

PENKO Engineering B.V.

Your Partner for Fully Engineered Factory Solutions



How to...

Connect a 1020 Profinet to a Siemens PLC



PENKO

an ETC Company

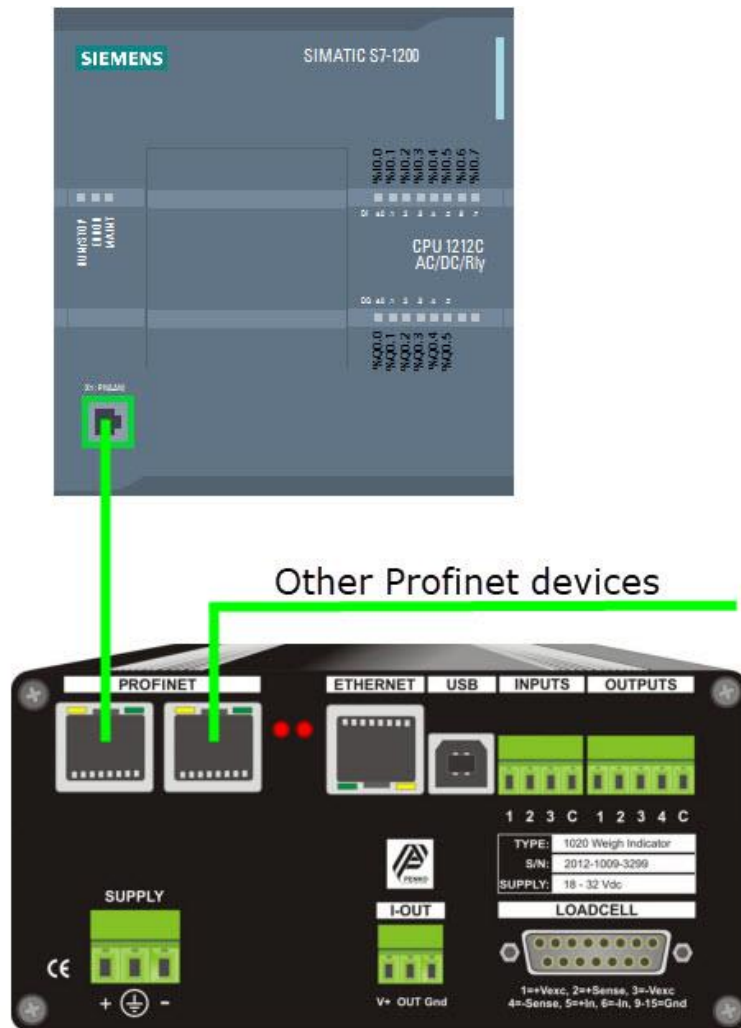
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Hardware connection

Connect the PLC with an Ethernet cable to 1 of the Ethernet ports of the 1020 on the left side, it does not matter which port you choose. The other Ethernet port on the 1020 can be used to connect other Profinet devices.

You can also connect the PLC and 1020 through an Ethernet switch.



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Software

The software that is used in this How to:

Tia Portal V15.1

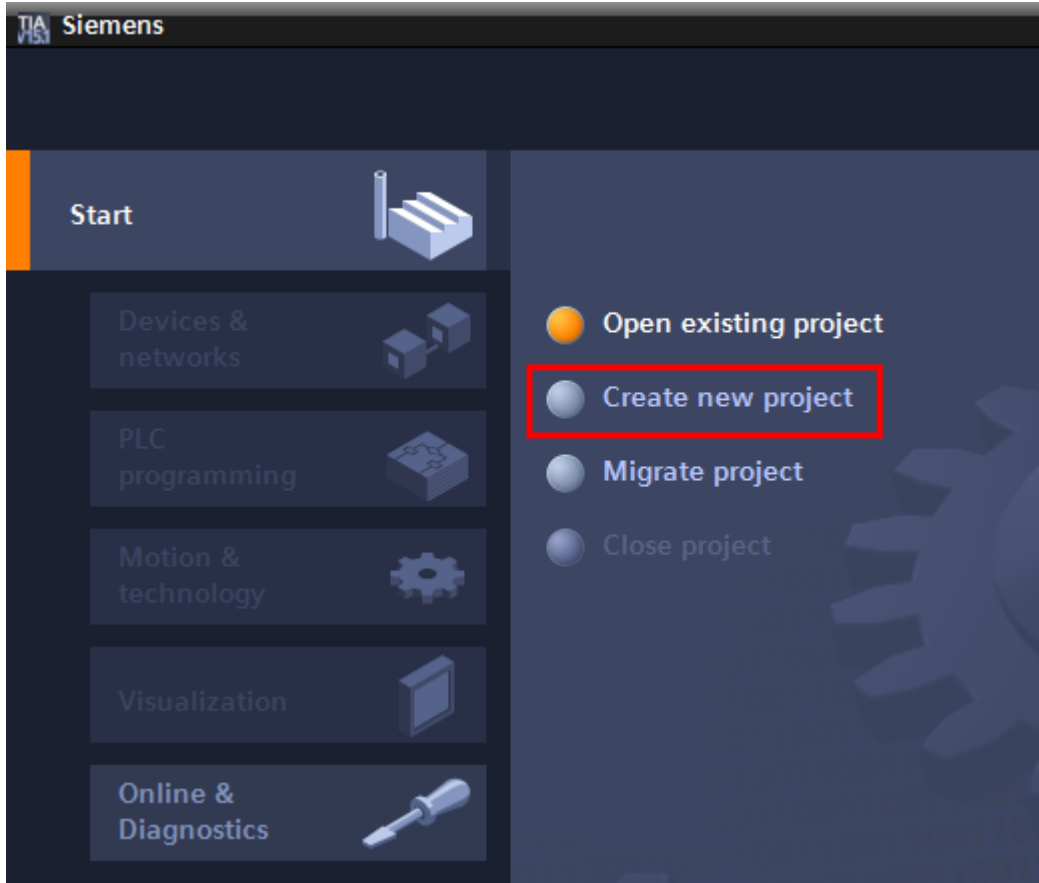
The GSDML file for the 1020 can be downloaded from the Penko website:

<https://penko.com/Support/Software/>

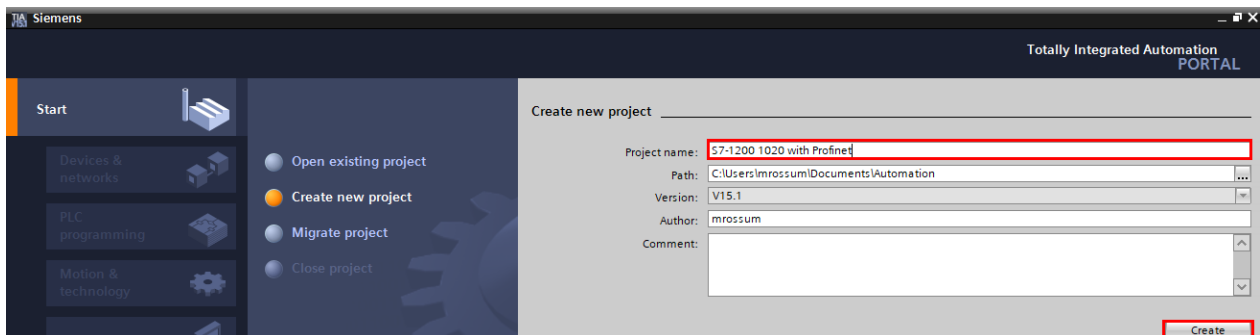
Tia Portal V15.1

Create a project

Open Tia Portal and click on Create new project.

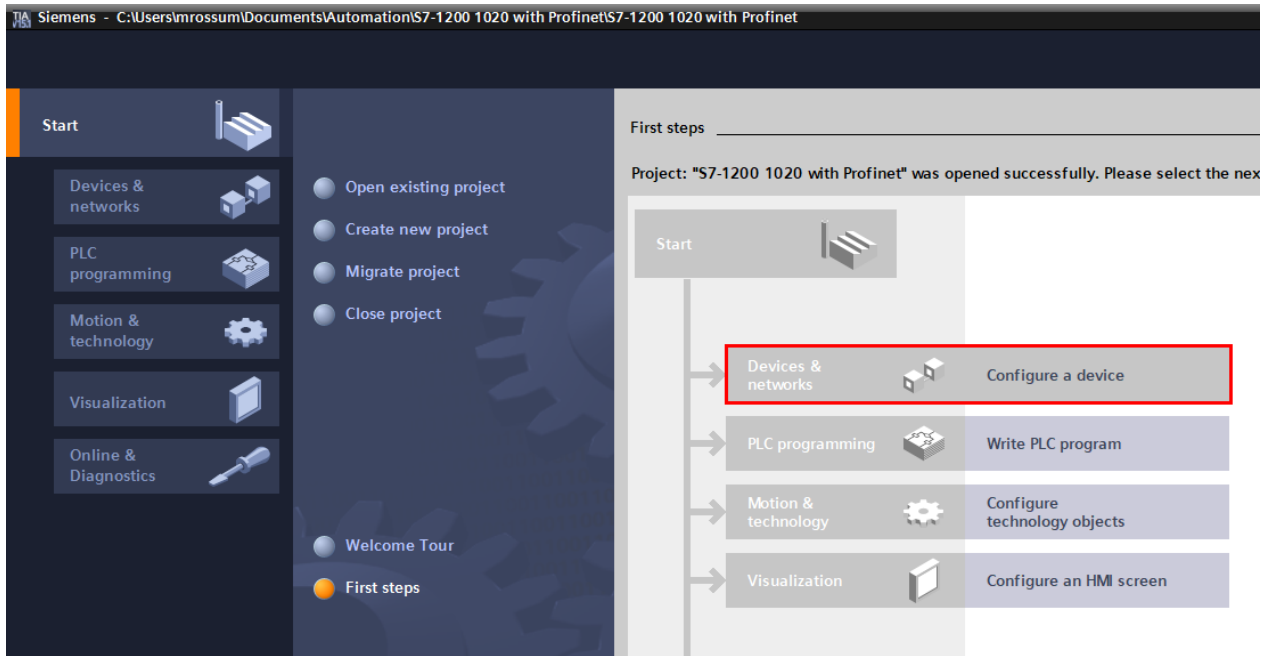


Give the project a name and click on Create.

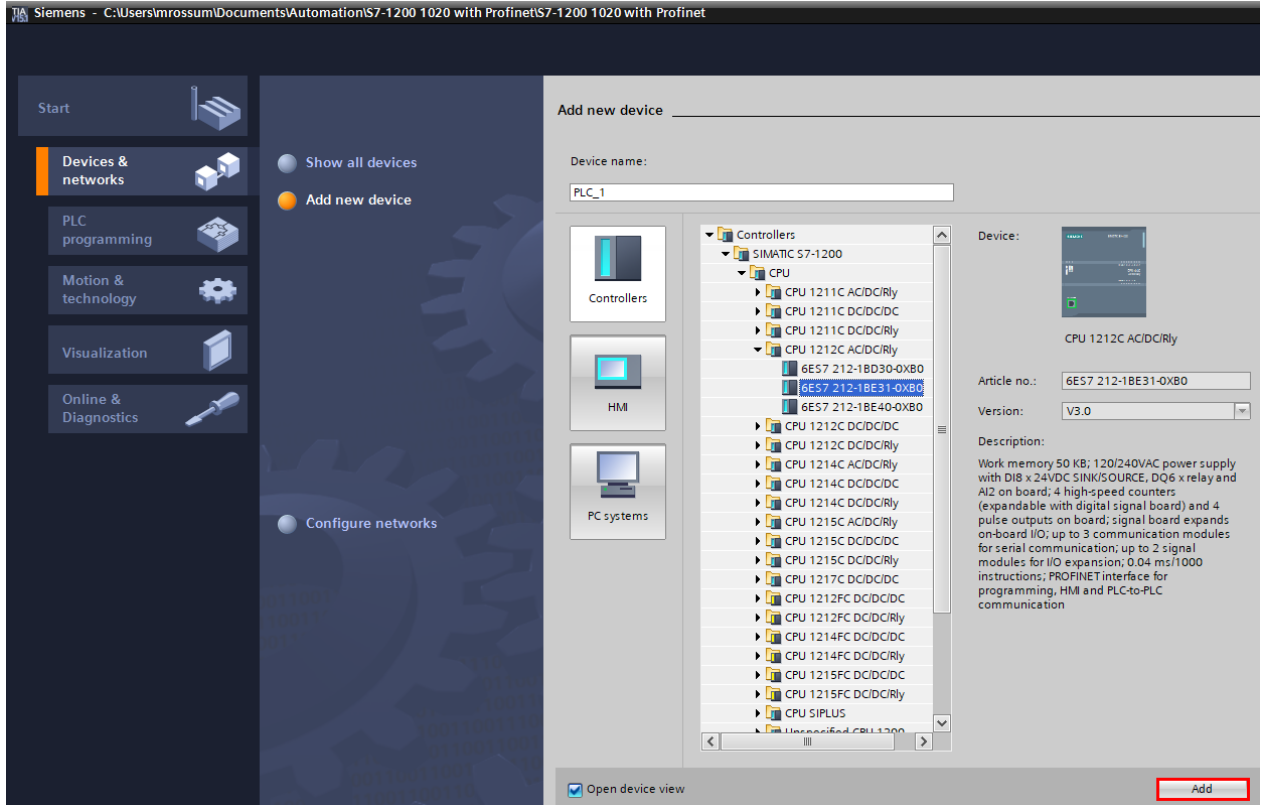


Add a PLC to the project

Click on Configure a device.



Click on Add new device, select your PLC and click on Add.

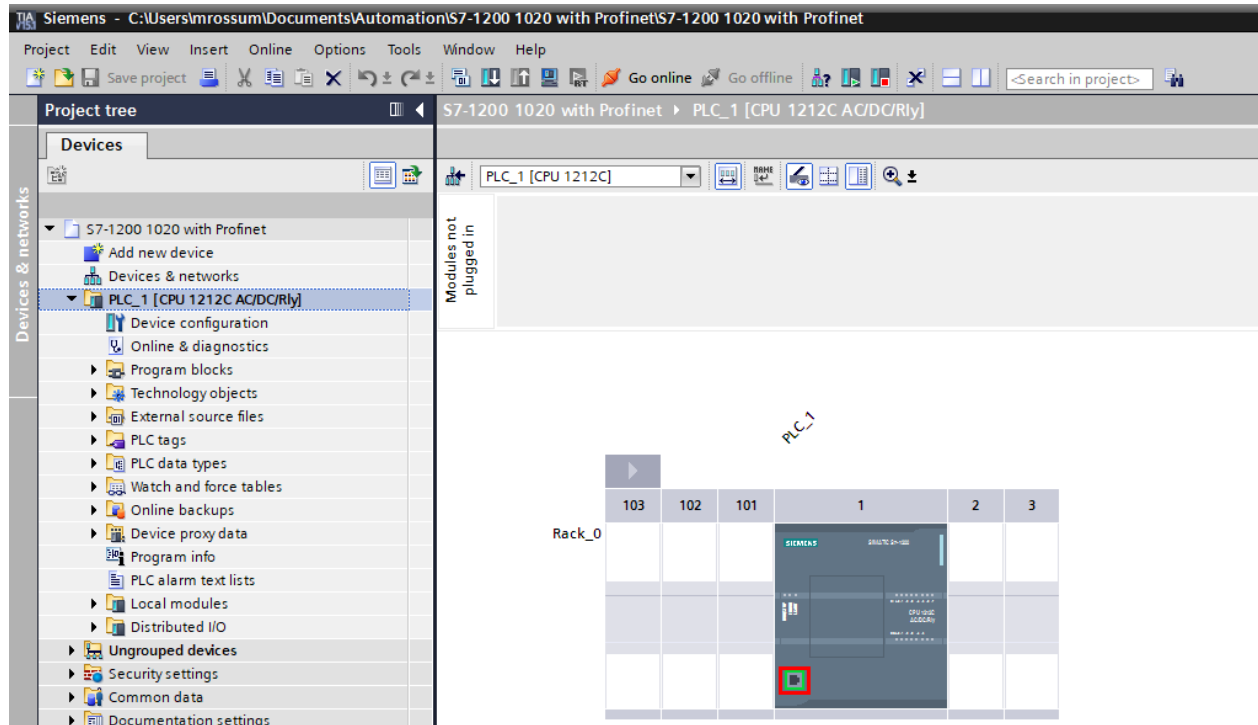


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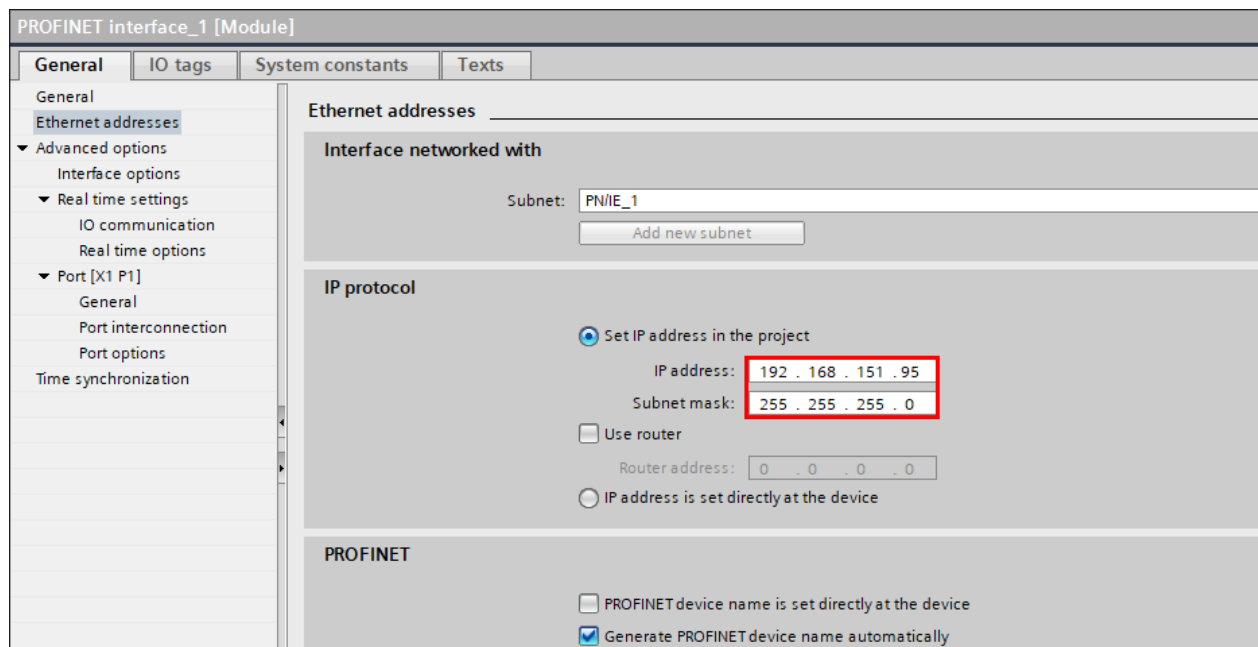
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Assign an IP address to the PLC

Double click on the green square of the PLC.



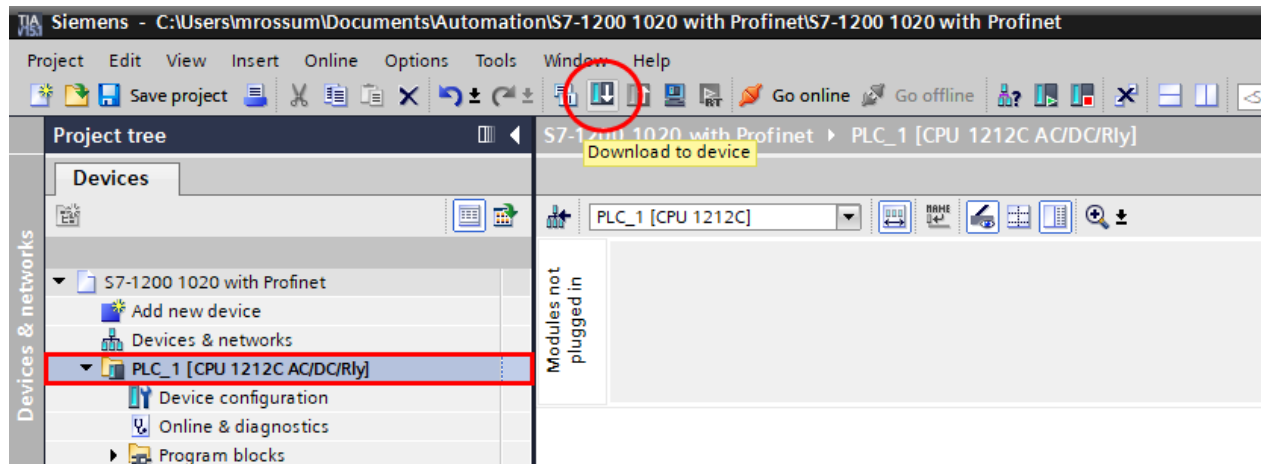
Here you can set the IP address for the PLC.



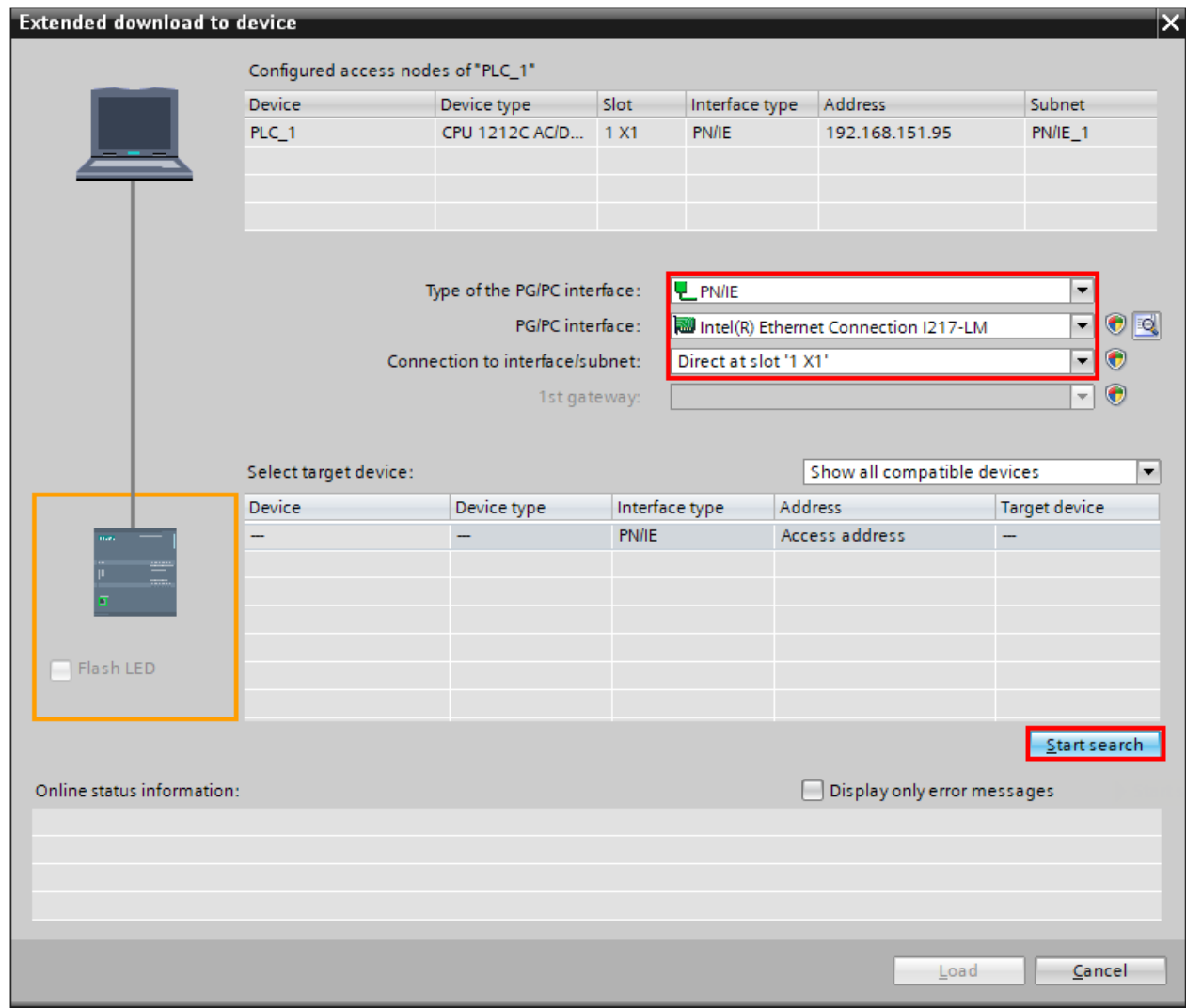
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Click on the Line PLC_1 [CPU 1212C AC/DC/Rly] and click on the button Download to device.



Select the interface that the PLC is connected to and click on Start search.



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When the PLC is found click on Load. (The example below already had the correct IP address. When the PLC doesn't have an IP address yet, the MAC Address is shown.)

Extended download to device

Configured access nodes of "PLC_1"

Device	Device type	Slot	Interface type	Address	Subnet
PLC_1	CPU 1212C AC/D...	1 X1	PN/IE	192.168.151.95	PN/IE_1

Type of the PG/PC interface:

PG/PC interface:

Connection to interface/subnet:

1st gateway:

Select target device:

Device	Device type	Interface type	Address	Target device
PLC_1	CPU 1212C AC/D...	PN/IE	192.168.151.95	PLC_1
--	--	PN/IE	Access address	--

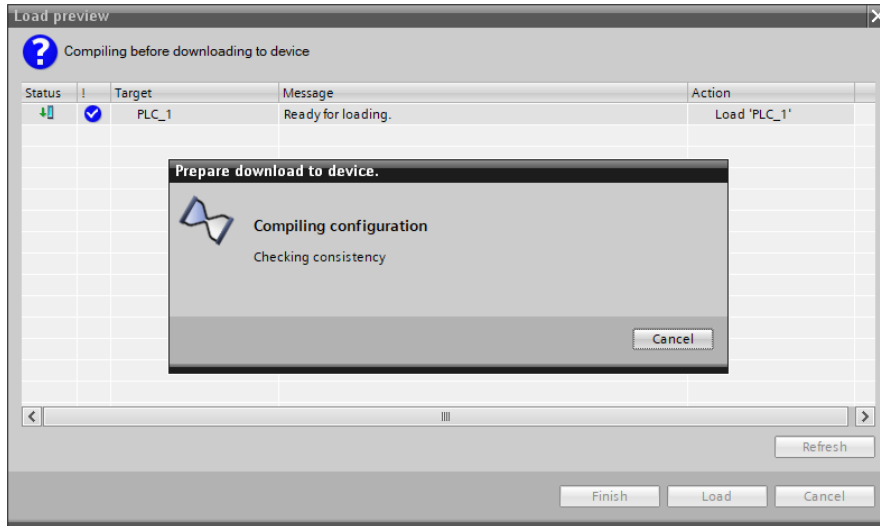
Flash LED

Online status information: Display only error messages

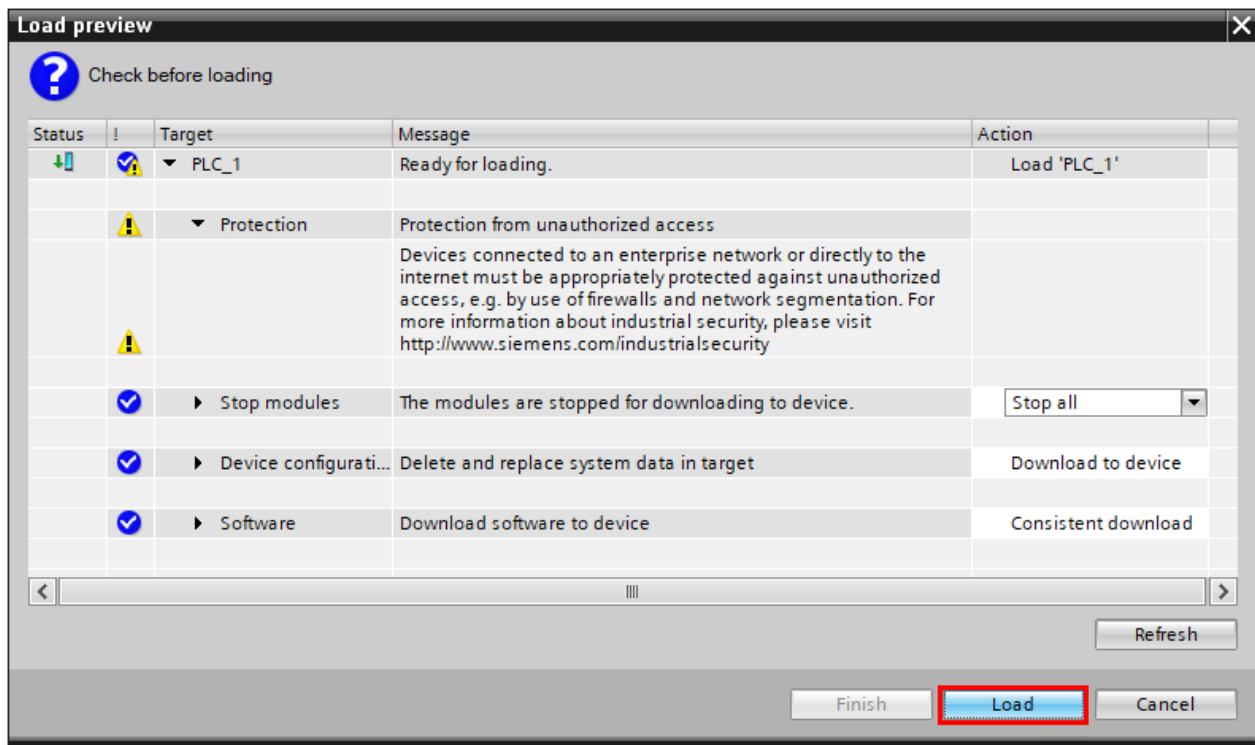
- Connection established to the device with address 192.168.151.95.
- Scan completed. 1 compatible devices of 3 accessible devices found.
- Retrieving device information...
- Scan and information retrieval completed.

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The configuration will compile.

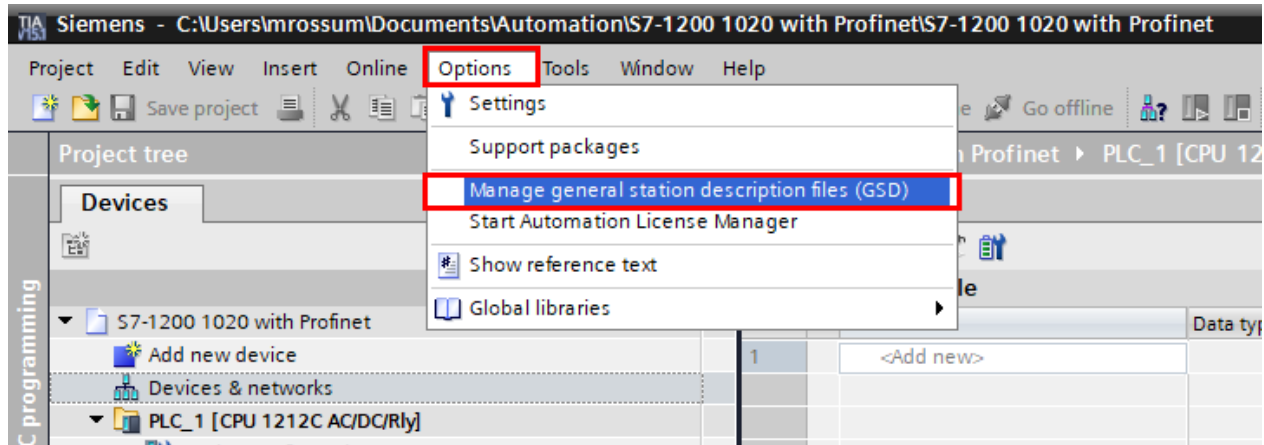


Click on Load to download the configuration into the PLC. When completed click on Finish.

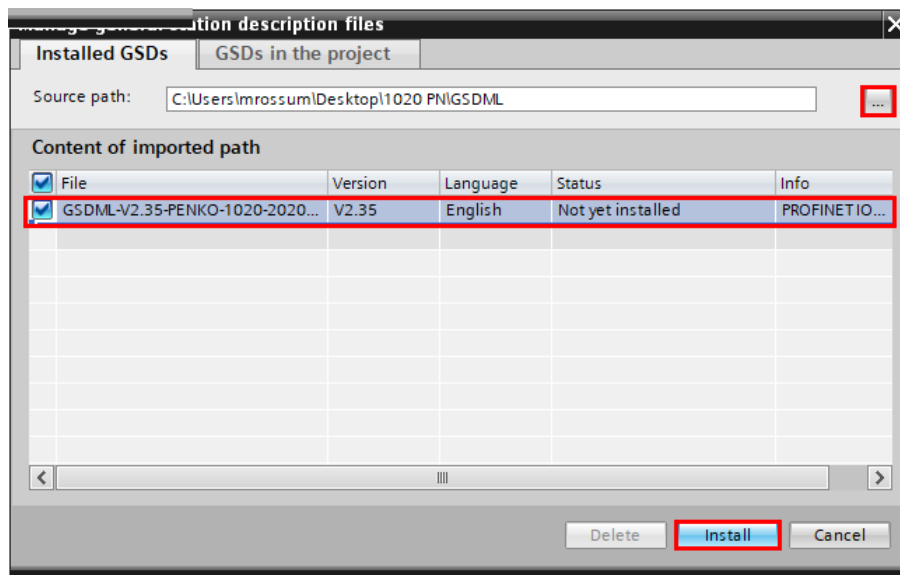


Add the GSDML file to the project

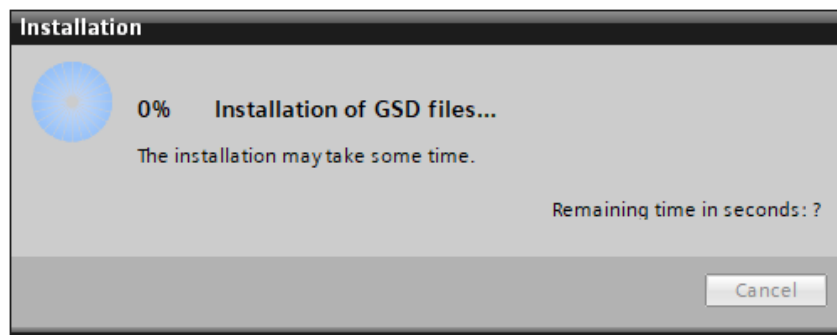
Click on Options and click on Manage general station description files (GSD).



Select the folder with the GSDML file for the 1020, select the file and click on Install.

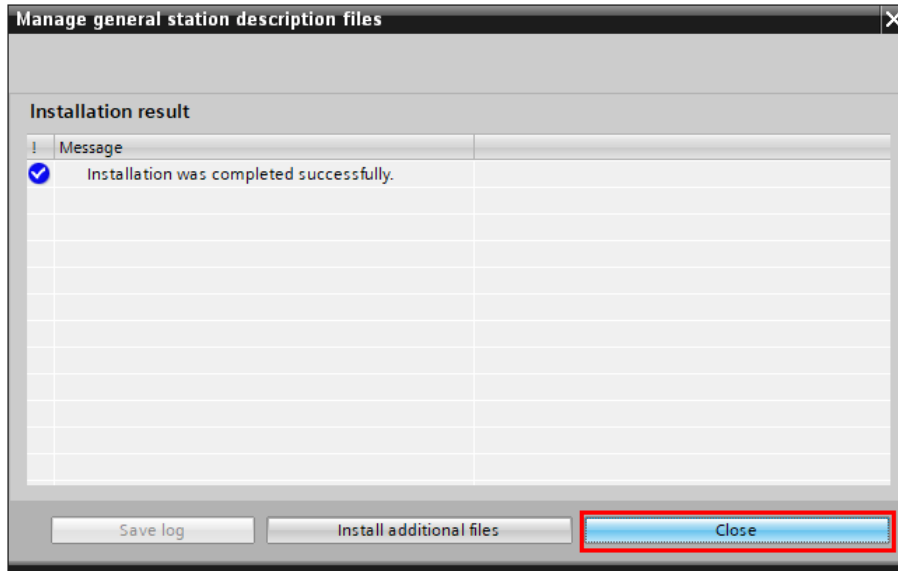


The file will be installed.

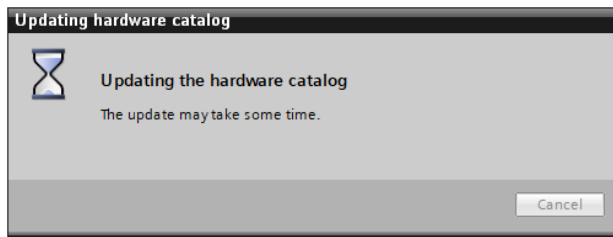


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The installation result is shown, click on Close.

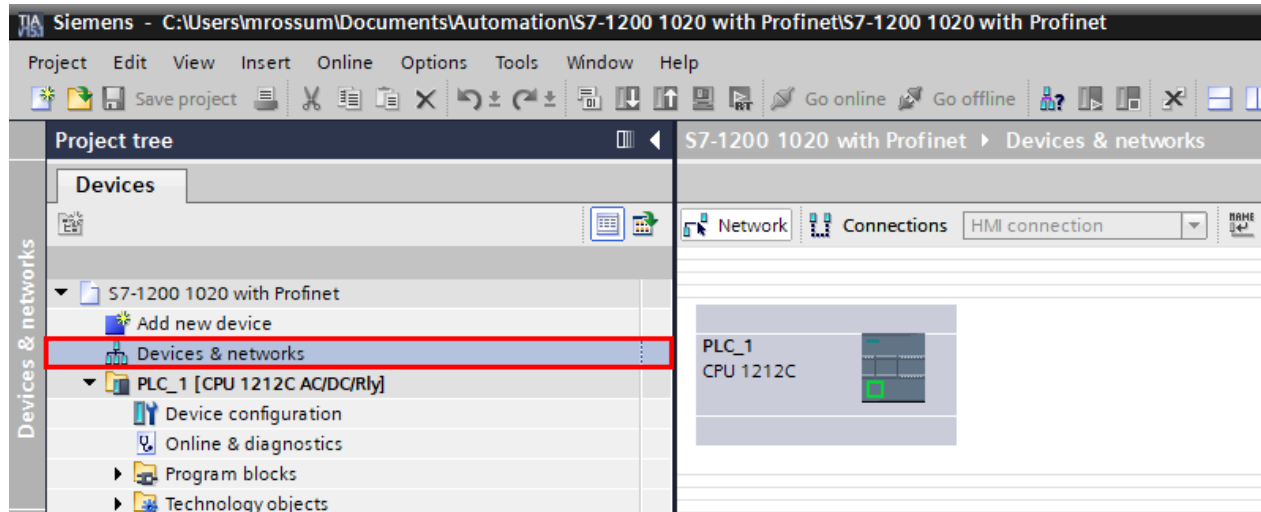


The hardware catalog will be updated.



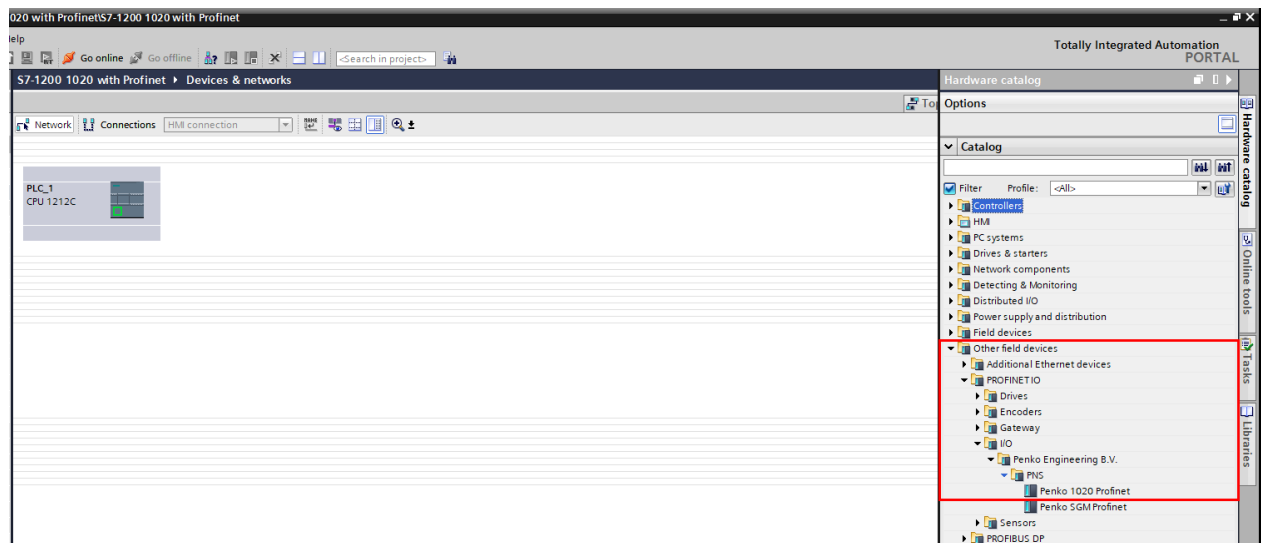
Devices & networks

Double click on Devices & networks in the left column. It will show the PLC in the network.



Go to the right column and select the Penko 1020 Profinet file in the Hardware catalog. Follow the path:

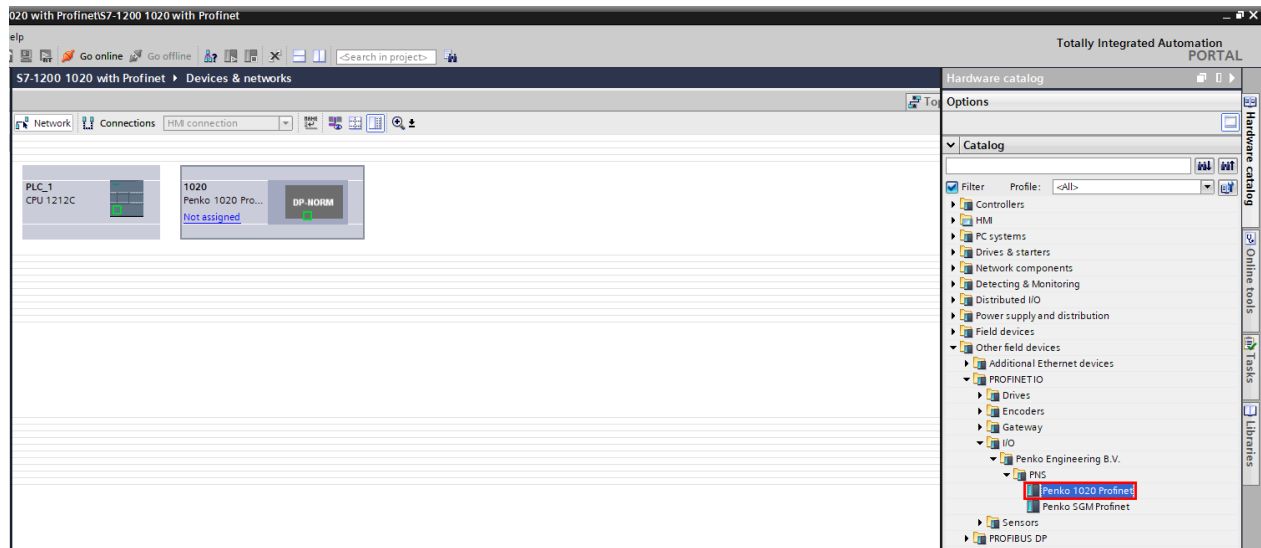
Other field devices – PROFINET IO – I/O – Penko Engineering B.V. - PNS



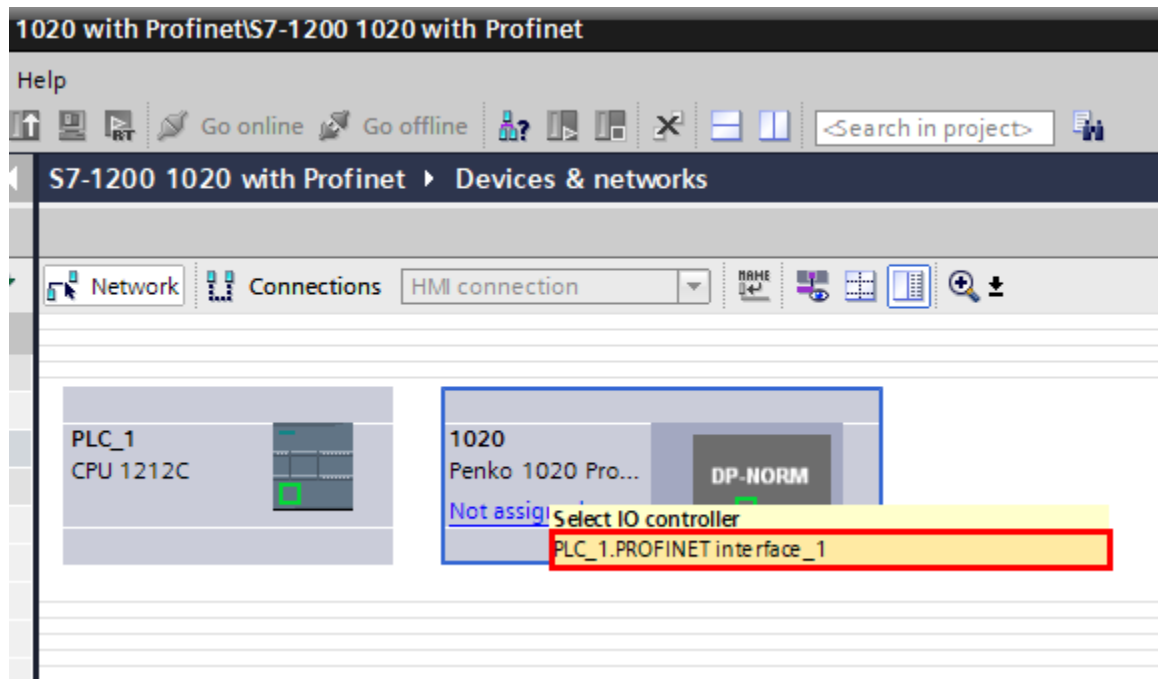
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Double click on Penko 1020 Profinet to add the 1020 into the network.



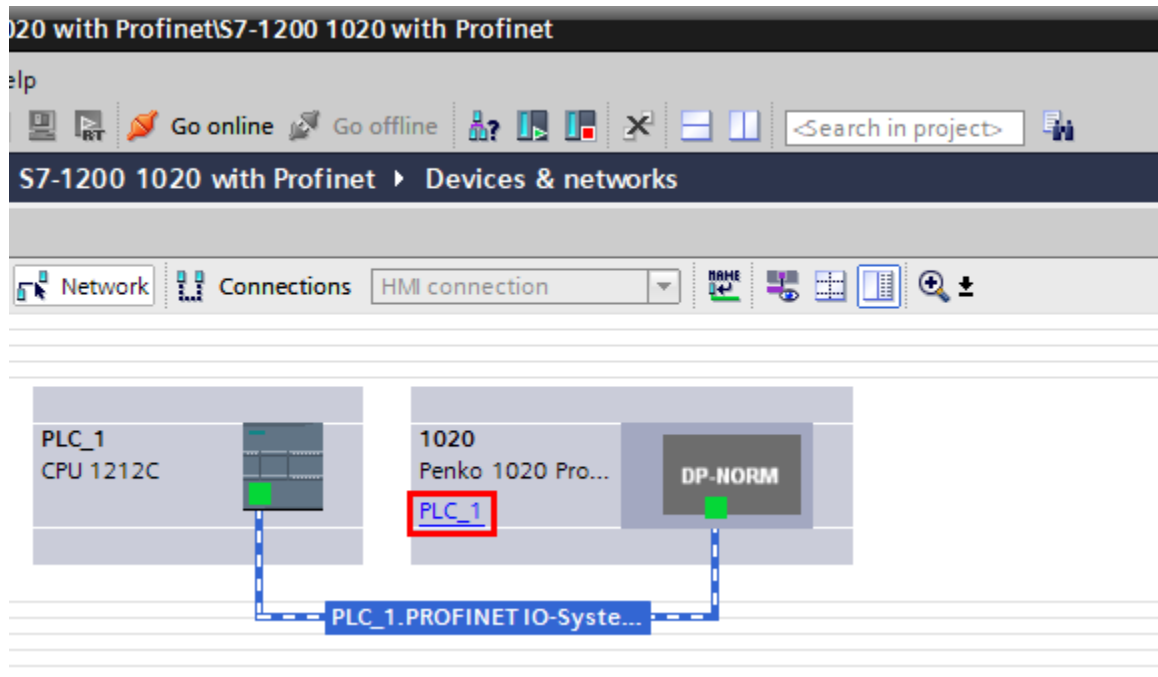
As you can see the 1020 is not assigned yet. Click on Not assigned and select the PLC_1.PROFINET interface_1



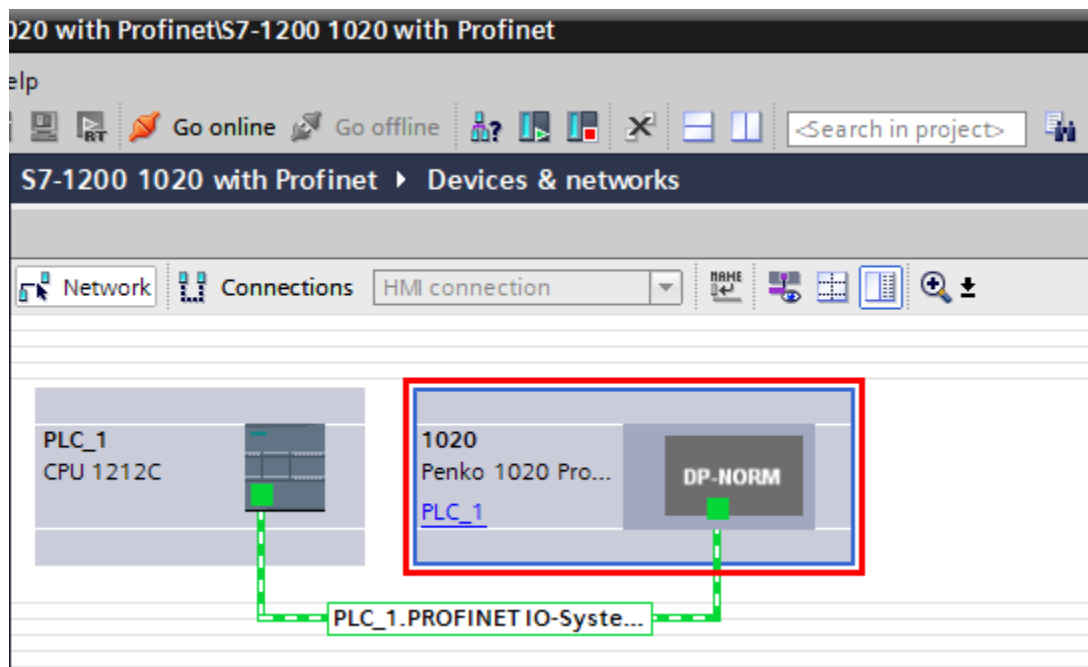
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The 1020 is now assigned to PLC_1.



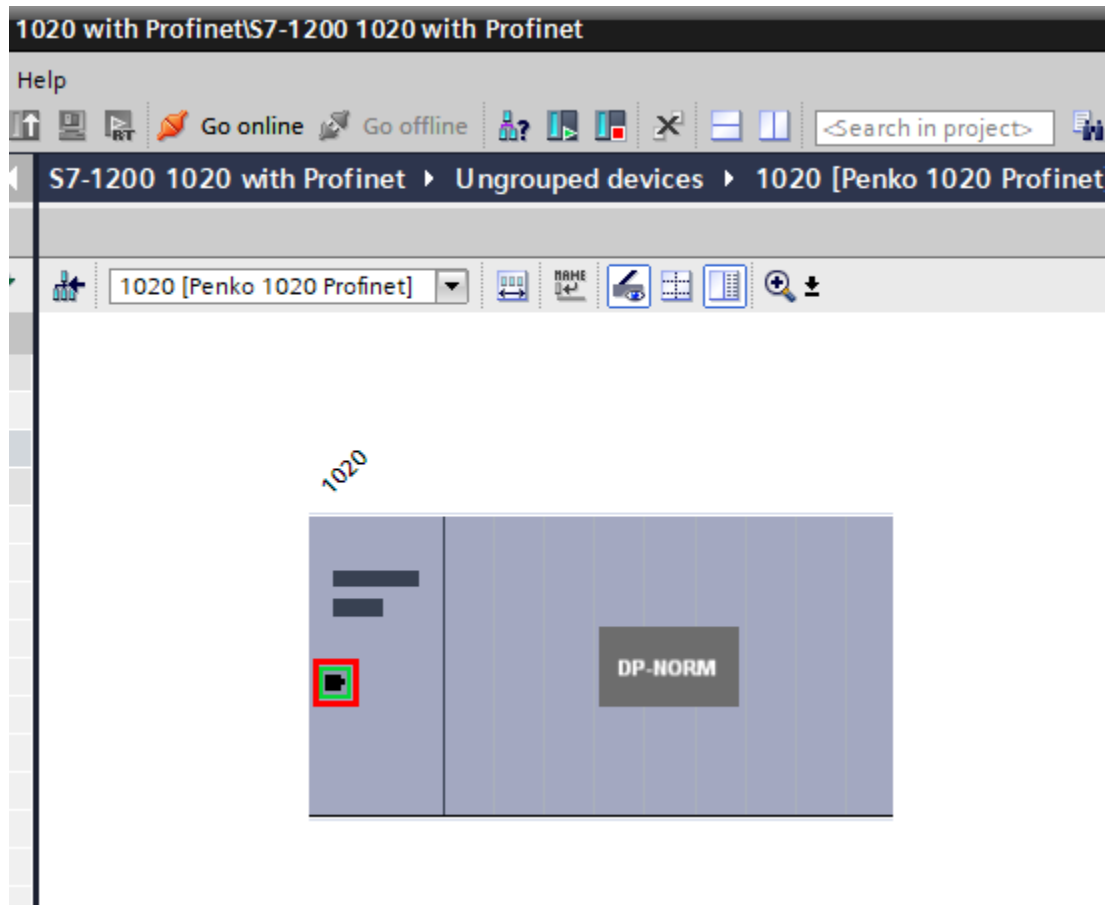
You can give the 1020 a different name and IP address if you want. Double click on the 1020 module.



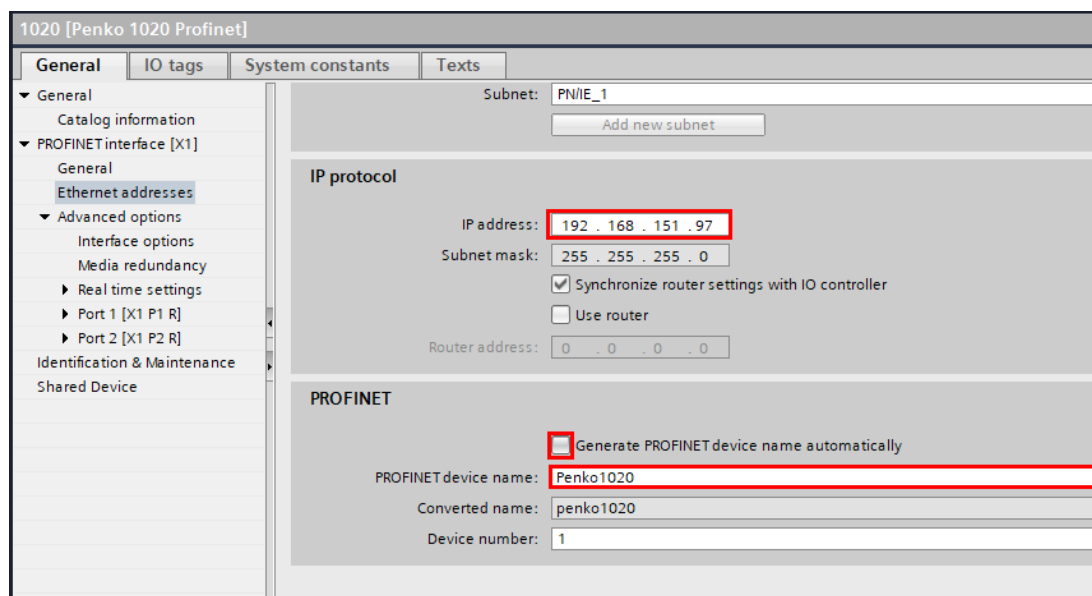
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Double click on the green square in the 1020 module.



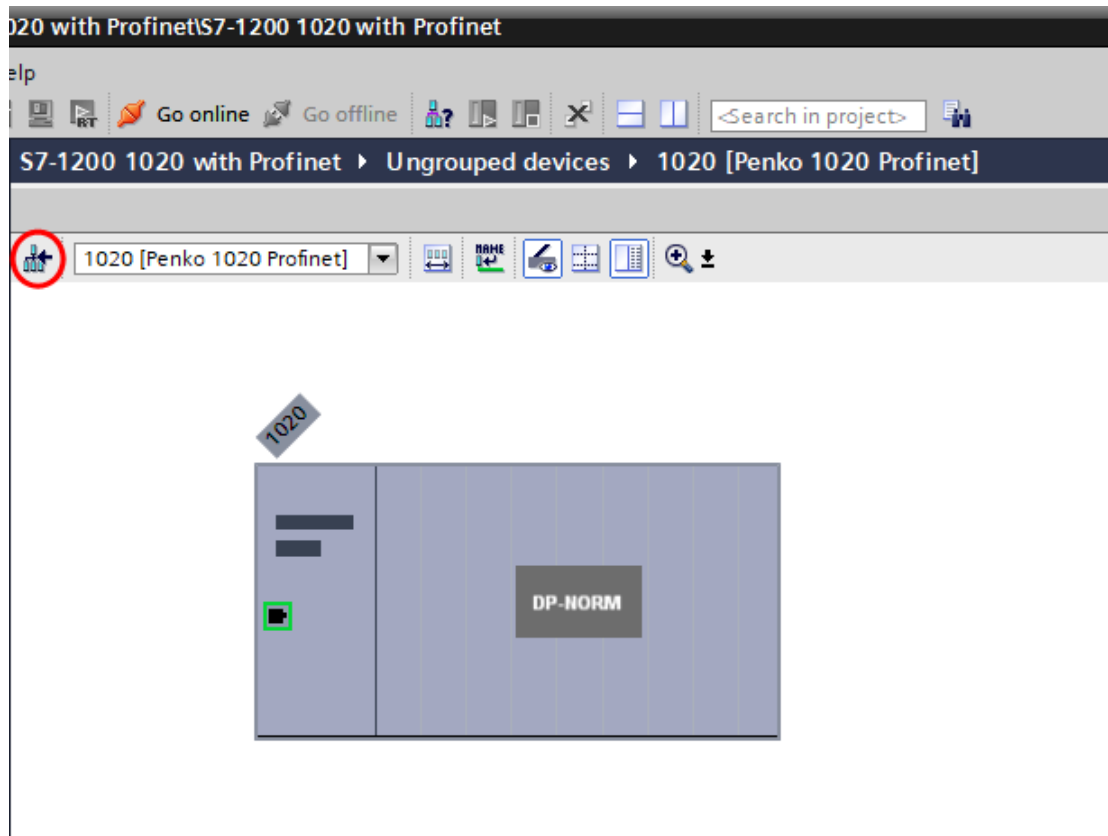
Under Ethernet Addresses you can set an IP address and set a different Profinet device name when you uncheck the option Generate PROFINET device name automatically.



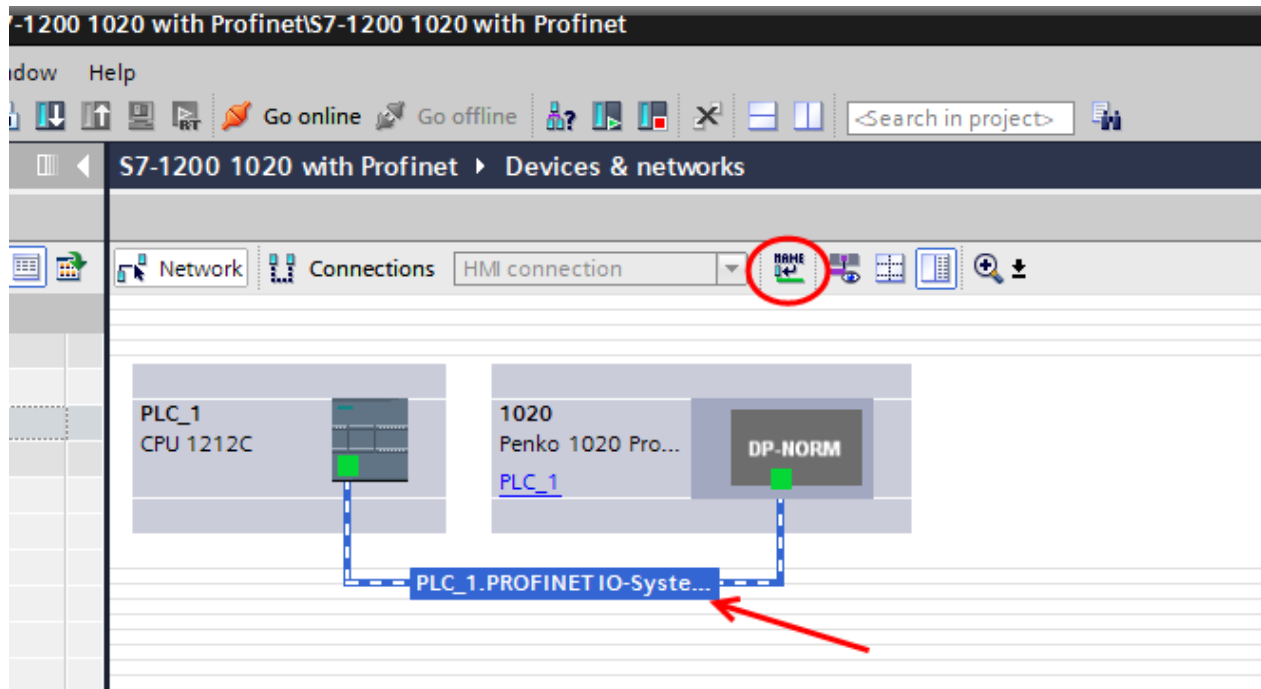
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Go back to Network view by clicking on the network button.



When the Profinet interface is selected you can click on the button Name.



Select the name that you have given to the 1020 at the PROFINET device name and set the correct interface, then click on Update list.

Assign PROFINET device name.

Configured PROFINET device

PROFINET device name: **penko1020**
Device type: Penko 1020 Profinet

Online access

Type of the PG/PC interface: **PN/IE**
PG/PC interface: **Intel(R) Ethernet Connection I217-LM**

Device filter

- Only show devices of the same type
- Only show devices with bad parameter settings
- Only show devices without names

Accessible devices in the network:

IP address	MAC address	Device	PROFINET device name	Status

Update list Assign name

Online status information:
Search completed. 0 of 0 devices were found.

Close

The 1020 is found but it has no IP address and a different PROFINET device name.

Assign PROFINET device name.

Configured PROFINET device

PROFINET device name: penko1020
Device type: Penko 1020 Profinet

Online access

Type of the PG/PC interface: PN/IE
PG/PC interface: Intel(R) Ethernet Connection I217-LM

Device filter

- Only show devices of the same type
- Only show devices with bad parameter settings
- Only show devices without names

Accessible devices in the network:

IP address	MAC address	Device	PROFINET device name	Status
0.0.0.0	00-02-A2-50-02-21	1020 Mo...	1020	⚠ Device name is different

Flash LED

Update list Assign name

Online status information:

- Search completed. 0 of 0 devices were found.
- Search completed. 1 of 3 devices were found.

Close

Select the line with the 1020 and click on Assign name.

Assign PROFINET device name.

Configured PROFINET device

PROFINET device name: penko1020
Device type: Penko 1020 Profinet

Online access

Type of the PG/PC interface: PN/IE
PG/PC interface: Intel(R) Ethernet Connection I217-LM

Device filter

- Only show devices of the same type
- Only show devices with bad parameter settings
- Only show devices without names

Accessible devices in the network:

IP address	MAC address	Device	PROFINET device name	Status
0.0.0.0	00-02-A2-50-02-21	1020 Mo...	1020	⚠ Device name is different

Flash LED

Update list Assign name

Online status information:

- Search completed. 0 of 0 devices were found.
- Search completed. 1 of 3 devices were found.

Close

The name is now updated and the status is OK, the IP address will be assigned when the configuration is downloaded to the PLC. Close the window.

Assign PROFINET device name.

Configured PROFINET device

PROFINET device name: penko1020
Device type: Penko 1020 Profinet

Online access

Type of the PG/PC interface: PN/IE
PG/PC interface: Intel(R) Ethernet Connection I217-LM

Device filter

- Only show devices of the same type
- Only show devices with bad parameter settings
- Only show devices without names

Accessible devices in the network:

IP address	MAC address	Device	PROFINET device name	Status
0.0.0.0	00-02-A2-50-02-21	1020 Mo...	penko1020	OK

Flash LED

Update list Assign name

Online status information:

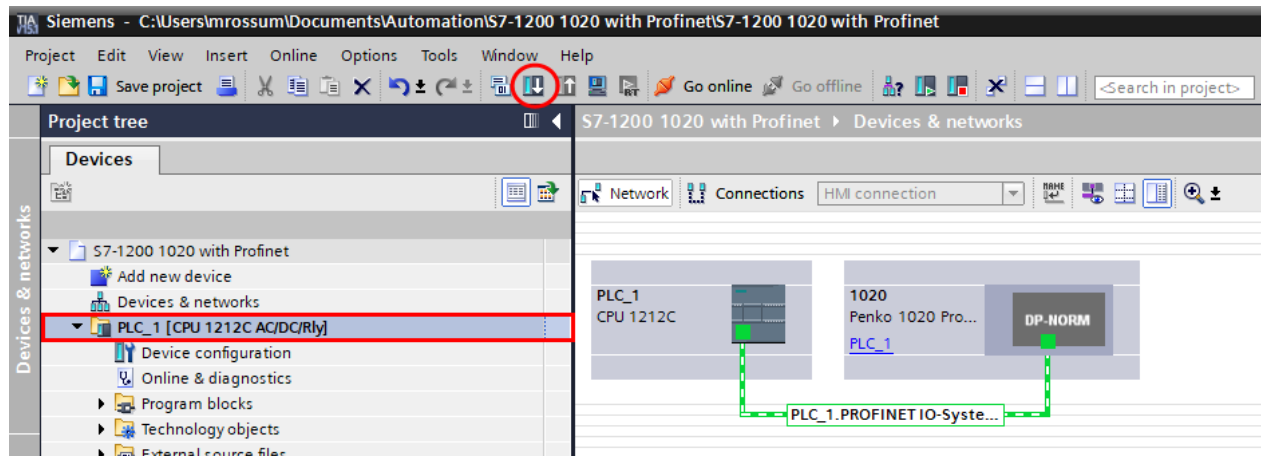
- Search completed. 0 of 0 devices were found.
- Search completed. 1 of 3 devices were found.
- The PROFINET device name "penko1020" was successfully assigned to MAC address "00-02-A2-50-02-21".

Close

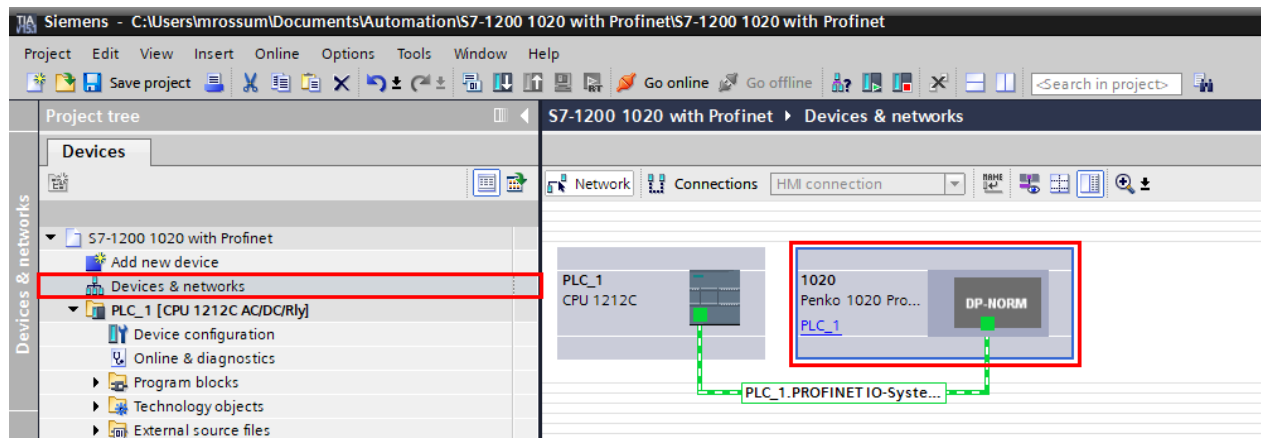
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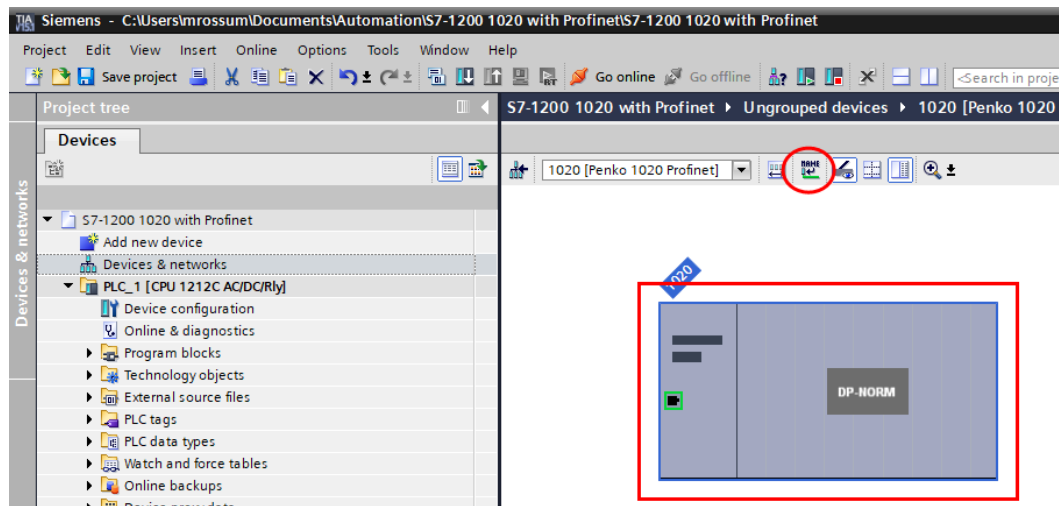
Select the line PLC_1 [CPU 1212C AC/DC/Rly] and click on download to device and follow the download steps.



To check the IP address double click on Devices & networks and double click on the 1020 module.



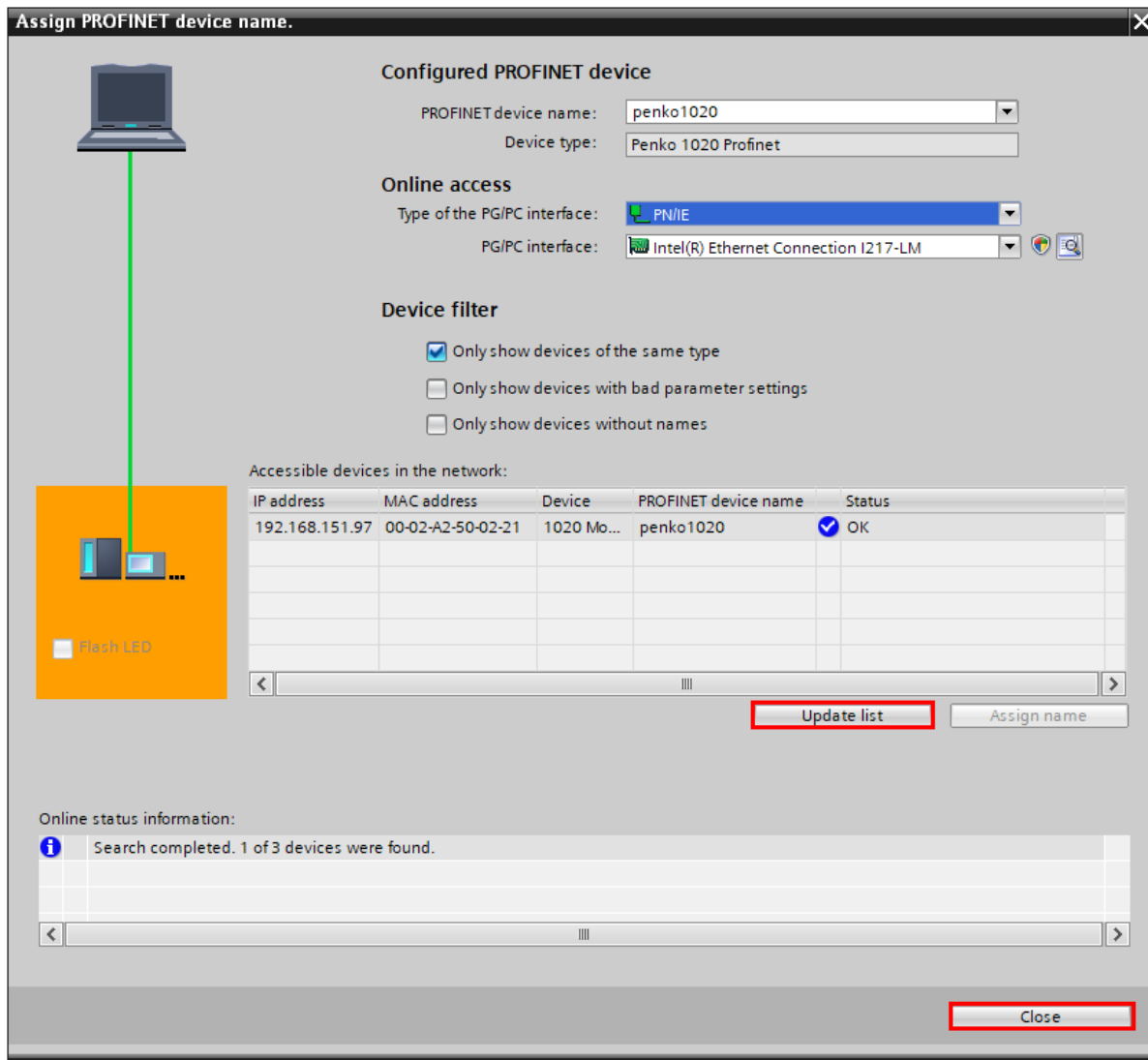
Select the module and click on Name.



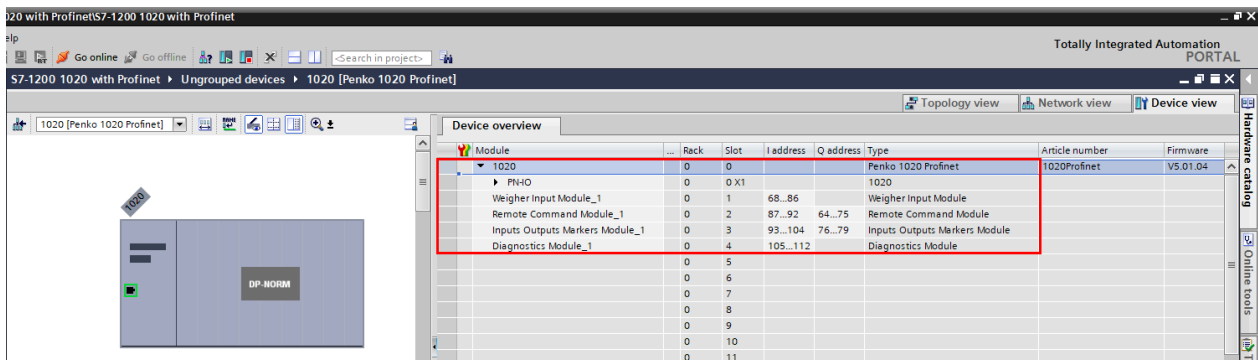
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Click on Update list and the 1020 is now showing the correct IP address. Click on Close.

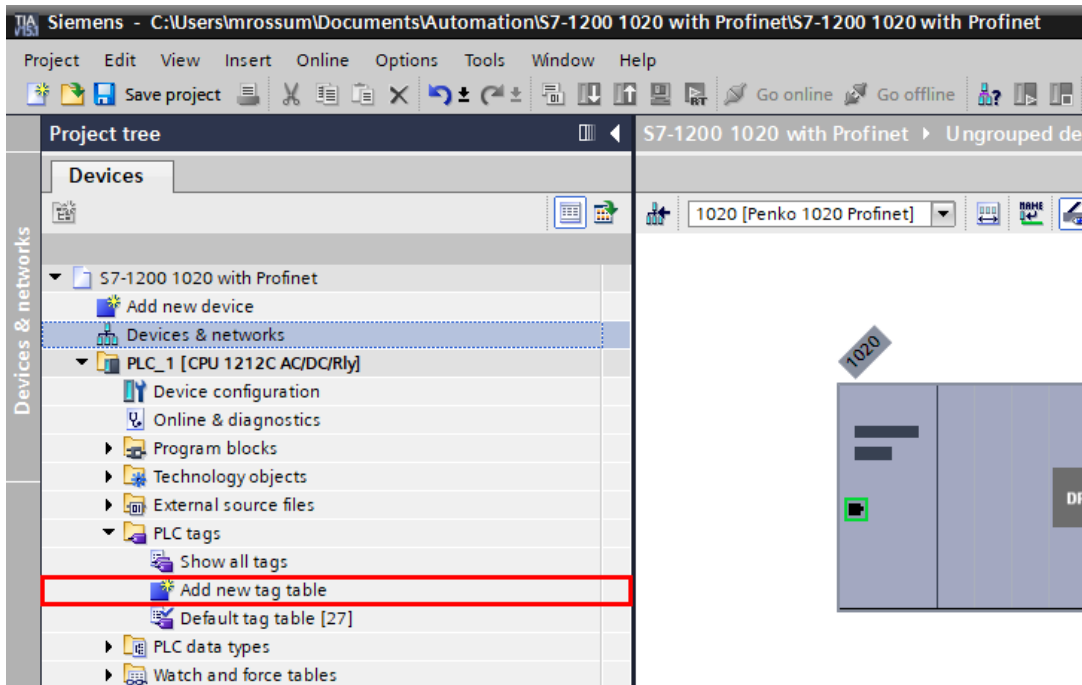


You should now also see the Device overview, here you can see the data that you can read and write. These I addresses and Q addresses can differ if you have a different PLC or already have added different modules.

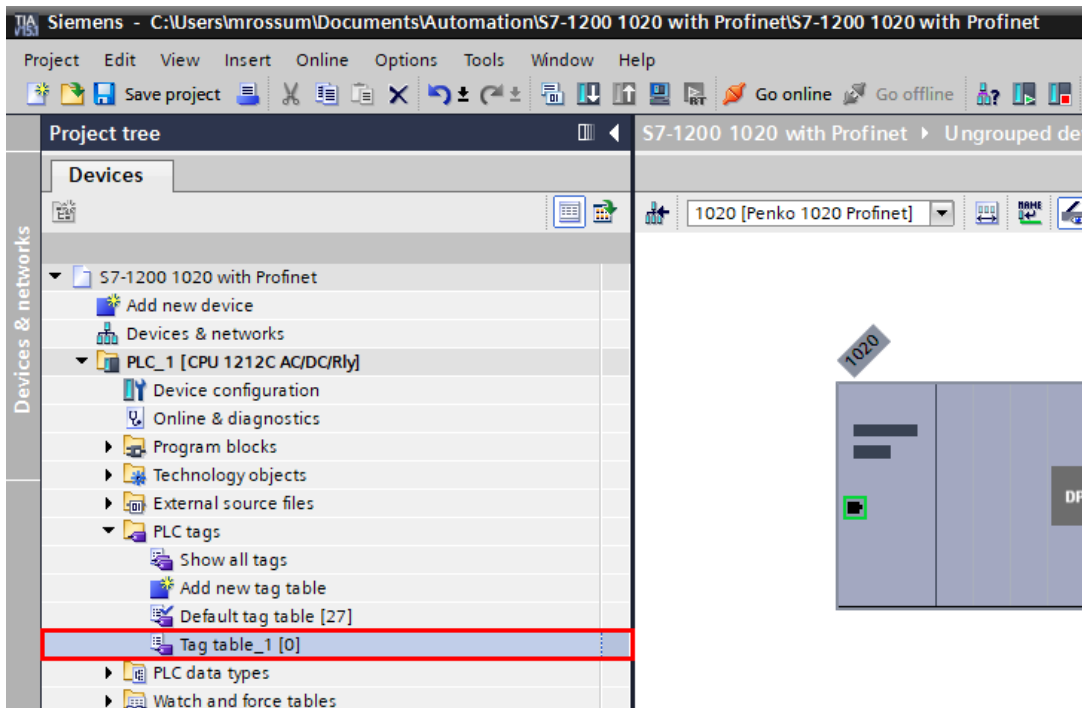


PLC Tags

Add a new tag table by opening PLC_1 [CPU 1212c AC/DC/Rly] – PLC Tags and double click on Add new tag table.



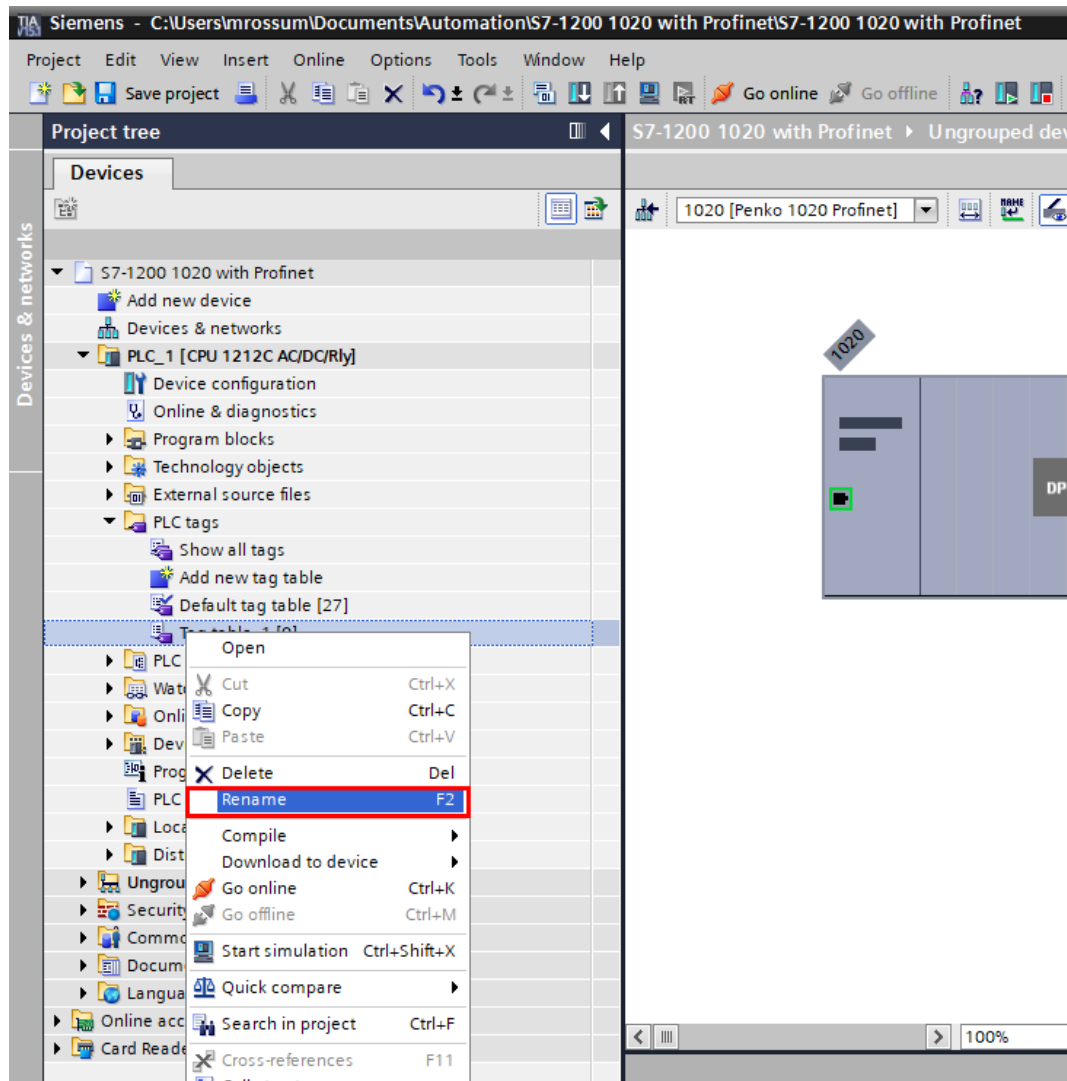
A new tag table is added to the project.



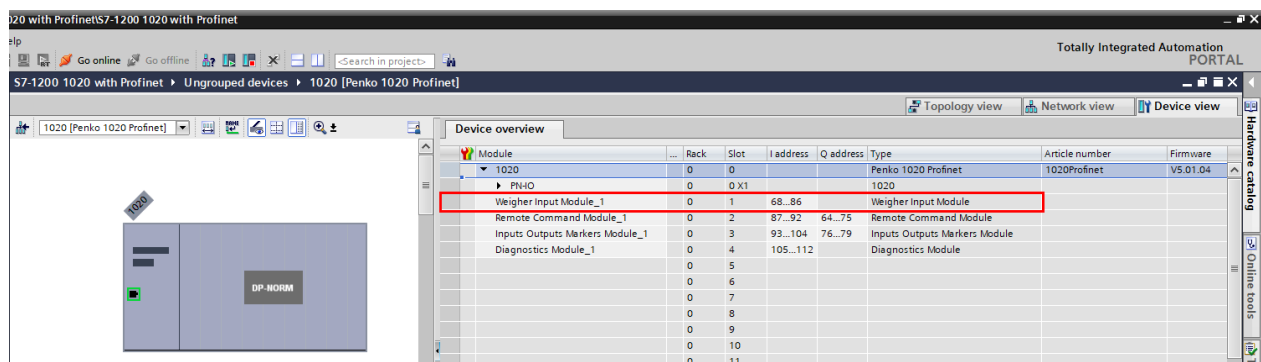
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Right click on the Tag table and click on Rename.



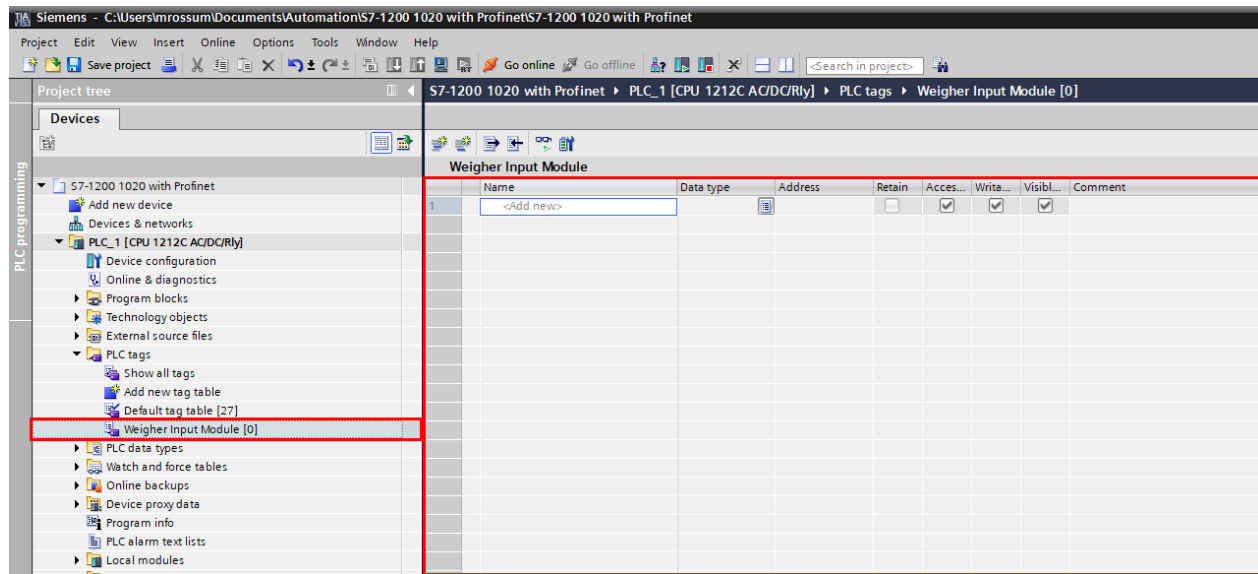
Give the Tag a name, in the example the name Weigher Input Module is used. Look at the I Addresses the range is 68-86 in the example but it can differ in your project.



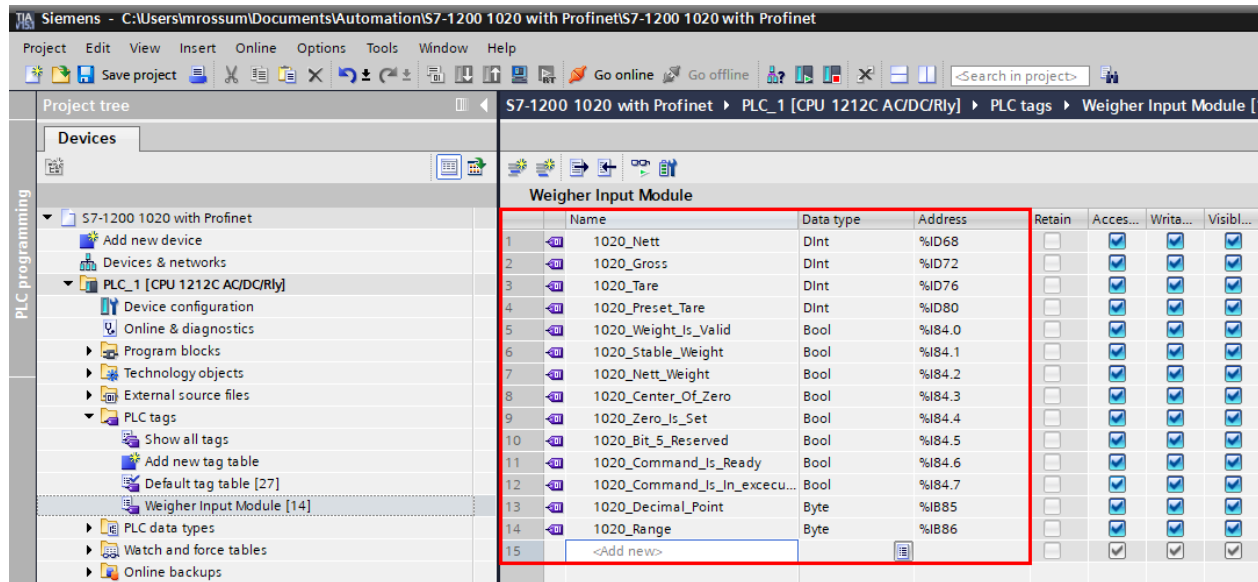
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Double click on the Weigher Input Module to open the tags.



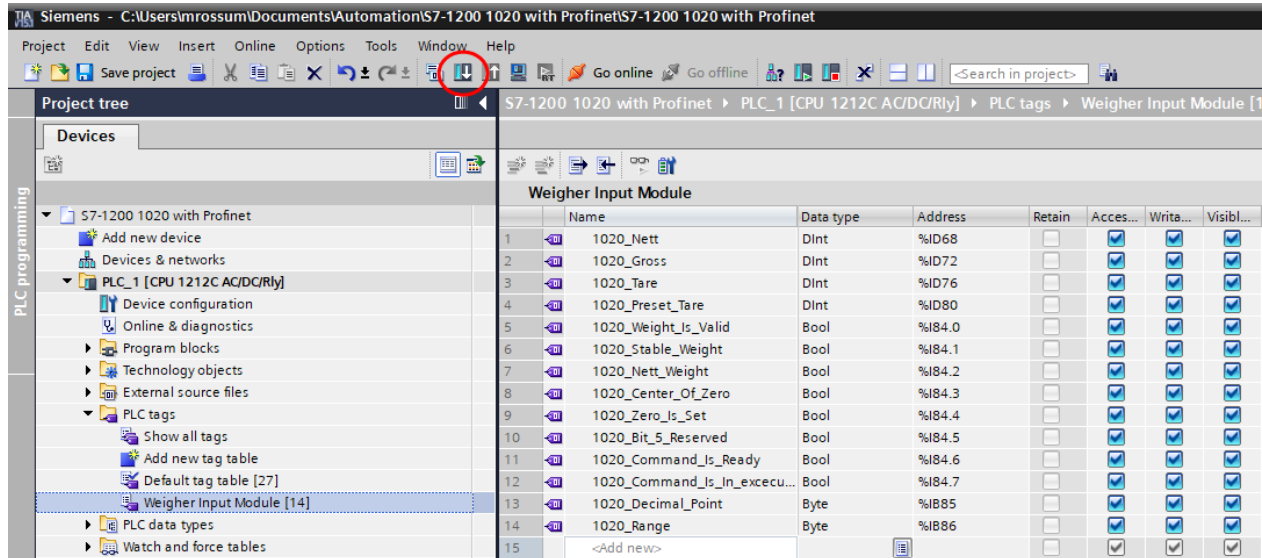
Add the following tags and set the Data type and address.



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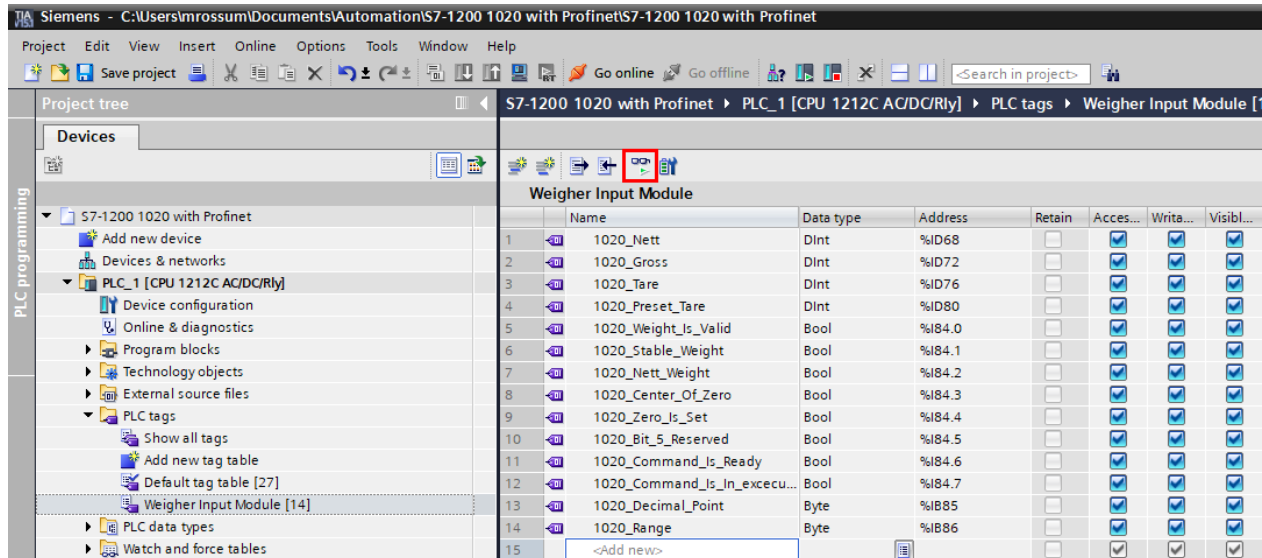
Download the tags into the PLC by clicking on the Download to device button. And follow the download steps.



The screenshot shows the Siemens SIMATIC Manager interface. The top toolbar contains various icons, with the 'Download to device' icon (a downward arrow) circled in red. The main window displays the 'Weigher Input Module' configuration table.

	Name	Data type	Address	Retain	Acces...	Writa...	Visibl...
1	1020_Nett	Dint	%ID68	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2	1020_Gross	Dint	%ID72	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3	1020_Tare	Dint	%ID76	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4	1020_Preset_Tare	Dint	%ID80	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
5	1020_Weight_Is_Valid	Bool	%I84.0	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
6	1020_Stable_Weight	Bool	%I84.1	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
7	1020_Nett_Weight	Bool	%I84.2	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
8	1020_Center_Of_Zero	Bool	%I84.3	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
9	1020_Zero_Is_Set	Bool	%I84.4	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
10	1020_Bit_5_Reserved	Bool	%I84.5	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
11	1020_Command_Is_Ready	Bool	%I84.6	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
12	1020_Command_Is_In_execu...	Bool	%I84.7	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
13	1020_Decimal_Point	Byte	%IB85	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
14	1020_Range	Byte	%IB86	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
15	<Add new>			<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Click on Monitor All.



The screenshot shows the Siemens SIMATIC Manager interface. The top toolbar contains various icons, with the 'Monitor All' icon (a magnifying glass) circled in red. The main window displays the 'Weigher Input Module' configuration table.

	Name	Data type	Address	Retain	Acces...	Writa...	Visibl...
1	1020_Nett	Dint	%ID68	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2	1020_Gross	Dint	%ID72	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3	1020_Tare	Dint	%ID76	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4	1020_Preset_Tare	Dint	%ID80	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
5	1020_Weight_Is_Valid	Bool	%I84.0	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
6	1020_Stable_Weight	Bool	%I84.1	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
7	1020_Nett_Weight	Bool	%I84.2	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
8	1020_Center_Of_Zero	Bool	%I84.3	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
9	1020_Zero_Is_Set	Bool	%I84.4	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
10	1020_Bit_5_Reserved	Bool	%I84.5	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
11	1020_Command_Is_Ready	Bool	%I84.6	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
12	1020_Command_Is_In_execu...	Bool	%I84.7	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
13	1020_Decimal_Point	Byte	%IB85	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
14	1020_Range	Byte	%IB86	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
15	<Add new>			<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

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The PLC will go online and the actual values of the 1020 is shown.

The screenshot shows the Siemens SIMATIC Manager interface. The 'Project tree' on the left shows the project structure: S7-1200 1020 with Profinet > PLC_1 [CPU 1212C AC/DC/Rly] > Weigher Input Module [14]. The main window displays the 'Weigher Input Module' tag table. The 'Monitor value' column is highlighted with a red box, showing the following values:

Name	Data type	Address	Retain	Acces...	Writa...	Visibl...	Monitor value
1020_Nett	Dint	%ID68	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	150
1020_Gross	Dint	%ID72	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	379
1020_Tare	Dint	%ID76	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	229
1020_Preset_Tare	Dint	%ID80	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	0
1020_Weight_Is_Valid	Bool	%I84.0	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	TRUE
1020_Stable_Weight	Bool	%I84.1	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	TRUE
1020_Nett_Weight	Bool	%I84.2	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	TRUE
1020_Center_Of_Zero	Bool	%I84.3	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	FALSE
1020_Zero_Is_Set	Bool	%I84.4	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	FALSE
1020_Bit_5_Reserved	Bool	%I84.5	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	FALSE
1020_Command_Is_Ready	Bool	%I84.6	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	FALSE
1020_Command_Is_In_execu...	Bool	%I84.7	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	FALSE
1020_Decimal_Point	Byte	%IB85	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	16#02
1020_Range	Byte	%IB86	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	16#01

To add the other tags and rename them, go offline.

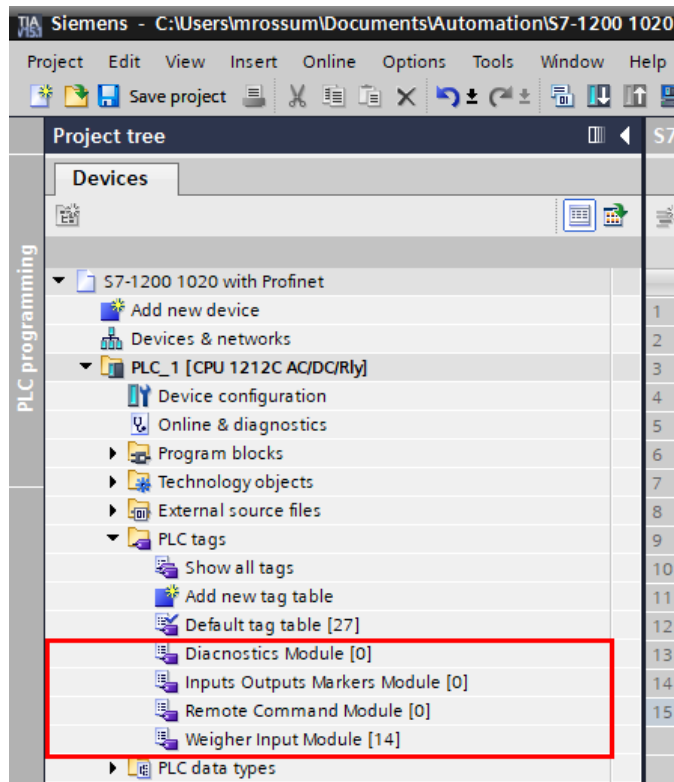
The screenshot shows the Siemens SIMATIC Manager interface. The 'Project tree' on the left shows the project structure: S7-1200 1020 with Profinet > PLC_1 [CPU 1212C AC/DC/Rly] > Weigher Input Module [14]. The main window displays the 'Weigher Input Module' tag table. The 'Go offline' button in the top toolbar is highlighted with a red box. The tag table shows the following values:

Name	Data type	Address	Re
1020_Nett	Dint	%ID68	
1020_Gross	Dint	%ID72	
1020_Tare	Dint	%ID76	
1020_Preset_Tare	Dint	%ID80	

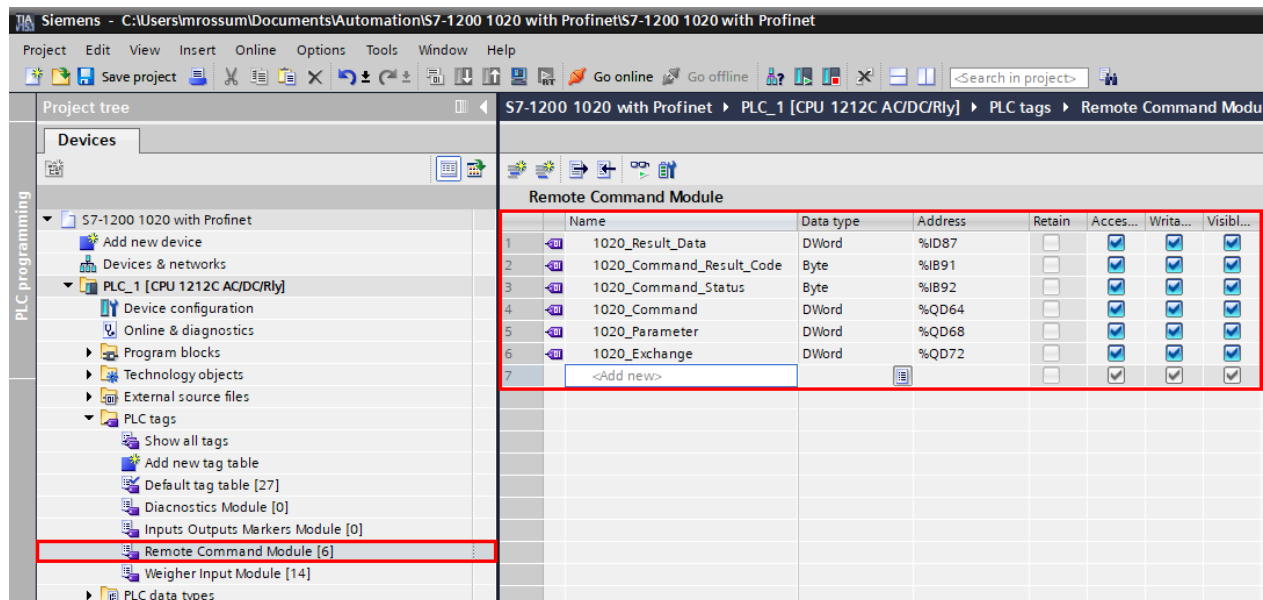
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Add 3 new tags and rename them as below.



Double click on Remote Command Module and add the tags below.



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Double click on Inputs Outputs Markers Module and add the tags below.

	Name	Data type	Address	Retain	Acces...	Writa...	Visibl...
1	1020_Inputs	DWord	%ID93	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2	1020_Outputs	DWord	%ID97	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3	1020_Read_Marker_401-432	DWord	%ID101	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4	1020_Write_Marker_969-1000	DWord	%QD76	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
5	<Add new>			<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Double click on Diagnostic Module and add the tags below.

	Name	Data type	Address	Retain	Acces...	Writa...	Visibl...
1	1020_Slave_Sequence_Counter	DWord	%ID105	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2	1020_Master_Sequence_Counter	DWord	%ID109	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3	<Add new>			<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

This is all the data that can be read and write to the 1020, use the Penko Manual Profinet slave module that can be downloaded from the site: <https://penko.com/Support/Software/> to see what you can do with the data.



About PENKO

Our design expertise include systems for manufacturing plants, bulk weighing, check weighing, force measuring and process control. For over 35 years, PENKO Engineering B.V. has been at the forefront of development and production of high-accuracy, high-speed weighing systems and our solutions continue to help cut costs, increase ROI and drive profits for some of the largest global brands, such as Cargill, Sara Lee, Heinz, Kraft Foods and Unilever to name but a few.

Whether you are looking for a simple stand-alone weighing system or a high-speed weighing and dosing controller for a complex automated production line, PENKO has a comprehensive range of standard solutions you can rely on.

Certifications

PENKO sets high standards for its products and product performance which are tested, certified and approved by independent expert and government organizations to ensure they meet – and even – exceed metrology industry guidelines. A library of testing certificates is available for reference on:

http://penko.com/nl/publications_certificates.html



PENKO Professional Services

PENKO is committed to ensuring every system is installed, tested, programmed, commissioned and operational to client specifications. Our engineers, at our weighing center in Ede, Netherlands, as well as our distributors around the world, strive to solve most weighing-system issues within the same day. On a monthly basis PENKO offers free training classes to anyone interested in exploring modern, high-speed weighing instruments and solutions. A schedule of training sessions is found on: www.penko.com/training

PENKO Alliances

PENKO's worldwide network: Australia, Belgium, Brazil, China, Denmark, Germany, Egypt, Finland, France, India, Italy, Netherlands, Norway, Poland, Portugal, Slovakia, Spain, Syria, Turkey, United Kingdom, South Africa, Slovakia Sweden, Switzerland and Singapore. A complete overview you will find on: www.penko.com/dealers

