Optris CSvision-Profinet interface

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1 General

The Optris CSvision-Profinet interface you can use for CSvision with the Profinet communication protocol. The Profinet interface has a M12 D-coded 4 pin female connector for communication to PLC, installed in the electronic box. For the connection with the pyrometer, you need in addition the I/O cable **[ACCSVICBx]**, which is in the scope of supply with your CSvision. Other lengths and high temperature option is also available.

It is suited for industrial Ethernet with an IP67 protection rate. An extra implemented software stack guarantees the Profinet communication functionality.

2 Description

Optris CSvision-Profinet interface basic characteristics:
• Device class: adapter device
• Device type: 06h
• Connection: 1 x M12
• Transfer speed up to 100Mbit/s full-duplex, auto-negotiation capable
The Optris CSvision-Profinet interface maps the object temperature, internal temperature, device status, and other Pyrometer data to its Input Assembly which is then sent onto the Profinet network using CIP. In the initialization phase, the Optris CSvision-Profinet interface sends the device's configuration data which is accessible for setup via the PLC programming software Controller Tags. Furthermore, Optris CSvision-Profinet interface allows you to change a subset of sensor parameters in data exchange mode using different classes.

3 Profinet Communication Setup for CSvision

To establish Profinet communication between the CSvision pyrometer and your PLC, the following steps must be completed:

- Prepare the CSvision Device
  Before initiating the Profinet communication, ensure that the CSvision pyrometer is properly configured. Refer to Chapter **3.1 Preparing the CSvision for Profinet Communication** for detailed instructions.

- Connect the Profinet Interface Box
  The Profinet interface box must be physically connected to the CSvision device. For step-by-step guidance on this process, refer to Chapter **Connect the Profinet Interface Box**.

- Manage the Communication
  Once the hardware setup is complete, the Profinet communication parameters must be configured and managed. Detailed instructions for this process can be found in Chapter **4 Manage the Communication**.

By following these steps, you will ensure a seamless integration of the CSvision pyrometer into your Profinet network, enabling efficient data exchange with your PLC.

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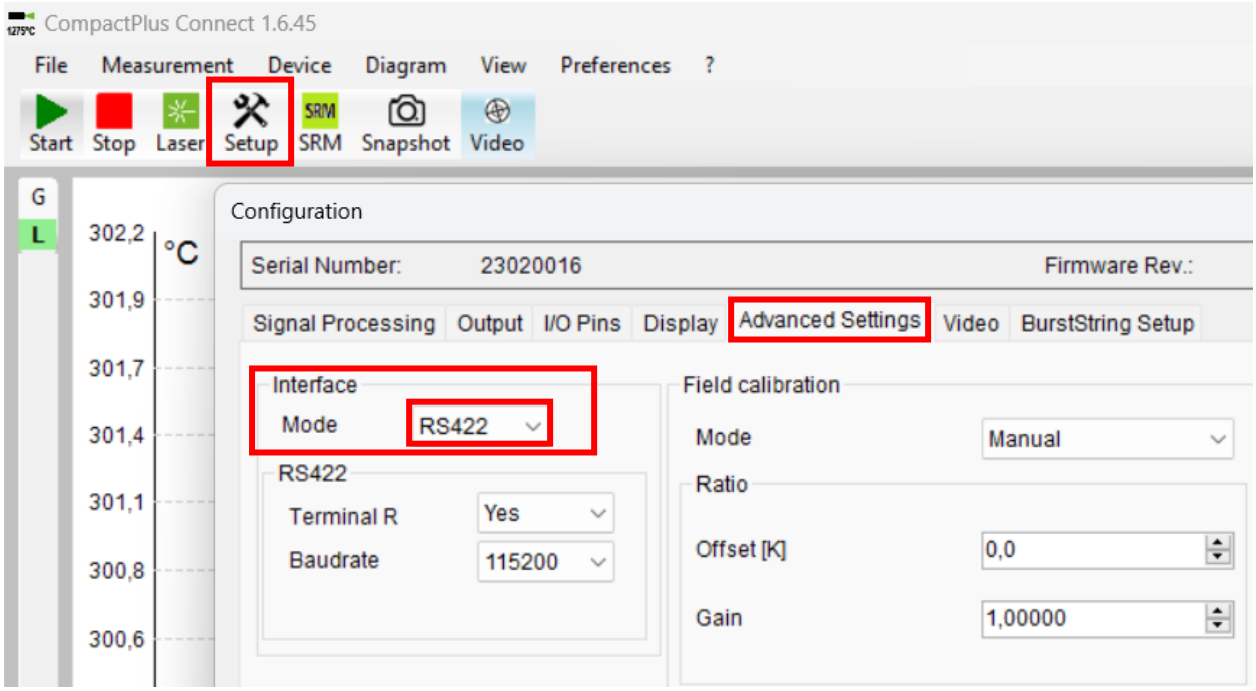
3.1 Preparing the CSvision for Profinet Communication

Connect the CSvision with the supplied USB cable to your computer and start the software *CompactPlus Connect*. Go to **Setup** and **Advanced Settings.** Set the **interface mode** to **RS422** and the **Baud rate** to **115200.**

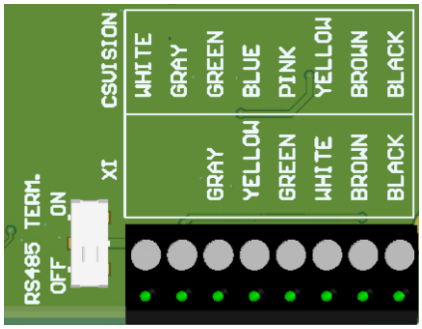


Picture 1: GUI of CompactPlus Connect - settings for CSvision

For more information see the manual for CSvision.

3.2 Connect the Profinet Interface Box

Remove the terminal block from the supplied I/O cable. Open the cover of the Profinet Interface Box and feed the cable through the cable gland on the side. Unscrew the cable gland and guide the washers and rubber seal over the cable. The cables of the I/O cable have different colors. Connect the wire end ferrules of the I/O cable corresponding the colors on the Profinet Interface Box, like shown in the picture below.



Picture 2: Connectors on the Profinet interface Box

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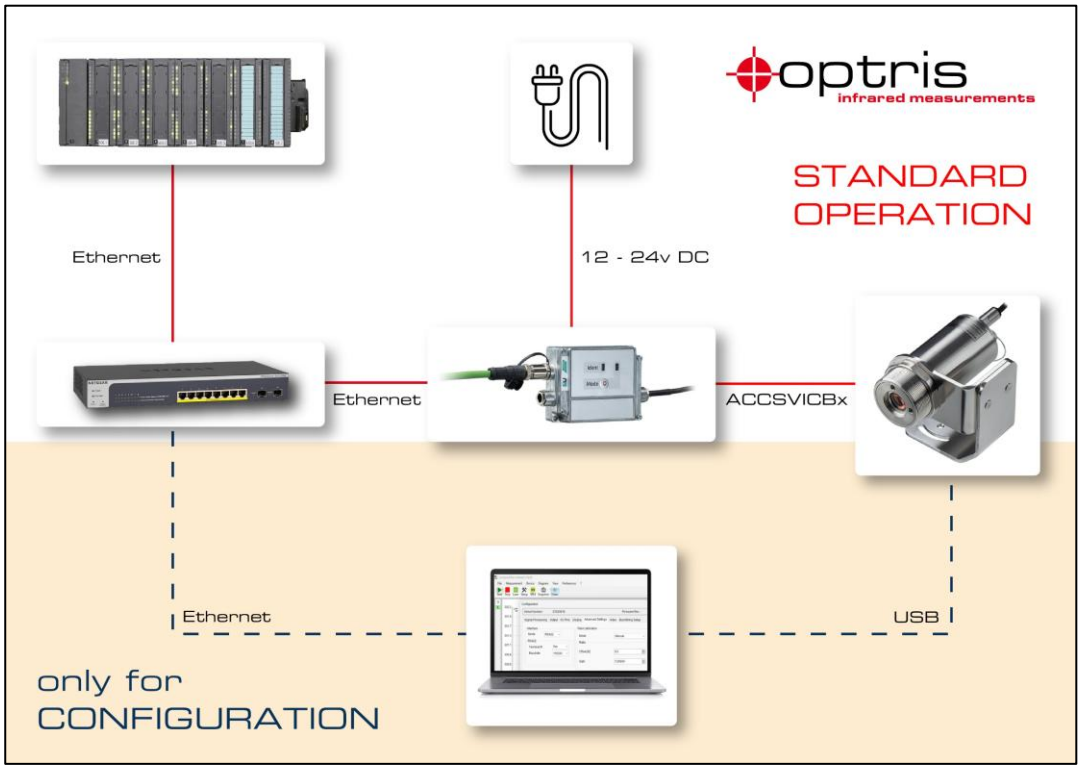
Now connect the Profinet Interface Box to the 12-24 VDC power supply, the CSvision will be powered by the Profinet Interface Box.
The CSvision has two connector plugs (see: **Picture 3**) integrated in the sensor backplane. Connect the other end of the I/O cable to the CSvision 7-pin sensor connector on the right side.

Picture 3: Backplane of CSvision - Connector side

Now connect the Profinet Interface Box with the Ethernet cable to your PLC or network and start the Profinet configuration.

Note: Your PC, the PLC and the Profinetbox have to be in the same network.



Picture 4: Connection diagram for Profinet Communication Setup

► Note: The PC is only needed for configuration of the pyrometer and the interface and not for operation.

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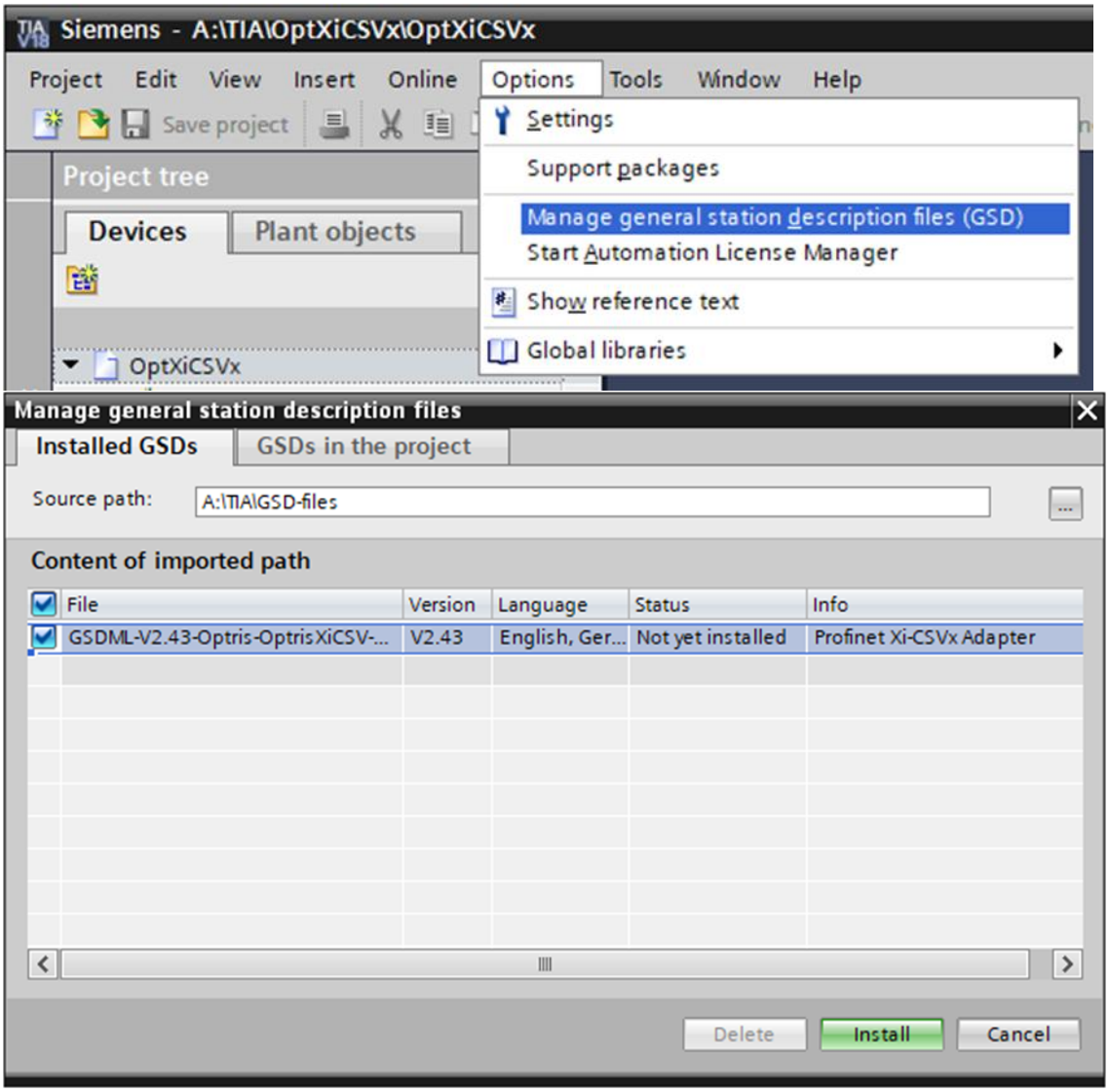
4 Manage the Communication

The easiest way to incorporate a CSvision-Profinet interface into a PLC programming software Project is by installing the GSD file.

4.1 Installing GSD file

Here you can see an example of installing the GSD file with ***SIEMENS TIA Portal V18.***
In the **project tree** go to **Options** → **Manage general station files (GSD)**. Choose your GSD file and click on **install**.



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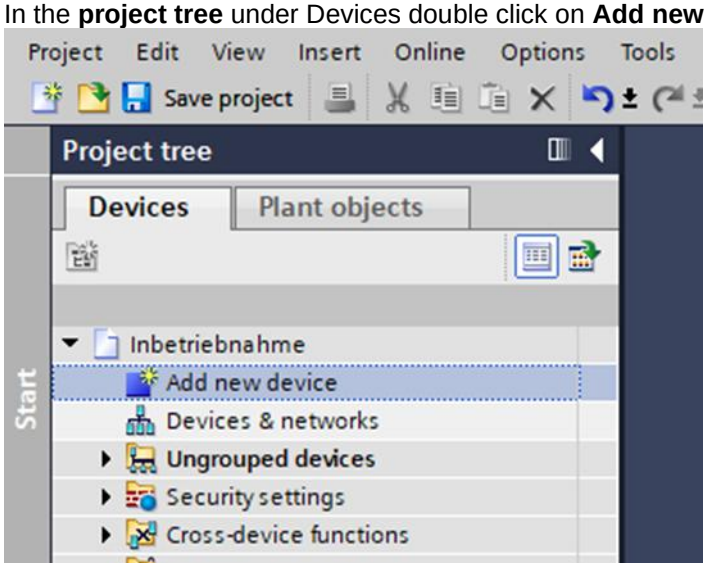
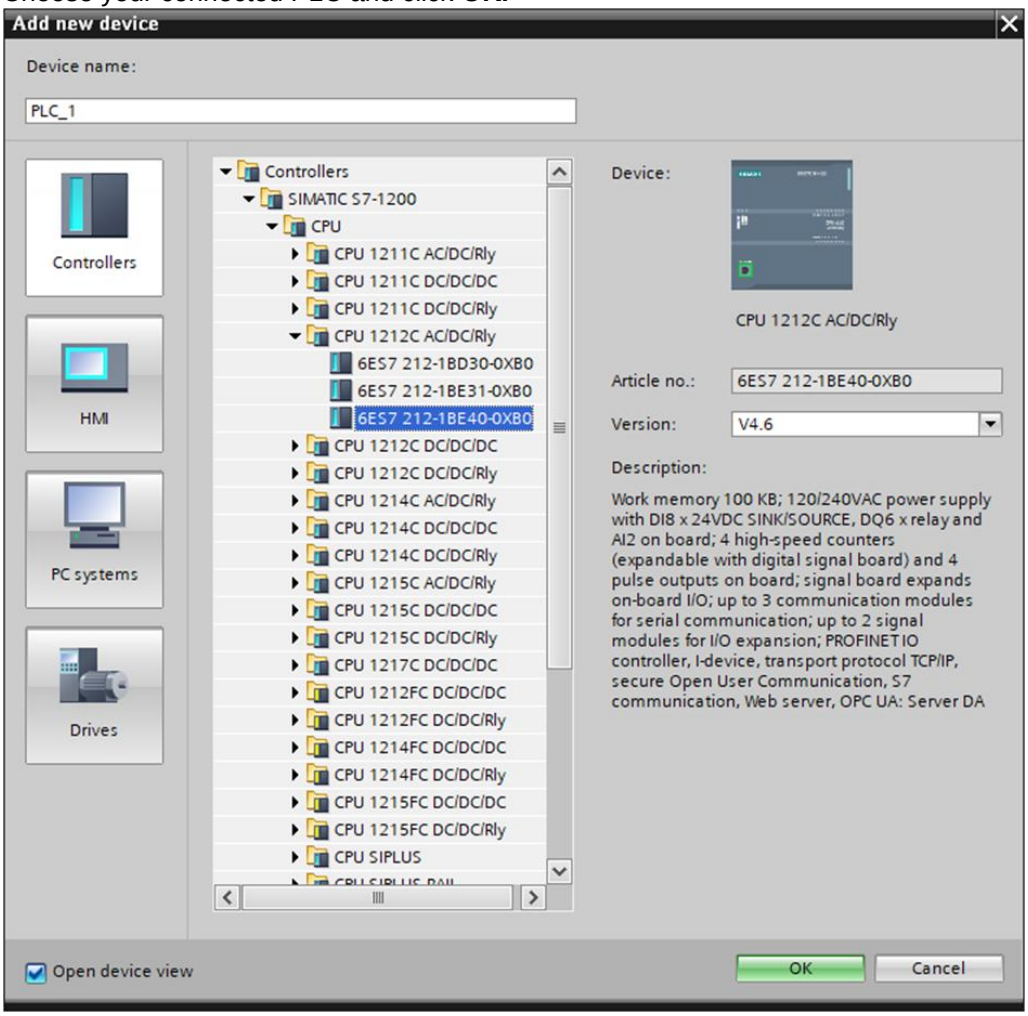
4.2 Installing PLC

In the **project tree** under Devices double click on **Add new device**.



Choose your connected PLC and click **OK.**



Go through the Settings dialog box of the PLC (depending on customer).

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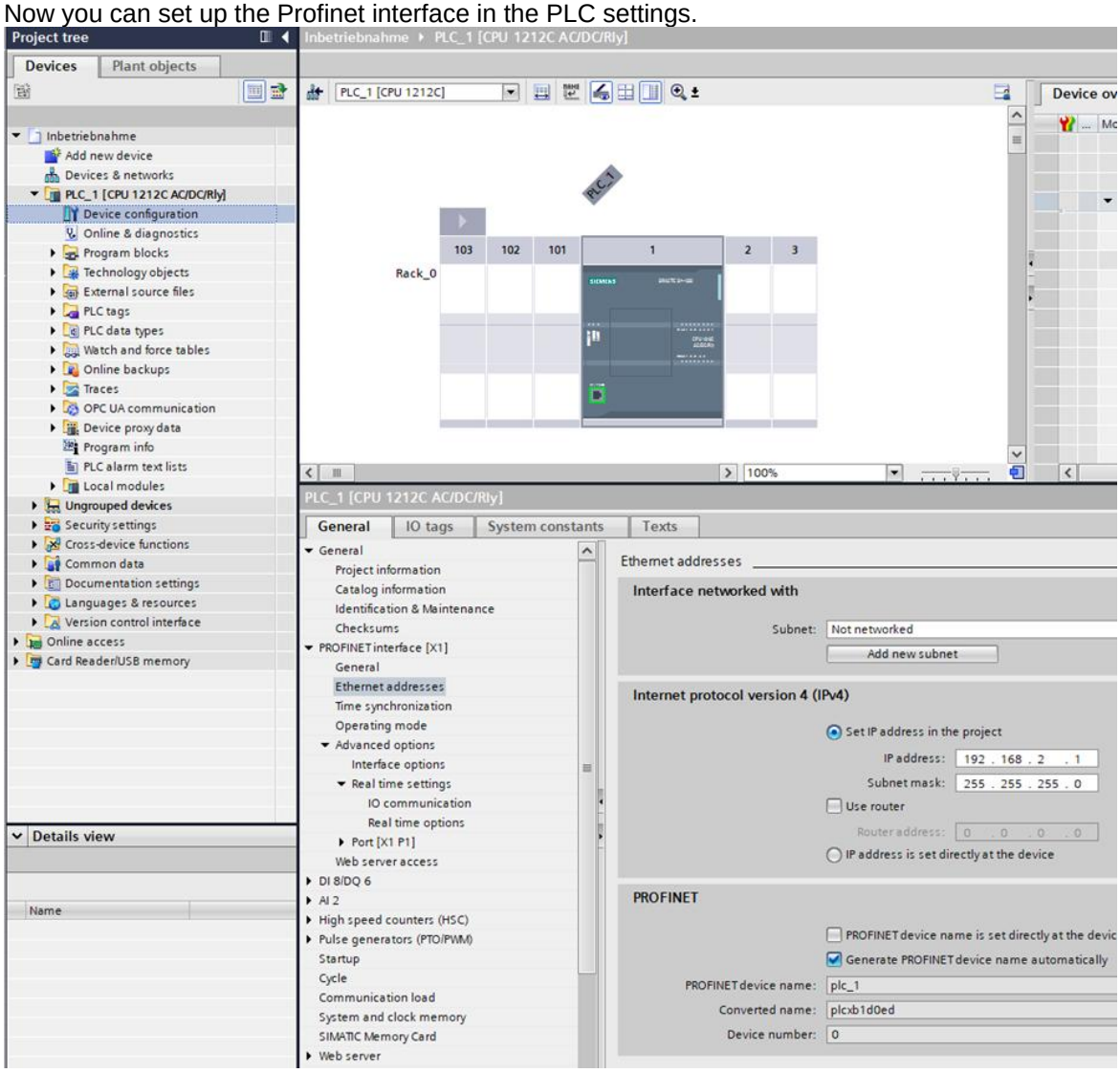
4.3 Configure the Profinet interface

Now you can set up the Profinet interface in the PLC settings.



Set the IP address under Internet protocol version 4 (IPv4)

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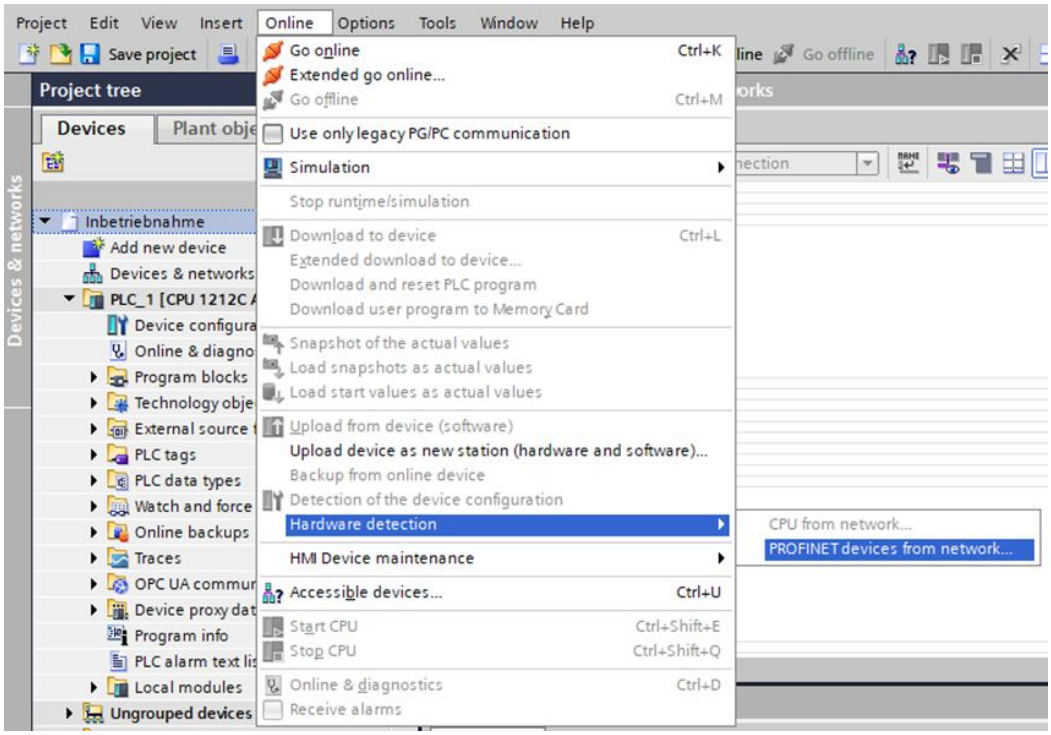
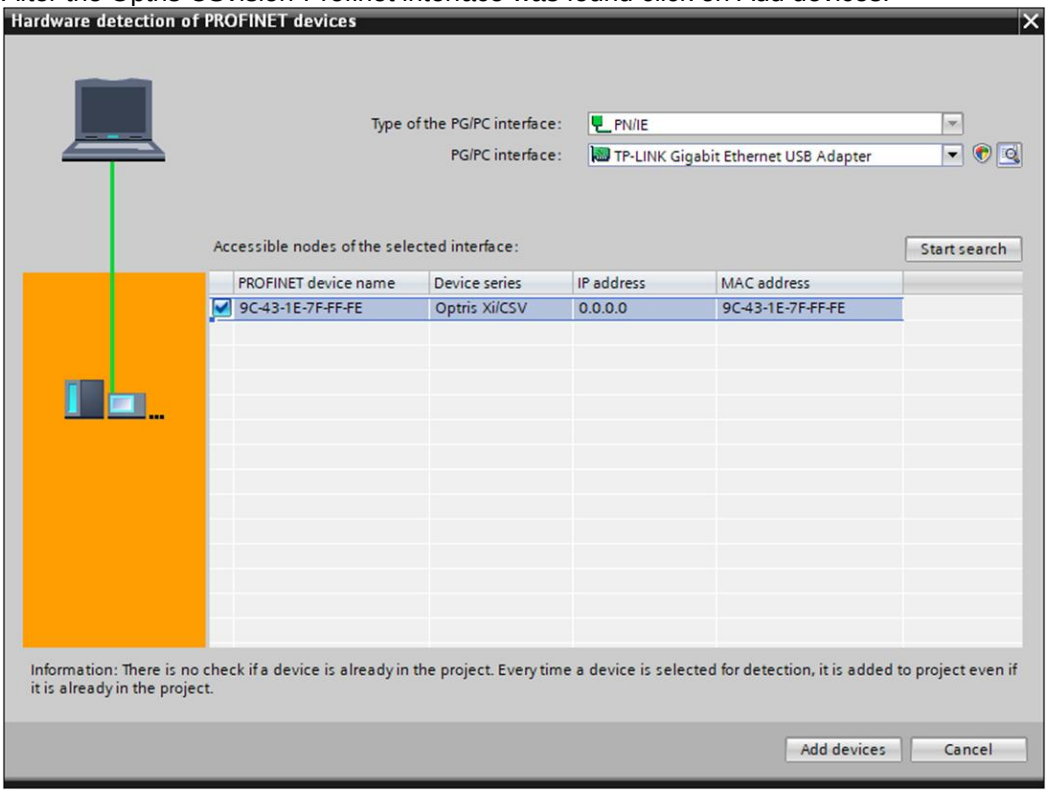
4.4 Add optris CSvision-Profinet interface

Click on your project in the **project tree** under Devices. In the menu go to **Online → Hardware detection → PROFINET devices from network**



Choose your Ethernet interface and click on Start search.
After the Optris CSvision-Profinet interface was found click on Add devices.



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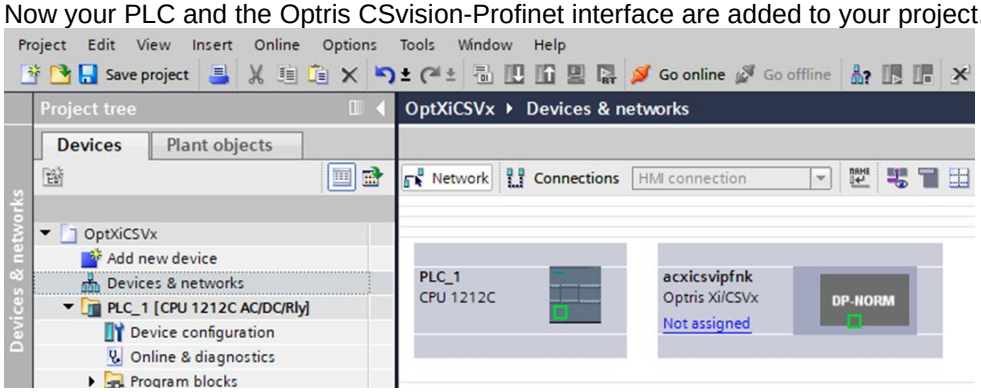
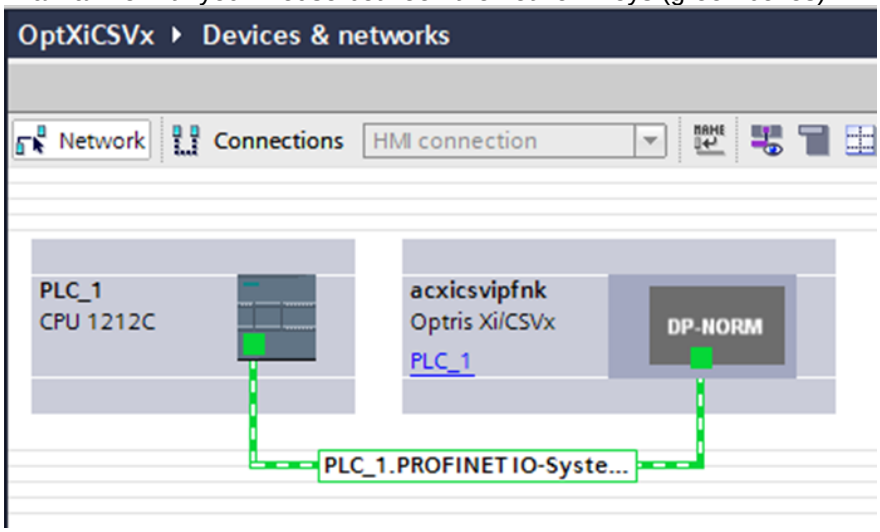
Now your PLC and the Optris CSvision-Profinet interface are added to your project.

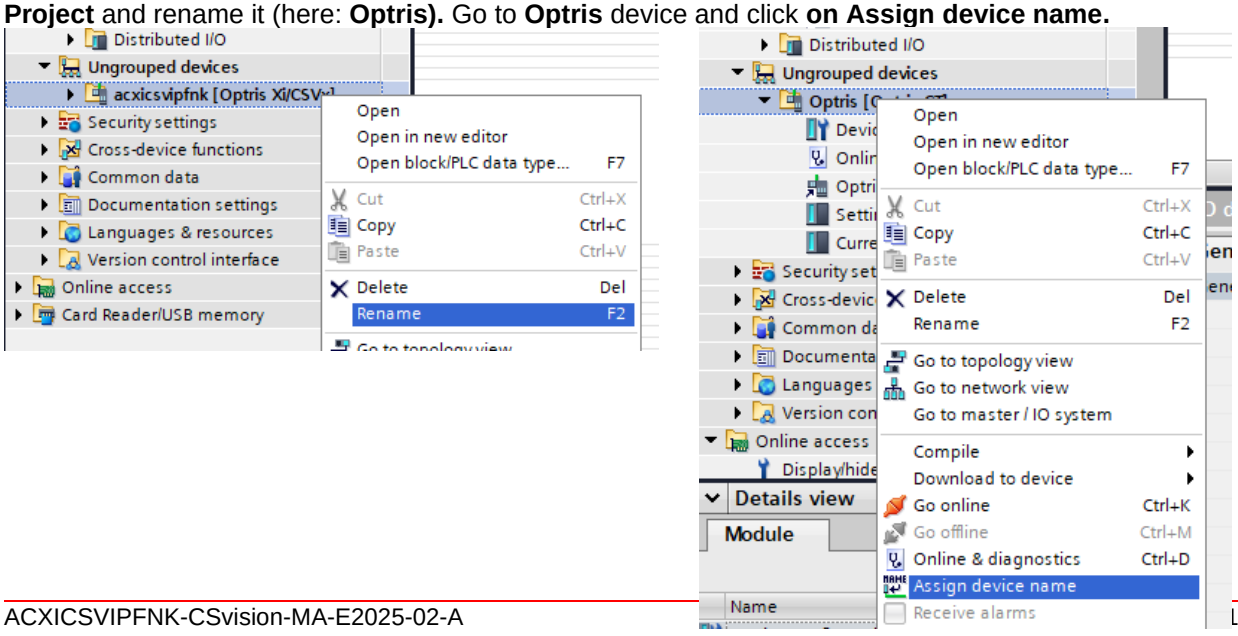


Draw a line with your mouse between the network keys (green boxes).



4.5 Rename Optris device

Go to your project in the project tree under **Ungrouped Devices.** Click with the right mouse button on **the Project** and rename it (here: **Optris).** Go to **Optris** device and click **on Assign device name.**



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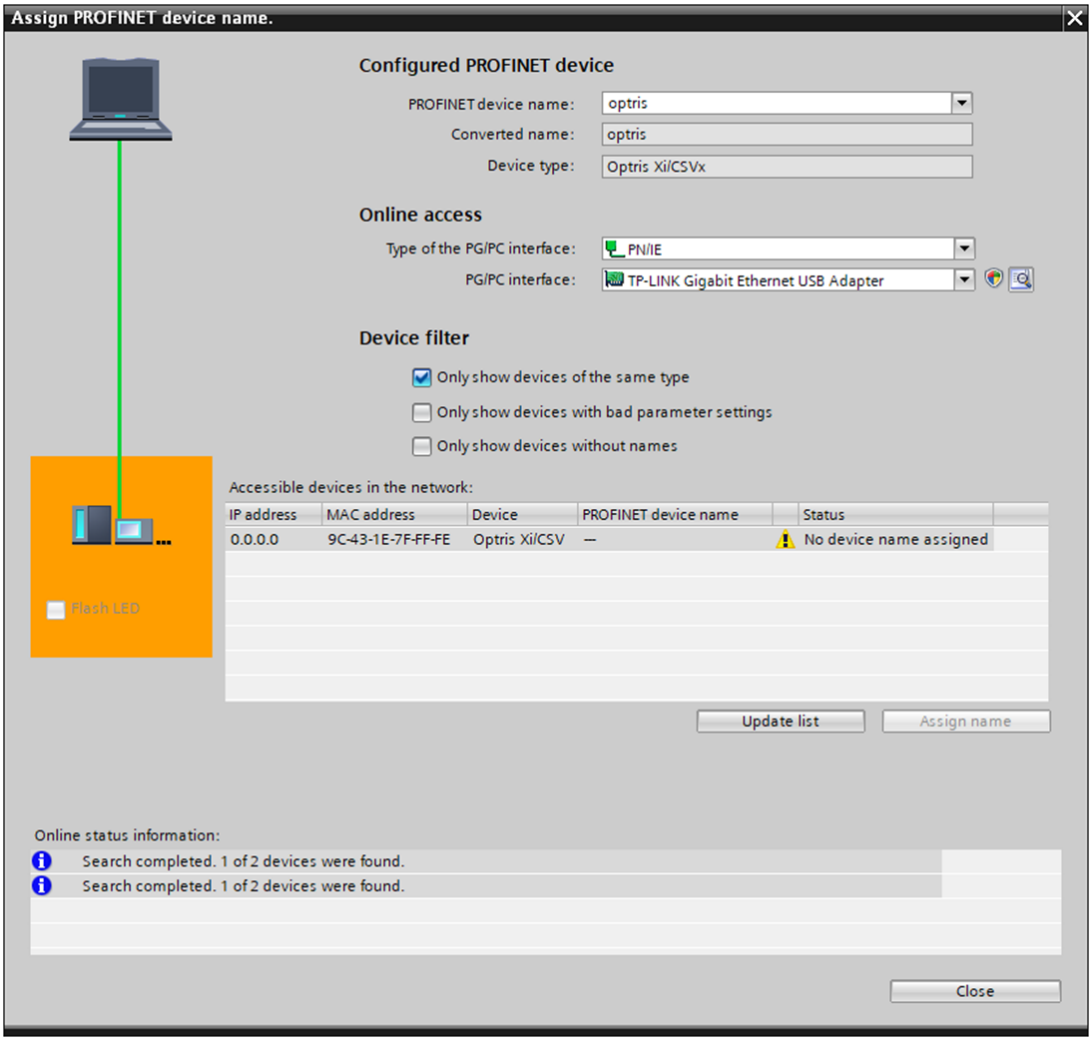

Choose the device and click **Update list.**
Choose the found device and click **Assign name** and **Close.**

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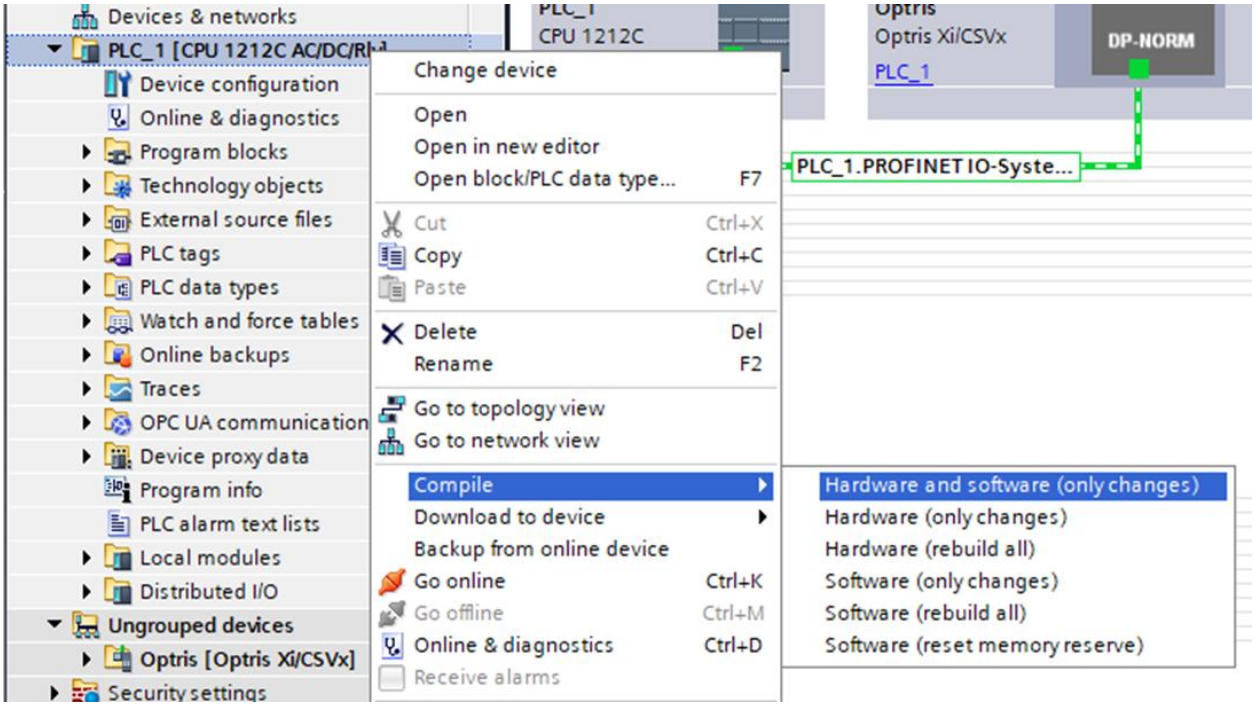
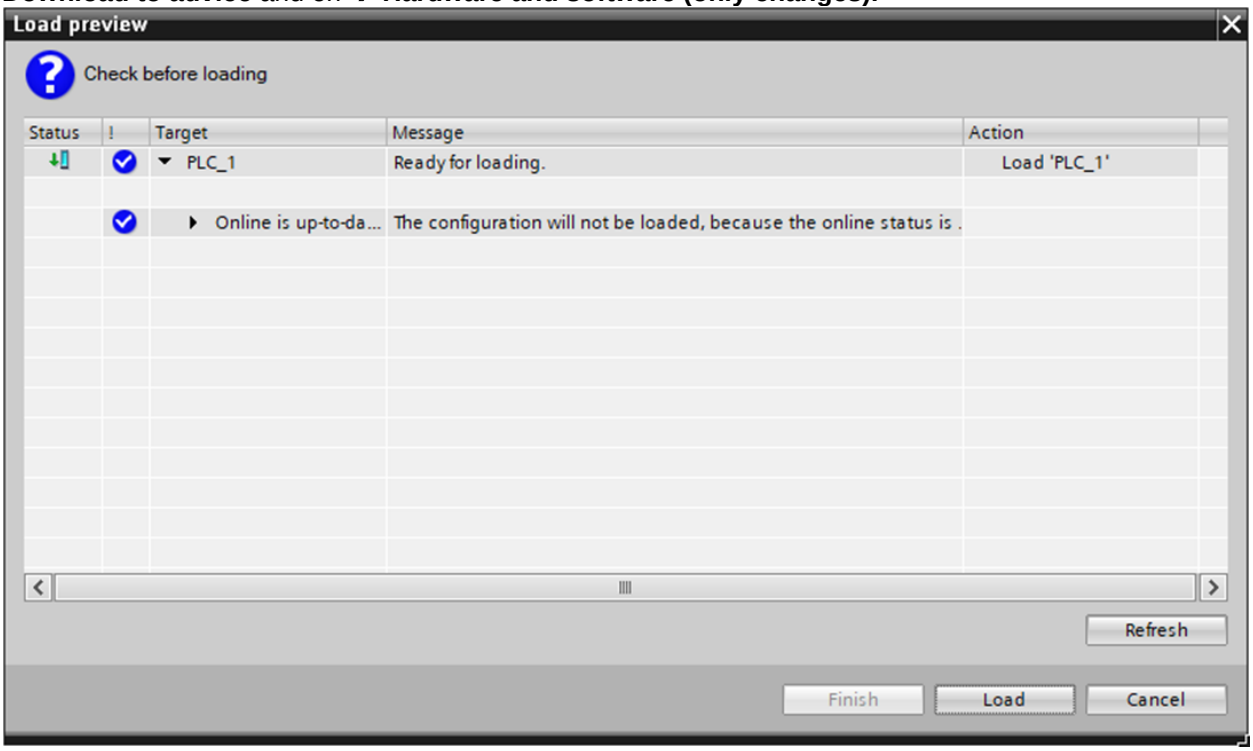
5 Compiling the project

Go to your project in the project tree under **Devices.** Click with the right mouse button on **PLC → compile** and on → **Hardware and software (only changes).**



Go to your project in the project tree under **Devices.** Click with the right mouse button on **PLC → Download to advice** and on → **Hardware and software (only changes).**



Click on **Load** and after the project was loaded to the PLC click on **Finish.**

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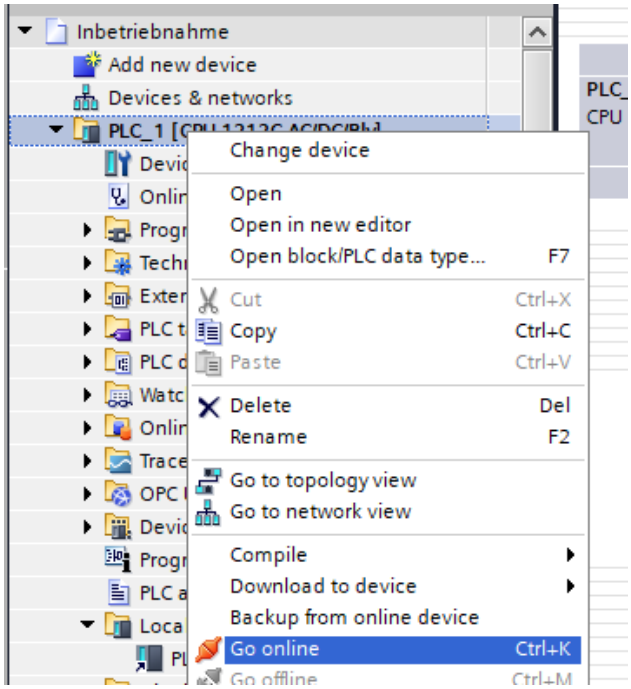
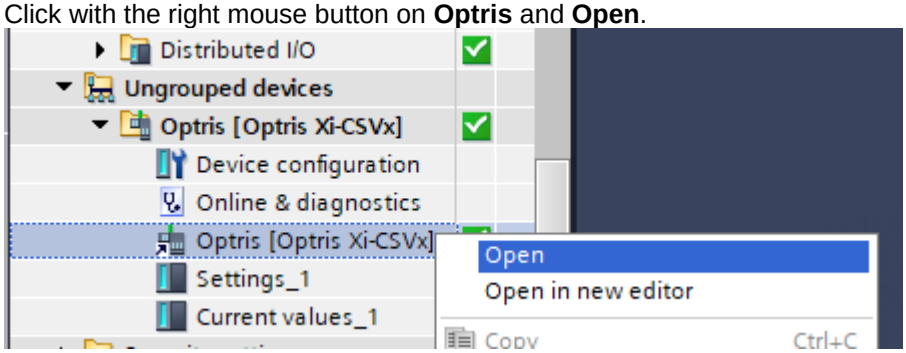
6 Strating the project

Go to your project in the project tree under **Devices.** Click with the right mouse button on **PLC** and click on **Go online.**



6.1 Show the device data

Click with the right mouse button on **Optris** and **Open**.



Here you will find all addresses of the single values.

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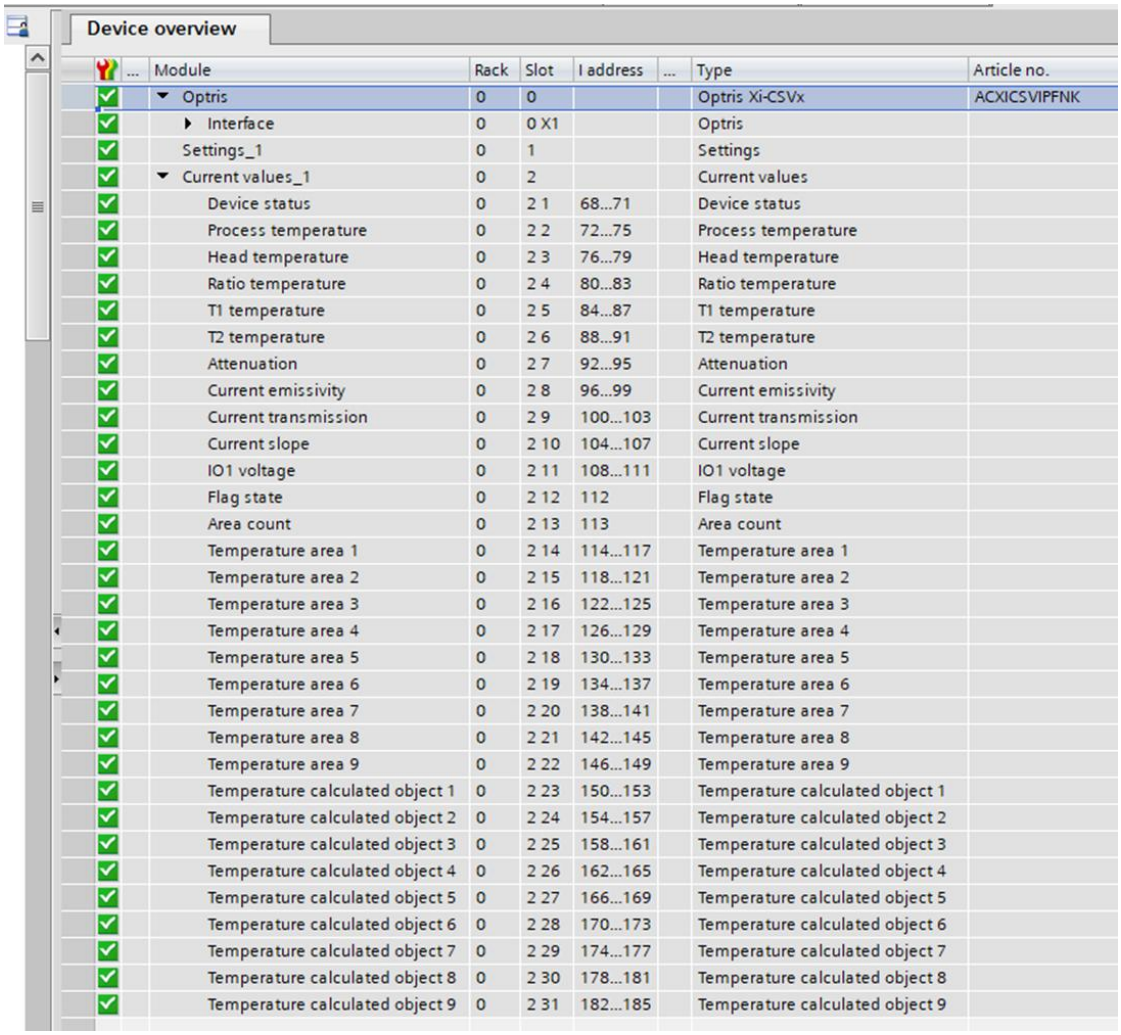

...	Module	Rack	Slot	I address	...	Type	Article no.
	Optris	0	0			Optris Xi-CSVx	ACXICSVIPFNK
	Interface	0	0 X1			Optris	
	Settings_1	0	1			Settings	
	Current values_1	0	2			Current values	
	Device status	0	2 1	68...71		Device status	
	Process temperature	0	2 2	72...75		Process temperature	
	Head temperature	0	2 3	76...79		Head temperature	
	Ratio temperature	0	2 4	80...83		Ratio temperature	
	T1 temperature	0	2 5	84...87		T1 temperature	
	T2 temperature	0	2 6	88...91		T2 temperature	
	Attenuation	0	2 7	92...95		Attenuation	
	Current emissivity	0	2 8	96...99		Current emissivity	
	Current transmission	0	2 9	100...103		Current transmission	
	Current slope	0	2 10	104...107		Current slope	
	IO1 voltage	0	2 11	108...111		IO1 voltage	
	Flag state	0	2 12	112		Flag state	
	Area count	0	2 13	113		Area count	
	Temperature area 1	0	2 14	114...117		Temperature area 1	
	Temperature area 2	0	2 15	118...121		Temperature area 2	
	Temperature area 3	0	2 16	122...125		Temperature area 3	
	Temperature area 4	0	2 17	126...129		Temperature area 4	
	Temperature area 5	0	2 18	130...133		Temperature area 5	
	Temperature area 6	0	2 19	134...137		Temperature area 6	
	Temperature area 7	0	2 20	138...141		Temperature area 7	
	Temperature area 8	0	2 21	142...145		Temperature area 8	
	Temperature area 9	0	2 22	146...149		Temperature area 9	
	Temperature calculated object 1	0	2 23	150...153		Temperature calculated object 1	
	Temperature calculated object 2	0	2 24	154...157		Temperature calculated object 2	
	Temperature calculated object 3	0	2 25	158...161		Temperature calculated object 3	
	Temperature calculated object 4	0	2 26	162...165		Temperature calculated object 4	
	Temperature calculated object 5	0	2 27	166...169		Temperature calculated object 5	
	Temperature calculated object 6	0	2 28	170...173		Temperature calculated object 6	
	Temperature calculated object 7	0	2 29	174...177		Temperature calculated object 7	
	Temperature calculated object 8	0	2 30	178...181		Temperature calculated object 8	
	Temperature calculated object 9	0	2 31	182...185		Temperature calculated object 9	

The addresses will be needed for creating new variables in the project: Double click on PLC and click on **Show all tags**.

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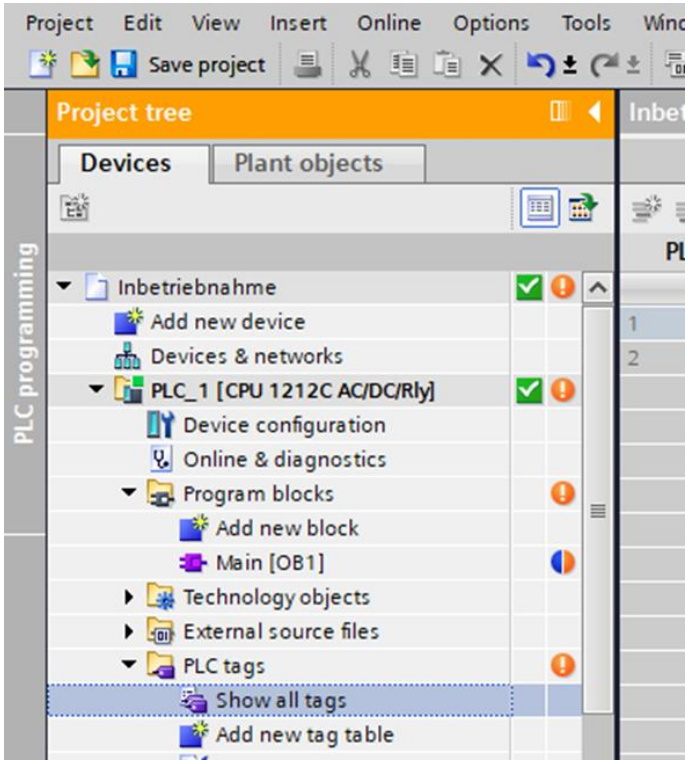

Here you can create new values.

PLC tags

	Name	Tag table	Data type	Address	Retain	Acces...	Writa...	Visibl...	Com
1	Process temp.	Default tag table	Real	%ID72	☐	☑	☑	☑	
2	Head temp.	Default tag table	Real	%ID76	☐	☑	☑	☑	
3	Area 1 temp.	Default tag table	Real	%ID114	☐	☑	☑	☑	
4	<Add new>				☐	☑	☑	☑	

Click on the symbol “glasses with the green arrow” 

Now you see the values in the tab **Monitor value**.

PLC tags

	Name	Tag table	Data type	Address	Retain	Acces...	Writa...	Visibl...	Monitor value
1	Process temp.	Default tag table	Real	%ID72	☐	☑	☑	☑	31.5
2	Head temp.	Default tag table	Real	%ID76	☐	☑	☑	☑	29.3
3	Area 1 temp.	Default tag table	Real	%ID114	☐	☑	☑	☑	28.7
4	<Add new>				☐	☑	☑	☑	

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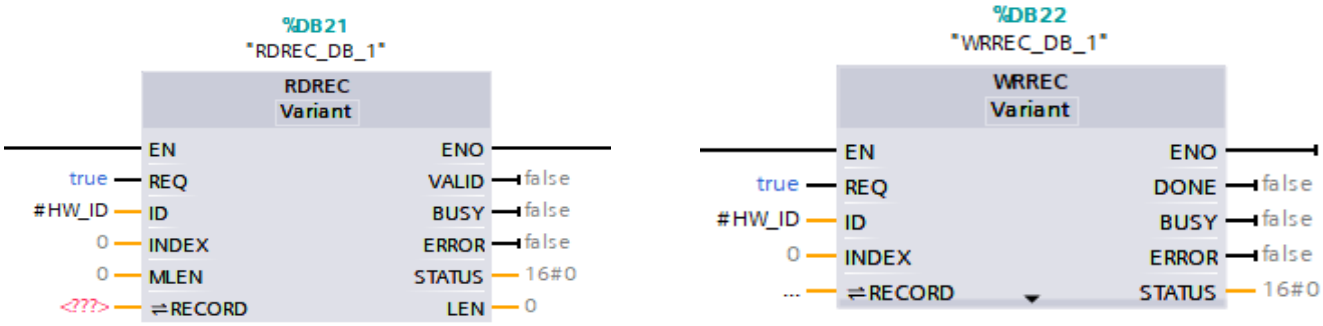
7 Read and write device Information

Read and write of Information via "RDREC" und "WRREC" direct to/from the device:



Parameter :

HW_ID Optris~Current_values_1~Device_status

INDEX	MLEN	RECORD (Typ)	Value	Notice
16#03e9	4	DWORD	Serial number	
16#03ea	2	WORD	FW Revision	
16#03eb	1	BOOL	Temp. unit	false - °F | true - °C
16#03ec	4	REAL	Measuring range 1 min	
16#03ed	4	REAL	Measuring range 1 max	
16#03ee	4	REAL	Measuring range 2 min	
16#03ef	4	REAL	Measuring range 3 min	
16#03f0	4	BYTE	Device Temp. Range min	
16#03f1	4	REAL	Device Temp. Range max	
16#03f2	24	ARRAY[0..23] OF CHAR	Device description	
16#03f3	8	ARRAY[0..4] OF BYTE	Device Flags	
16#044c	1	BYTE	Xi area 1 mode	
16#044d	1	BYTE	Xi area 2 mode	
16#044e	1	BYTE	Xi area 3 mode	
16#044f	1	BYTE	Xi area 4 mode	
16#0450	1	BYTE	Xi area 5 mode	
16#0451	1	BYTE	Xi area 6 mode	
16#0452	1	BYTE	Xi area 7 mode	
16#0453	1	BYTE	Xi area 8 mode	
16#0454	1	BYTE	Xi area 9 mode	
16#0456	4	REAL	Xi area 1 emissivity	
16#0457	4	REAL	Xi area 2 emissivity	
16#0458	4	REAL	Xi area 3 emissivity	
16#0459	4	REAL	Xi area 4 emissivity	
16#045a	4	REAL	Xi area 5 emissivity	
16#045b	4	REAL	Xi area 6 emissivity	
16#045c	4	REAL	Xi area 7 emissivity	

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16#045d	4	REAL	Xi area 8 emissivity	
16#045e	4	REAL	Xi area 9 emissivity	
16#0460	4	REAL	Xi area 1 d. range min *	
16#0461	4	REAL	Xi area 2 d. range min *	
16#0462	4	REAL	Xi area 3 d. range min *	
16#0463	4	REAL	Xi area 4 d. range min *	
16#0464	4	REAL	Xi area 5 d. range min *	
16#0465	4	REAL	Xi area 6 d. range min *	
16#0466	4	REAL	Xi area 7 d. range min *	
16#0467	4	REAL	Xi area 8 d. range min *	
16#0468	4	REAL	Xi area 9 d. range min *	
16#046b	4	REAL	Xi area 1 d. range max *	
16#046c	4	REAL	Xi area 2 d. range max *	
16#046d	4	REAL	Xi area 3 d. range max *	
16#046e	4	REAL	Xi area 4 d. range max *	
16#046f	4	REAL	Xi area 5 d. range max *	
16#0470	4	REAL	Xi area 6 d. range max *	
16#0471	4	REAL	Xi area 7 d. range max *	
16#0472	4	REAL	Xi area 8 d. range max *	
16#0473	4	REAL	Xi area 9 d. range max *	

* min. or max. distribution range

8 Read and write device Settings

Parameter :

HW_ID Optris~Settings_1

INDEX	MLEN	RECORD (Typ)	Value	Notice
16#0001	1	BOOL	Temp. unit	false - °F | true - °C
16#0002	1	BOOL	Laser on	false | true
16#0003	4	REAL	Emissivity	
16#0004	4	REAL	Transmission	
16#0005	4	REAL	Slope	
16#0006	4	REAL	Emissivity T1	
16#0007	1	BYTE	Average Mode	0 - normal | 1 - Smart
16#0008	4	REAL	Average time	
16#000c	4	REAL	Threshold for Smart Mode	
16#000d	4	REAL	max. Attenuation	
16#000e	1	BYTE	max. Attenuation Mode	
16#0010	4	REAL	max. Attenuation Fix Value	
16#0011	4	REAL	Fix. Ambient Temp.	
16#0014	4	REAL	focusmotor position	%
16#0015	1	BYTE	Filter motor position	0,1,2 only CSVx
16#0016	1	BYTE	Flag state	0- open | 1- close

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9 Tunnel commands – direct device communication

This feature allows you via tunnel to have access to all device settings.

Parameter :

HW_ID	Optris~Current_values_1~Device_status
INDEX	10001
RECORD	Variable vom Typ "Array [0..x] of Byte"

Example : Read Xi Firmware Revision	
Record = Array[0..4] of Byte	
Record[0] := 16#00	
Record[1] := 16#00	Always „0“
Record[2] := 16#00	
Record[3] := 16#64	← Xi command Timeout in ms
Record[4] := „?“	← Xi command “?FWVer” read f/w and h/w Revision
Record[5] := „F“	
Record[6] := „W“	
Record[7] := „V“	
Record[8] := „e“	
Record[9] := „r“	
WRREC execute	
RDREC execute	
Record[0] := 16#00	
Record[1] := 16#02	← answer number of bytes
Record[2] := „!“	← Xi answer „!FWVer=1234, 5678‘
Record[5] := „F“	
Record[6] := „W“	
Record[7] := „V“	
Record[8] := „e“	
Record[9] := „r“	
Record[5] := „=“	
Record[6] := „1“	
Record[7] := „2“	
Record[8] := „3“	
Record[9] := „4“	
Record[5] := „,“	
Record[6] := „ “	
Record[7] := „5“	
Record[8] := „6“	
Record[9] := „7“	
Record[9] := „8“	

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