

PSS 4000 ETH UDP communication with SIMATIC PLCs



Product

Type: PSSu H PLC1 FS SN SD (-T, -R)
Name: PSS 4000 system
Manufacturer: Pilz GmbH & Co. KG, Safe Automation

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We are grateful for any feedback on the contents.

September 2012

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1. Useful documentation

Reading the documentation listed below is necessary for understanding this application note.
The availability of the indicated tools and safe handling are also presupposed with the user.

1.1. Documentation from Pilz GmbH & Co. KG

No.	Description	Item No.
1	Pilz international homepage, download section	www.pilz.com
2	Operating Manual PSSu H PLC1 FS SN SD	21939-EN-xx
3	System Description Programmable safety and control system PSS 4000	1001467-EN-xx
4	Safety Manual Programmable safety and control system PSS 4000 1001	1001468-EN-xx
5	PAS4000 online help	
6		

1.2. Documentation from other sources of information

No.	Description	Item No.
1	SIMATIC portal "Automation Systems" (international) Internet-Link to "www.automation.siemens.com"	
2	SIMATIC portal "Siemens Industry Online Support" Internet Link: FAQ and Example for UDP communication with S7-CPU	

2. Preface

This document provide a Step by Step example how to communicate between Siemens S7-300 and PSS4000 with UDP connection .

The document is not intended as a technical documentation for general use of SIMATIC Manager Step 7. It may not be distributed to customers without a special note to its scope.

Notice: You need for this application a sample project from “Siemens Industry Online Support”:

- ▶ Step7 – provided Project “openUDP”
- ▶ complete title of part of FAQ with ID 22866139 (2012-07-23):
“S7-300 CPU 31x -- Configuring and programming communication -- **Using communication blocks**”
 - How do you program the communication blocks FB67 "TUSEND", FB68 "TURCV", FB65 "TCON" and FB66 "TDISCON" in order to use the UDP protocol for data exchange by means of the integrated PROFINET interface of a CPU?
- ▶ [Link: Siemens Industry Online Support; FAQ and Example UDP communication with S7-CPU](#)
- ▶ In the lower part of this webpage you find the STEP 7 project as download.

The STEP 7 project as download

The STEP 7 project contains a sample program for calling FB500 and the functions FC95 "SET_UDP_ENDPOINT", FC96 "SET_UDP_REMOTE", the blocks FB65 "TCON", FB66 "TDISCON", FB67 "TUSEND" and FB68 "TURECV" with status evaluation. It was created with STEP 7 V5.4 SP3.



[Sample_open_UDP.zip \(44 KB \)](#)

Configuration of UDP connections

In order to send UDP datagrams to multiple communication partners, you configure additional local and remote UDP endpoints. Copy the FB500 so that you receive more function blocks (such as FB501). Change

Fig. 1: Siemens Industry Online Support – Download STEP 7 project “openUDP”

3. Configuration

3.1. List of used hardware

► Siemens Hardware

This application Note has been tested with the following Hardware:

- CPU 317-2FK13-0AB0 V2.6.7

► Pilz Hardware

This Application Note has been tested with the following Hardware:

- PSSu H PLC1 FS SN SD (312070)
- Firmware: 1.6.0
- HW: 2

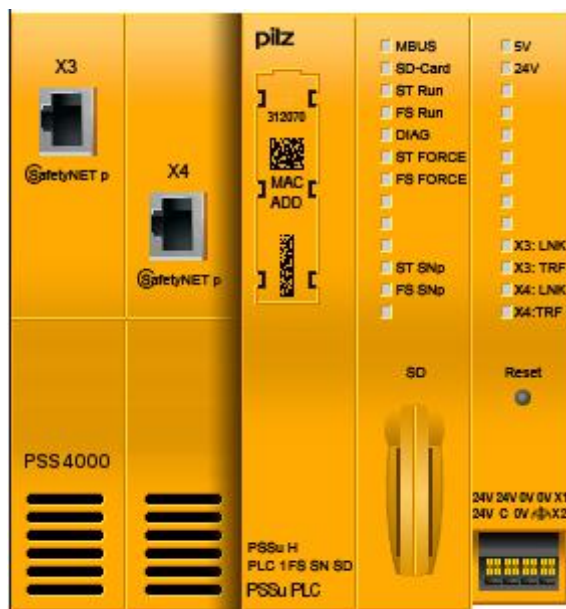


Fig. 2: PAS4000 – Hardware Configuration PSS4000

3.2. List of supported Pilz hardware

► PSS 4000 head modules

- PSSu H PLC1 FS SN SD 312070
- PSSu H PLC1 FS SN SD-T 314070
- PSSu H PLC1 FS SN SD-R 315070
- PSSu H PLC1 FS DP SN SD 312071

3.3. List of used software

This Application Note has been tested with the following software:

- ▶ PAS4000: Version 1.6.0
- ▶ Siemens Simatic STEP7, Version 5.4

3.4. List of used IP addresses

The following IP addresses has been used in the example project:

- ▶ Computer: 172.016.209.011
- ▶ PSS 4000: 172.016.209.055
- ▶ Simatic S7 PLC: 172.016.209.092

Notice: For more information about setting IP address open in software “PAS4000” Help function "Contents and Index" and choose "Hardware configuration".

4. Application Task

Create a connection with UDP and communicate between PSS4000 and Siemens S7-300. The initial S7-Hardware configuration is not implemented in this “Application Note”. One can get further details if one read the Siemens Simatic Step 7 manual. (e.g. http://www.automation.siemens.com/fea/html_76/down_module.htm).

4.1. Steps before you can start

- ▶ Set the IP address of your PC.
In this example the IP address for the PC is 172.16.209.11.

4.2. Steps for S7

- ▶ Download of provided Project from Siemens Industry Online Support please see **No. 2** of Ch. 1.2 Documentation from other sources of information, page 5
- ▶ Start the example project “openUDP” in the SIMATIC Manager and follow the description of the sample program.

4.3. Steps for PSS4000

- ▶ Start PAS4000.
- ▶ Click at “New” to create a new project.

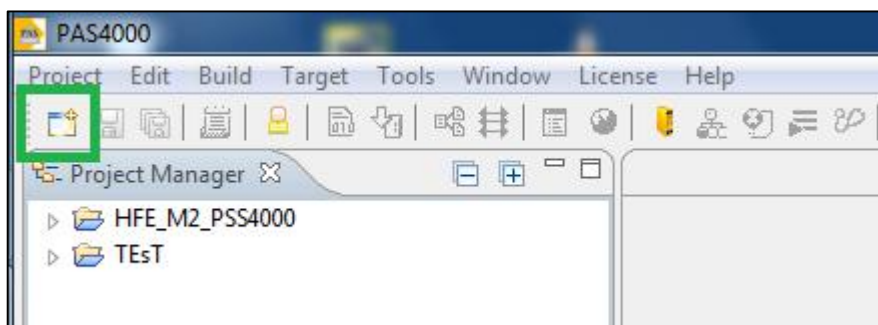


Fig. 3: PAS4000 – Create new project (1)

- Enter the project name and continue with “OK”. The new project will be created.

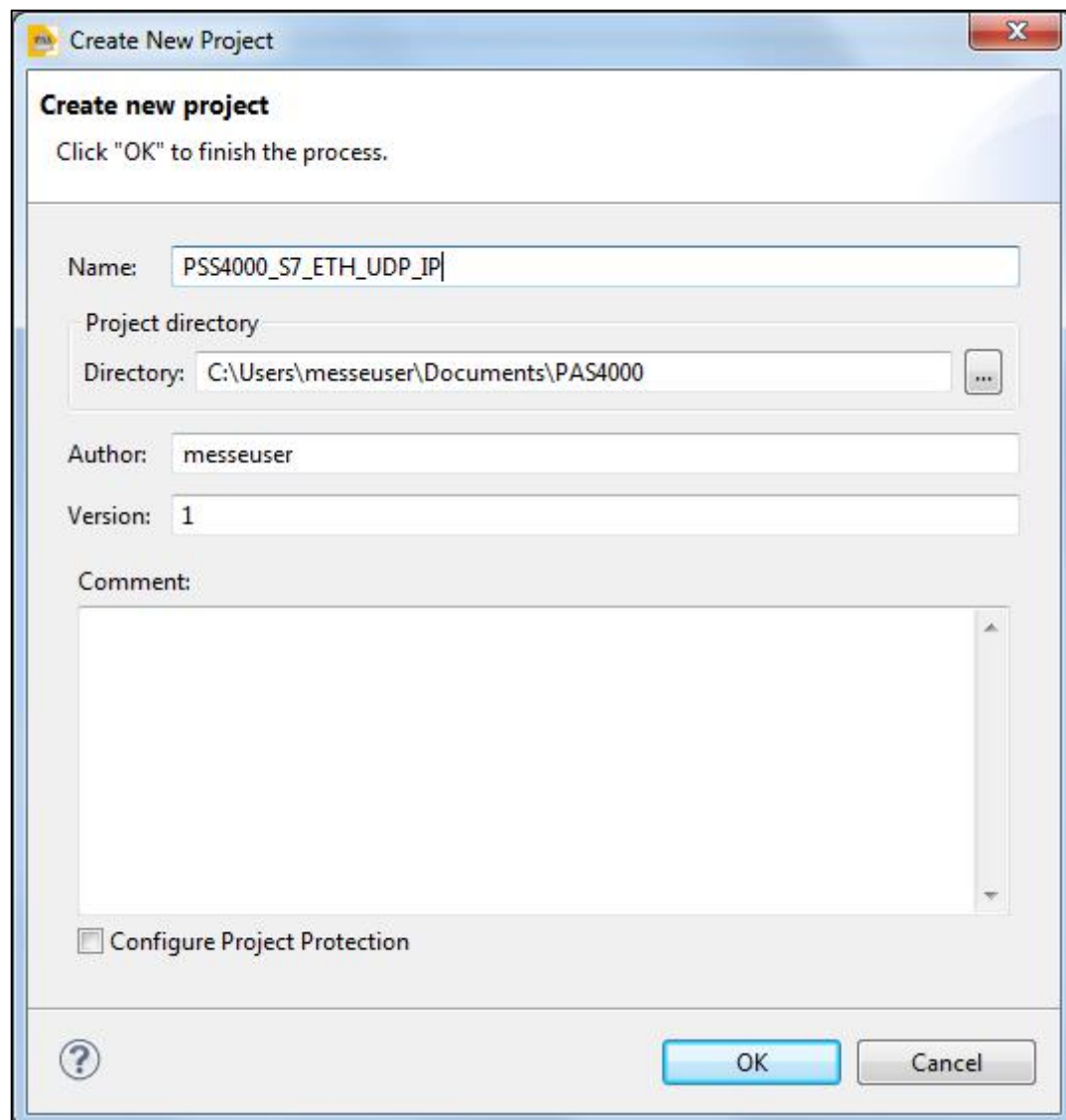


Fig. 4: PAS4000 – Create new project (2)

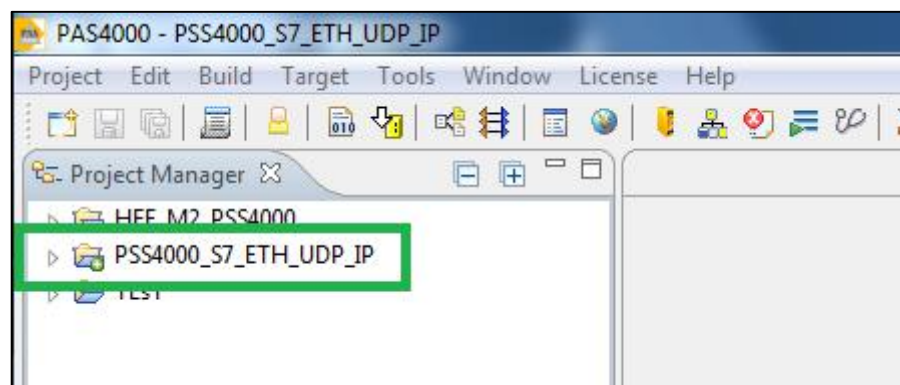


Fig. 5: PAS4000 – Create new project (3)

- Click at “Online Network Editor”.

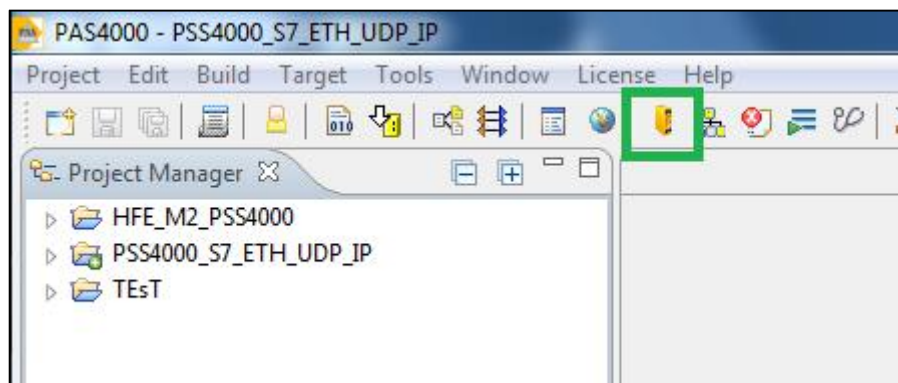


Fig. 6: PAS4000 – Open Online Network Editor

- Click at “Scan Network”.

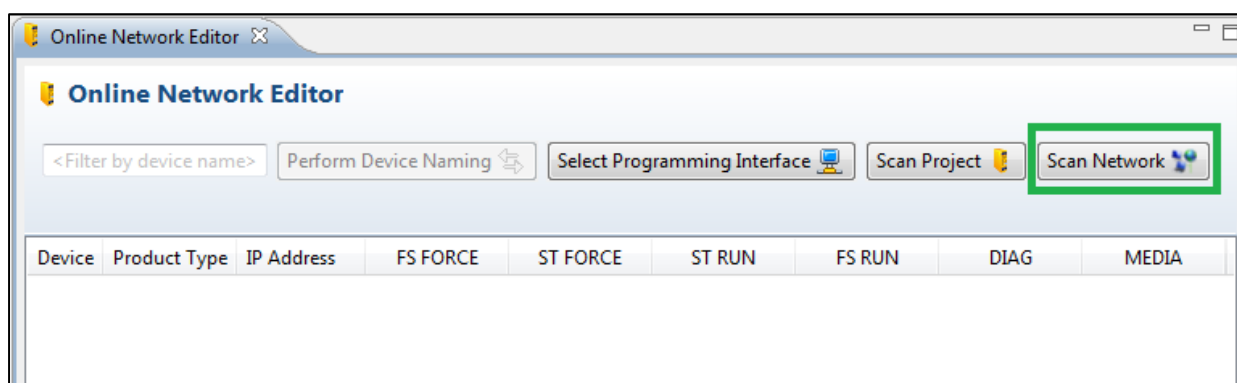


Fig. 7: PAS4000 – Scan Network (1)

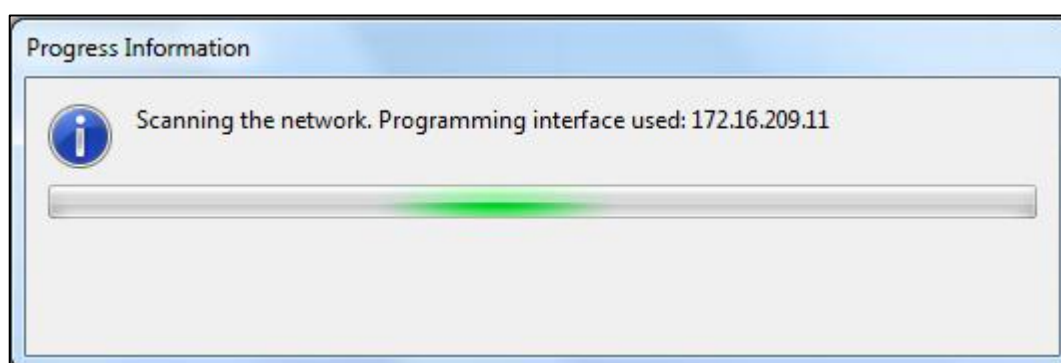


Fig. 8: PAS4000 – Scan Network (2)

- ▶ Click with the right mouse button on your device and choose “Change Naming Data”.

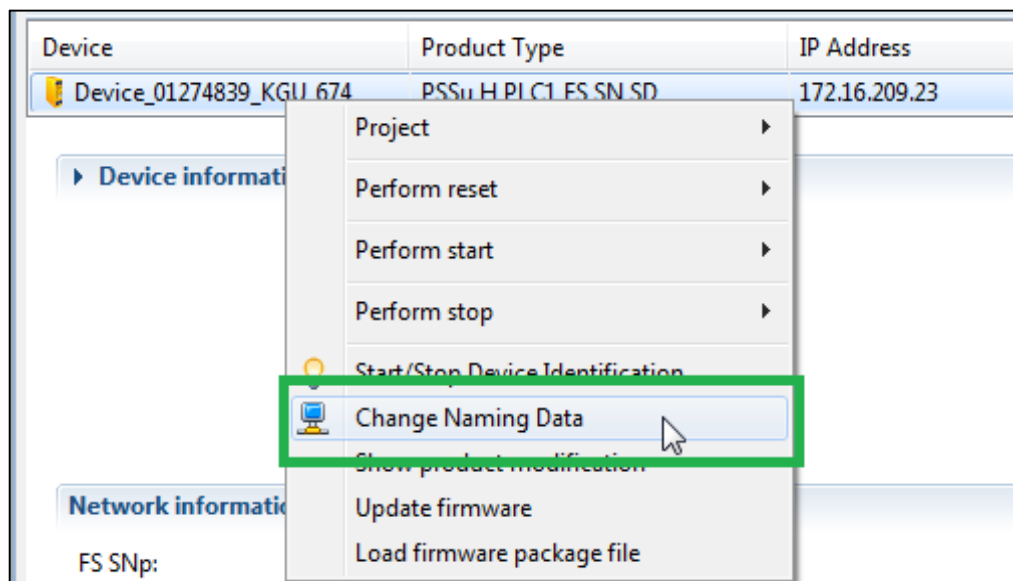


Fig. 9: PAS4000 – Change Naming Data (1)

- ▶ Enter the IP address of the PSS4000 and the device name.
In the example the IP address is “172.16.209.55” and the device name “PSS_PLC”.
- ▶ Continue with “OK”.

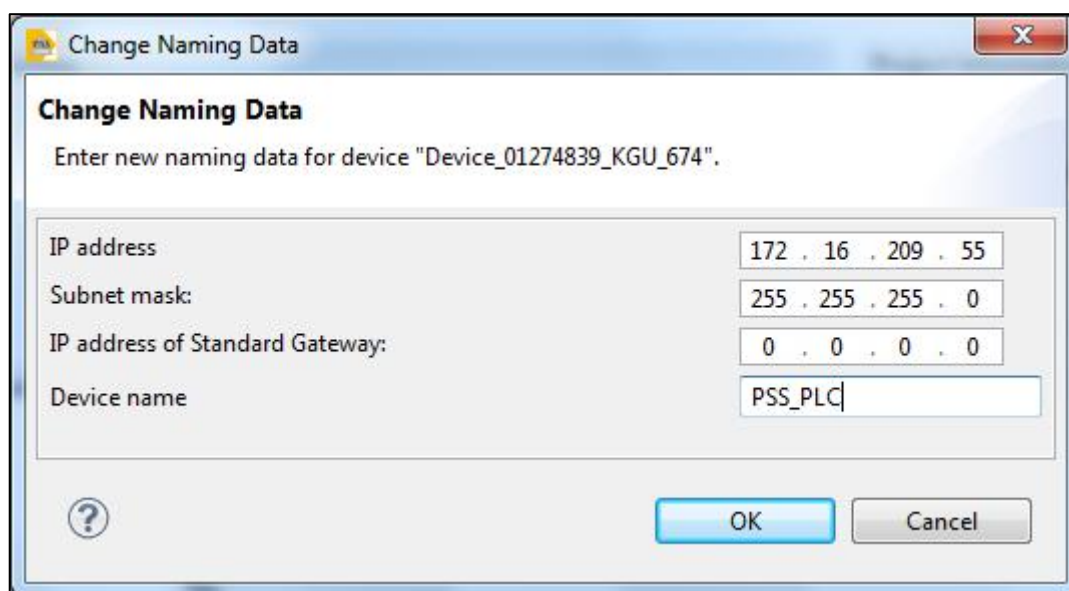


Fig. 10: PAS4000 – Change IP address and name

- Continue with “OK”. It can take some minutes to change the settings.

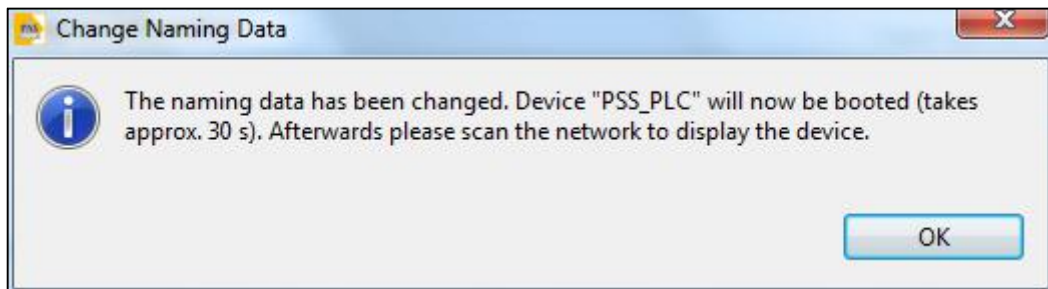


Fig. 11: PAS4000 – Change Naming Data (1)

- Scan the network again to display saved changes:

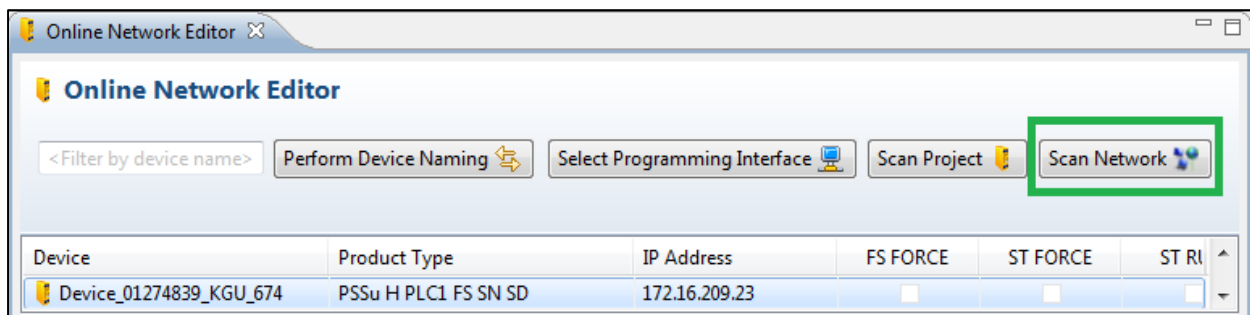


Fig. 12: PAS4000 – Scan Network (3)

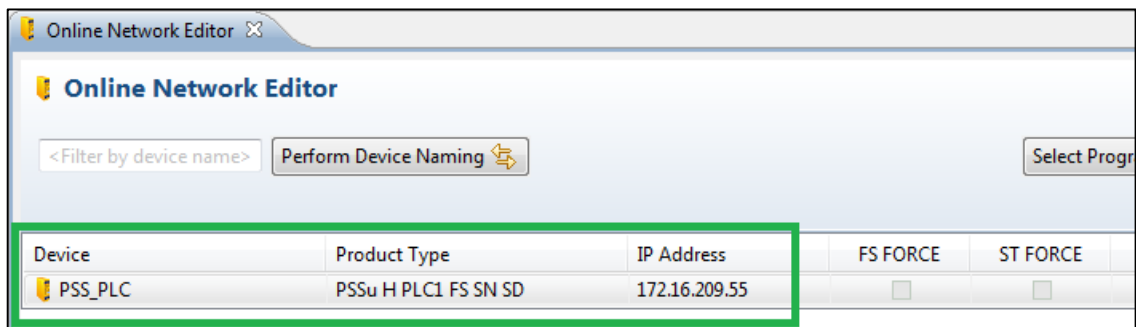


Fig. 13: PAS4000 – Changed device IP address and name

Now you have to insert a new device in your PAS4000 project.

- ▶ Click with right mouse button on “Hardware configuration” and
- ▶ choose “New” and click on “Device”.

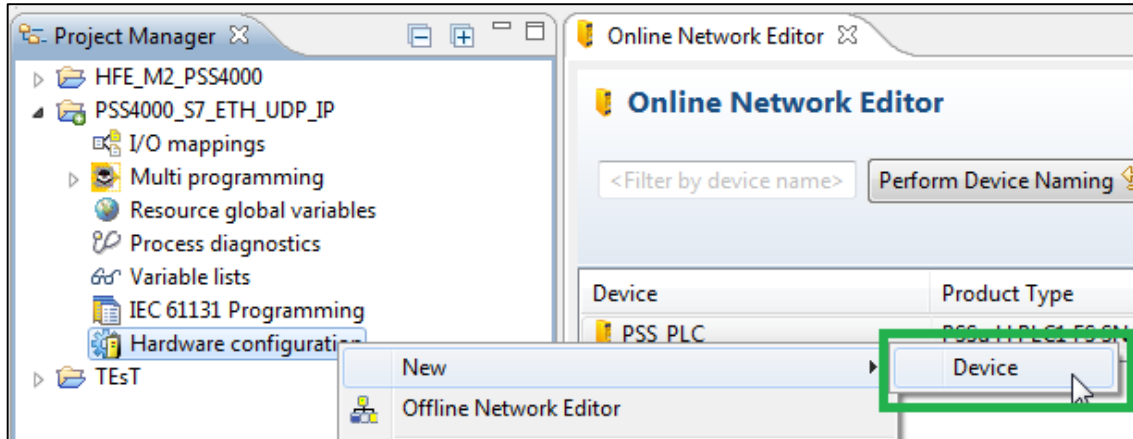


Fig. 14: PAS4000 – Create new device

- ▶ Choose the “Filter” and “Product type”.
The Pilz hardware used in this example is described in Ch. 3.1, page 7.

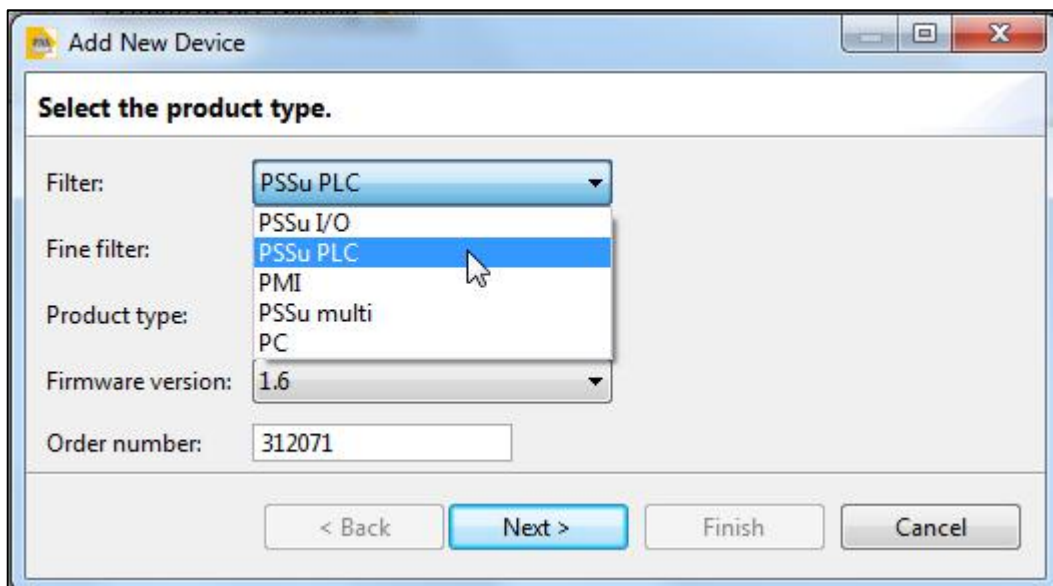


Fig. 15: PAS4000 – Filter setting

- Choose “PSSu PLC” as filter and “PSSu H PLC1 FS SN SD” as product type.

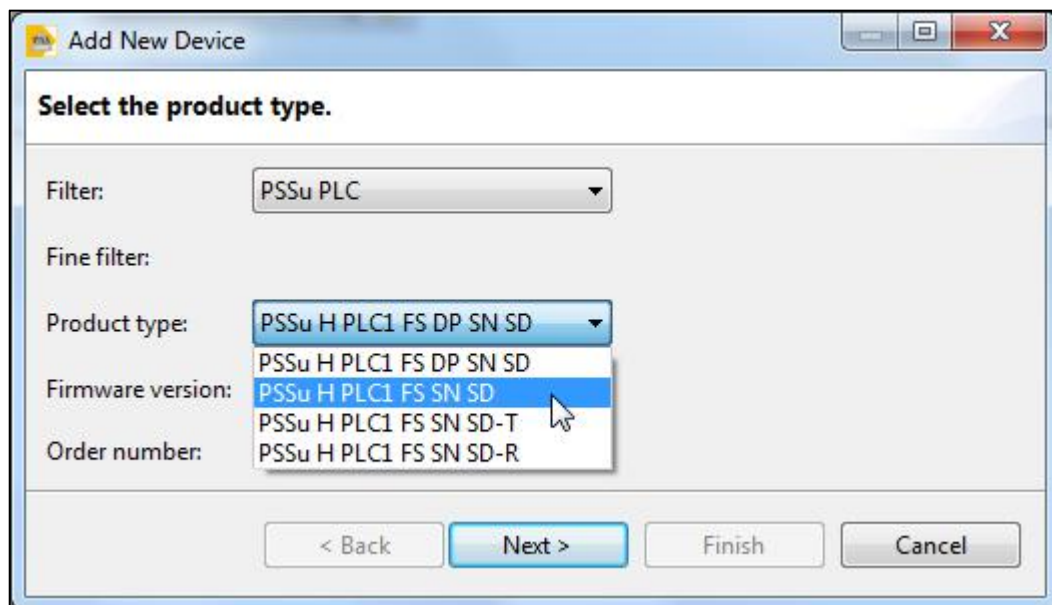


Fig. 16: PAS4000 – Product type setting

- The firmware version used in this example is “1.6”.
Continue with “Next”.

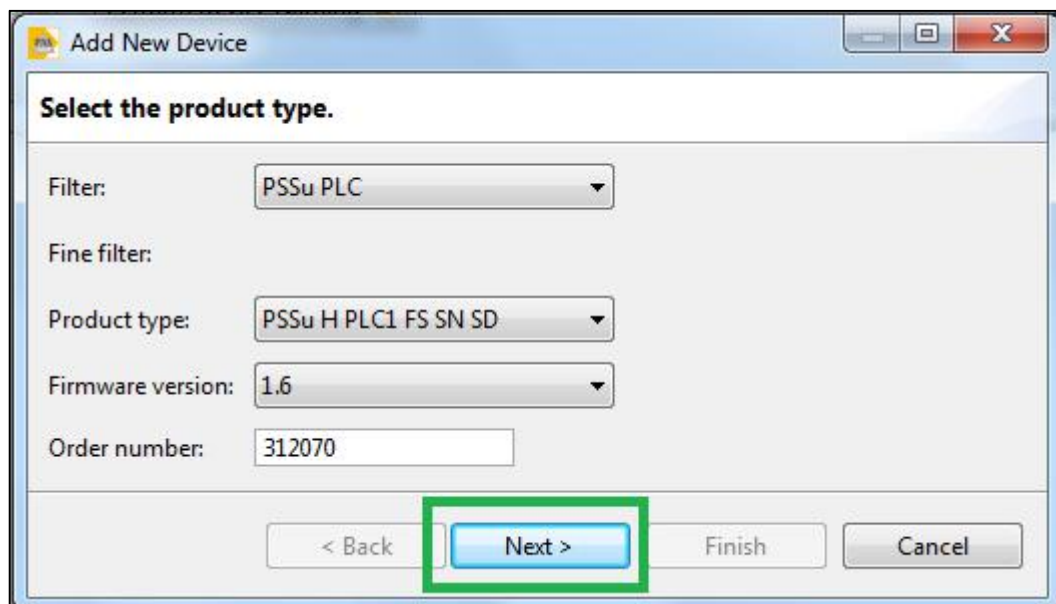


Fig. 17: PAS4000 – Add New Device

- ▶ Enter the IP address and the device name of the PSS4000. In this example:
 - the IP address of the PSS 4000 is “172.16.209.55” and
 - the device name is “PSS_PLC”.
- ▶ Continue with “Finish”. The new head module will be generated.

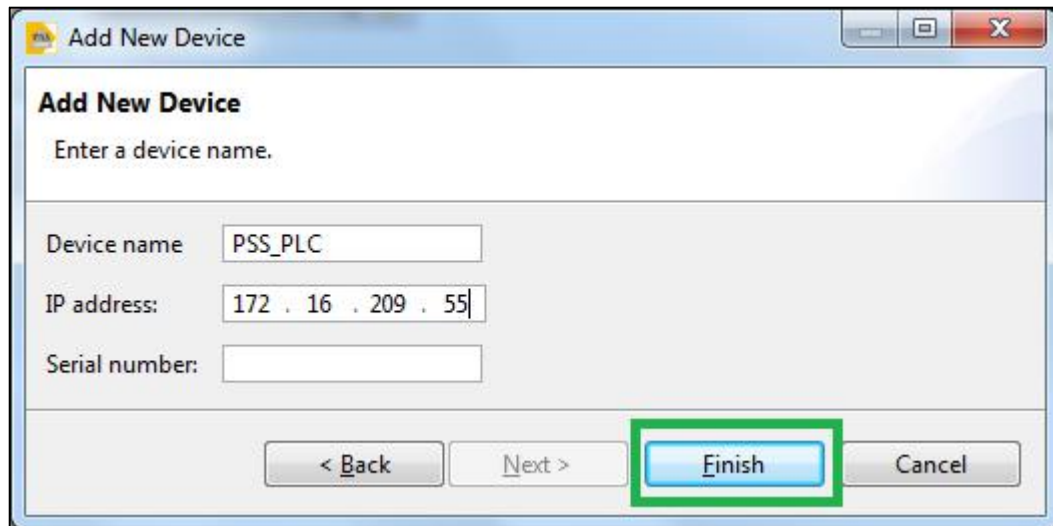


Fig. 18: PAS4000 – Finish device setting

Continue with the setup of IP connections.

- ▶ Double-Click at “IP connections”.

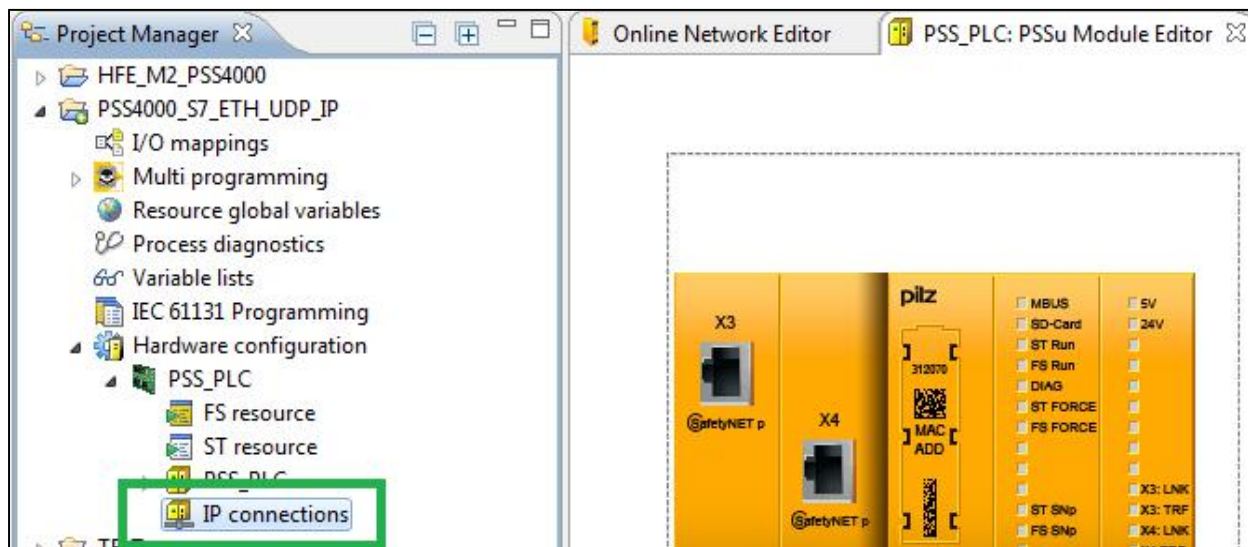


Fig. 19: PAS4000 – IP connections

- Click on “New Raw UDP Connection”.

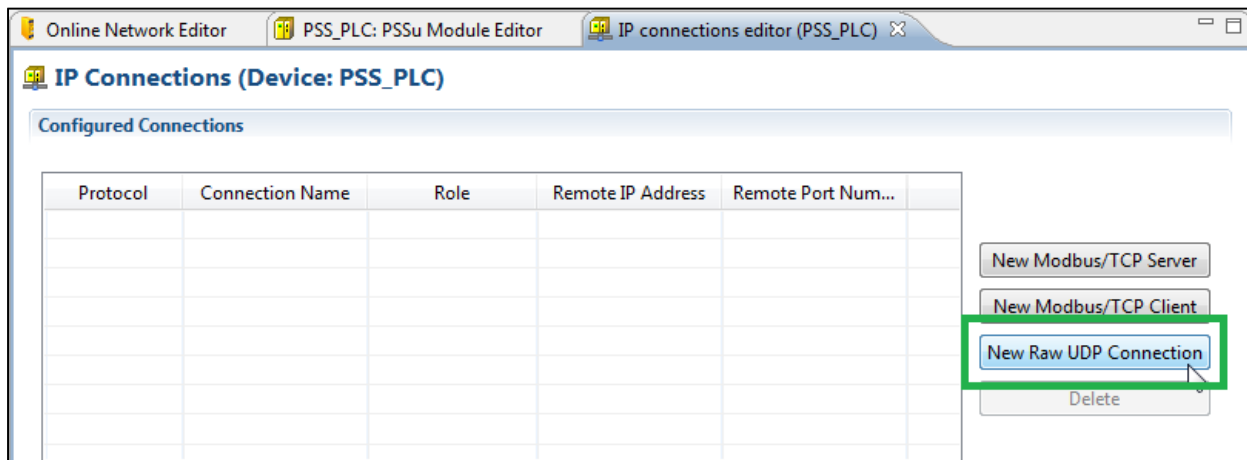


Fig. 20: PAS4000 – New Raw UDP Connection

- At first you must set the “Local port number”, the “Remote IP address” and the “Remote Port Number” like you can see in the green box (Step 1).
- Thereafter expand lower section “Transmitter/receiver” (Step 2).
- Set the data length for “Send” and “Receive” on “50” (Step 3+4).

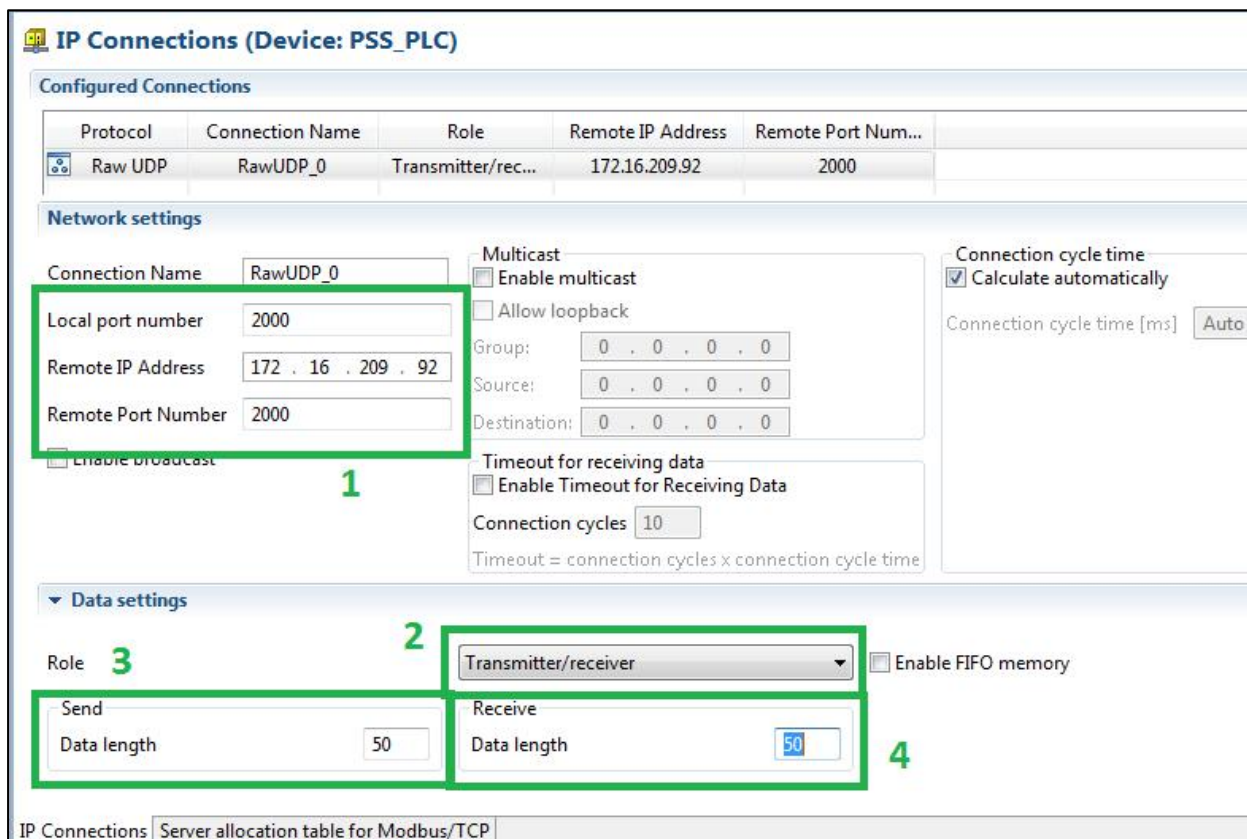


Fig. 21: PAS4000 – Network and Data settings

- “Save all Editors”.

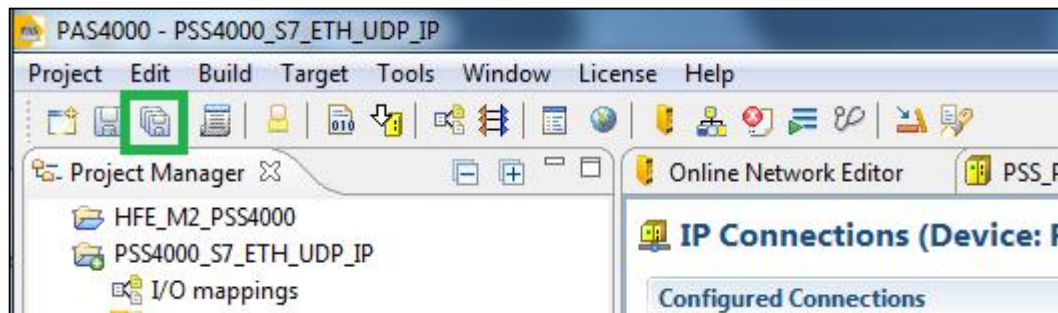


Fig. 22: PAS4000 – Save all Editors (1)

- Create a new “POU”:
 - Click with right mouse button on “IEC 61131 Programming”.
 - Click at “New” and choose “POU”.

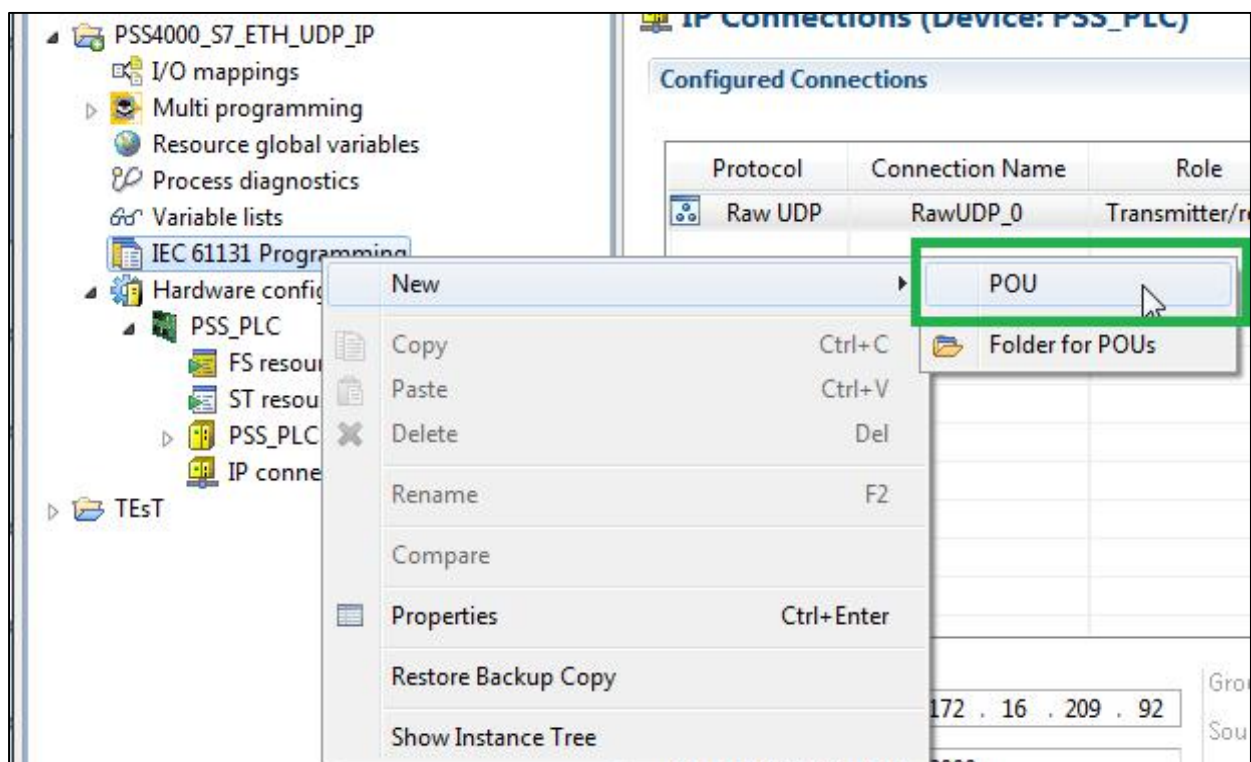


Fig. 23: PAS4000 – Create new POU

- Choose a name. In this example the Name is “POU_1”. Set the Programming language to “IL: Instruction List” and the Type to “Program”. Continue with “OK”.

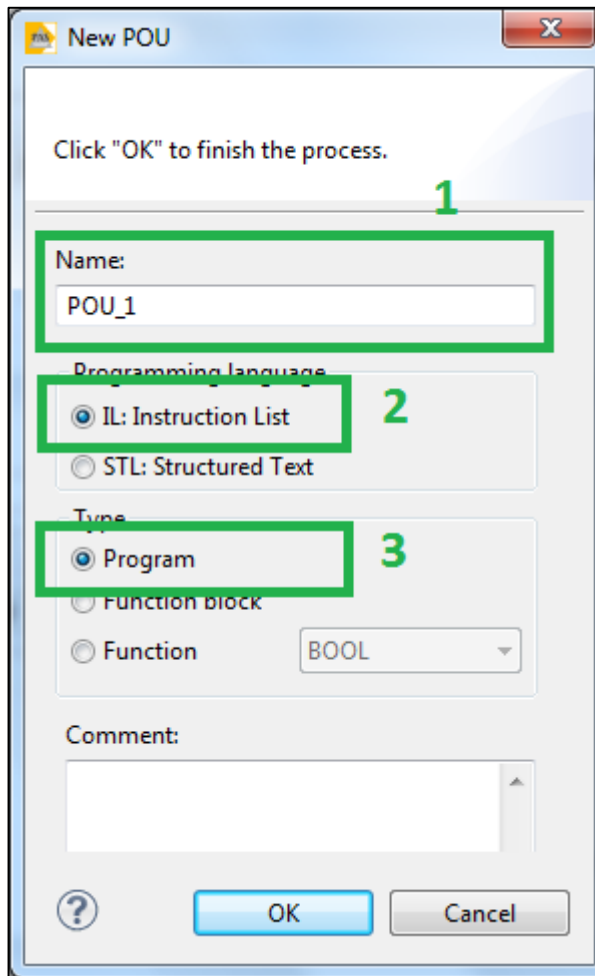


Fig. 24: PAS4000 – Settings of new POU

- Enter the program code for POU_1 as shown in the following figure:

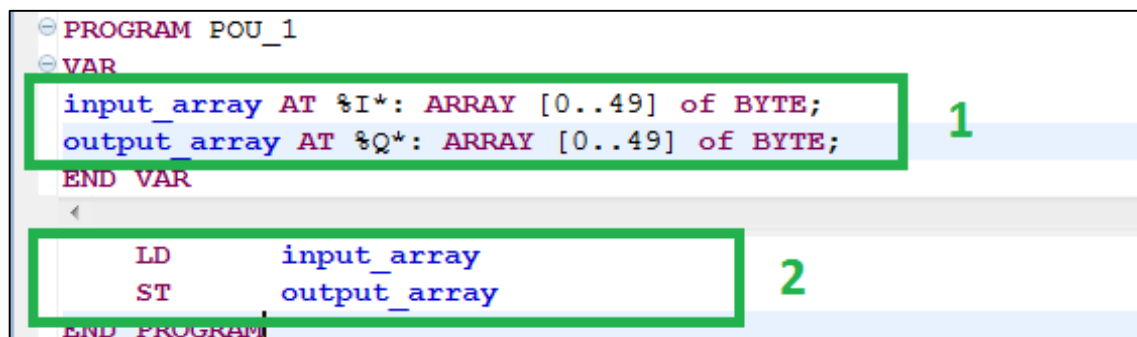


Fig. 25: PAS4000 – Program code for POU

Note: This program code is only an example.

- “Save all Editors”.

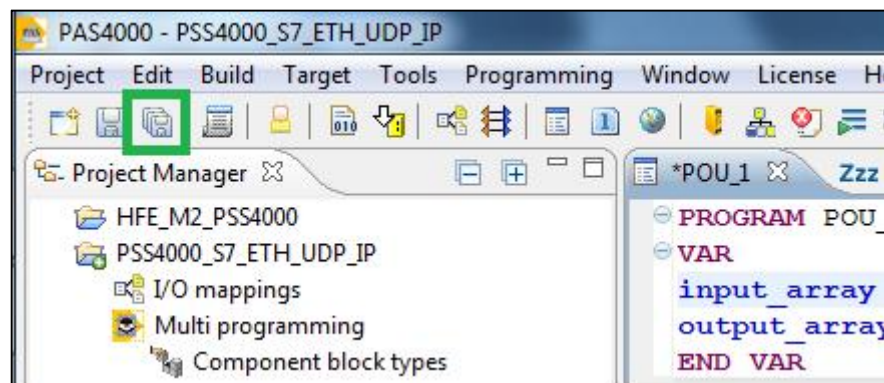


Fig. 26: PAS4000 – Save all Editors (2)

- Assign the program resource to the PLC head module
Drag “POU_1 [PRG]” and drop it to the “PSS_PLC” hardware.

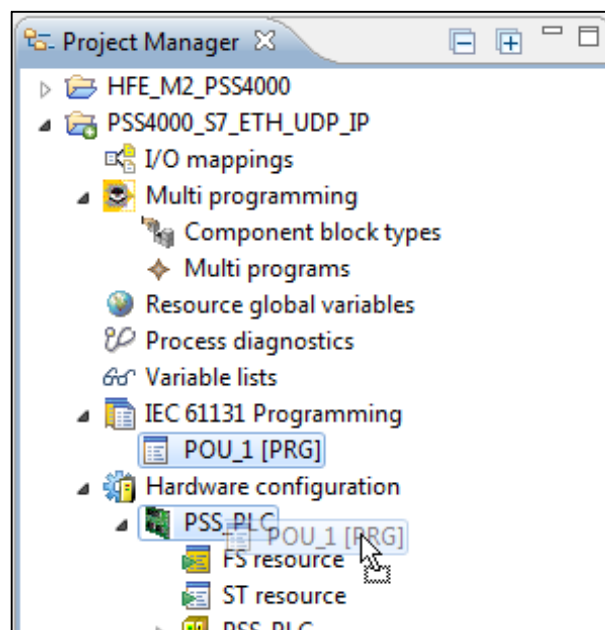


Fig. 27: PAS4000 – Assign POU to PSS 4000 PLC

Now you have to set the I/O mappings.

- ▶ Double-Click at “I/O mappings”

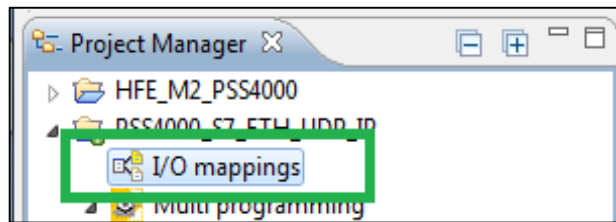


Fig. 28: PAS4000 – Start I/O mapping

- ▶ Set filter to “PI variables < - > IP connections”.

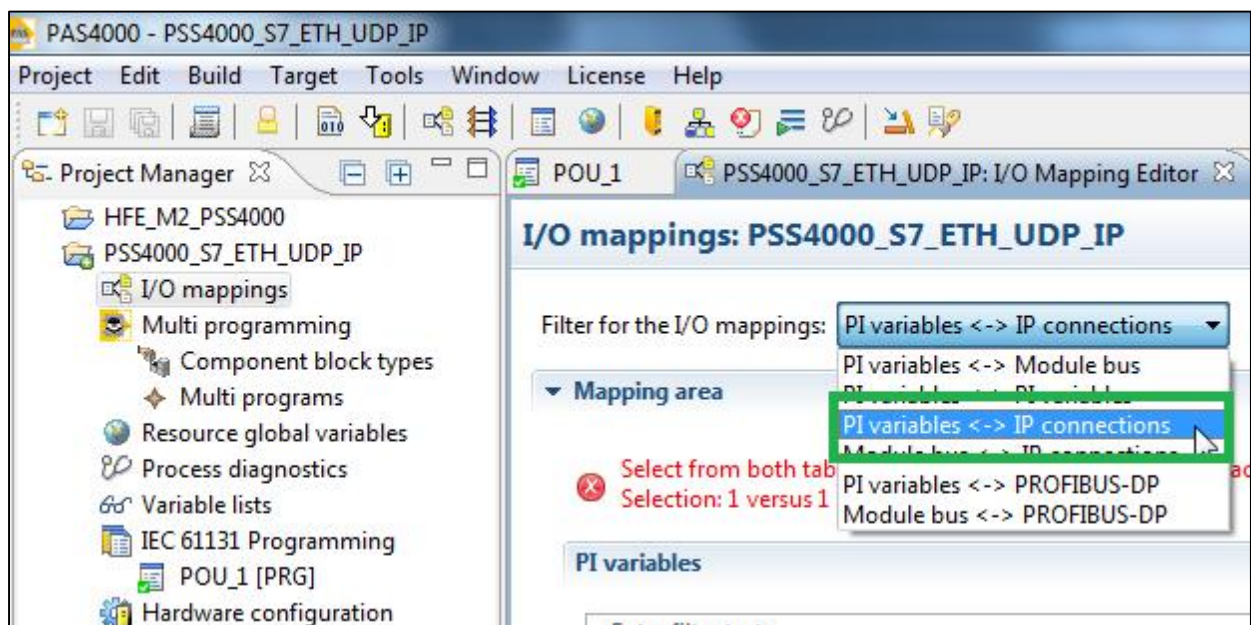


Fig. 29: PAS4000 – Set Filter of I/O mappings

- ▶ Assign the I/Os of PI variables to data of IP connection. Set ...
 - “input_array: ARRAY [0..49] OF BYTE” to “RawUDP_0_Receive: ARRAY [0..49] OF BYTE” and
 - “output_array: ARRAY [0..49] OF BYTE” to “RawUDP_0_Send: ARRAY [0..49] OF BYTE”.

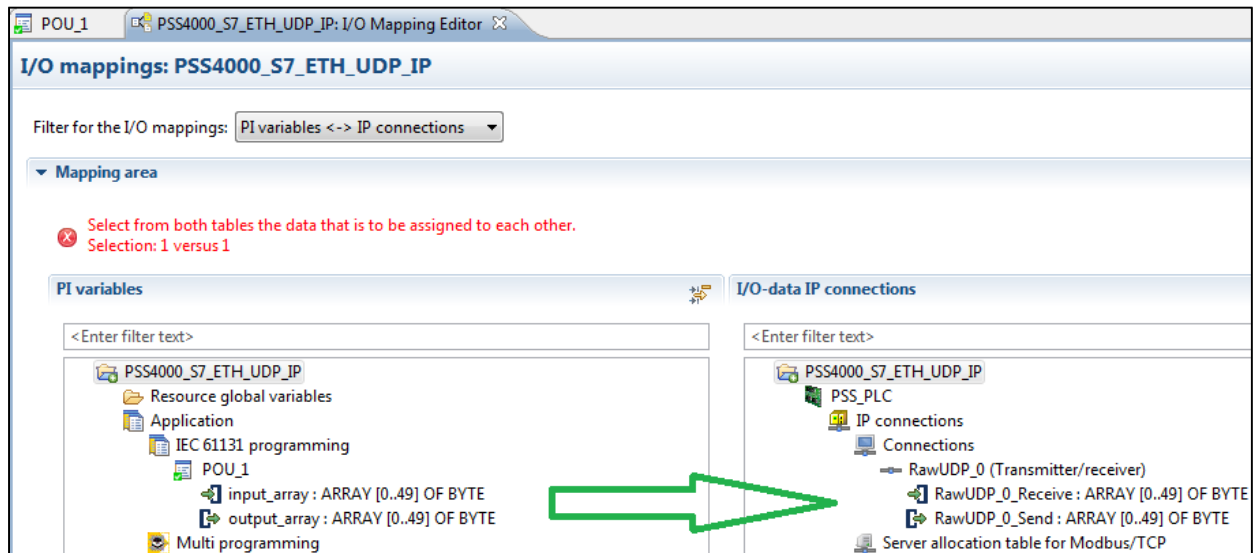


Fig. 30: PAS4000 – Assign I/Os of PI variables to data of IP connection

Notice: After I/O Assignment the “POUs” and “RawUPDs” have to change colour to green or red.

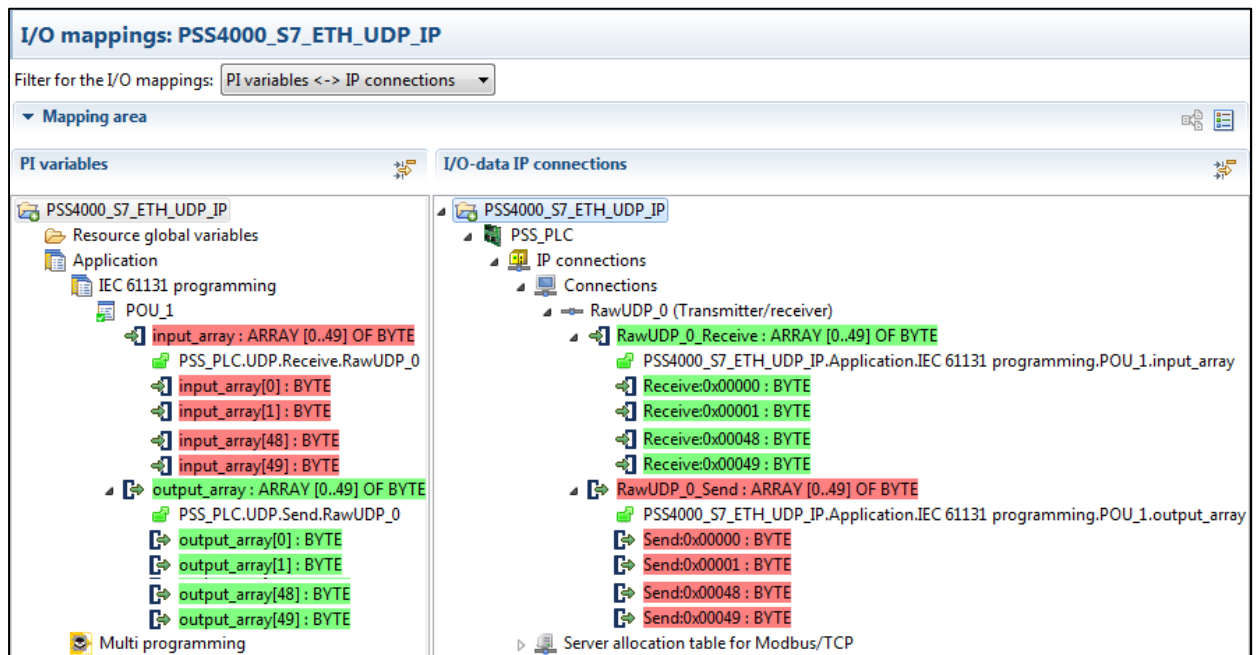


Fig. 31: PAS4000 – Result of correct I/O Assignment, Part A

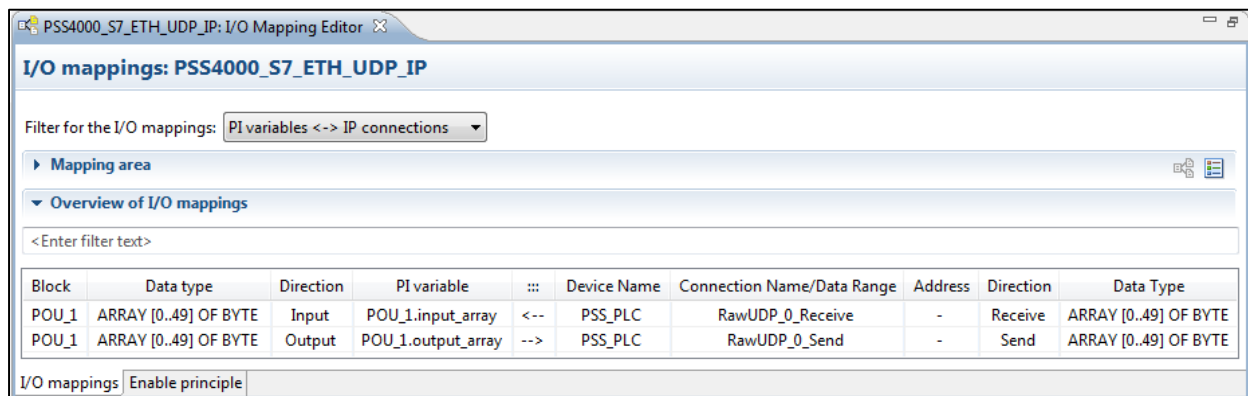


Fig. 32: PAS4000 – Result of correct Assignment, Part B

- “Build Changes”, check the result of Build process and start “Download Project”:

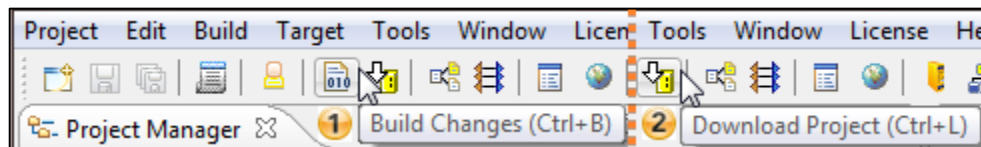


Fig. 33: PAS4000 – Build Changes and Start Download Project to Pilz PLC

- Check the “Device” and continue with “Start Download”.

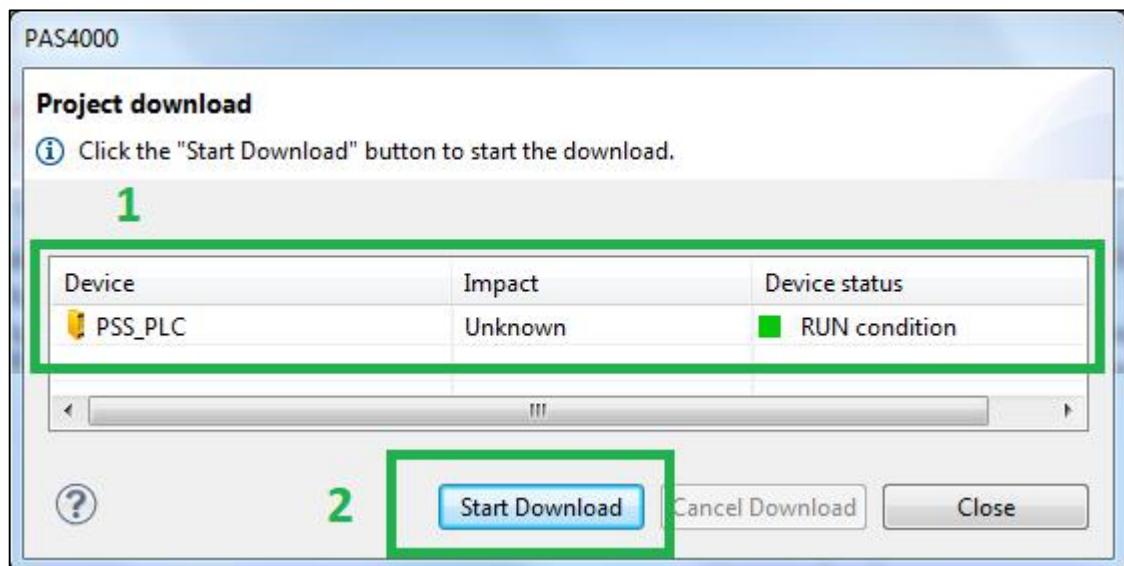


Fig. 34: PAS4000 – Check device and Start Download

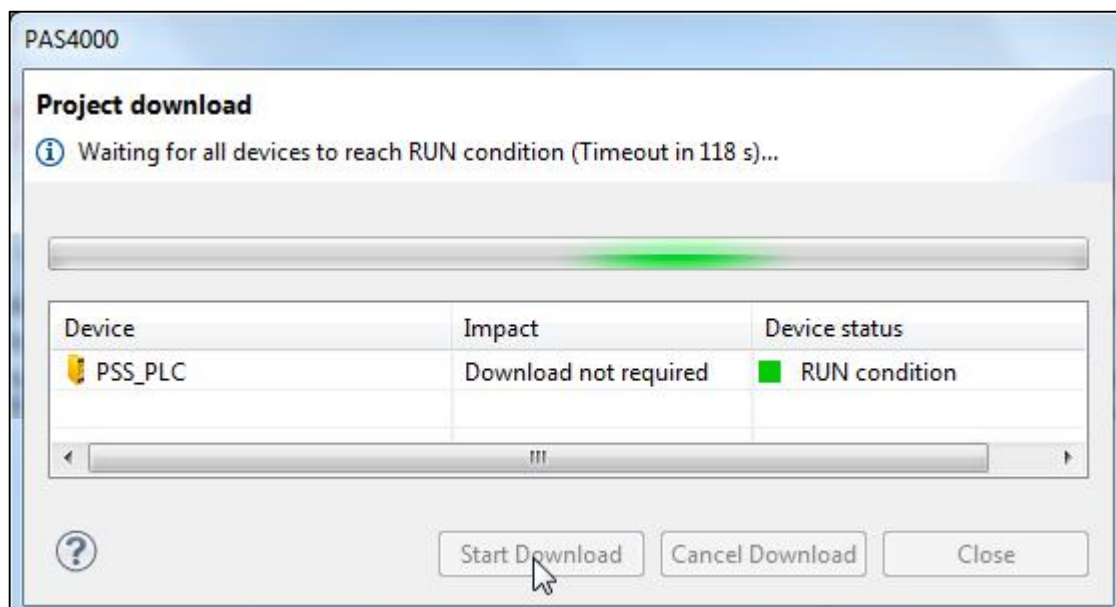


Fig. 36: PAS4000 – Project download and Restart of Pilz PLC

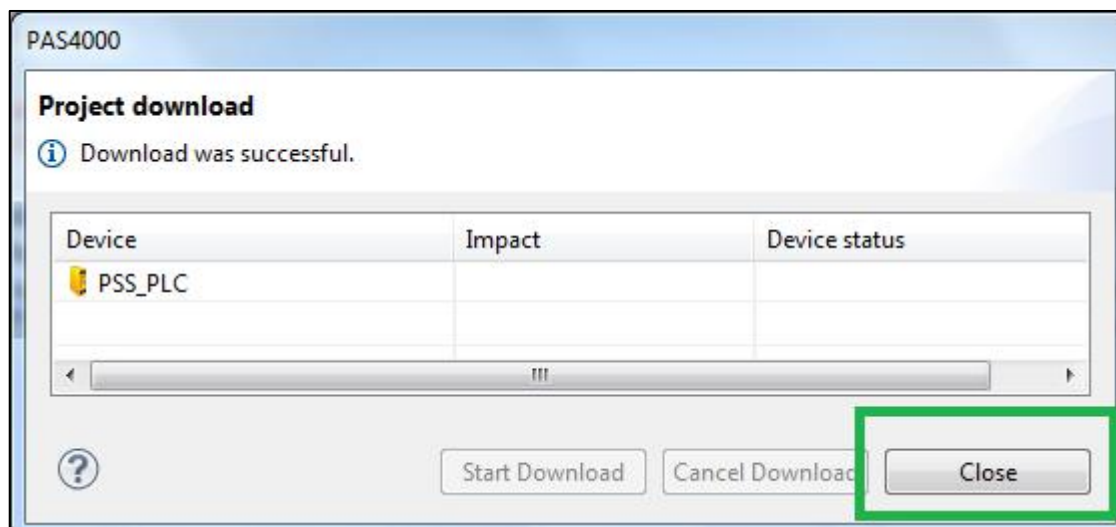


Fig. 37: PAS4000 – Close Project download

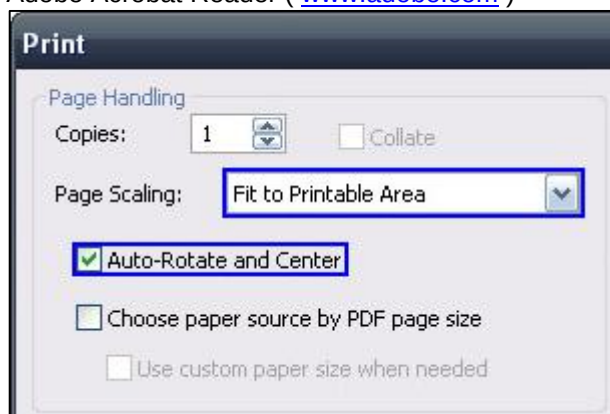
If the download was successful, the UDP communication of Pilz PLC is ready.
Now you can exchange data with the Simatic S7 PLC and PSS 4000 PLC over Ethernet UDP.

5. Table of figures

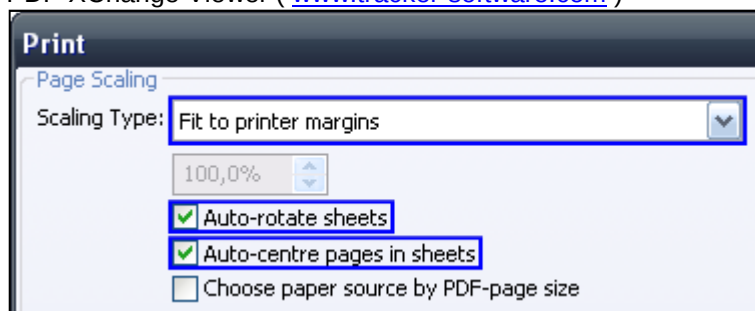
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Recommended printer settings

Adobe Acrobat Reader (www.adobe.com)



PDF-XChange Viewer (www.tracker-software.com)





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