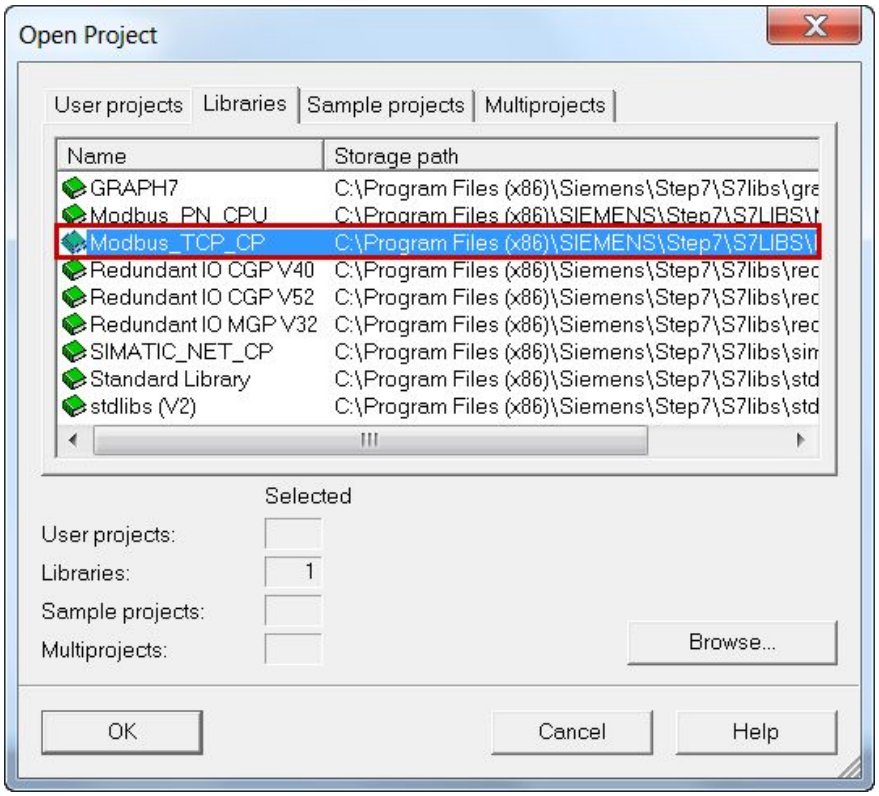
2 Migrate the "MODBUS_TCP_CP" V4.3 Library to STEP 7 V11/12/13 (TIA Portal)

The instructions below describe how to migrate the blocks of the "MODBUS_TCP_CP" V4.3 library to STEP 7 Professional V11/V12/13 (TIA Portal) to be able to use them there.

Table 2-1

No.	Procedure
1.	You can only install the "Modbus_TCP_CP" library on a PC 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.	Open the "Modbus_TCP_CP" library with the "File > Open" menu. In the "Open Project" dialog you select the "Libraries" tab. Select the "Modbus_TCP_CP" library. If the "Modbus_TCP_CP" library is not displayed in the "Libraries" tab of the "Open Project" dialog, click the "Browse..." button. Select the "Modbus_TCP_CP" library in the "...\SIEMENS\Step7\S7LIBS" directory. 

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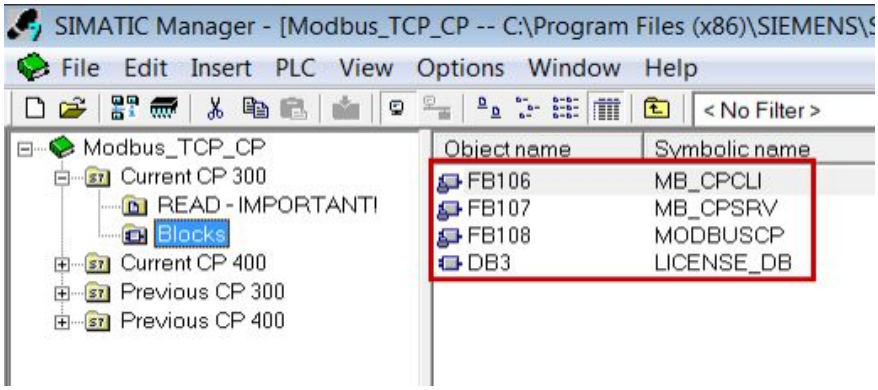
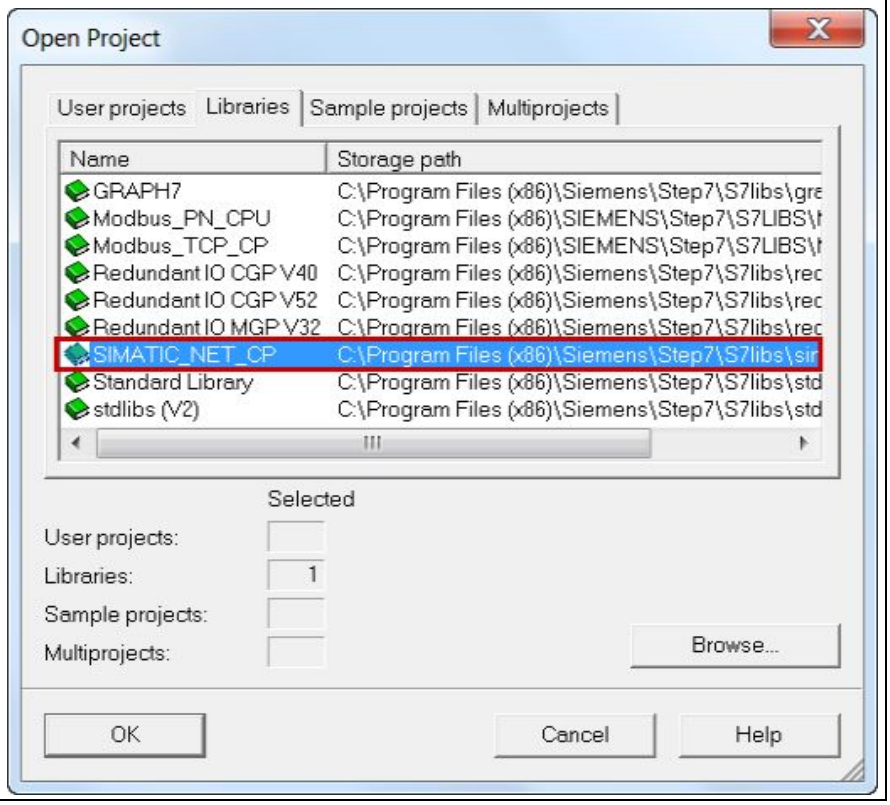
No.	Procedure
4.	Copy the blocks from the "Modbus_TCP_CP" and add them to the new project. 
5.	Open the "SIMATIC_NET_CP" library with the "File > Open" menu. In the "Open Project" dialog you switch to the "Libraries" tab and select the "SIMATIC_NET_CP" library. 

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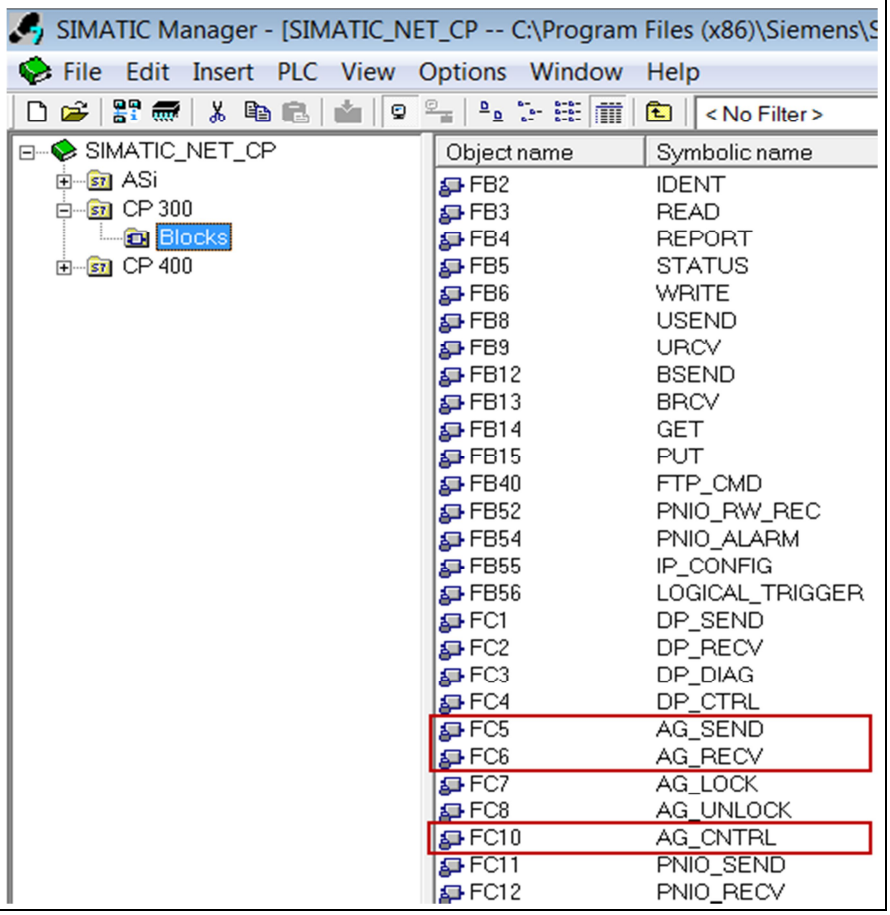
No.	Procedure
6.	If you are using a SIMATIC S7-300, then copy the following blocks from the "SIMATIC_NET_CP > CP 300 > Blocks" library and add them to the new project. • FC5 "AG_SEND" • FC6 "AG_RECV" If you are using a current station, copy the FC10 "AG_CNTRL" as well into your project. 

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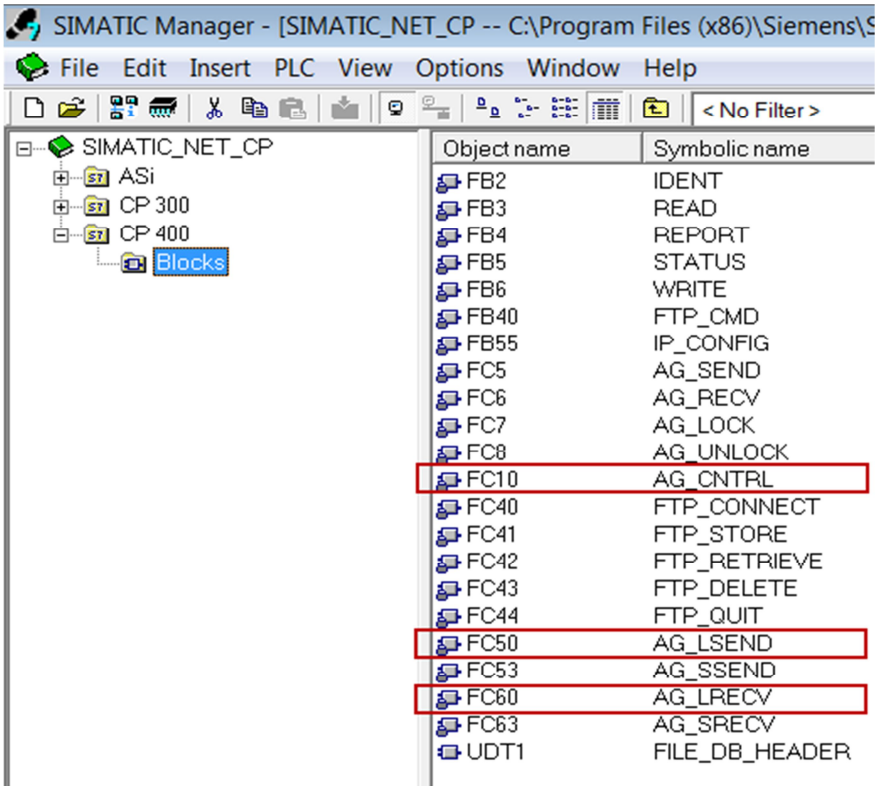
No.	Procedure
7.	If you are using a SIMATIC S7-400, then copy the following blocks from the "SIMATIC_NET_CP > CP 400 > Blocks" library and add them to the new project. • FC50 "AG_LSEND" • FC60 "AG_LRECV" If you are using a current station, copy the FC10 "AG_CNTRL" as well into your project. 

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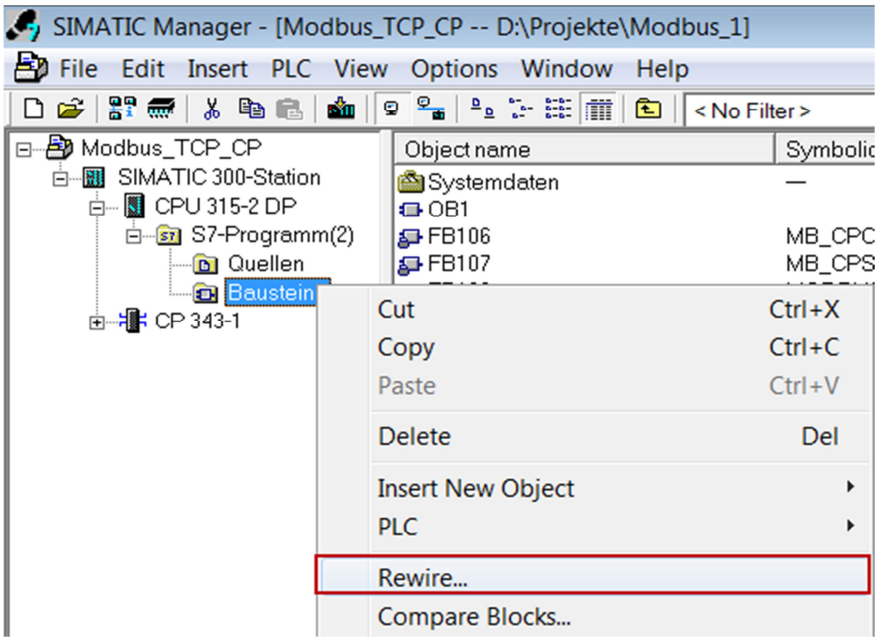
No.	Procedure
8.	If you change the numbers of the function blocks, use the "Rewire" function. It is no longer possible to rewire after migration. Right-click the block folder in the S7 program of the CPU. In the pop-up menu you select the "Rewire" function. 
9.	Start STEP 7 Professional V11/V12/13 (TIA Portal)

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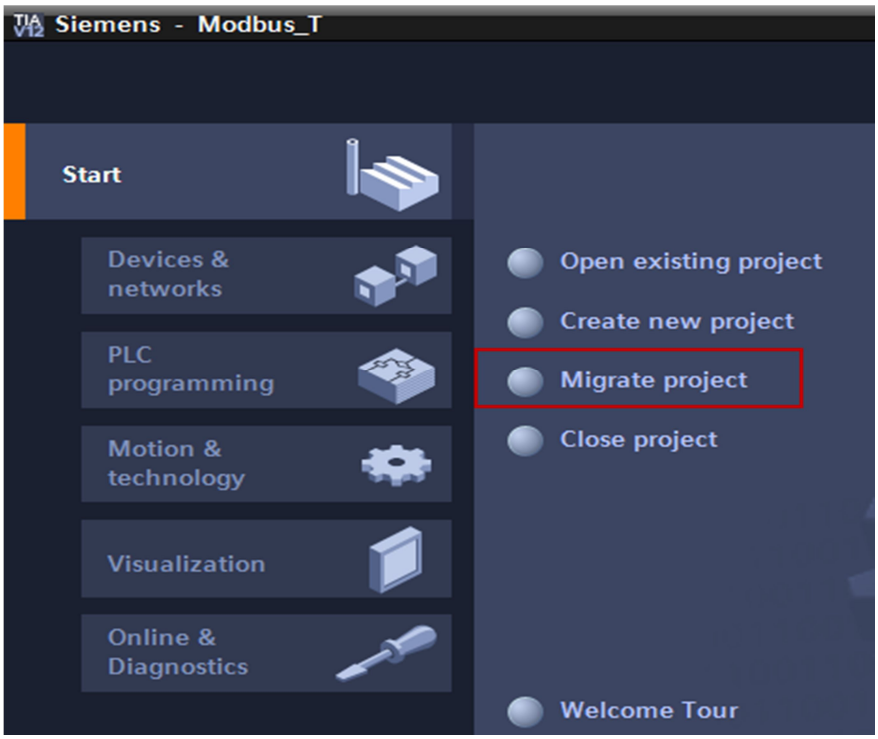
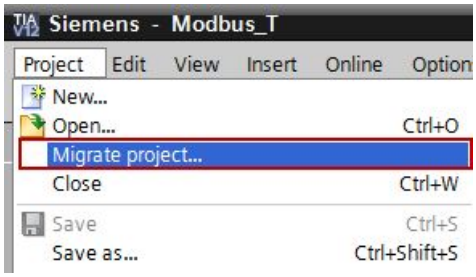
No.	Procedure
10.	Select "Migrate project" in the Portal view or the "Project > Migrate project..." menu in the Project view. The "Migrate project" dialog opens. **Portal view**  **Project view** 

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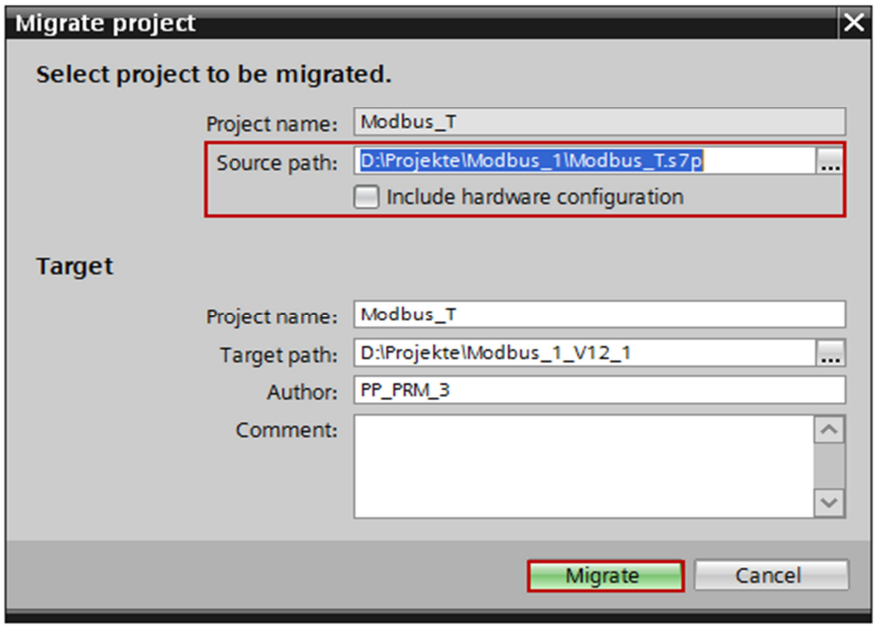
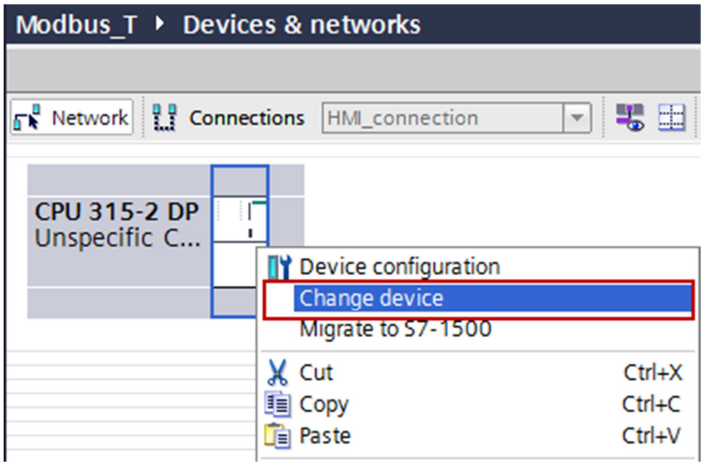
No.	Procedure
11.	In the "Migrate project" dialog you select the project to be migrated. Deselect the "Include hardware configuration" option. Specify the project name and target path of the TIA Portal project. Click the "Migrate" button to execute the migration. 
12.	Close the "Migrate project" dialog and open the migration log. You are informed that the associated SCL sources of the blocks FB106, FB107 and FB108 are missing. You can ignore this message.
13.	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. 

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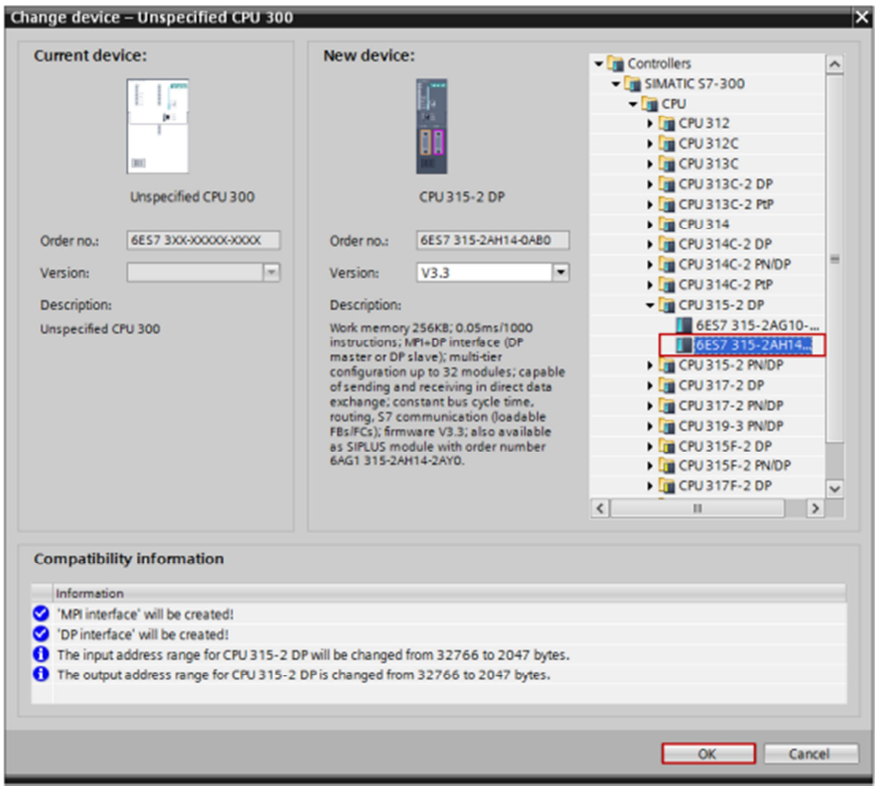
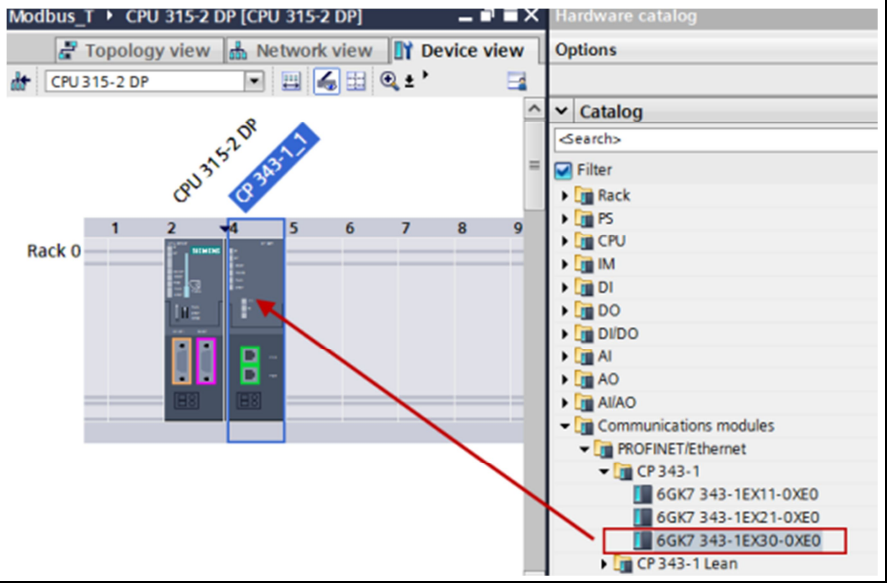
No.	Procedure
14.	In the "Change device" dialog you select the correct CPU according to your hardware setup, CPU 315-2 DP, for example. Confirm the settings with "OK". 
15.	According to your hardware setup, in the Device view you drag-and-drop the Industrial Ethernet CP from the Hardware Catalog to the rack of the SIMATIC S7-300. 

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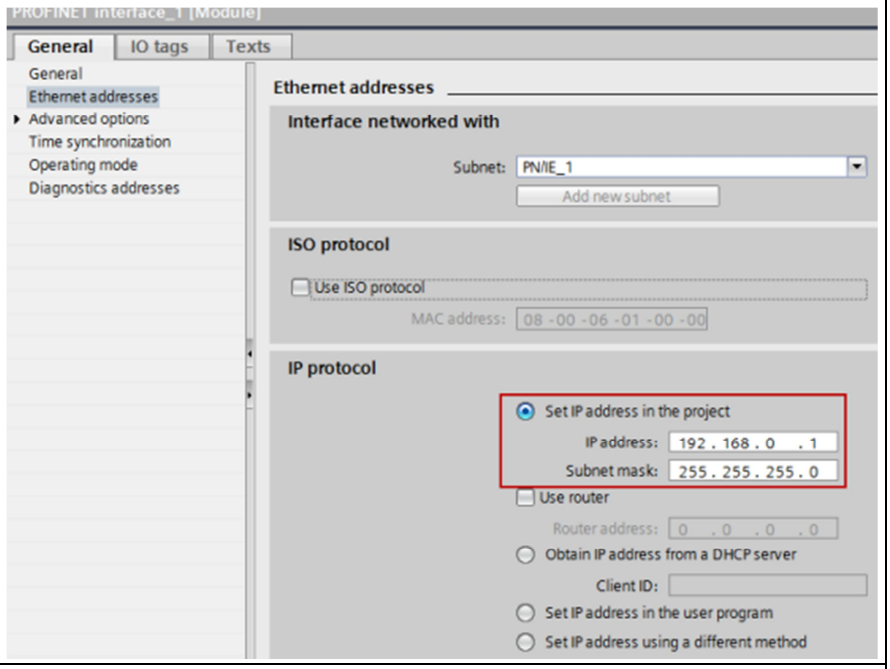
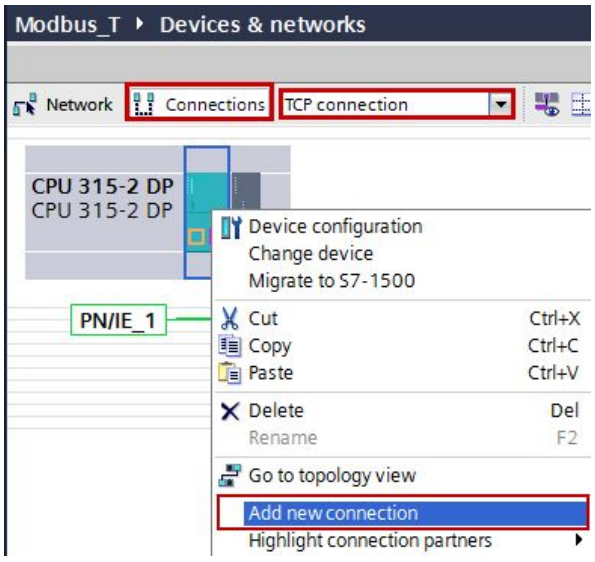
No.	Procedure
16.	In the Device view you mark the PROFINET interface of the Industrial Ethernet CP. In the inspector window you assign a subnet to the PROFINET interface and enter the IP address and subnet mask of the Industrial Ethernet CP in "Properties > General > Ethernet addresses". 
17.	Insert a TCP connection for the CPU. • In the Network view you click "Connections". • Select "TCP connection" as the connection type. • Right-click the CPU and select "Add new connection" in the pop-up menu. The "Create new connection" dialog opens. 

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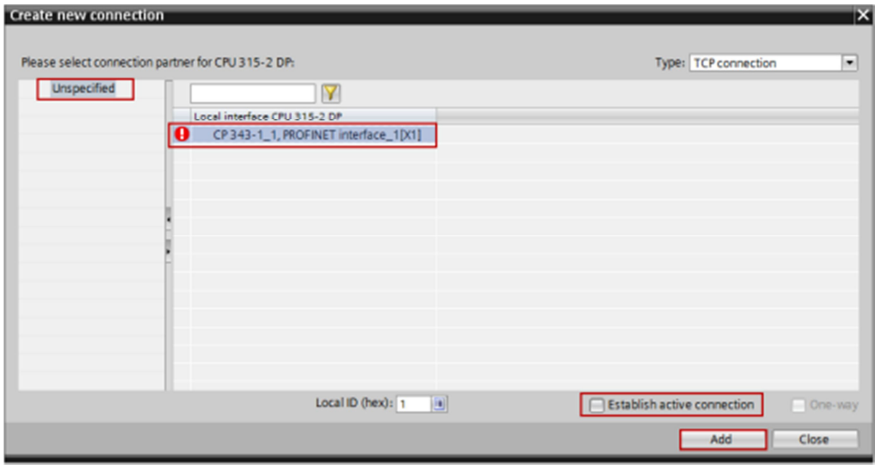
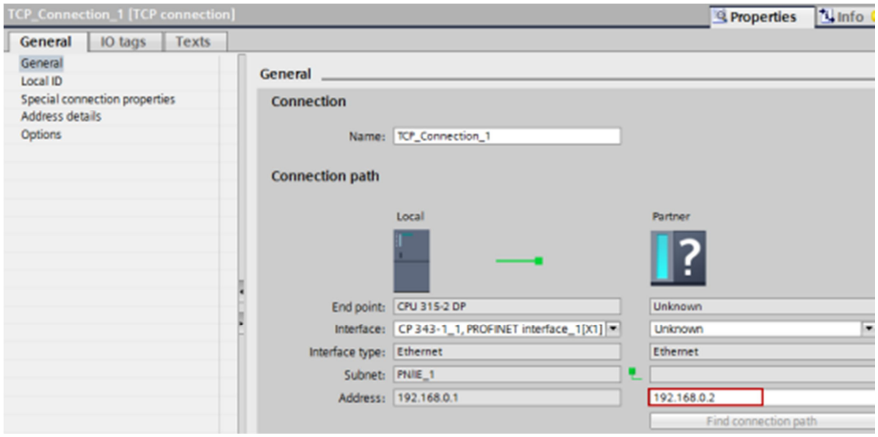
No.	Procedure
18.	In the "Create new connection" dialog you make the following settings. • Select "Unspecified" as the connection partner. • Select the Industrial Ethernet CP as local interface. • Disable the "Establish active connection" function if the Modbus block is parameterized as server. • Enable the "Establish active connection" function if the Modbus block is parameterized as client. • Click "Add" and close the dialog. 
19.	The TCP connection established is displayed in the table area of the Network view in the "Connections" table. The properties of the TCP connection are displayed in the TCP connection. In the Properties of the TCP connection you open the "General" tab. Navigate to and open the "General" area. Here you enter the IP address of the partner if the Modbus block is parameterized as client. 

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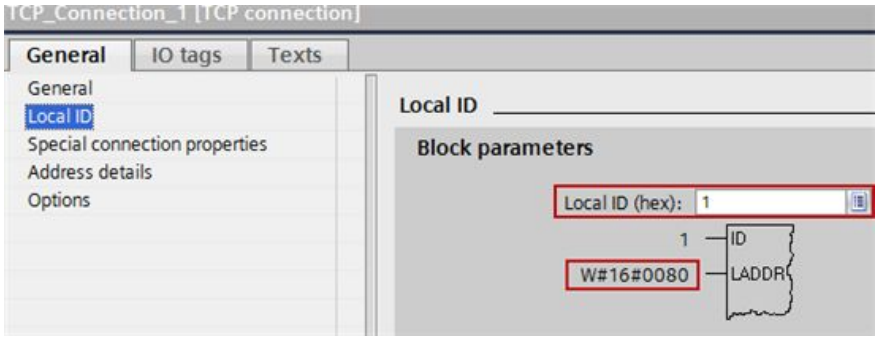
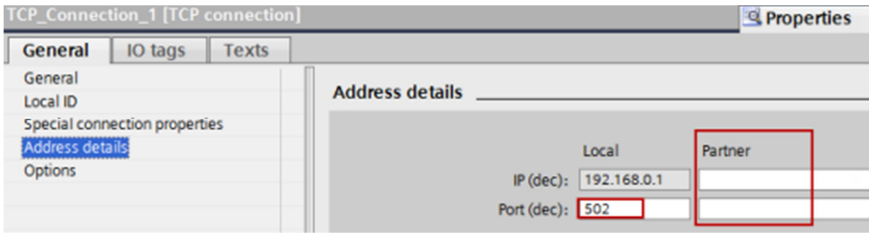
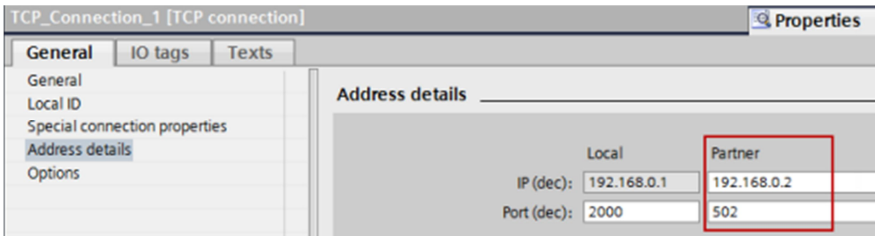
No.	Procedure
20.	Navigate to and open the "Local ID" area. Enter the local ID that you parameterize for the Modbus TCP connection on the Modbus block. Note the LADDR for the parameterization of the Modbus blocks. 
21.	Navigate to and open the "Address details" area. If you parameterize the Modbus block as server, enter Port 502 as local port of the CPU. **Do not** make any specifications about the partner.  If you parameterize the Modbus block as client, you enter the IP address of the partner and specify Port 502 as the partner port. You can apply the default value for the local port of the CPU, 2000, for example. 

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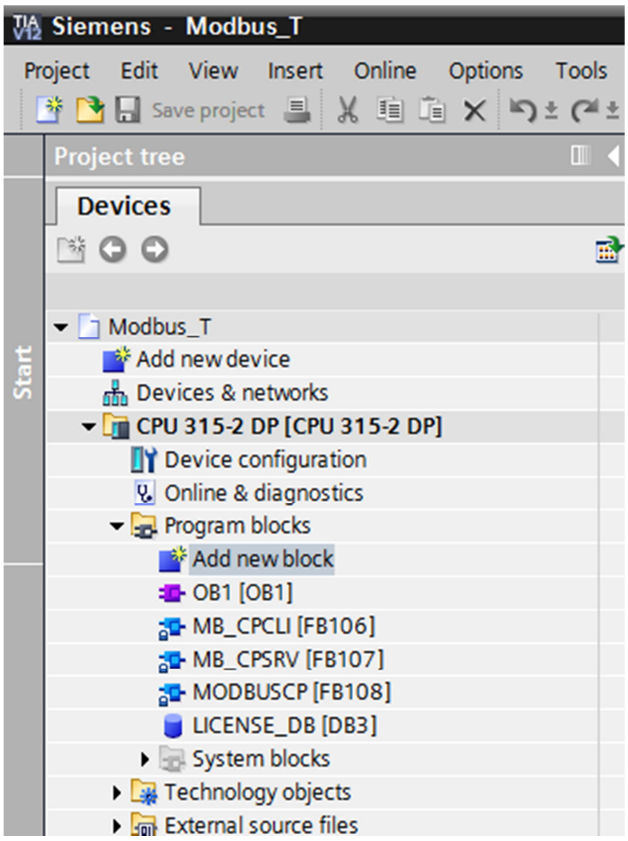
No.	Procedure
22.	In the project navigation you open the folder structure for the CPU 315-2 DP. Here you open the "Program blocks" folder. Double-click the "Add new block" command. The "Add new block" dialog opens. 

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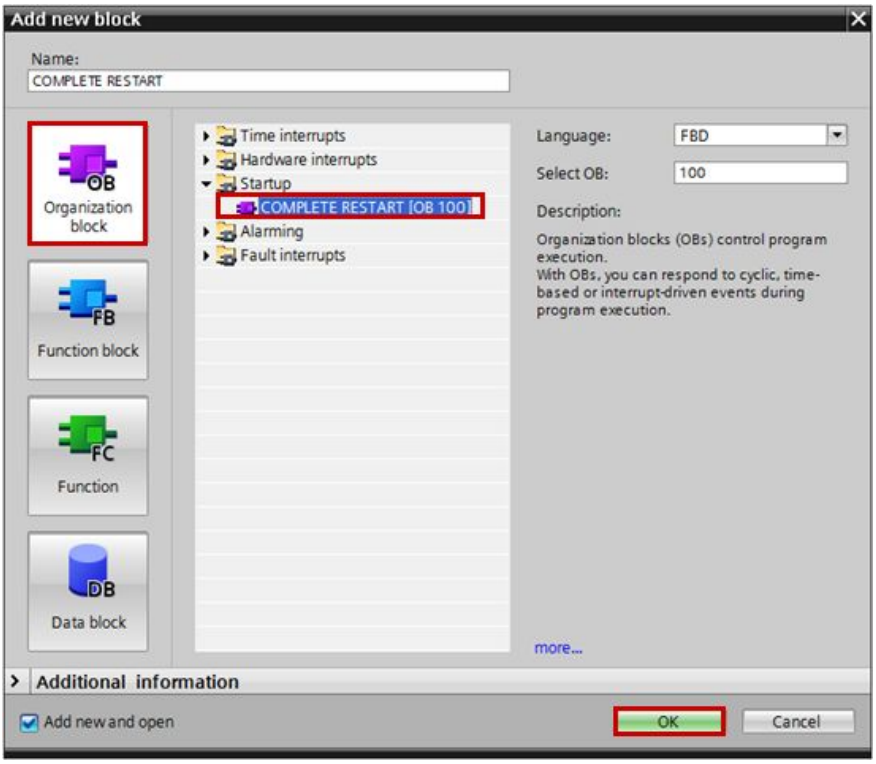
No.	Procedure
23.	In the "Add new block" dialog you click the "Organization block (OB)" button. Select the Startup OB: OB 100. Click the "OK" button to add OB100 to your project. 

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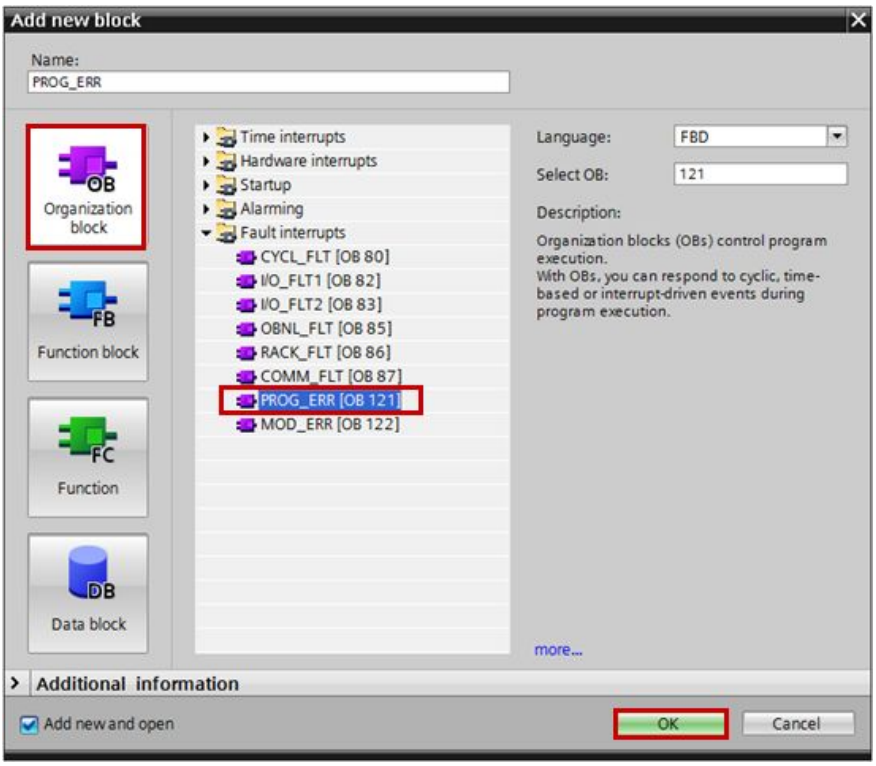
No.	Procedure
24.	Double-click the "Add new block" command again. The "Add new block" dialog opens. Click the "Organization block (OB)" button. Select the Fault interrupt OB: OB121. Click the "OK" button to add OB121 to your project. 
25.	Add the data blocks (DBs) for the Modbus data.
26.	Now you program the calls of the FB108 "MODBUSCP" block in the OB100 and in a cyclic OB, OB1, for example, as described in the manual. **Note** The manual for MODBUS/TCP communication over an Industrial Ethernet CP of S7-300 or S7-400 is available for downloading: http://support.automation.siemens.com/WW/view/en/103474603
27.	Now compile the project. There should be no errors or warnings.

Note

In STEP 7 V11/12/V13 (TIA Portal) it is not permitted to add migrated know-how-protected blocks to a library. If you do 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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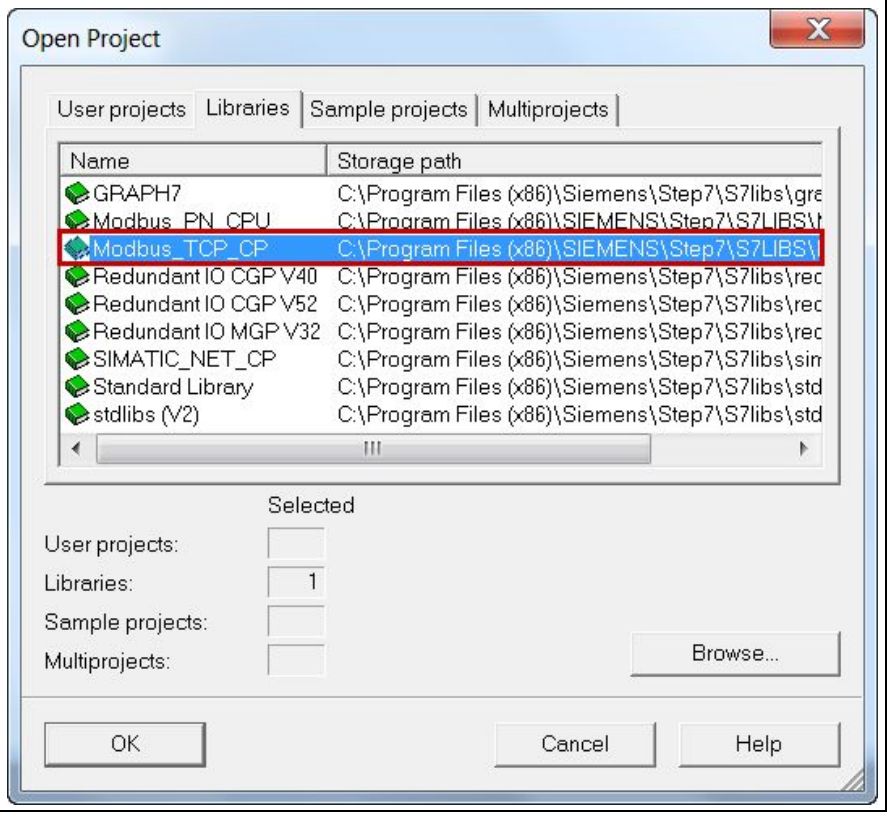
3 Migrate the "MODBUS_TCP_CP" V5.0 Library to STEP 7 V11/12/13 (TIA Portal)

The instructions below describe how to migrate the blocks of the "MODBUS_TCP_CP" V5.0 library to STEP 7 Professional V11/V12/13 (TIA Portal) to be able to use them there.

Table 3-1

No.	Procedure
1.	You can only install the "Modbus_TCP_CP" library on a PC 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.	Open the "Modbus_TCP_CP" library with the "File > Open" menu. In the "Open Project" dialog you select the "Libraries" tab. Select the "Modbus_TCP_CP" library. If the "Modbus_TCP_CP" library is not displayed in the "Libraries" tab of the "Open Project" dialog, then click the "Browse..." button. Select the "Modbus_TCP_CP" library in the "...\SIEMENS\Step7\S7LIBS" directory. 

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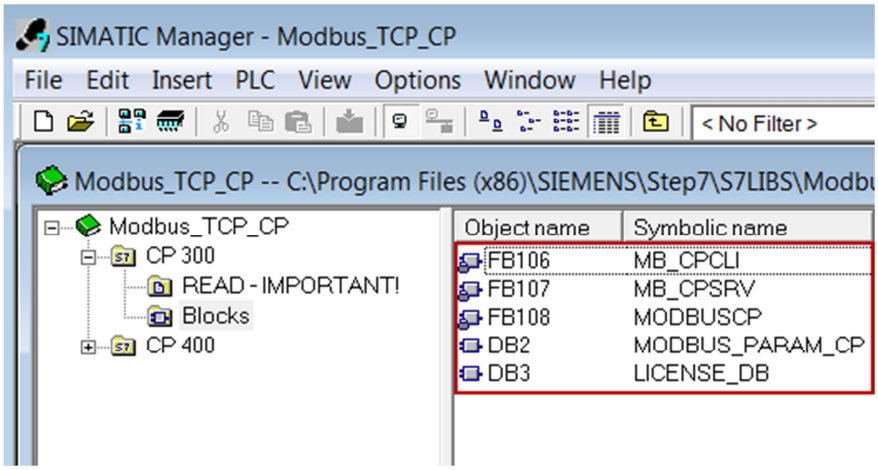
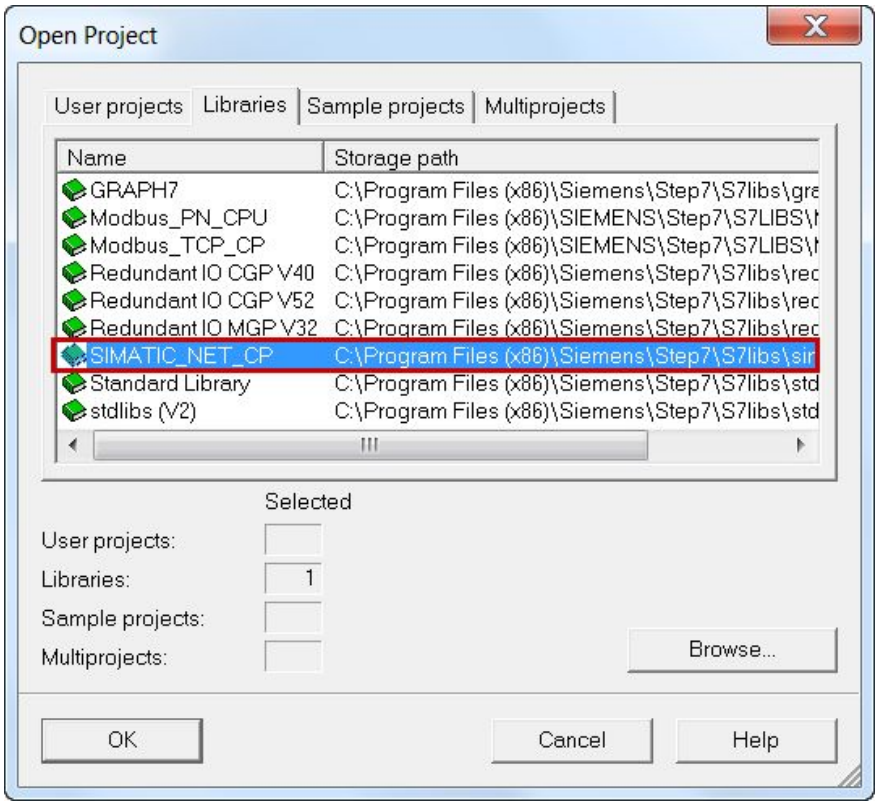
No.	Procedure
4.	Copy the blocks from the "Modbus_TCP_CP" and add them to the new project. 
5.	Open the "SIMATIC_NET_CP" library with the "File > Open" menu. In the "Open Project" dialog you switch to the "Libraries" tab and select the "SIMATIC_NET_CP" library. 

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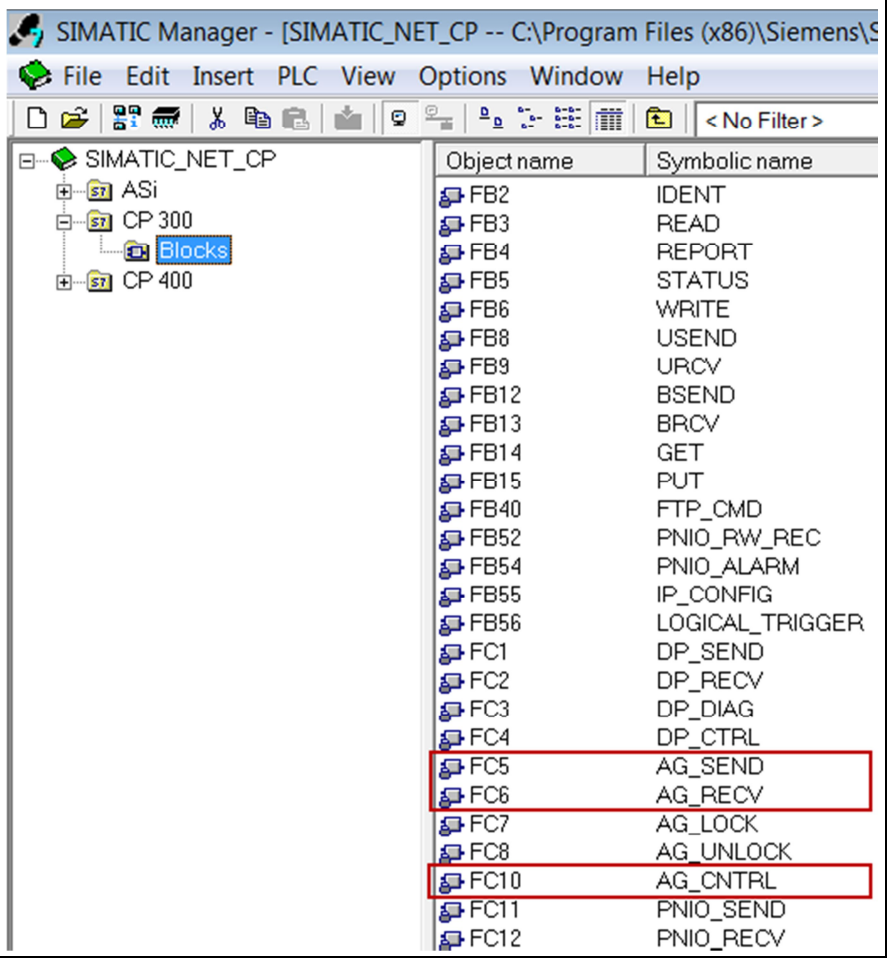
No.	Procedure
6.	If you are using a SIMATIC S7-300, then copy the following blocks from the "SIMATIC_NET_CP > CP 300 > Blocks" library and add them to the new project. • FC5 "AG_SEND" • FC6 "AG_RECV" • FC10 "AG_CNTRL" 

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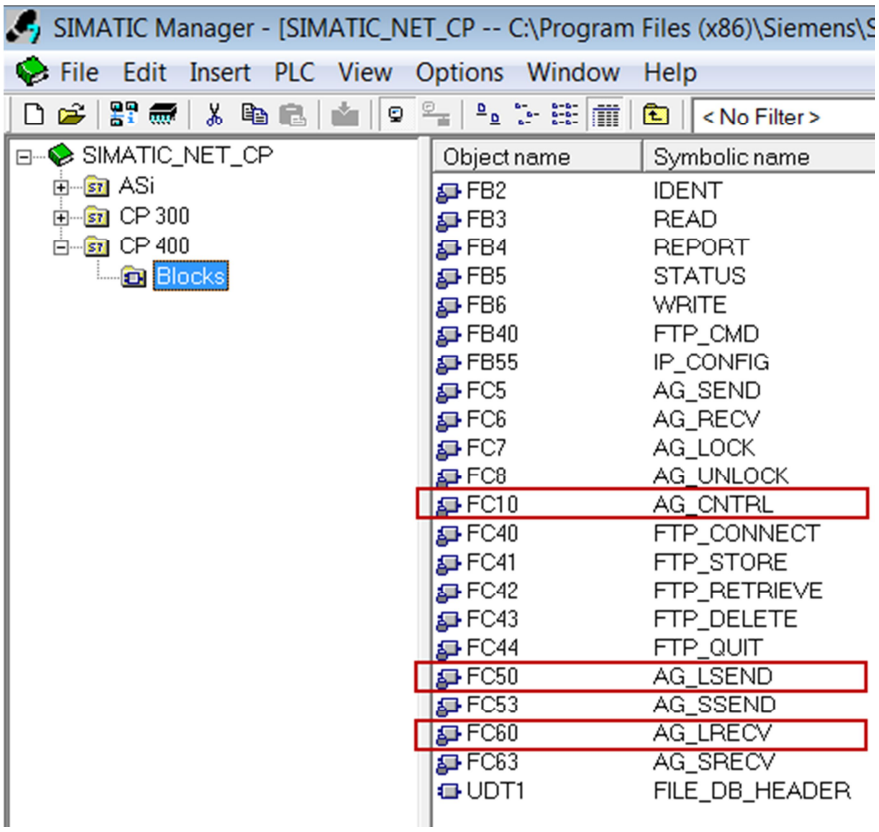
No.	Procedure
7.	If you are using a SIMATIC S7-400, then copy the following blocks from the "SIMATIC_NET_CP > CP 400 > Blocks" library and add them to the new project. • FC50 "AG_LSEND" • FC60 "AG_LRECV" • FC10 "AG_CNTRL" 

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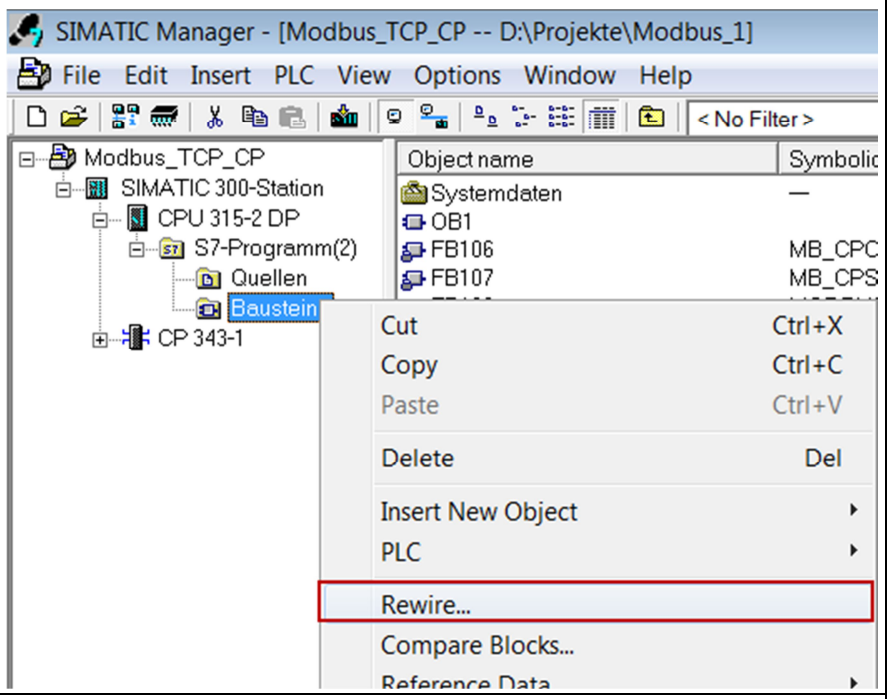
No.	Procedure
8.	If you change the numbers of the function blocks, use the "Rewire" function. It is no longer possible to rewire after migration. Right-click the block folder in the S7 program of the CPU. In the pop-up menu you select the "Rewire" function. 
9.	Create the Parameter DB using the Modbus/TCP-CP Wizard. The Modbus/TCP-CP Wizard is available for downloading at this link: https://support.industry.siemens.com/cs/ww/en/view/60735352 **Note** The Modbus/TCP-CP 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.
10.	Start STEP 7 Professional V11/V12/13 (TIA Portal)

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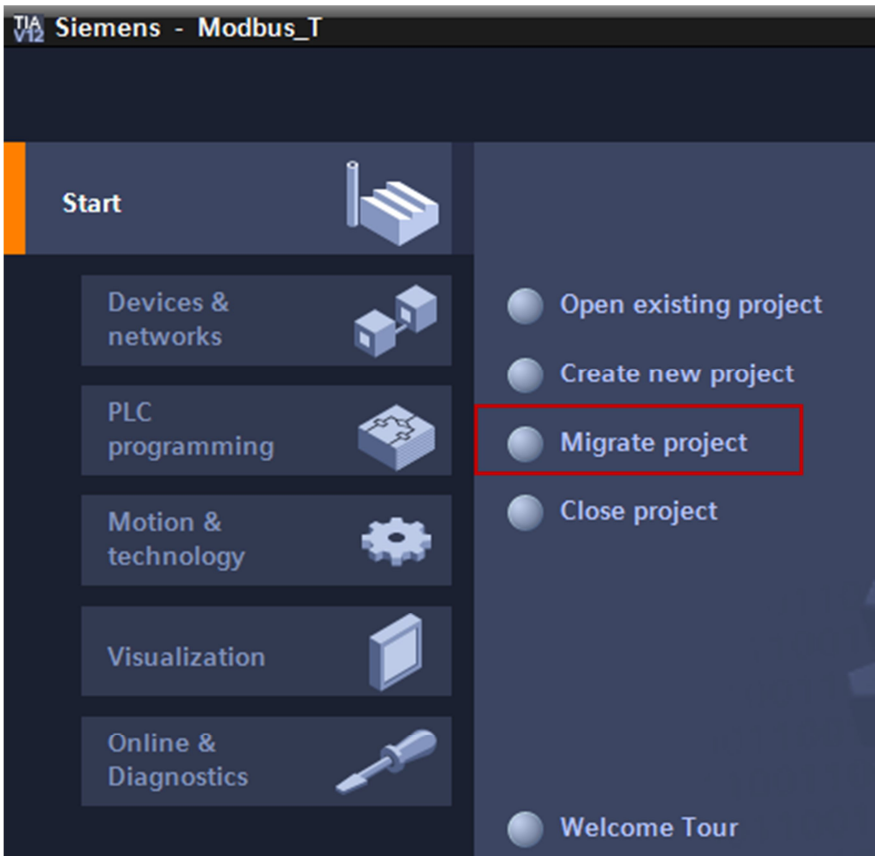
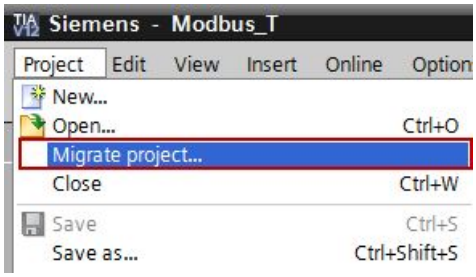
No.	Procedure
11.	Select "Migrate project" in the Portal view or the "Project > Migrate project..." menu in the Project view. The "Migrate project" dialog opens. **Portal view**  **Project view** 

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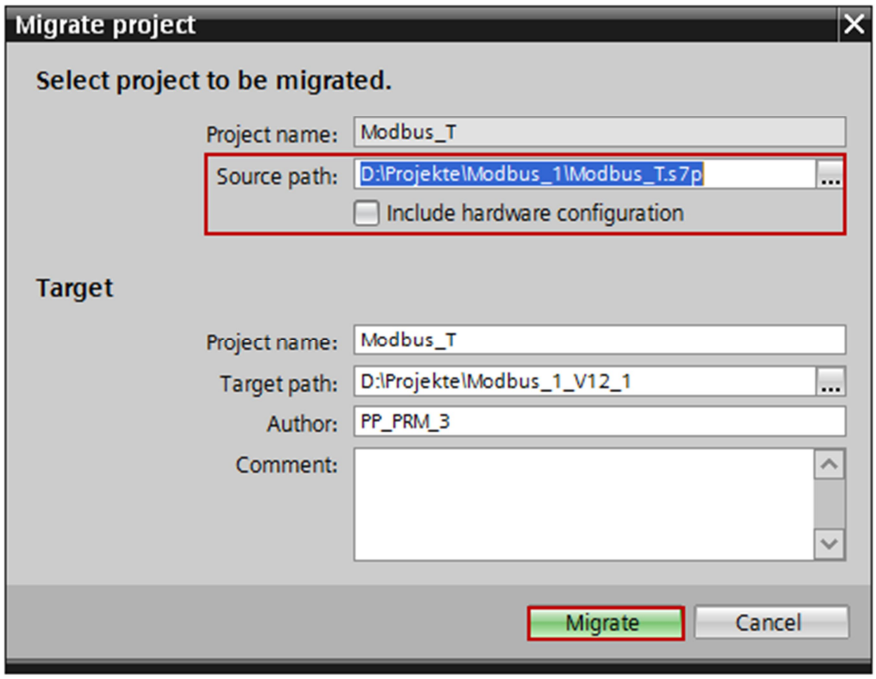
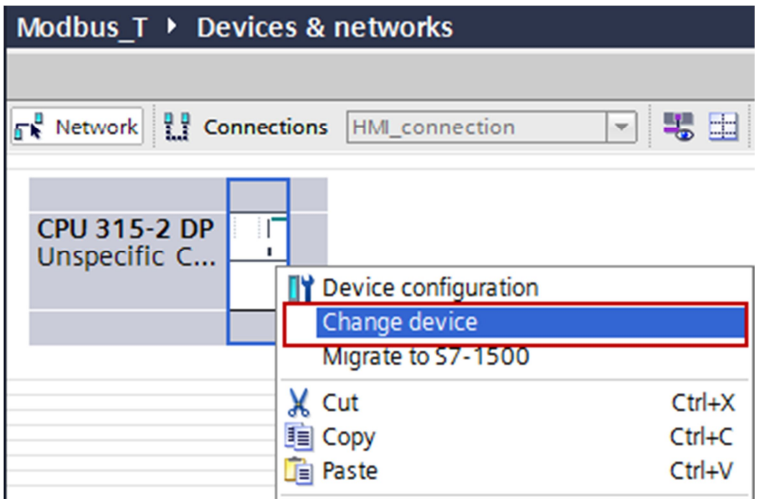
No.	Procedure
12.	In the "Migrate project" dialog you select the project to be migrated. Deselect the "Include hardware configuration" option. Specify the project name and target path of the TIA Portal project. Click the "Migrate" button to execute the migration. 
13.	Close the "Migrate project" dialog and open the migration log. You are informed that the associated SCL sources of the blocks FB106, FB107 and FB108 are missing. You can ignore this message.
14.	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. 

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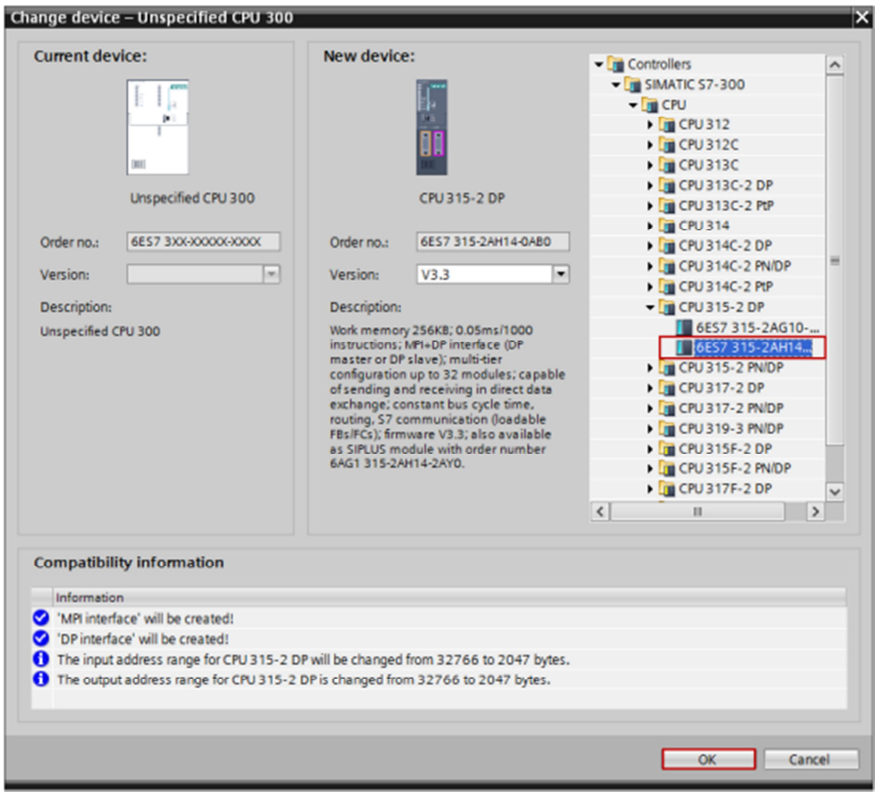
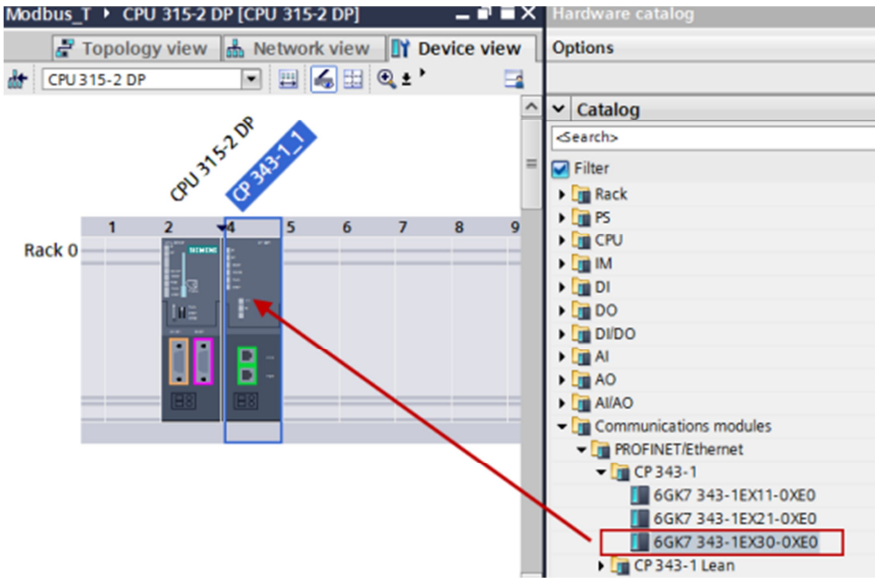
No.	Procedure
15.	In the "Change device" dialog you select the correct CPU according to your hardware setup, CPU 315-2 DP, for example. Confirm the settings with "OK". 
16.	According to your hardware setup, in the Device view you drag-and-drop the Industrial Ethernet CP from the Hardware Catalog to the rack of the SIMATIC S7-300. 

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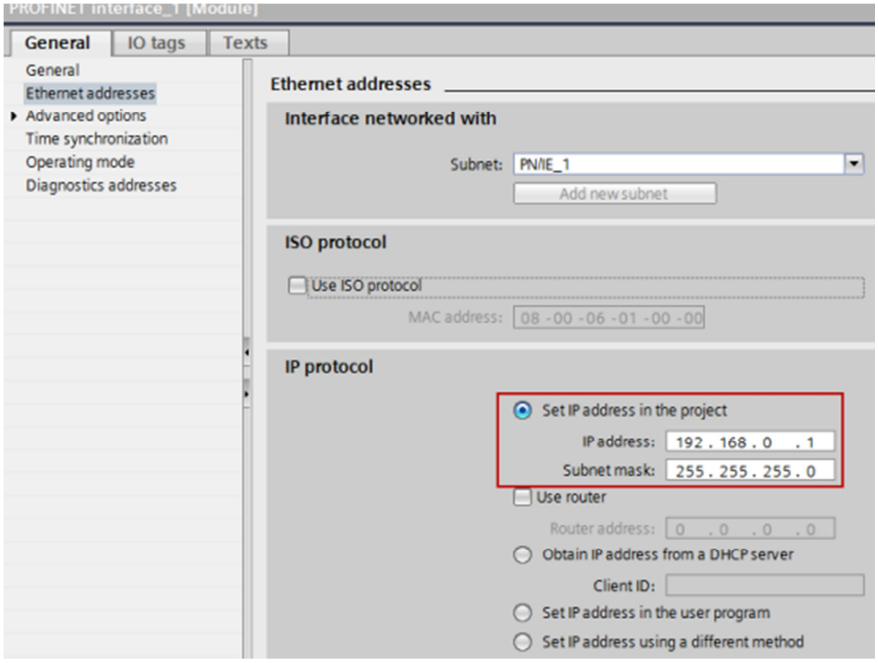
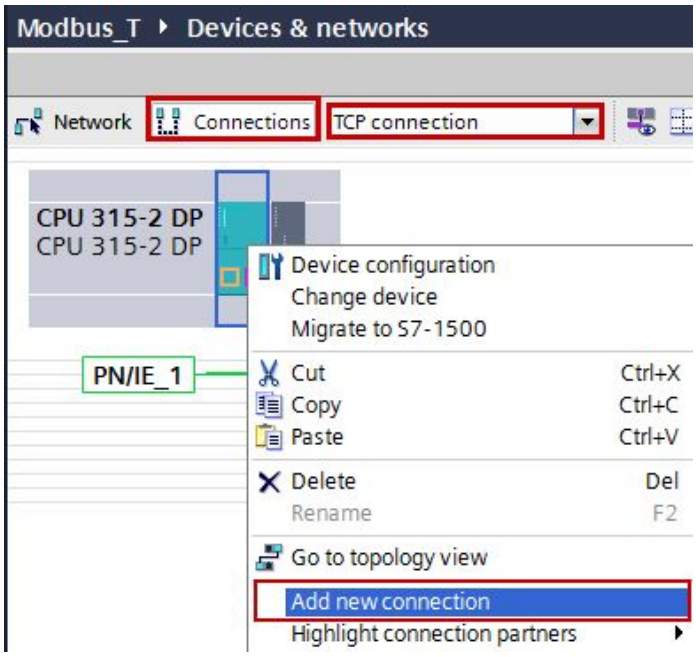
No.	Procedure
17.	In the Device view you mark the PROFINET interface of the Industrial Ethernet CP. In the inspector window you assign a subnet to the PROFINET interface and enter the IP address and subnet mask of the Industrial Ethernet CP in "Properties > General > Ethernet addresses". 
18.	Insert a TCP connection for the CPU. • In the Network view you click "Connections". • Select "TCP connection" as the connection type. • Right-click the CPU and select "Add new connection" in the pop-up menu. The "Create new connection" dialog opens. 

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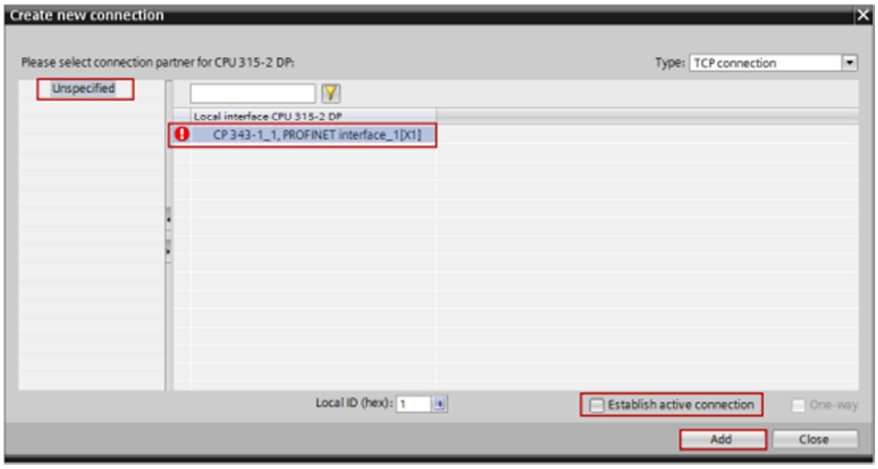
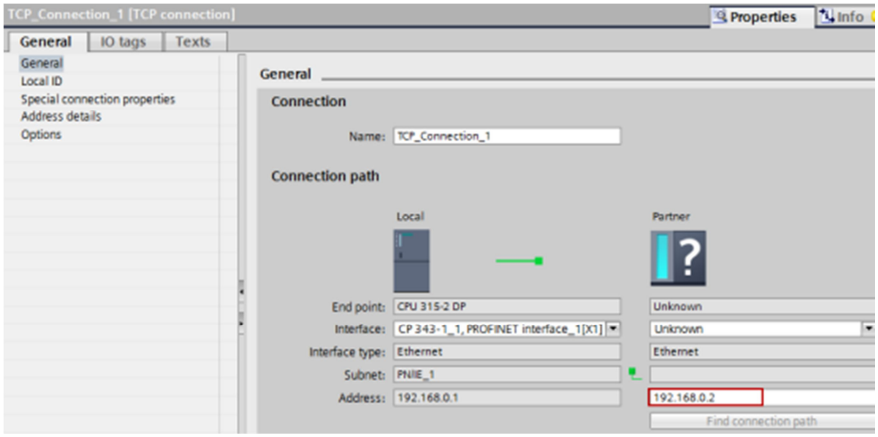
No.	Procedure
19.	In the "Create new connection" dialog you make the following settings. • Select "Unspecified" as the connection partner. • Select the Industrial Ethernet CP as local interface. • Disable the "Establish active connection" function if the Modbus block is parameterized as server. • Enable the "Establish active connection" function if the Modbus block is parameterized as client. • Click "Add" and close the dialog. 
20.	The TCP connection established is displayed in the table area of the Network view in the "Connections" table. The properties of the TCP connection are displayed in the TCP connection. In the Properties of the TCP connection you open the "General" tab. Navigate to and open the "General" area. Here you enter the IP address of the partner if the Modbus block is parameterized as client. 

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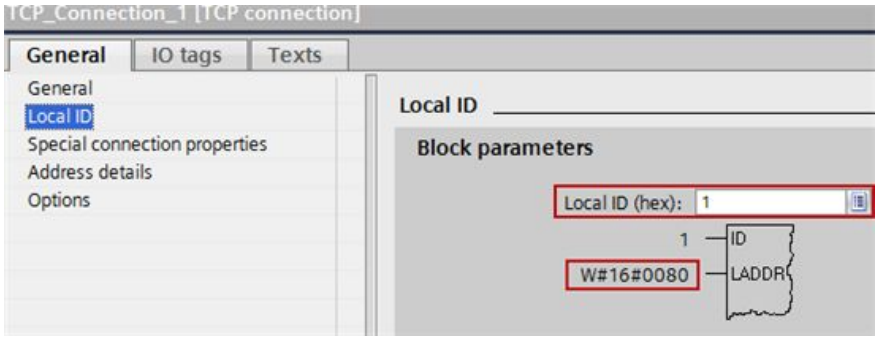
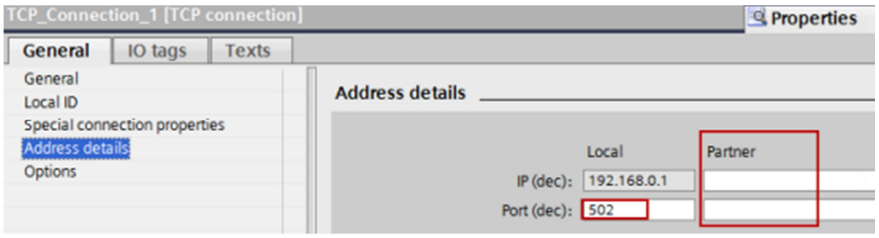
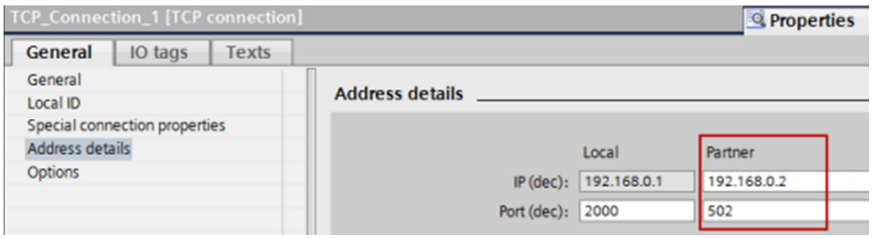
No.	Procedure
21.	Navigate to and open the "Local ID" area. Enter the local ID that you parameterize for the Modbus TCP connection on the Modbus block. Note the LADDR for the parameterization of the Modbus blocks. 
22.	Navigate to and open the "Address details" area. If you parameterize the Modbus block as server, enter Port 502 as local port of the CPU. **Do not** make any specifications about the partner.  If you parameterize the Modbus block as client, you enter the IP address of the partner and specify Port 502 as the partner port. You can apply the default value for the local port of the CPU, 2000, for example. 

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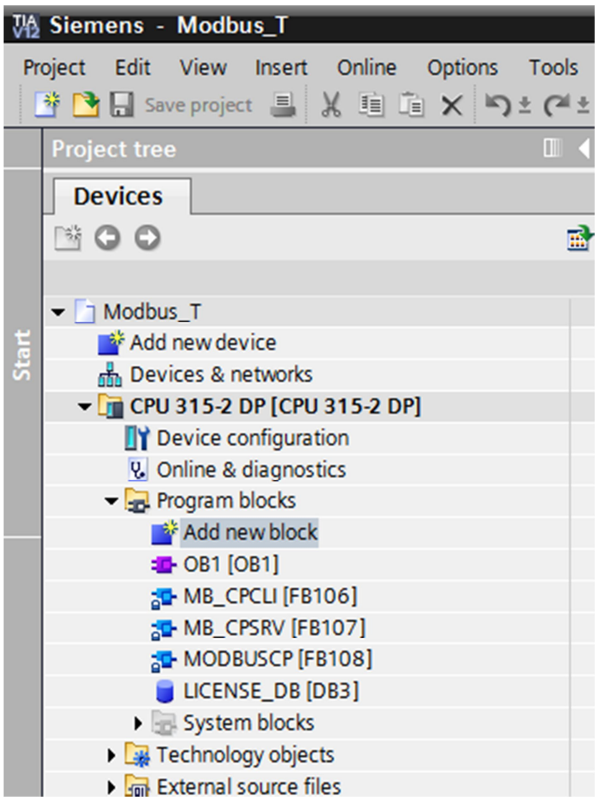
No.	Procedure
23.	In the project navigation you open the folder structure for the CPU 315-2 DP. Here you open the "Program blocks" folder. Double-click the "Add new block" command. The "Add new block" dialog opens. 

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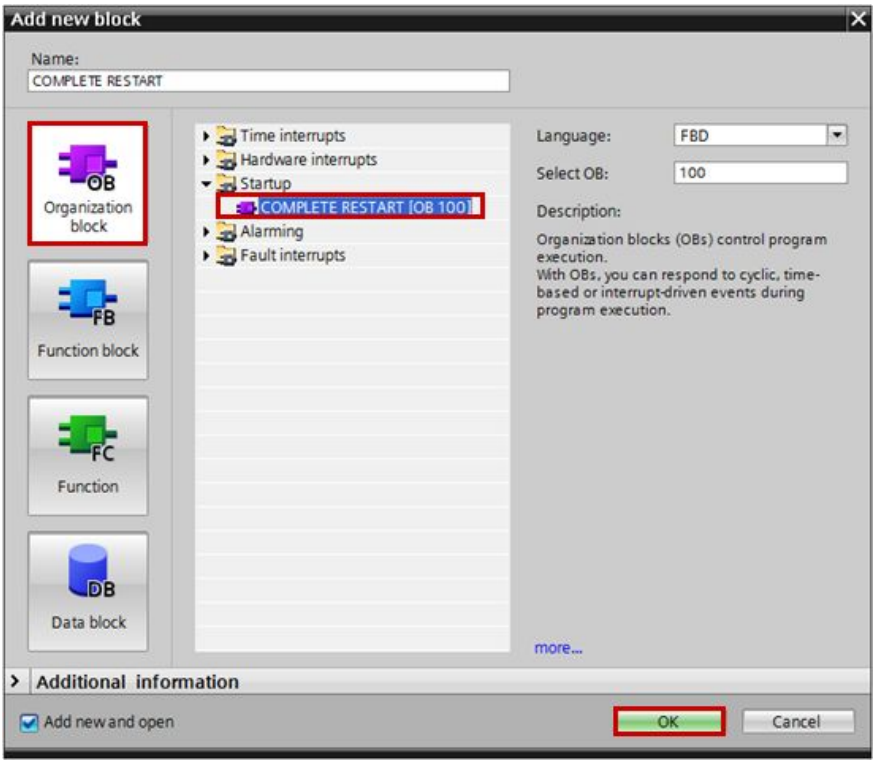
No.	Procedure
24.	In the "Add new block" dialog you click the "Organization block (OB)" button. Select the Startup OB: OB 100. Click the "OK" button to add OB100 to your project. 

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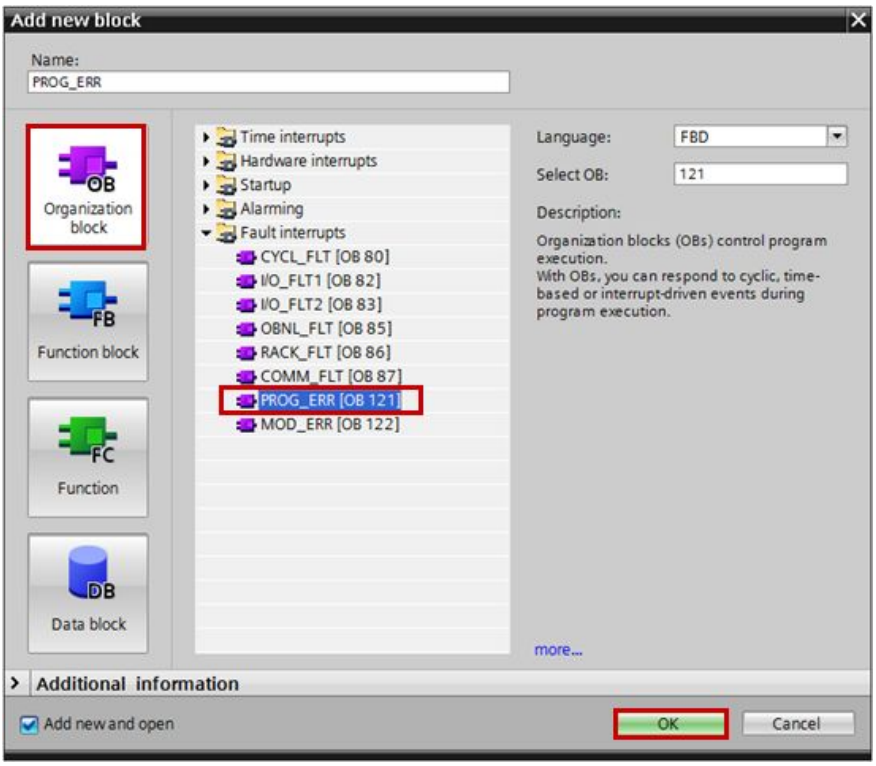
No.	Procedure
25.	Double-click the "Add new block" command again. The "Add new block" dialog opens. Click the "Organization block (OB)" button. Select the Fault interrupt OB: OB121. Click the "OK" button to add OB121 to your project. 
26.	Add the data blocks (DBs) for the Modbus data.
27.	Now you program the calls of the FB108 "MODBUSCP" block in the OB100 and in a cyclic OB, OB1, for example, as described in the manual. **Note** The manual for MODBUS/TCP communication over an Industrial Ethernet CP of S7-300 or S7-400 is available for downloading: http://support.automation.siemens.com/WW/view/en/103474603
28.	Now compile the project. There should be no errors or warnings.

Note

In STEP 7 V11/12/V13 (TIA Portal) it is not permitted to add migrated know-how-protected blocks to a library. If you do 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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