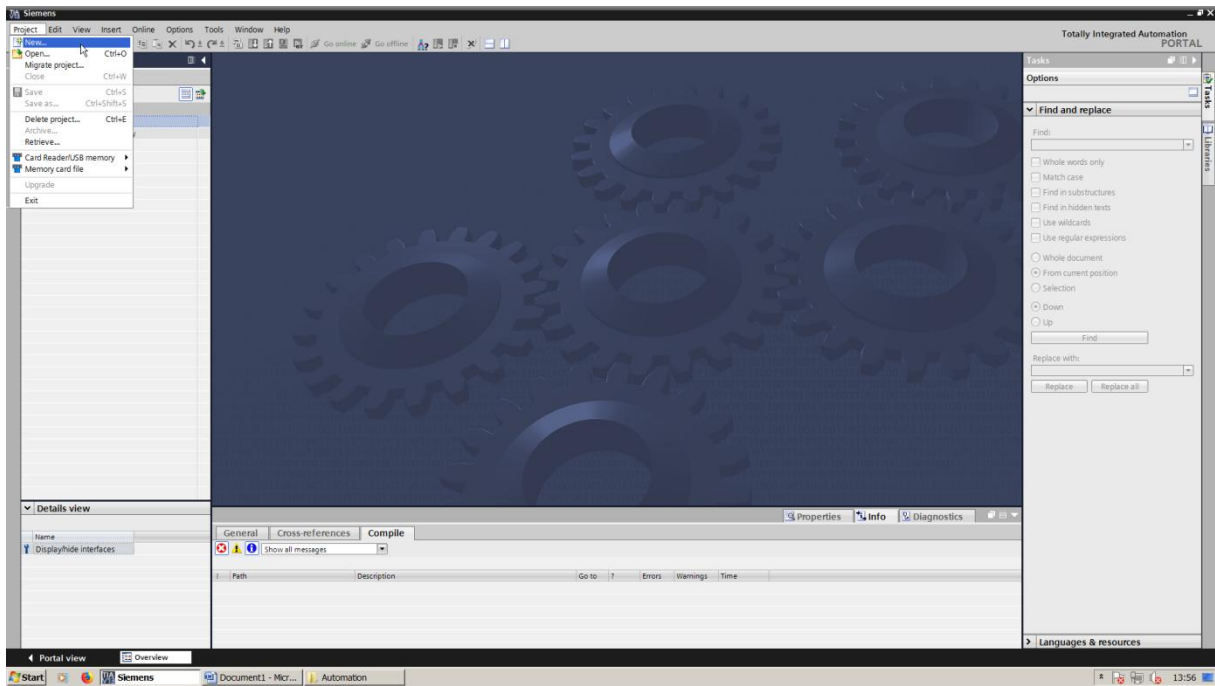
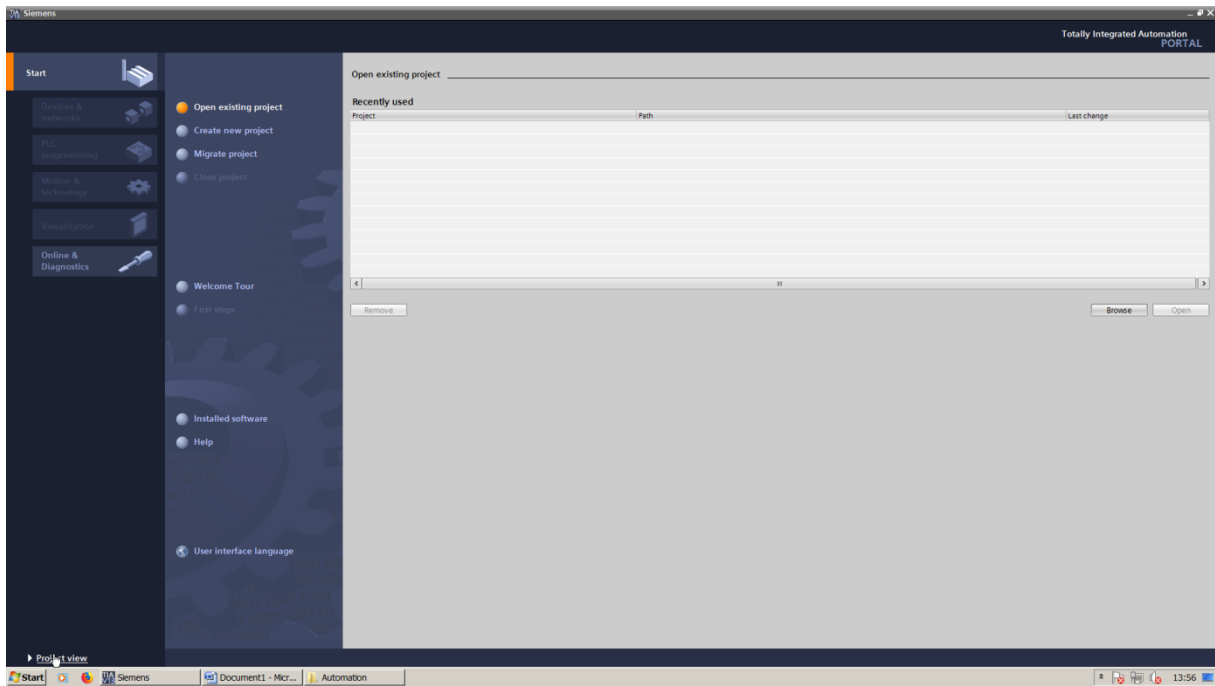
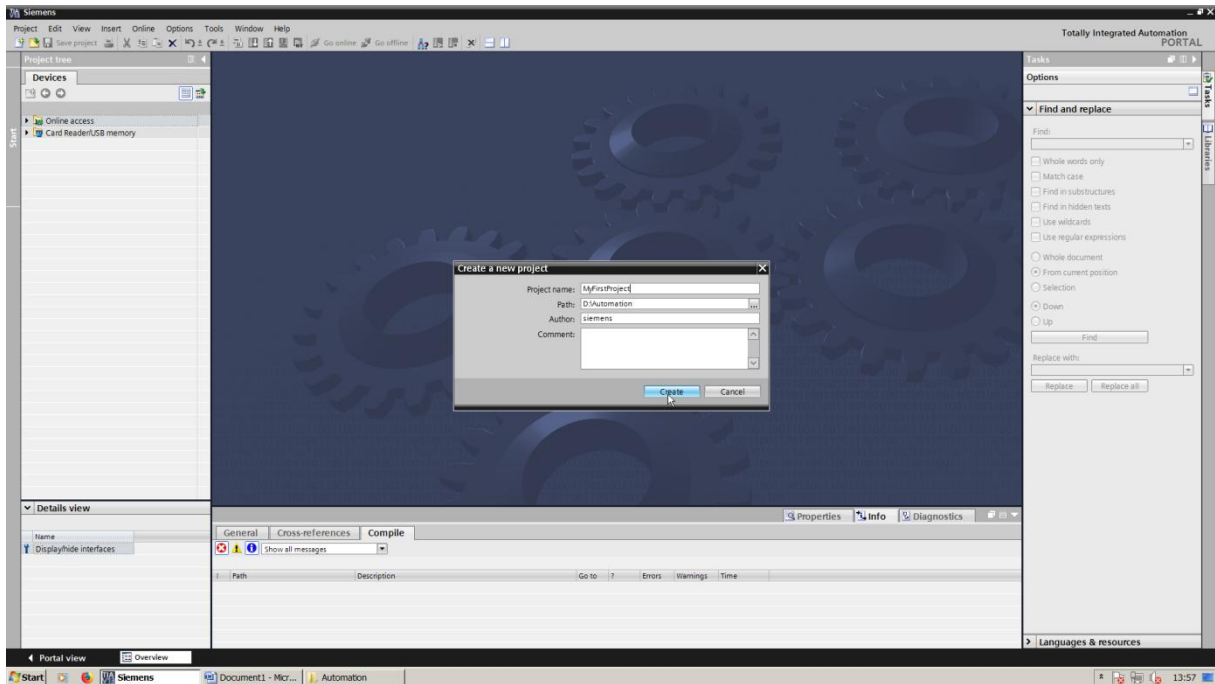
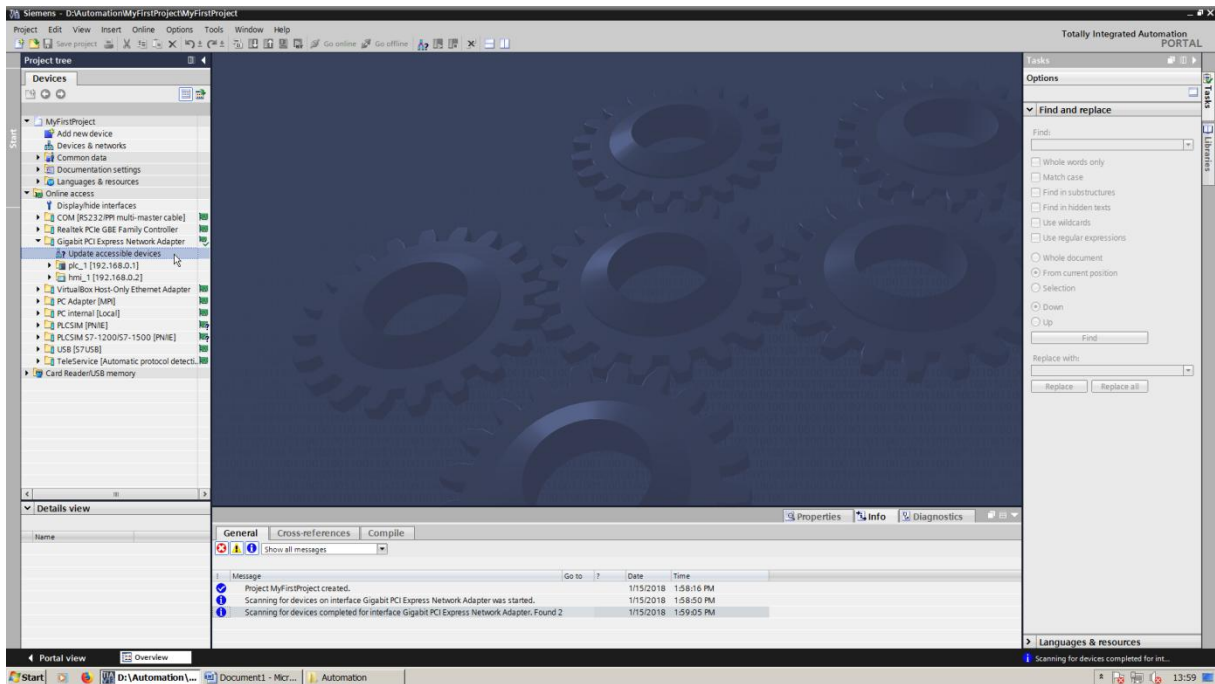


# 1.Zakładanie nowego projektu.





## 2. Wyszukiwanie dostępnych urządzeń



### 3. Diagnostyka

The screenshot displays the Siemens TIA Portal interface for a diagnostic session. The left sidebar shows the project tree with 'Online & diagnostics' selected. The main window is divided into several panels:

- General:** Shows module details for 'CPU 1214C DCDCDC' (Article number: 6ES7 214-1AE30-0XB0, Hardware: 2, Firmware: V 2.2.0). Rack: 0, Slot: 1.
- Module information:** Module name: PLC\_1.
- Manufacturer information:** Manufacturer description: SIEMENS AG, Serial number: 52VC4YYW65948, Profile: 16#0000, Profile details: 16#0001.
- Diagnostic status:** A message box states 'Module exists. OK'.
- Options:** 'CPU operator panel' for 'PLC\_1 [192.168.0.1] [CPU 1214C...]' with buttons for RUN/STOP, ERROR, STOP, MAINT, and MRES.
- Cycle time:** A bar chart showing cycle times with values: Shortest: 1 ms, Current/last: 2 ms, Longest: 3 ms.

The bottom status bar indicates 'Scanning for devices completed for int...' and the system time is 14:01.

This screenshot is identical to the one above, showing the Siemens TIA Portal diagnostics interface. The 'Diagnostic status' panel now displays 'Module exists. OK' in a larger font, indicating a successful connection to the PLC module.

Siemens - D:\Automation\MyFirstProject\MyFirstProject

Project Edit View Insert Online Options Tools Window Help

Online access > Gigabit PCI Express Network Adapter > plc\_1 [192.168.0.1] > PLC\_1 [192.168.0.1]

Diagnosic status

Module exists.  
OK

Options

CPU operator panel

PLC\_1 [192.168.0.1] [CPU 1214C...]

RUN / STOP RUN

ERROR STOP

MAINT MRES

Cycle time

Shortest: 1 ms  
Current/last: 3 ms  
Longest: 3 ms

Memory

Portal view Overview Online & dia...

Start D:\Automation\... Document1 - Mcr... Automation

Siemens - D:\Automation\MyFirstProject\MyFirstProject

Project Edit View Insert Online Options Tools Window Help

Online access > Gigabit PCI Express Network Adapter > plc\_1 [192.168.0.1] > PLC\_1 [192.168.0.1]

Diagnosic buffer

Events

Display CPU Time Stamps in PGPC local time

No.	Date and time	Event
1	1/13/1970 3:30:20.879	Follow-on operating mode change - CPU changes from STARTUP to RUN mode
2	1/13/1970 3:30:20.871	Follow-on operating mode change - CPU changes from STOP to STARTUP mode
3	1/13/1970 3:30:20.781	Follow-on operating mode change - CPU changes from STOP (initialisation) to STARTUP mode
4	1/13/1970 3:30:19.099	Power on - CPU changes from NO POWER to STOP (initialisation) mode
5	1/13/1970 3:30:19.099	Power off - CPU changes from RUN to NO POWER mode
6	1/13/1970 2:16:02.347 AM	Follow-on operating mode change - CPU changes from STARTUP to RUN mode
7	1/13/1970 2:16:02.338 AM	Communication initiated request: WARM RESTART - CPU changes from STOP to STARTUP mode
8	1/13/1970 2:16:02.338 AM	New startup information - Current CPU operating mode: STOP

Freeze display

Details on event:

Details on event: 1 of 15 Event ID: 16A 02 400C

Description: CPU info: Follow-on operating mode change  
Power-on mode set: WARM RESTART to RUN (if CPU was in RUN before power off)

Pending startup inhibit(s):  
- No startup inhibit set  
CPU changes from STARTUP to RUN mode

Time stamp: 1/13/1970 3:30:20.879 AM

Module: PLC\_1 [192.168.0.1]

Rack/slot: Rack ---/Slot 1

Plant designation:

Location identifier:

Priority: OK

Incoming/outgoing: Incoming event

Help on event Open in editor Save as...

Settings

Display events:  CPU error and temporary error messages  
 CPU operating state and maintenance messages

Options

CPU operator panel

PLC\_1 [192.168.0.1] [CPU 1214C...]

RUN / STOP RUN

ERROR STOP

MAINT MRES

Cycle time

Shortest: 1 ms  
Current/last: 3 ms  
Longest: 3 ms

Memory

Portal view Overview Online & dia...

Start D:\Automation\... Document1 - Mcr... Automation

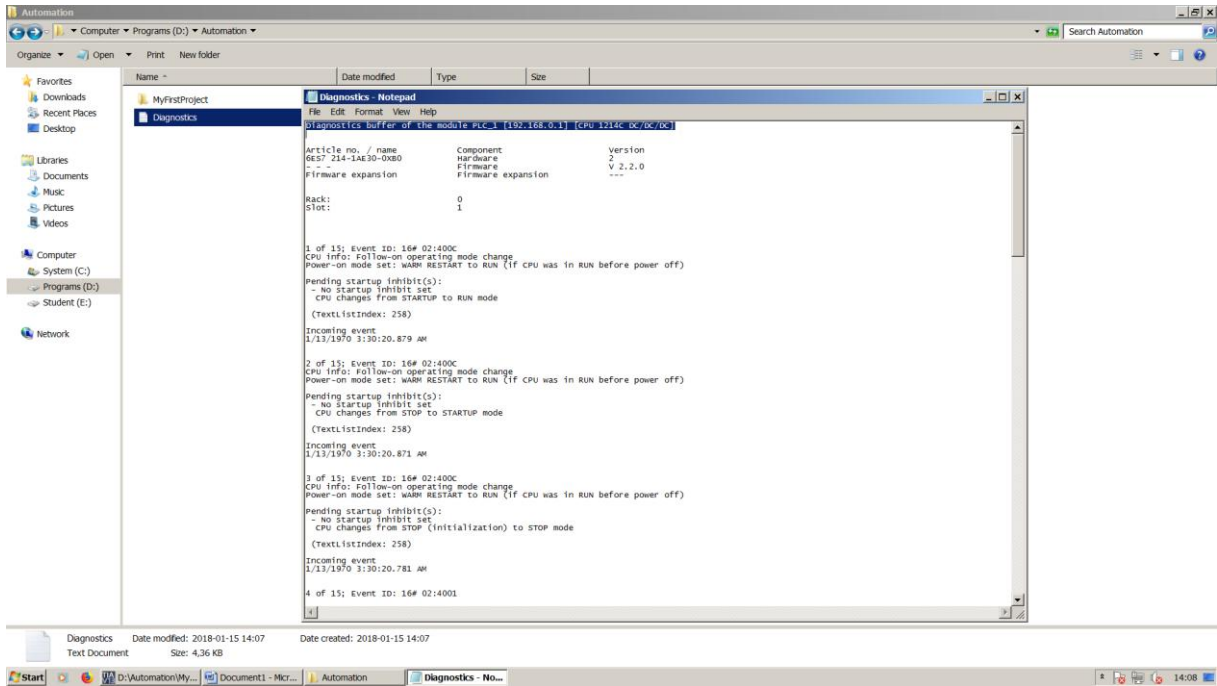
## 4.Zapis danych diagnostycznych

The screenshot shows the Siemens TIA Portal interface. The 'Diagnostics buffer' is open, displaying a list of events. The 'Details on event' section shows the following information:

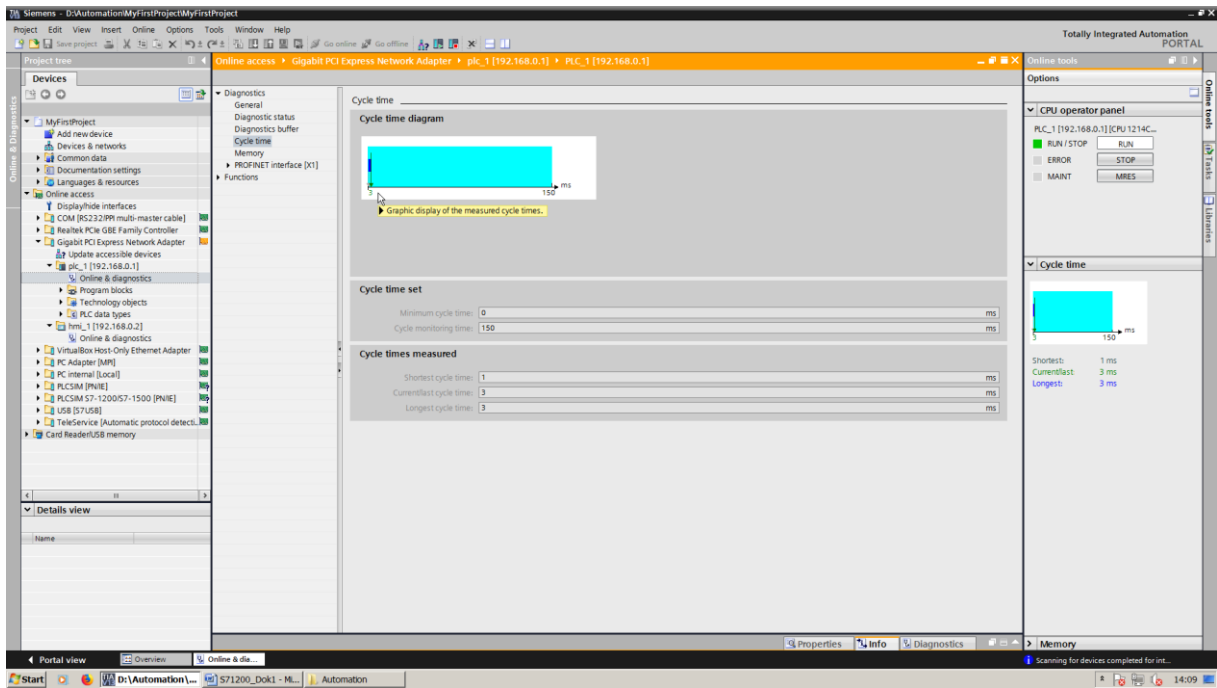
- Event ID: 168 02 400C
- Description: CPU info: follow-on operating mode change. Power-on mode set: WARM RESTART to RUN (if CPU was in RUN before power off).
- Time stamp: 1/13/1970 3:30:20.879 AM
- Module: PLC\_1 [192.168.0.1]
- Rack/slot: Rack --- / Slot 1
- Plant designation: [Empty]
- Location identifier: [Empty]
- Priority: OK
- Incoming/outgoing: Incoming event

The 'Save as...' dialog box is open, showing the file name 'Diagnostic' and the save location 'Automation'. The 'Save as type' is set to 'All files (\*.\*)'.

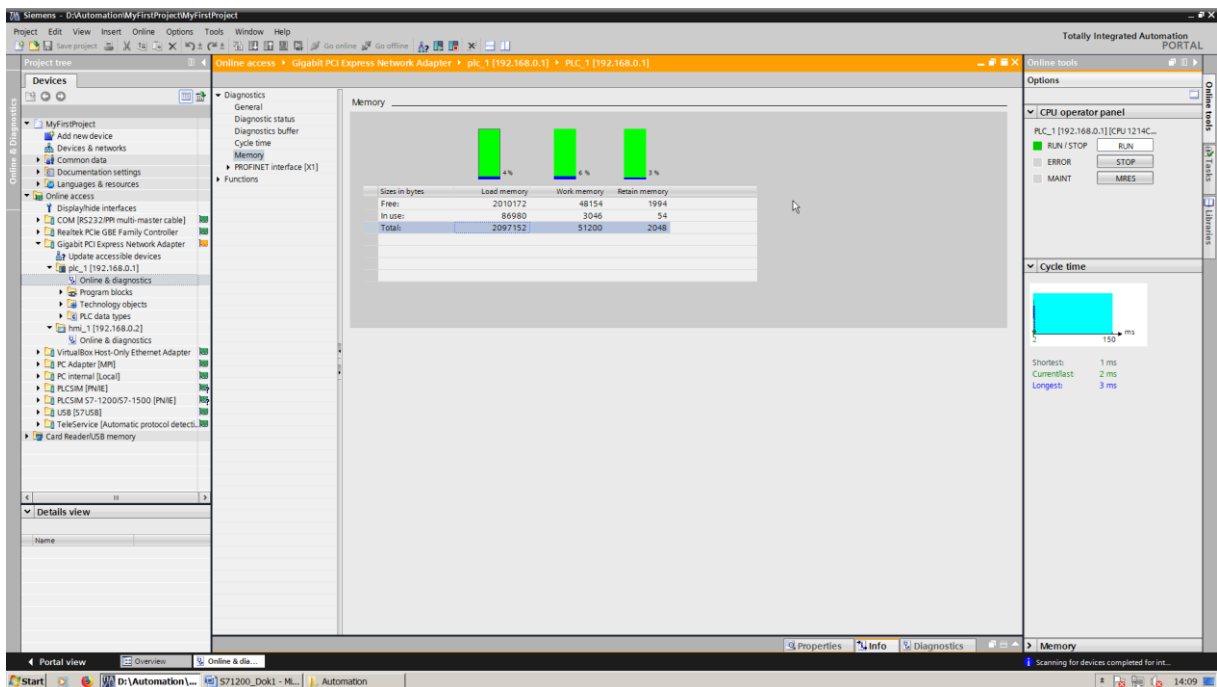
The screenshot shows the Siemens TIA Portal interface. The 'Diagnostics buffer' is open, displaying a list of events. The 'Save As' dialog box is open, showing the file name 'Diagnostic' and the save location 'Automation'. The 'Save as type' is set to 'All files (\*.\*)'.



## 5. Cykl CPU



## 6. Wykorzystanie pamięci



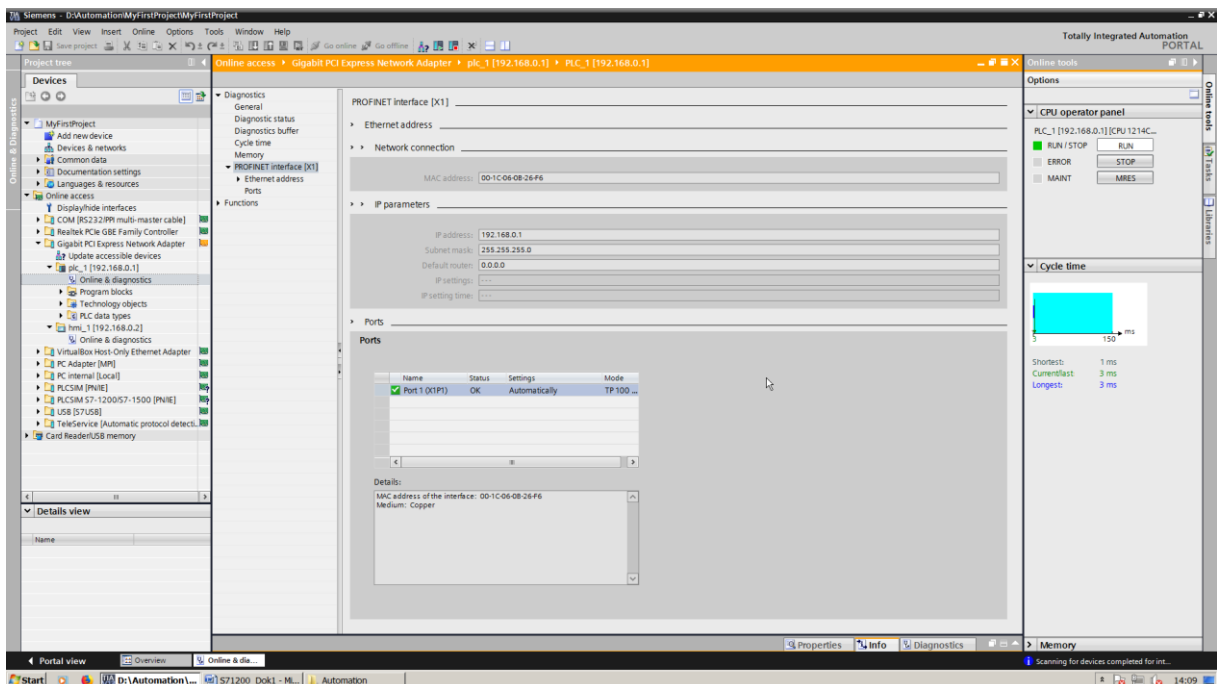
Memory usage summary:

Size in bytes	Load memory	Work memory	Retain memory
Free:	2010172	48154	1994
In use:	86980	3046	54
<b>Total:</b>	<b>2097152</b>	<b>51200</b>	<b>2048</b>

Additional details from the screenshot:

- CPU operator panel:** PLC\_1 [192.168.0.1] [CPU 1214C-...] is in RUN/STOP mode.
- Cycle time:** Shortest: 1 ms, Current/last: 2 ms, Longest: 3 ms.

## 7. Sieć profinet



PROFINET interface [X1] configuration details:

- Ethernet address:** (empty)
- MAC address:** 00-1C-06-08-24-F6
- IP parameters:**
  - IP address: 192.168.0.1
  - Subnet mask: 255.255.255.0
  - Default router: 0.0.0.0
  - IP settings: OK
  - IP setting time: OK
- Ports:**

Name	Status	Settings	Mode
Port 1 (X1P1)	OK	Automatically	TP 100...
- Details:**
  - MAC address of the interface: 00-1C-06-08-24-F6
  - Medium: Copper

Additional details from the screenshot:

- CPU operator panel:** Same as in the previous screenshot.
- Cycle time:** Same as in the previous screenshot.

Siemens - D:\Automation\MyFirstProject\MyFirstProject

Project Edit View Insert Online Options Tools Window Help

Online access > Gigabit PCI Express Network Adapter > plc\_1 [192.168.0.1] > PLC\_1 [192.168.0.1]

Devices

- MyFirstProject
  - Add new device
  - Devices & networks
  - Common data
  - Documentation settings
  - Languages & resources
  - Online access
    - Display/hide interfaces
    - COM (RS232/PIR multi-master cable)
    - Realtek PCIe GBE Family Controller
    - Gigabit PCI Express Network Adapter
    - Update accessible devices
    - plc\_1 [192.168.0.1]
      - Online & diagnostics
      - Program blocks
      - Technology objects
      - PLC data types
      - hmi\_1 [192.168.0.2]
        - Online & diagnostics
    - VirtualBox Host-Only Ethernet Adapter
    - PC adapter [MP]
    - PC internal [Local]
    - PLCSIM [PNI]
    - PLCSIM 57-120057-1500 [PNI]
    - USB [7USB]
    - TeleService (Automatic protocol detect...)
    - Card Reader/USB memory

Details view

Name

Diagnostics

- General
- Diagnostic status
- Diagnostics buffer
- Cycle time
- Memory
- PROFINET interface [X1]
  - Ethernet address
  - Network connection
  - IP parameters
- Ports
- Functions

Ethernet address

MAC address: 00-1C-06-08-26-F6

Network connection

IP parameters

IP address: 192.168.0.1  
Subnet mask: 255.255.255.0  
Default router: 0.0.0.0  
IP settings: ---  
IP setting time: ---

Options

CPU operator panel

PLC\_1 [192.168.0.1] [CPU 1214C...]

RUN / STOP RUN  
ERROR STOP  
MAINT MRES

Cycle time

Shortest: 1 ms  
Current/last: 3 ms  
Longest: 3 ms

Portal view Overview Online & dia... Properties Info Diagnostics Memory

Start D:\Automation\... S71200\_Dok1 - M... Automation Scanning for devices completed for int...

Siemens - D:\Automation\MyFirstProject\MyFirstProject

Project Edit View Insert Online Options Tools Window Help

Online access > Gigabit PCI Express Network Adapter > plc\_1 [192.168.0.1] > PLC\_1 [192.168.0.1]

Devices

- MyFirstProject
  - Add new device
  - Devices & networks
  - Common data
  - Documentation settings
  - Languages & resources
  - Online access
    - Display/hide interfaces
    - COM (RS232/PIR multi-master cable)
    - Realtek PCIe GBE Family Controller
    - Gigabit PCI Express Network Adapter
    - Update accessible devices
    - plc\_1 [192.168.0.1]
      - Online & diagnostics
      - Program blocks
      - Technology objects
      - PLC data types
      - hmi\_1 [192.168.0.2]
        - Online & diagnostics
    - VirtualBox Host-Only Ethernet Adapter
    - PC Adapter [MP]
    - PC internal [Local]
    - PLCSIM [PNI]
    - PLCSIM 57-120057-1500 [PNI]
    - USB [7USB]
    - TeleService (Automatic protocol detect...)
    - Card Reader/USB memory

Details view

Name

Diagnostics

- General
- Diagnostic status
- Diagnostics buffer
- Cycle time
- Memory
- PROFINET interface [X1]
  - Ethernet address
  - Network connection
  - IP parameters
  - Ports
  - Functions

Functions

Assign IP address

Devices connected to an enterprise network or directly to the internet must be appropriately protected against unauthorized access, e.g. by use of firewalls and network segmentation. For more information about industrial security, please visit <http://www.siemens.com/industrialsecurity>

MAC address: 00-1C-06-08-26-F6 Accessible devices

IP address: 192.168.0.1  
Subnet mask: 255.255.255.0  
Use router:   
Router address: 0.0.0.0  
Assign IP address

Set time

PG/PC time: (UTC+01:00) Sarajevo, Skopje, Warsaw, Zagreb  
January 15, 2018 02:10:45 PM  
Module time: January 13, 1970  
 Take from PG/PC Apply

Reset to factory settings

Options

CPU operator panel

PLC\_1 [192.168.0.1] [CPU 1214C...]

RUN / STOP RUN  
ERROR STOP  
MAINT MRES

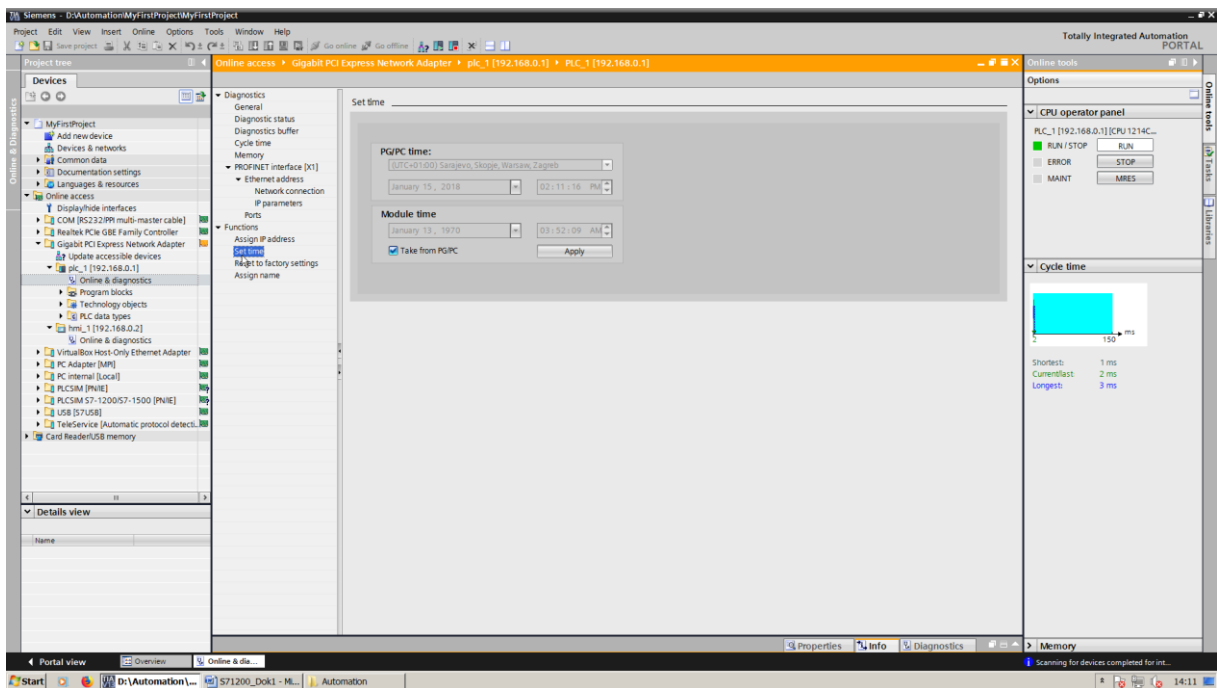
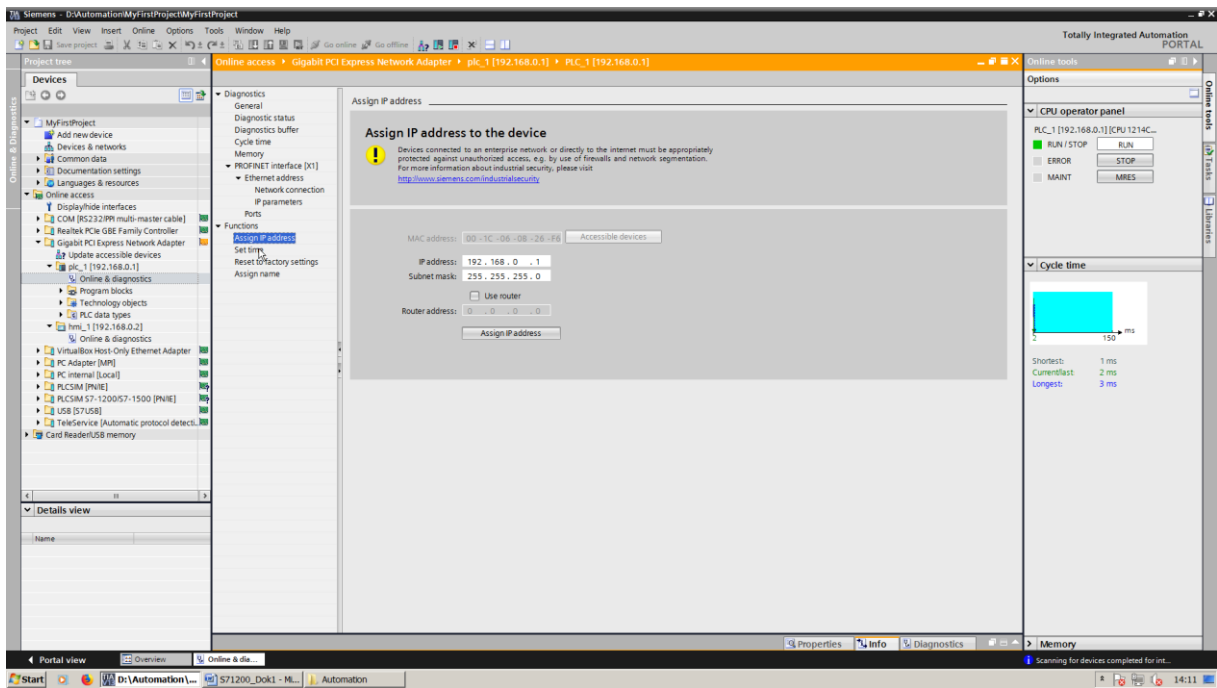
Cycle time

Shortest: 1 ms  
Current/last: 2 ms  
Longest: 3 ms

Portal view Overview Online & dia... Properties Info Diagnostics Memory

Start D:\Automation\... S71200\_Dok1 - M... Automation Scanning for devices completed for int...





## 8. Reset PLC

The screenshot shows the Siemens TIA Portal interface. The main window displays the 'Reset to factory settings' dialog for a PLC. The dialog includes the following fields and options:

- IP address: 192.168.0.1
- PROFINET device name: p1c\_1
- Options:  Retain IP address,  Delete IP address
- A prominent blue 'Reset' button.

The left sidebar shows the project tree with 'Online & diagnostics' expanded. The right sidebar shows the 'Options' panel with a 'CPU operator panel' and 'Cycle time' section.

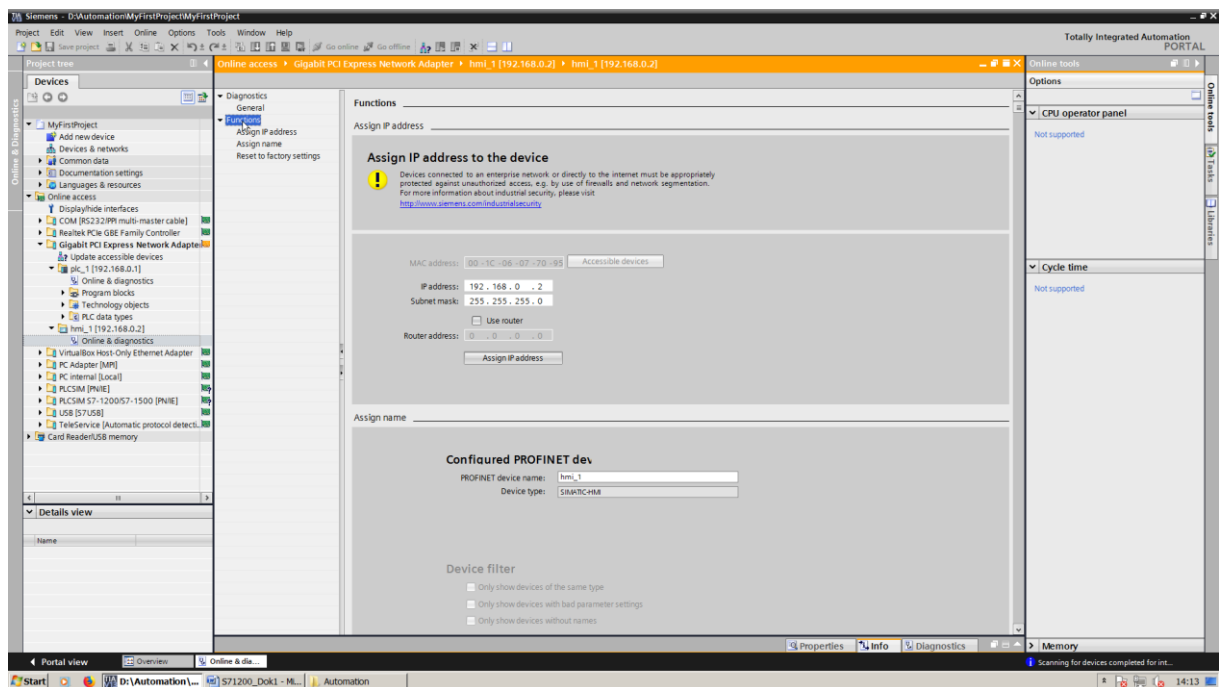
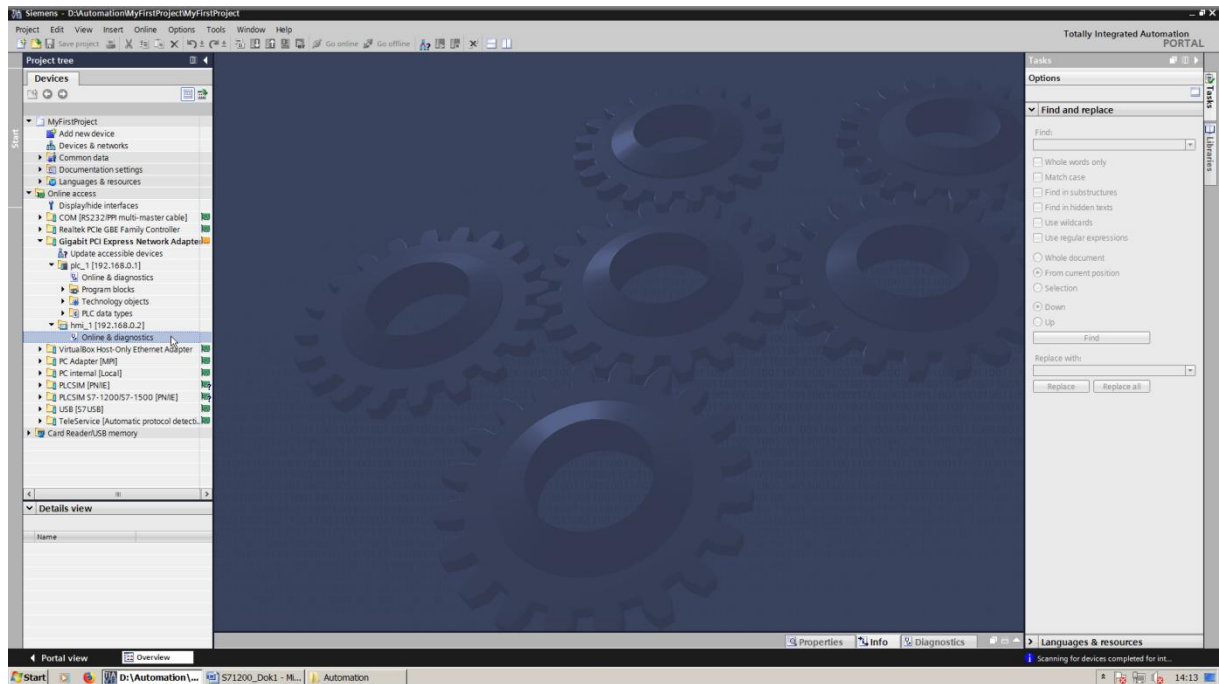
The screenshot shows the Siemens TIA Portal interface. The main window displays the 'Assign name' dialog for a configured PROFINET device. The dialog includes the following fields and options:

- PROFINET device name: p1c\_1
- Device type: S7-1200
- Device filter options:  Only show devices of the same type,  Only show devices with bad parameter settings,  Only show devices without names
- Table of accessible devices in the network:

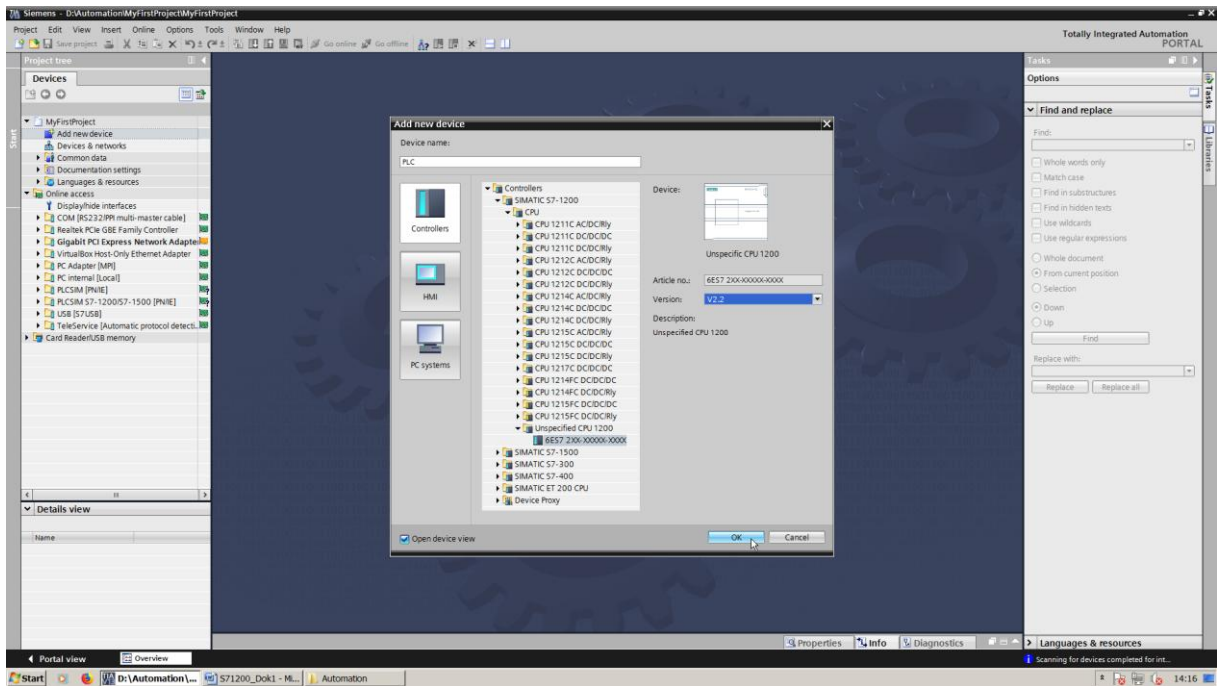
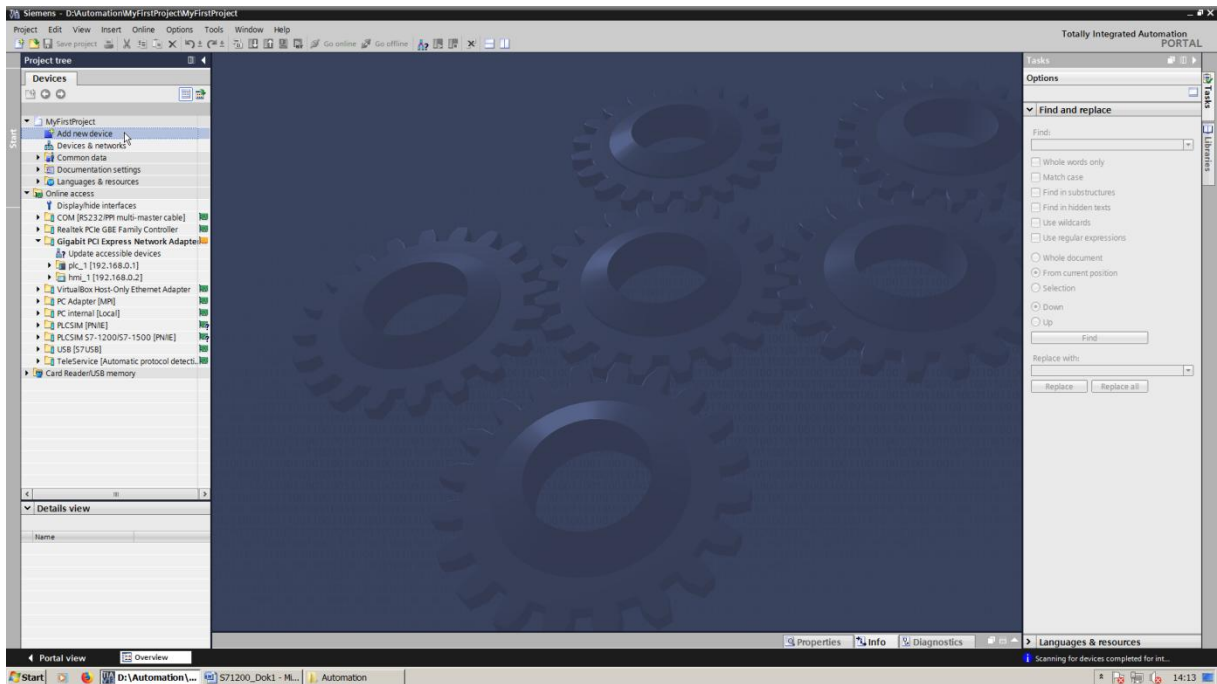
IP address	MAC address	Device	PROFINET device name	Status

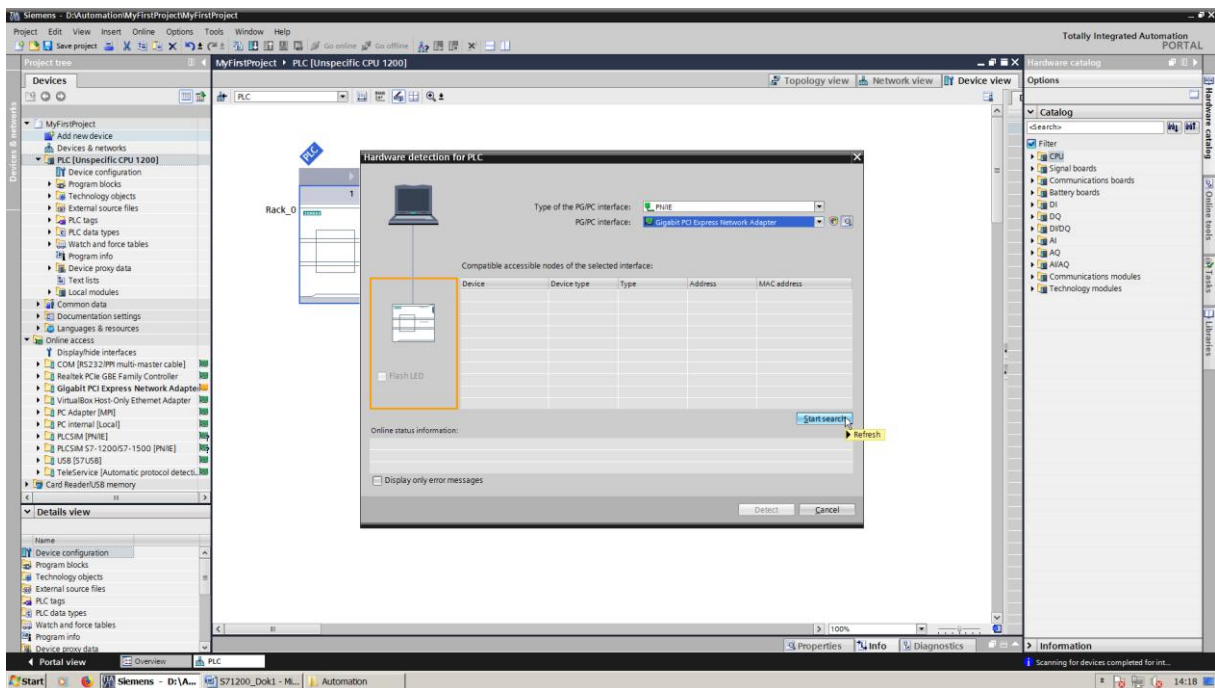
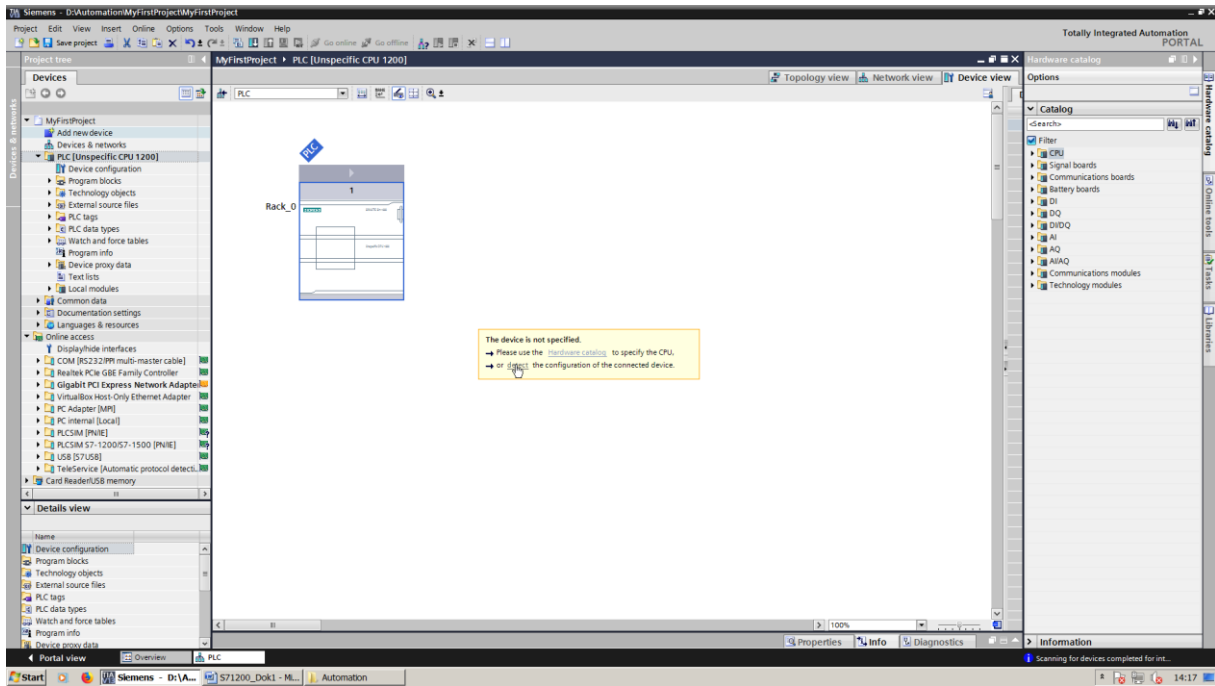
Buttons at the bottom include 'LED flashes', 'Update list', and 'Assign name'.

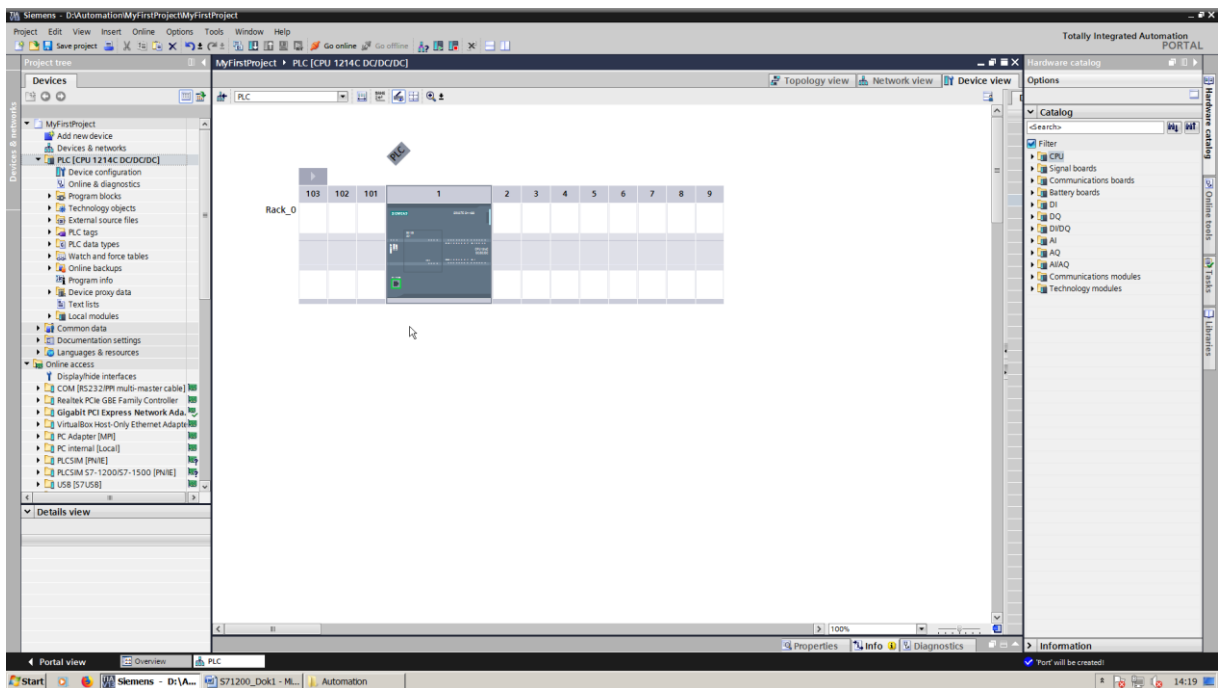
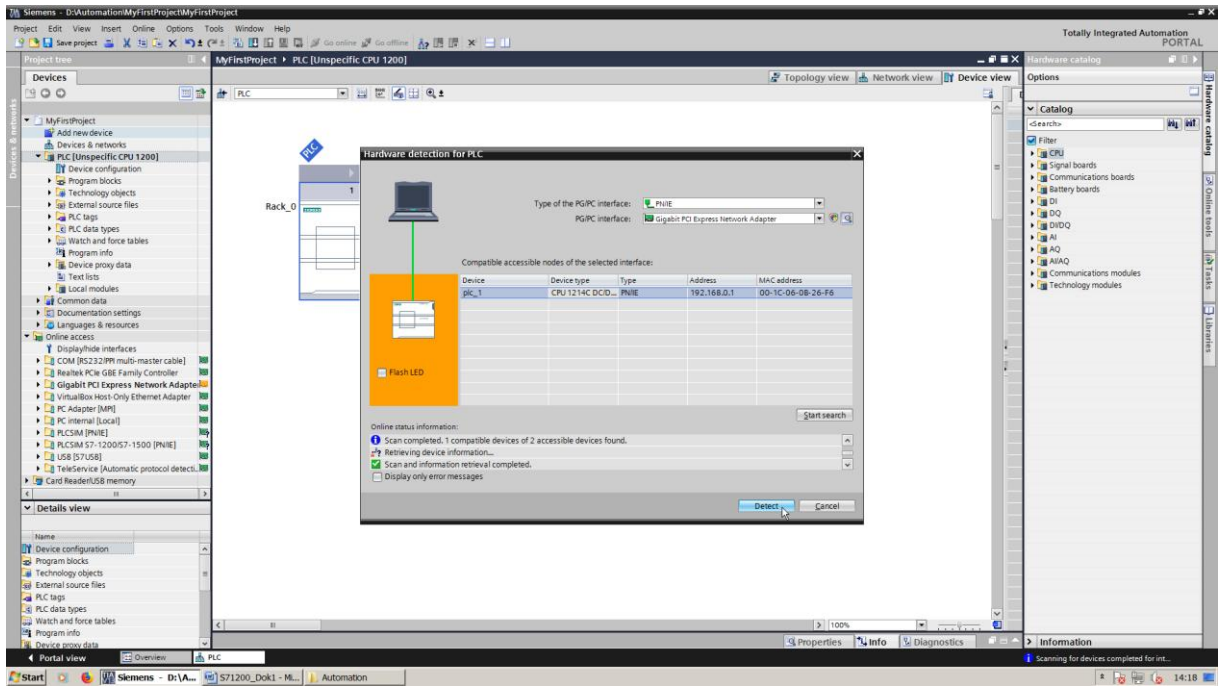
## 9. Diagnostyka HMI

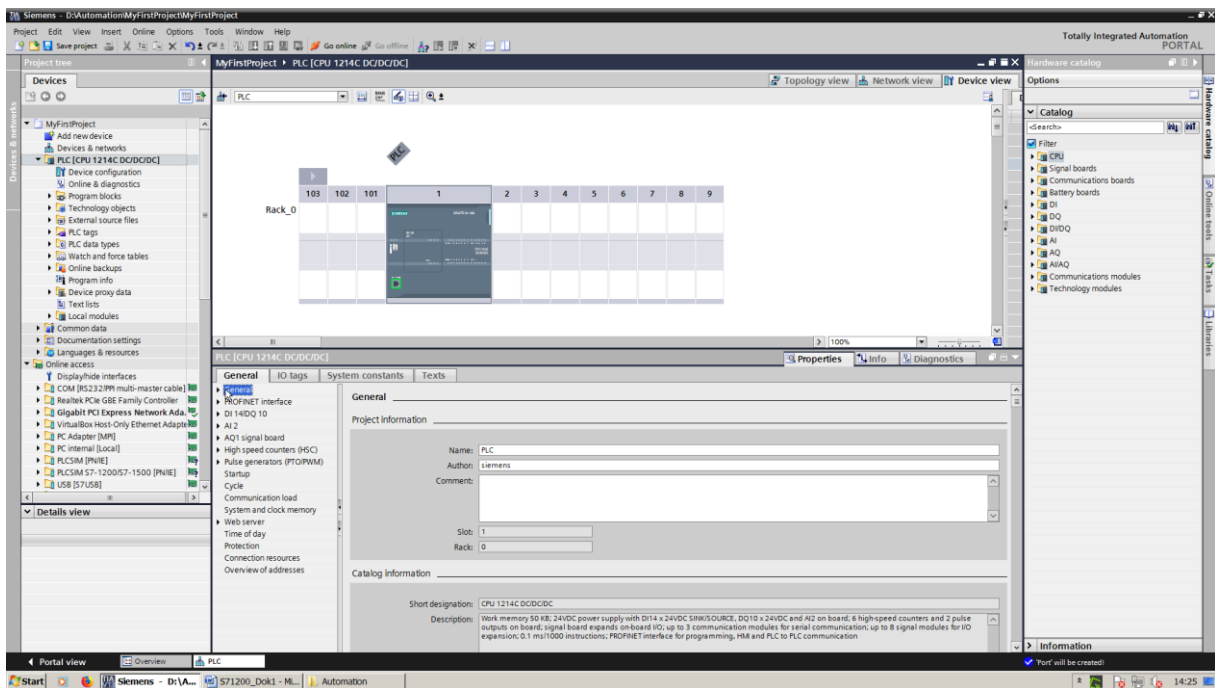
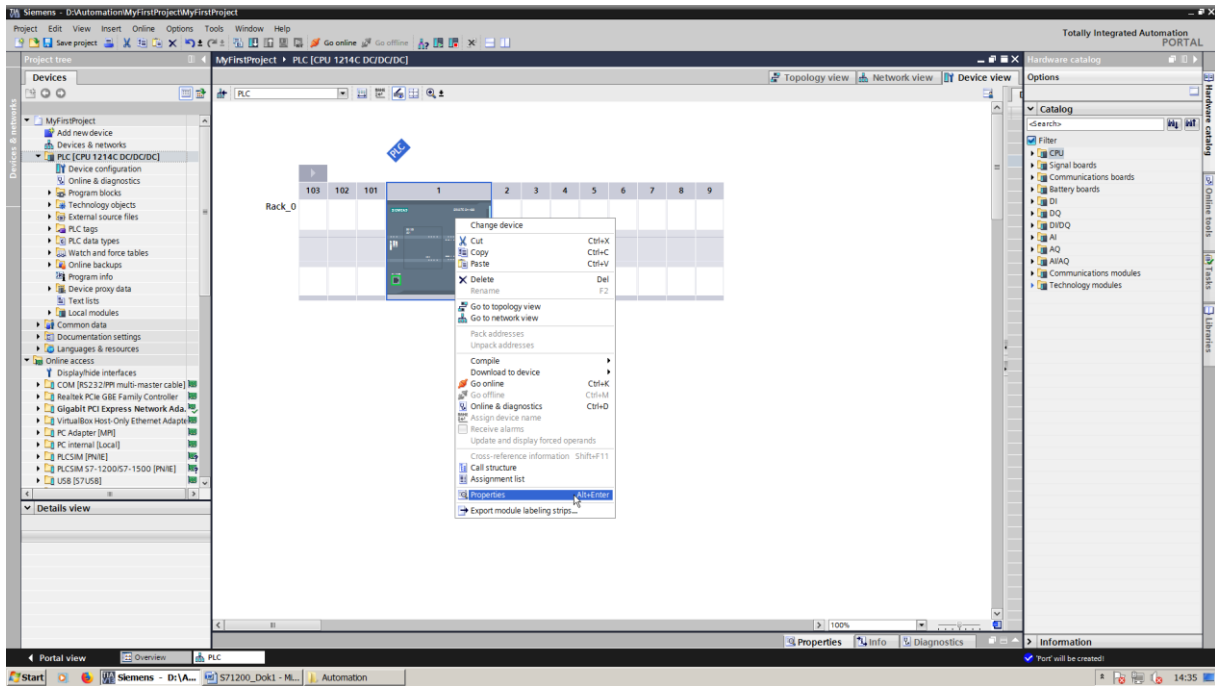


## 10. Dodawania PLC do projektu

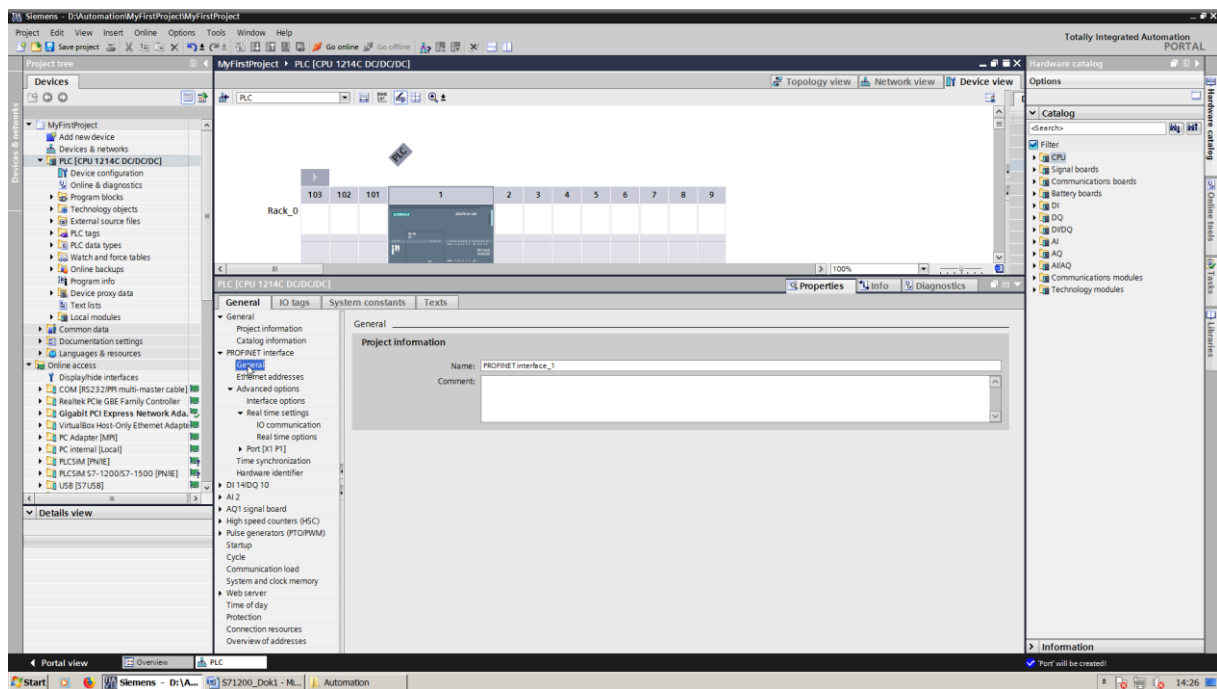
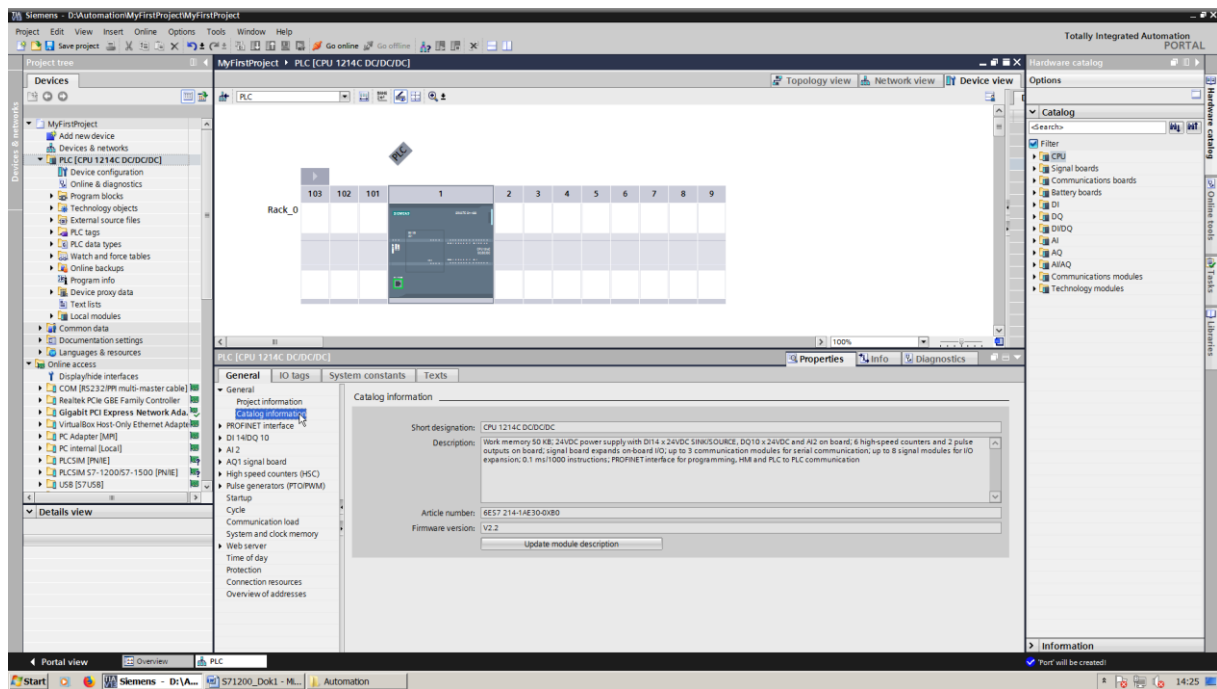




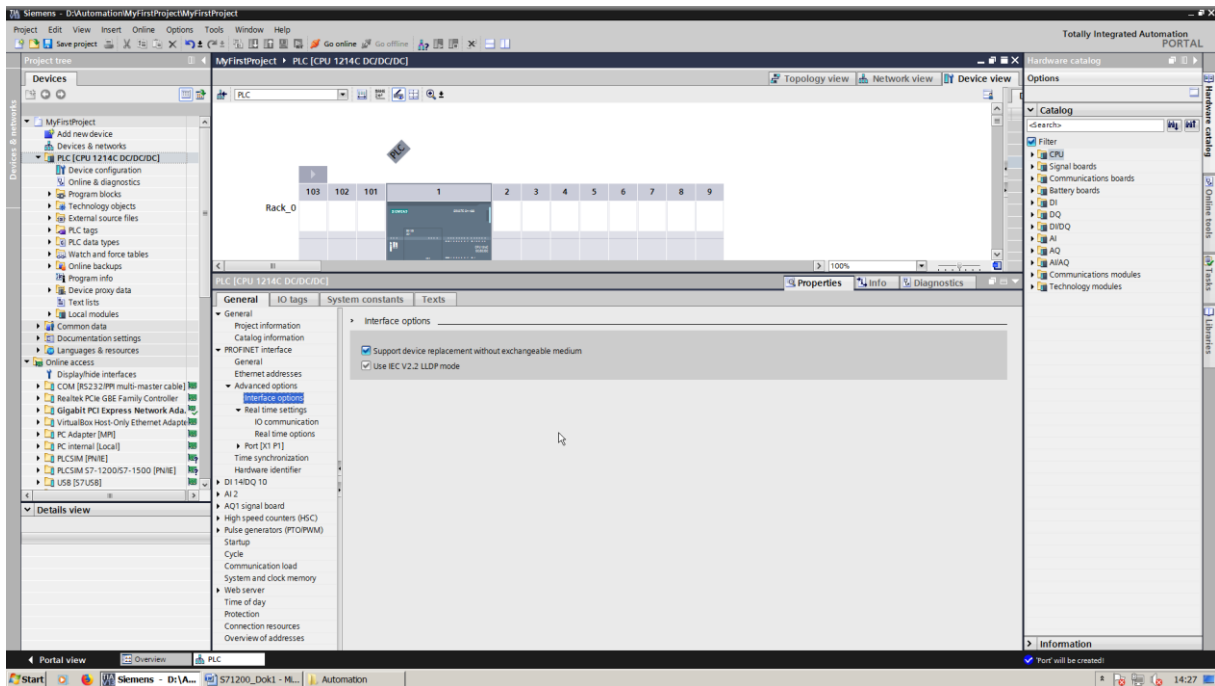
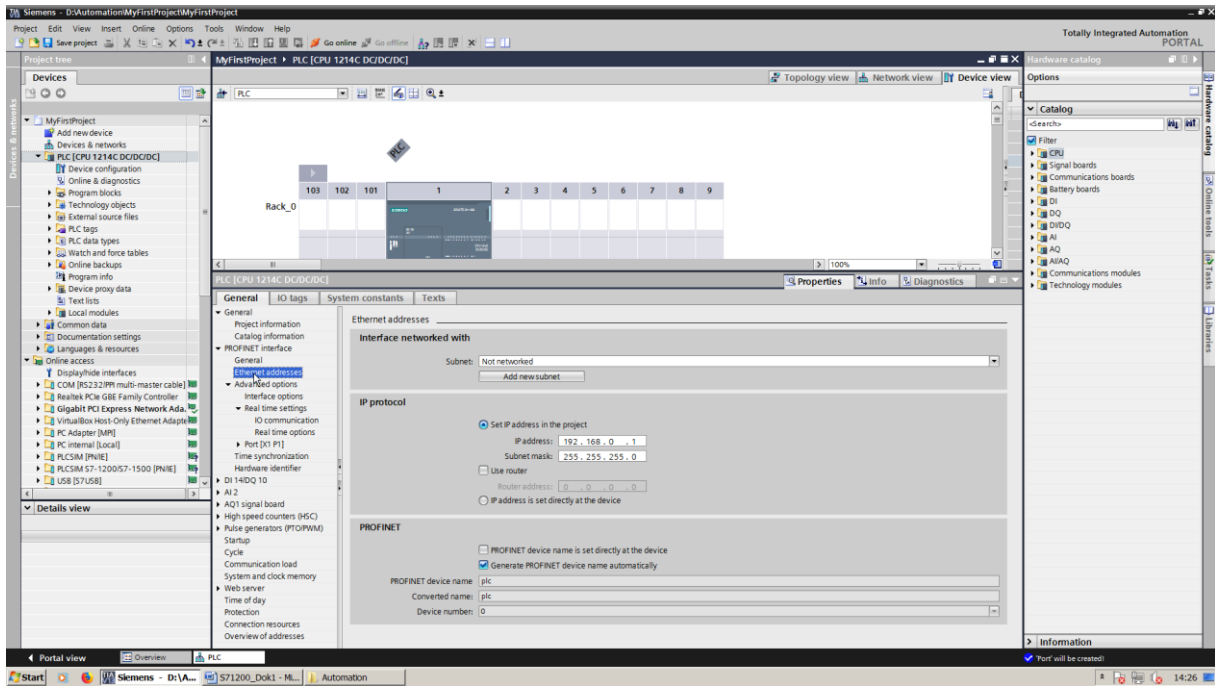


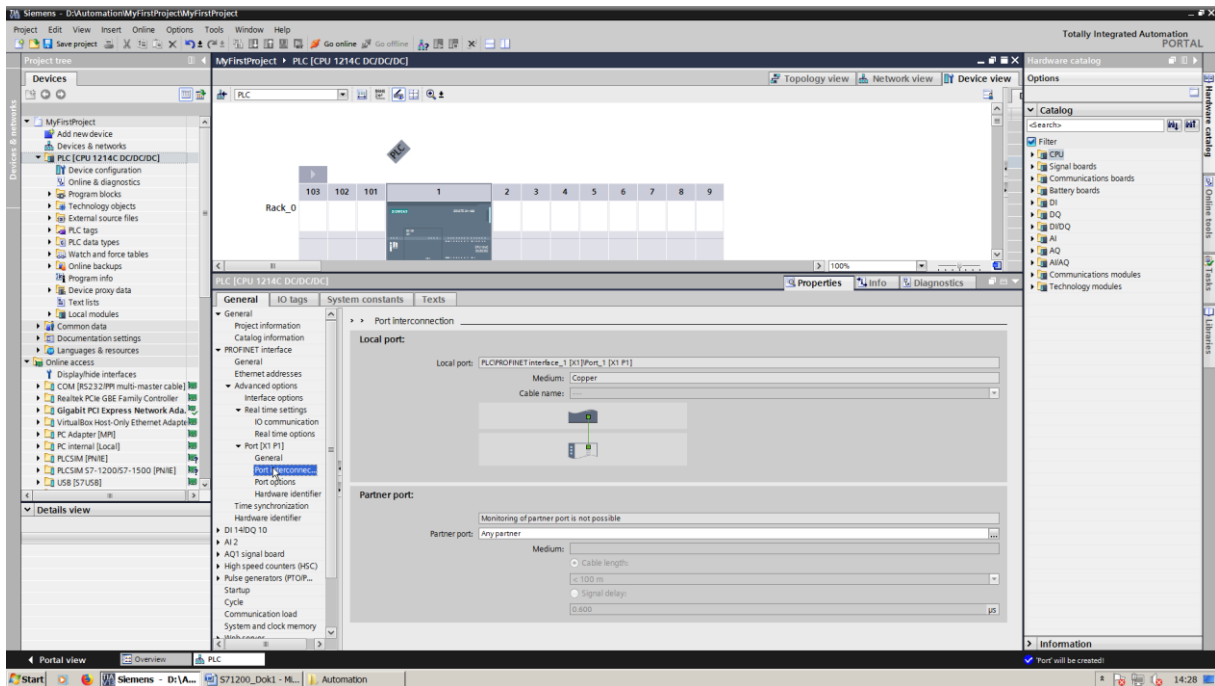
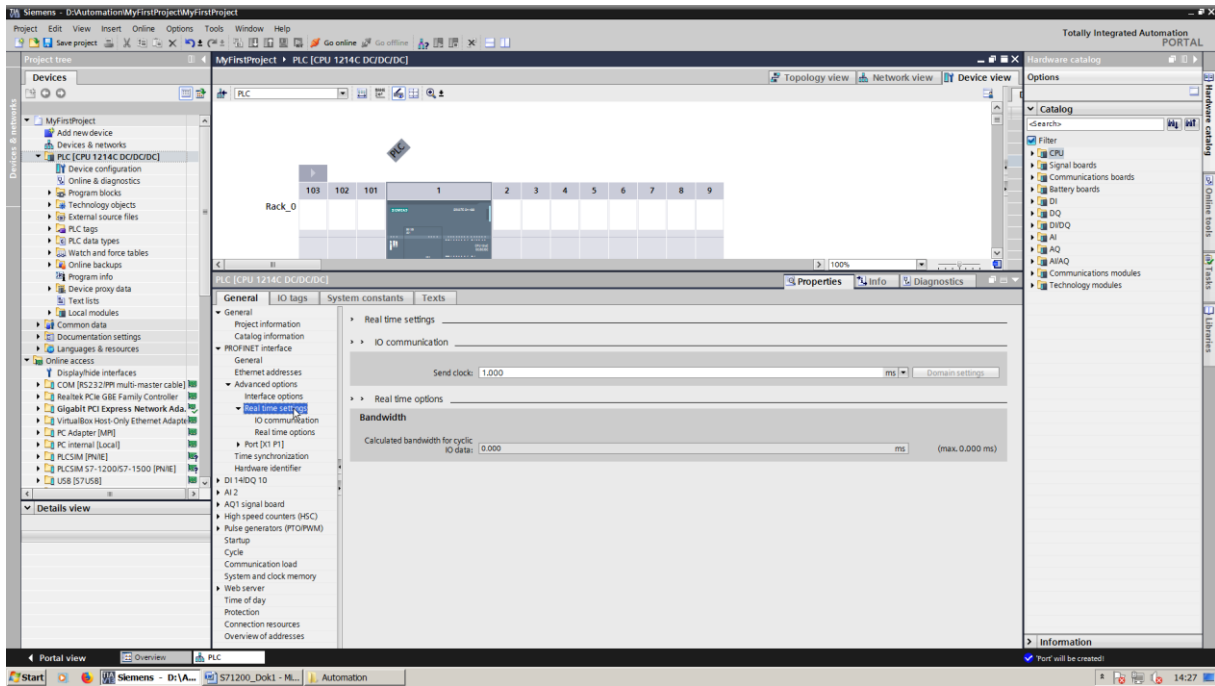


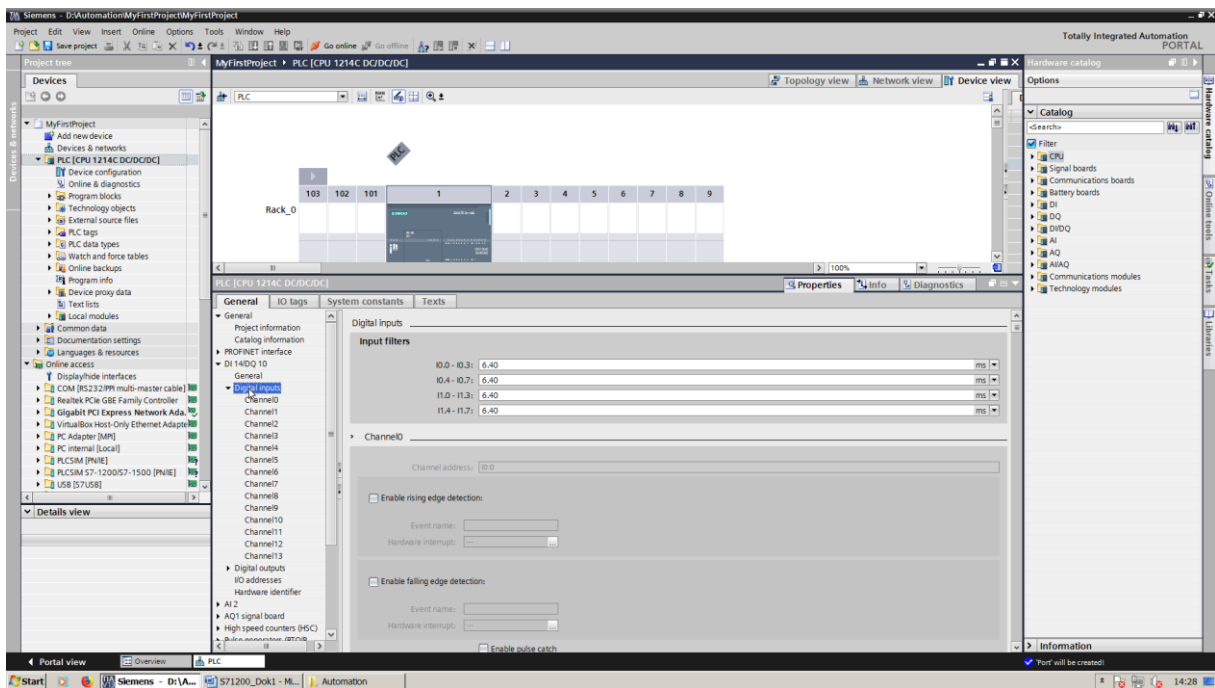
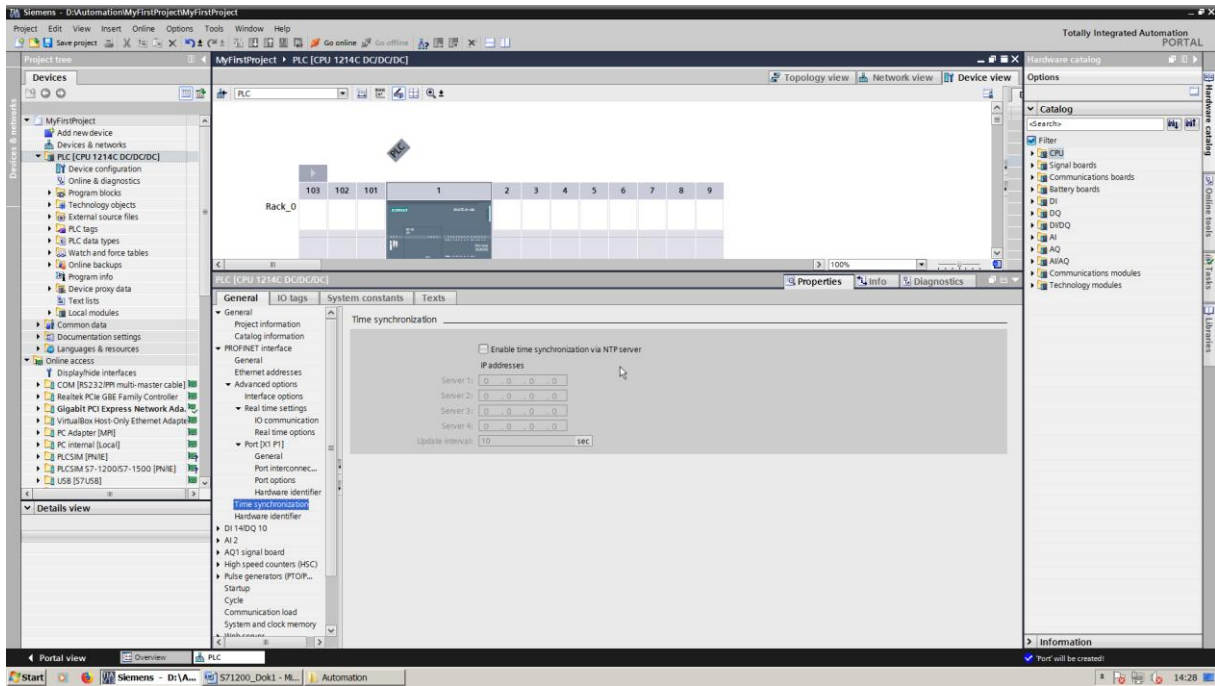
# 10. Przegląd dostępnych zasobów PLC

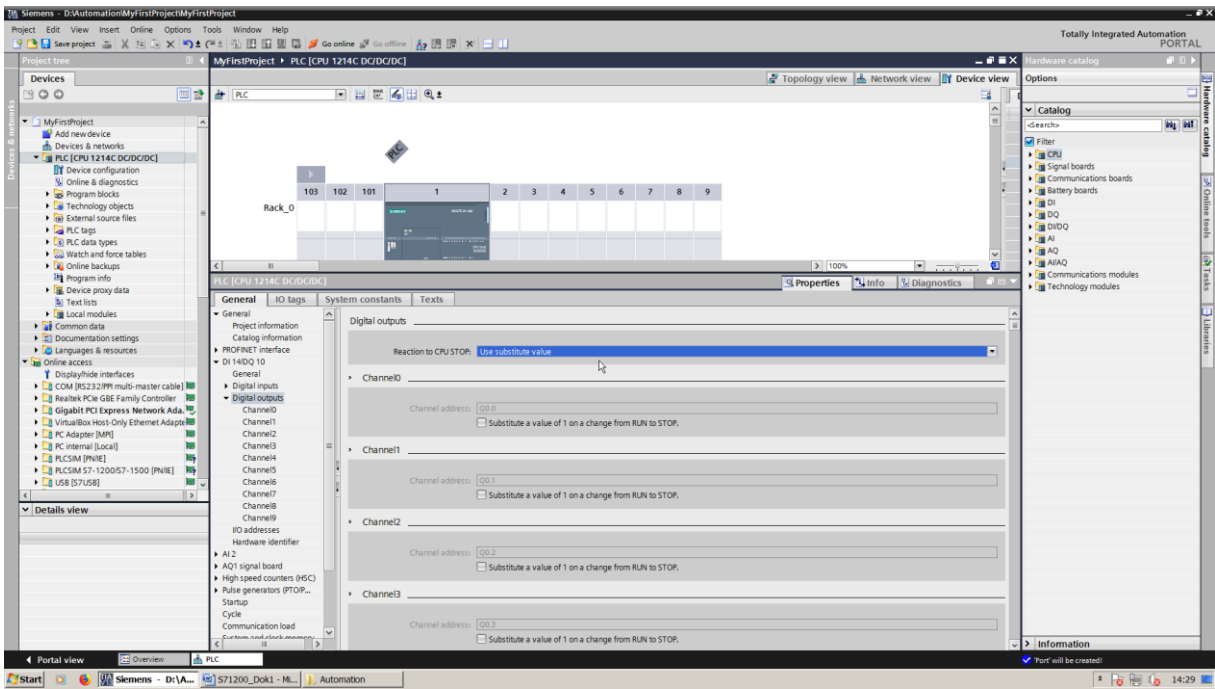
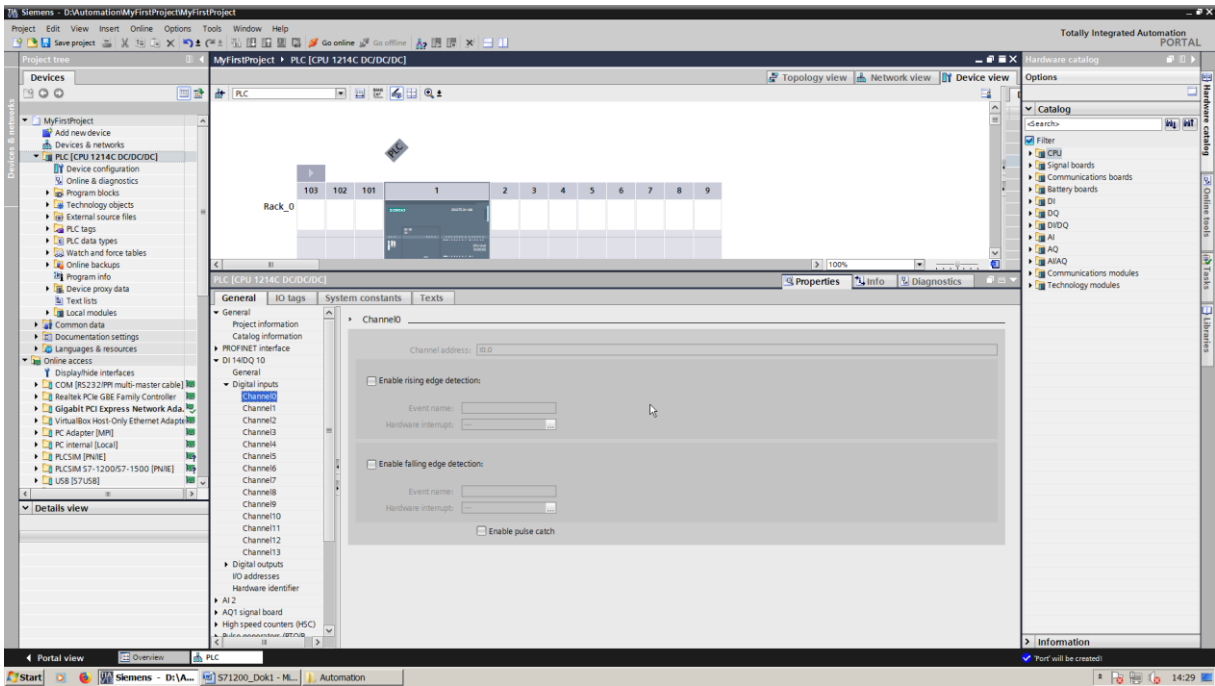


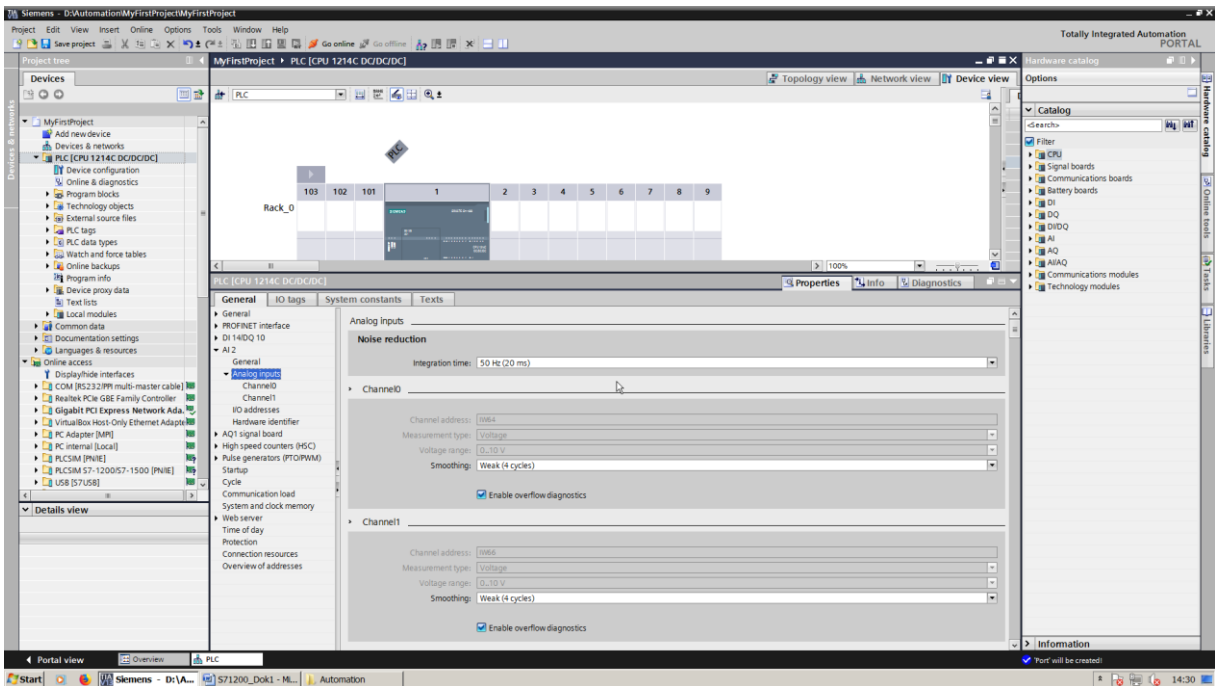
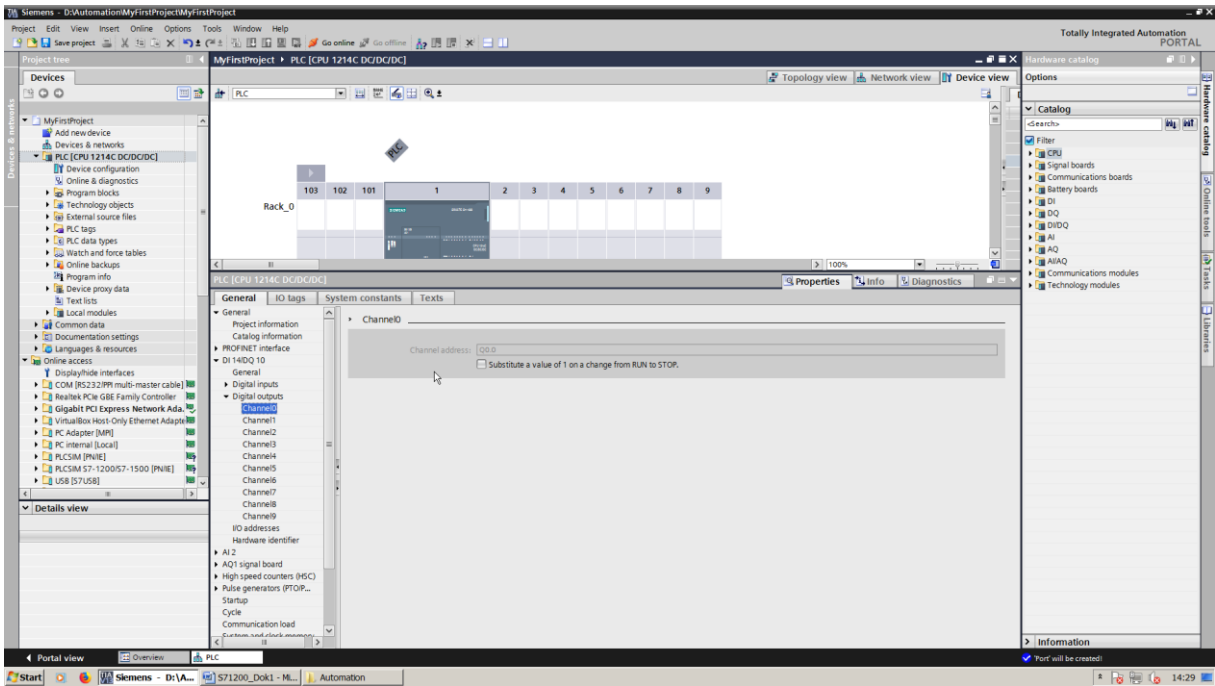


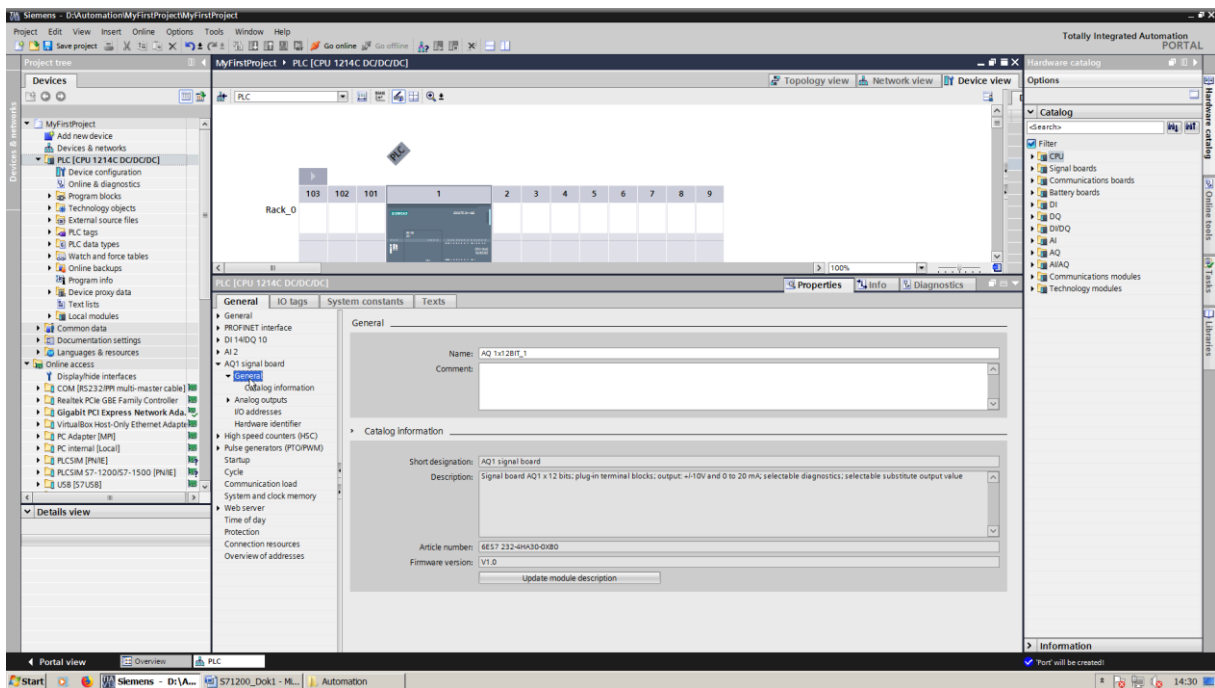
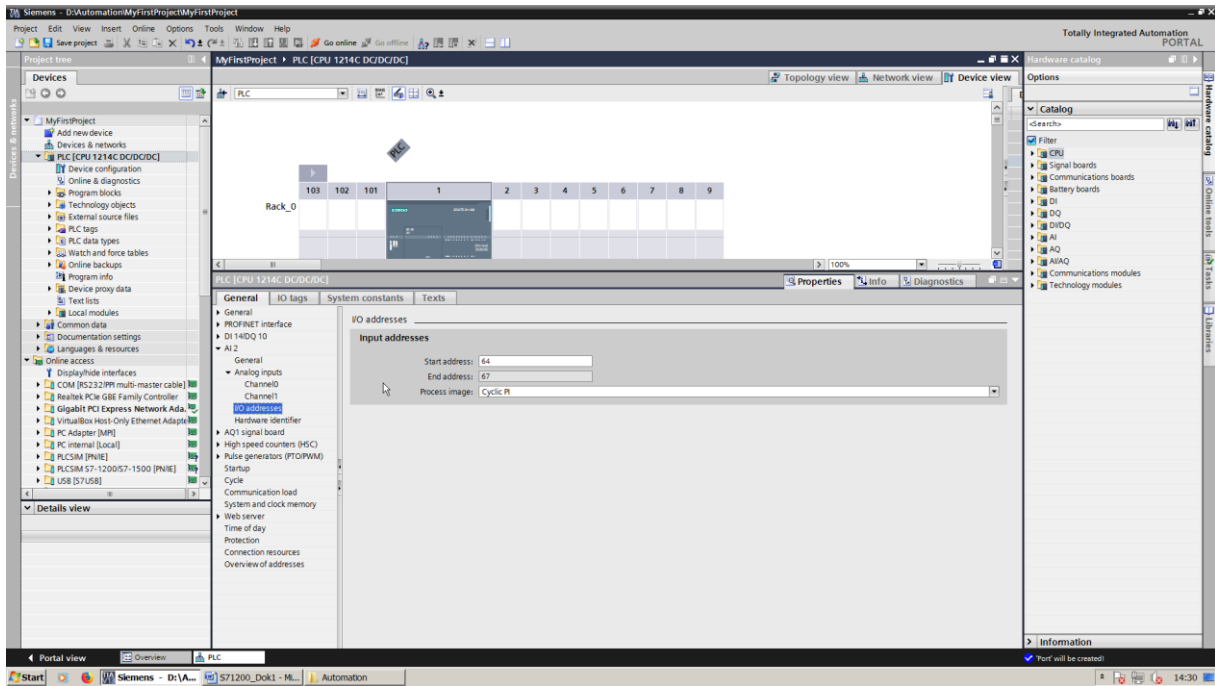


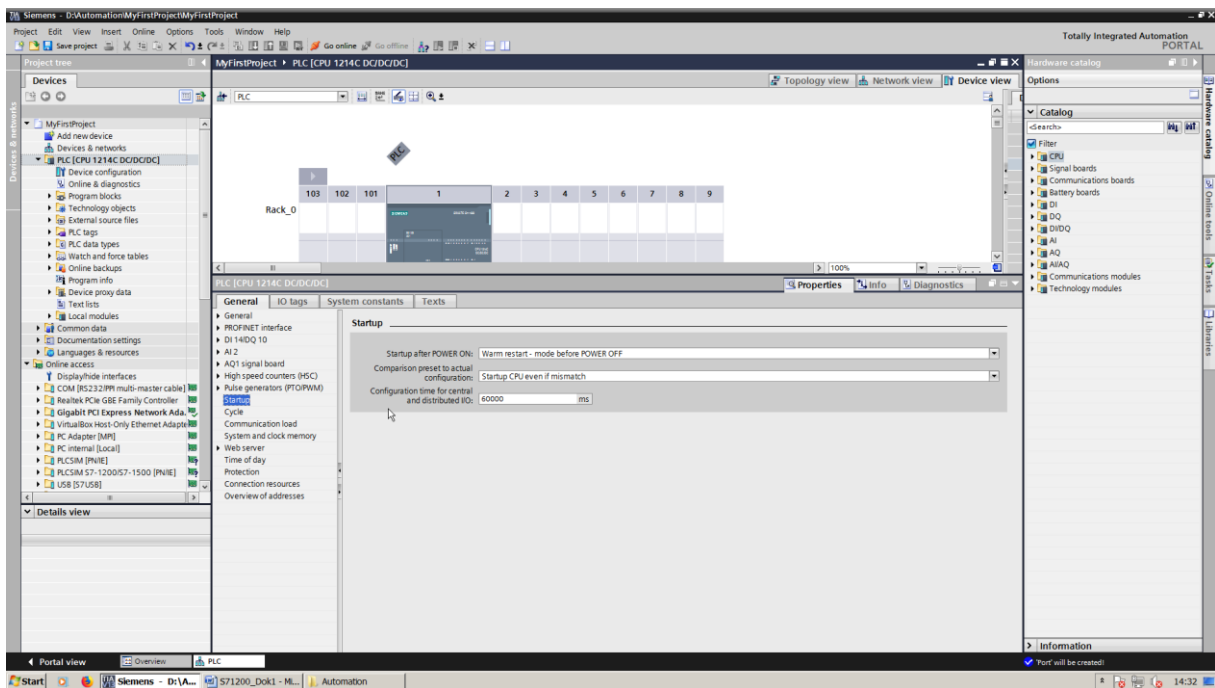
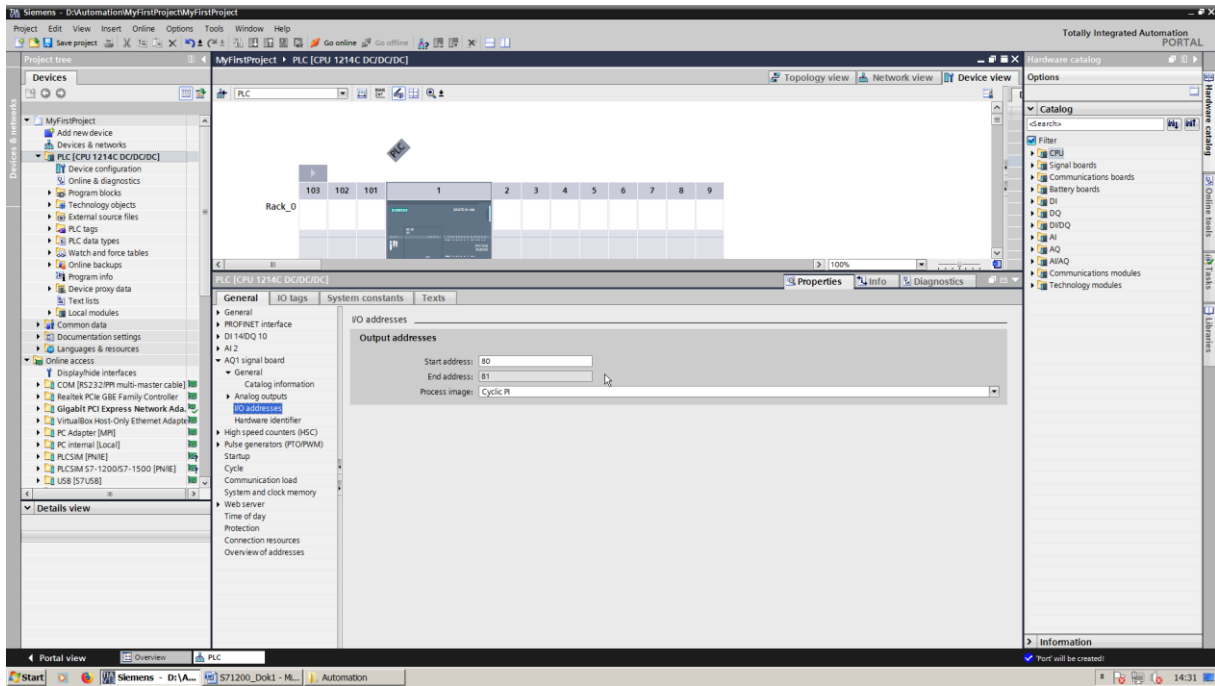


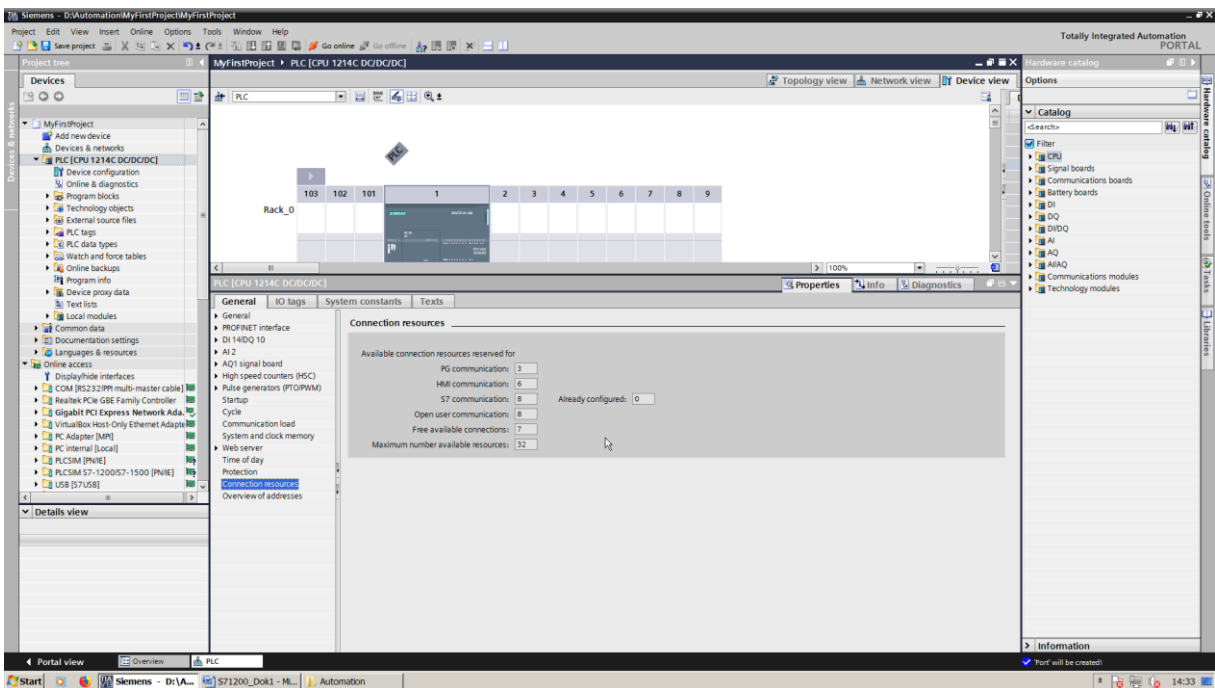
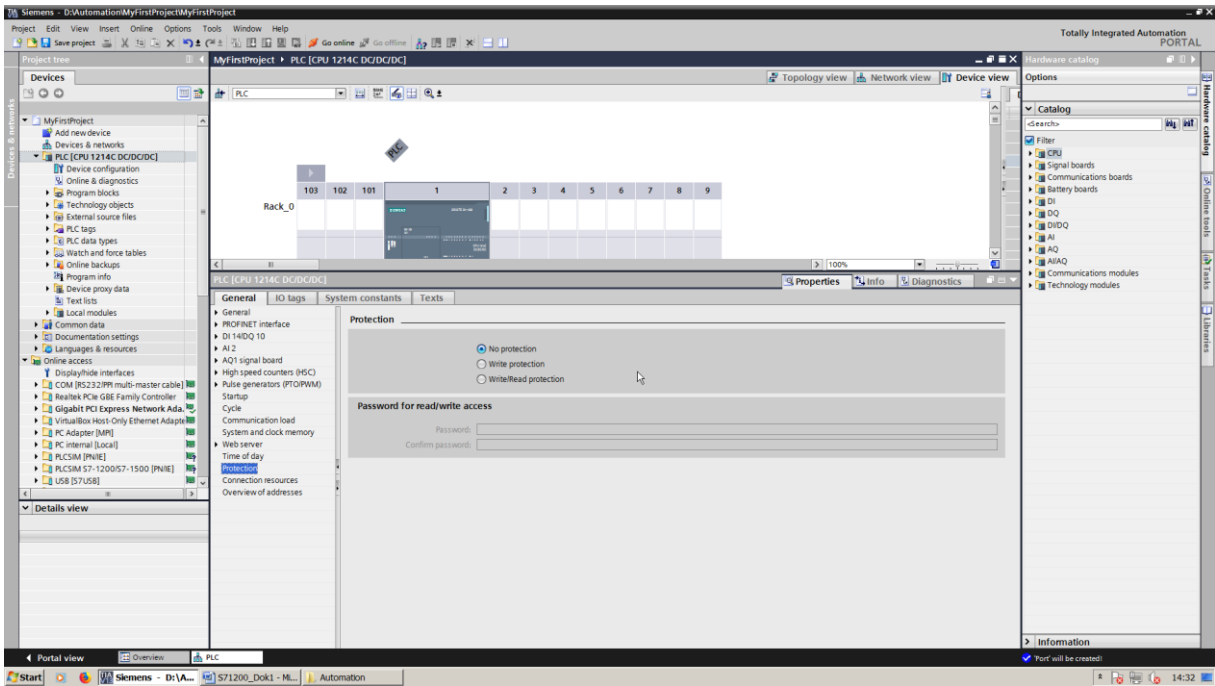




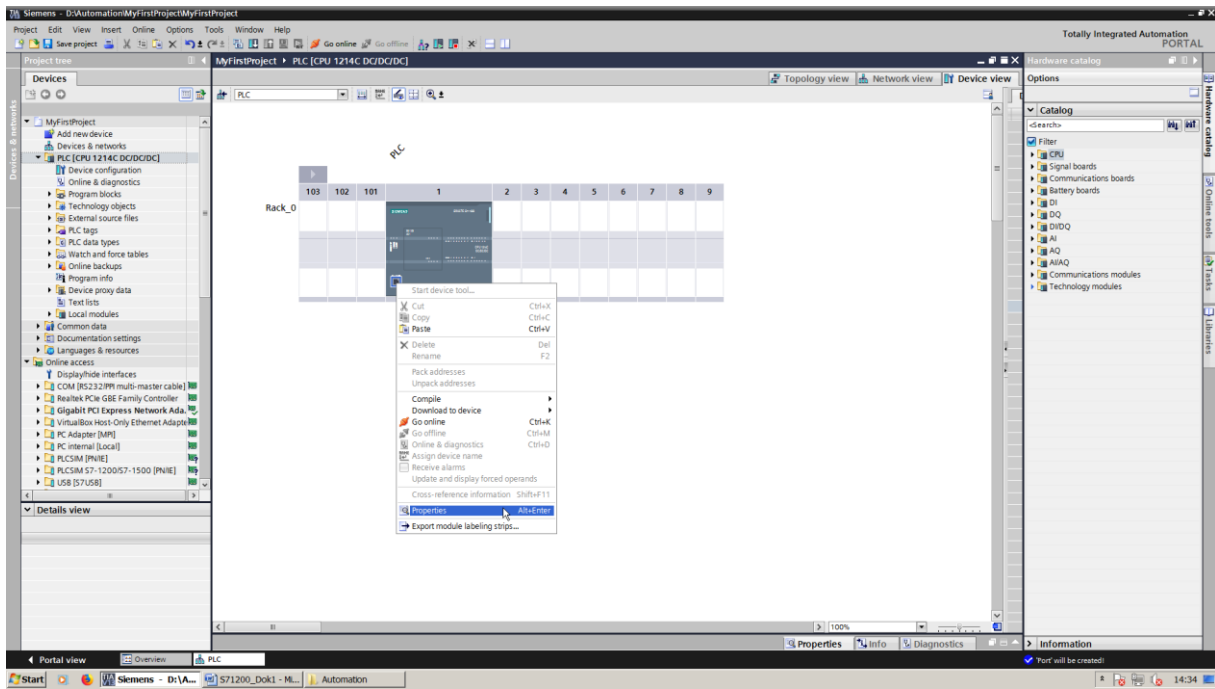
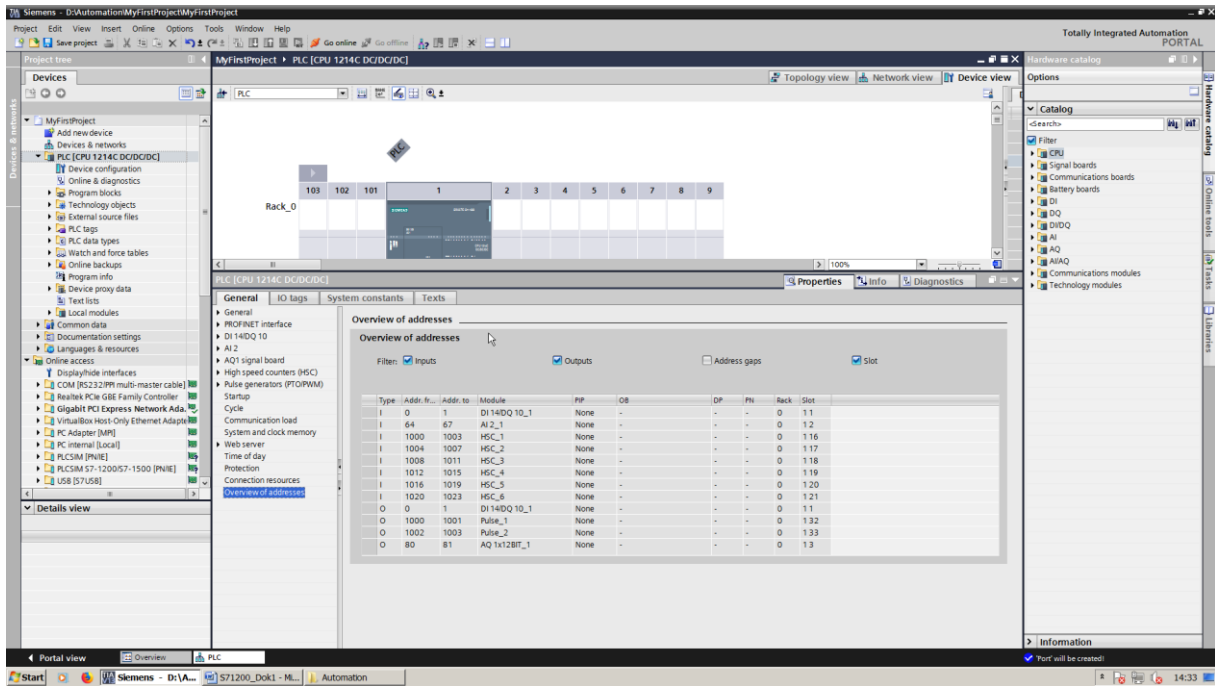


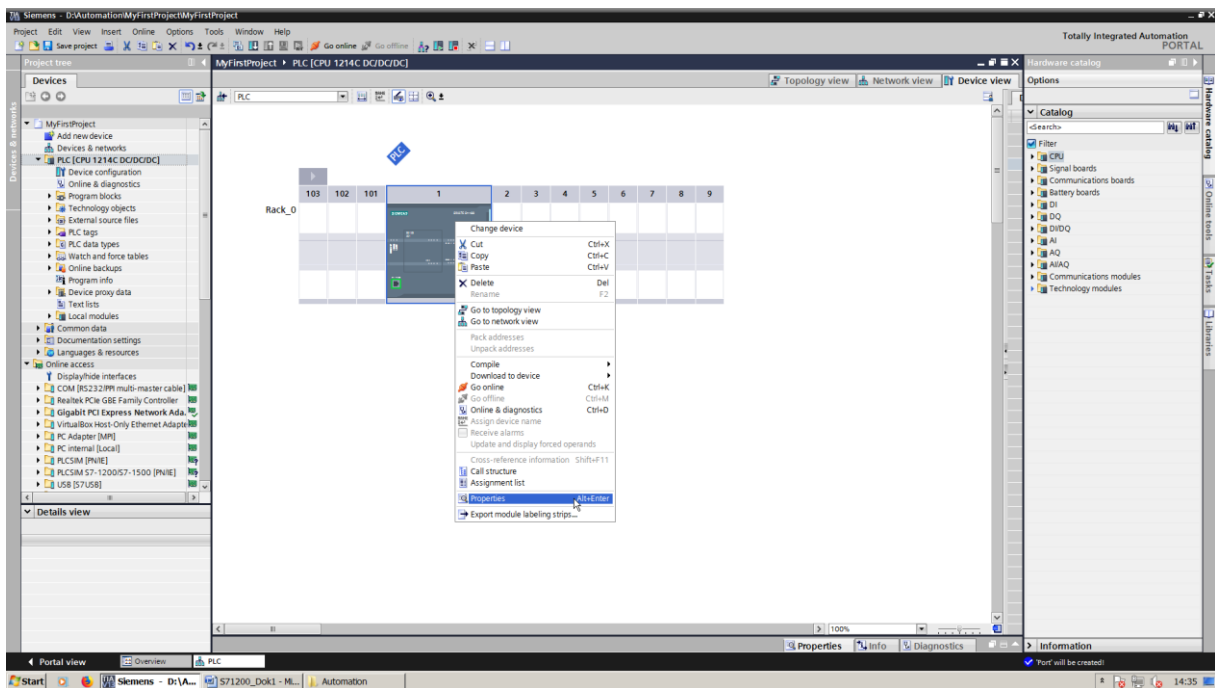
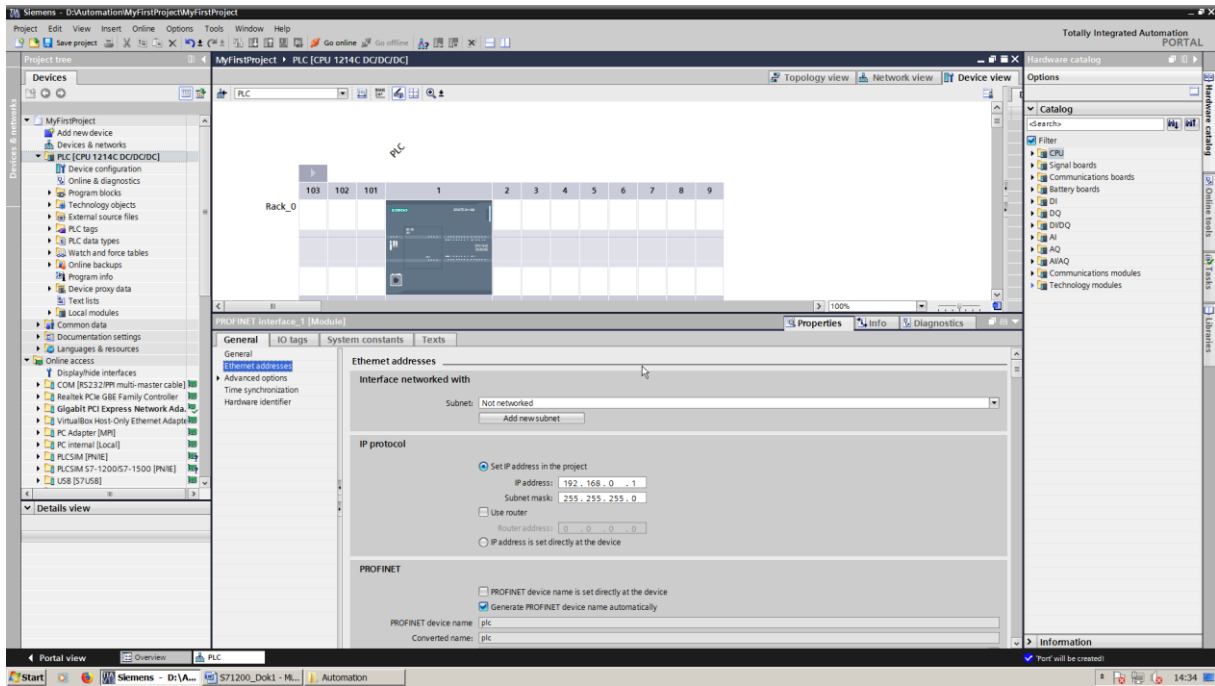












# 11. Adresacja wejść/wyjść PLC

The screenshot shows the IO configuration for a PLC rack. The rack table is as follows:

Rack	Slot	Module									
103	102	101	1	2	3	4	5	6	7	8	9

The IO tags table is shown below:

Name	Type	Address	Tag table	Comm.
Bool %I0.0	Bool	%I0.0		
Bool %I0.1	Bool	%I0.1		
Bool %I0.2	Bool	%I0.2		
Bool %I0.3	Bool	%I0.3		
Bool %I0.4	Bool	%I0.4		
Bool %I0.5	Bool	%I0.5		
Bool %I0.6	Bool	%I0.6		
Bool %I0.7	Bool	%I0.7		
Bool %I1.0	Bool	%I1.0		
Bool %I1.1	Bool	%I1.1		
Bool %I1.2	Bool	%I1.2		
Bool %I1.3	Bool	%I1.3		
Bool %I1.4	Bool	%I1.4		
Bool %I1.5	Bool	%I1.5		
Bool %Q0.0	Bool	%Q0.0		
Bool %Q0.1	Bool	%Q0.1		
Bool %Q0.2	Bool	%Q0.2		
Bool %Q0.3	Bool	%Q0.3		
Bool %Q0.4	Bool	%Q0.4		
Bool %Q0.5	Bool	%Q0.5		
Bool %Q0.6	Bool	%Q0.6		
Bool %Q0.7	Bool	%Q0.7		
Bool %Q1.0	Bool	%Q1.0		
Bool %Q1.1	Bool	%Q1.1		
Int %MW64	Int	%MW64		
Int %MW66	Int	%MW66		
Int %QWB0	Int	%QWB0		

The screenshot shows the IO configuration for a PLC rack with digital inputs and outputs assigned. The rack table is as follows:

Rack	Slot	Module									
103	102	101	1	2	3	4	5	6	7	8	9

The IO tags table is shown below:

Name	Type	Address	Tag table	Comm.
Wejsci0	Bool	%I0.0	Default tag table	
Wejsci1	Bool	%I0.1	Default tag table	
Wejsci2	Bool	%I0.2	Default tag table	
Wejsci3	Bool	%I0.3	Default tag table	
Wejsci4	Bool	%I0.4	Default tag table	
Wejsci5	Bool	%I0.5	Default tag table	
Wejsci6	Bool	%I0.6	Default tag table	
Wejsci7	Bool	%I0.7	Default tag table	
Wejsci8	Bool	%I1.0	Default tag table	
Wejsci9	Bool	%I1.1	Default tag table	
Wejsci10	Bool	%I1.2	Default tag table	
Wejsci11	Bool	%I1.3	Default tag table	
Wejsci12	Bool	%I1.4	Default tag table	
Wejsci13	Bool	%I1.5	Default tag table	
Wysci0	Bool	%Q0.0	Default tag table	
Wysci1	Bool	%Q0.1	Default tag table	
Wysci2	Bool	%Q0.2	Default tag table	
Wysci3	Bool	%Q0.3	Default tag table	
Wysci4	Bool	%Q0.4	Default tag table	
Wysci5	Bool	%Q0.5	Default tag table	
Wysci6	Bool	%Q0.6	Default tag table	
Wysci7	Bool	%Q0.7	Default tag table	
Wysci8	Bool	%Q1.0	Default tag table	
Wysci9	Bool	%Q1.1	Default tag table	
	Int	%MW64		
	Int	%MW66		
	Int	%QWB0		

Siemens - D:\Automation\MyFirstProject\MyFirstProject

Totally Integrated Automation PORTAL

Project Edit View Insert Online Options Tools Window Help

MyFirstProject > PLC [CPU 1214C DC/DC/DC] > PLC tags > Default tag table [39]

Tags User constants System constants

Options

Find and replace

Find: [ ]

Whole words only  Match case  Find in substructures  Find in hidden texts  Use wildcards  Use regular expressions  Whole document  From current position  Selection  Down  Up  Find

Replace with: [ ]

Replace Replace all

Language & resources

Portal view Overview PLC Default tag t...

Start Siemens - D:\A... S71200\_Dok1 - M... Automation 14:42

Project tree

MyFirstProject

Devices & networks

PLC [CPU 1214C DC/DC/DC]

Device configuration

Online & diagnostics

Program blocks

Technology objects

External source files

PLC tags

Show all tags

Add new tag table

Default tag table [39]

PLC data types

Watch and force tables

Online backups

Program info

Device proxy data

Text lists

Local modules

Common data

Documentation settings

Language & resources

Online access

Display/Hide interfaces

COM [RS232/PI multi-master cable]

Realtek PCIe GBE Family Controller

Gigabit PCI Express Network Adapter

VirtualBox Host-Only Ethernet Adapter

PC Adapter [MP]

PC internal [Local]

PLCCM [PIUS]

Details view

Name	Data type	Details	Comm...
Port_1	Hw_Interface	65	
Local	Hw_SubModule	50	
Local-AL_2_1	Hw_SubModule	258	
Local-AQ_1x12BIT_1	Hw_SubModule	267	
Local-DI_14_DQ_10_1	Hw_SubModule	257	
Local-HSC_1	Hw_Hsc	259	
Local-HSC_2	Hw_Hsc	260	
Local-HSC_3	Hw_Hsc	261	

Default tag table

Name	Data type	Value	Comment
1 Wejce0	Bool	%I.0	
2 Wejce1	Bool	%I.1	
3 Wejce2	Bool	%I.2	
4 Wejce3	Bool	%I.3	
5 Wejce4	Bool	%I.4	
6 Wejce5	Bool	%I.5	
7 Wejce6	Bool	%I.6	
8 Wejce7	Bool	%I.7	
9 Wejce8	Bool	%I.8	
10 Wejce9	Bool	%I.9	
11 Wejce10	Bool	%I.10	
12 Wejce11	Bool	%I.11	
13 Wejce12	Bool	%I.12	
14 Wejce13	Bool	%I.13	
15 Wyciec0	Bool	%Q.0	
16 Wyciec1	Bool	%Q.1	
17 Wyciec2	Bool	%Q.2	
18 Wyciec3	Bool	%Q.3	
19 Wyciec4	Bool	%Q.4	
20 Wyciec5	Bool	%Q.5	
21 Wyciec6	Bool	%Q.6	
22 Wyciec7	Bool	%Q.7	
23 Wyciec8	Bool	%Q.8	
24 Wyciec9	Bool	%Q.9	
25			<Add new>

Properties Info Diagnostics

Language & resources

The project MyFirstProject was saved s...

Siemens - D:\Automation\MyFirstProject\MyFirstProject

Totally Integrated Automation PORTAL

Project Edit View Insert Online Options Tools Window Help

MyFirstProject > PLC [CPU 1214C DC/DC/DC] > PLC tags > Default tag table [39]

Tags User constants System constants

Options

Find and replace

Find: [ ]

Whole words only  Match case  Find in substructures  Find in hidden texts  Use wildcards  Use regular expressions  Whole document  From current position  Selection  Down  Up  Find

Replace with: [ ]

Replace Replace all

Language & resources

Portal view Overview PLC Default tag t...

Start Siemens - D:\A... S71200\_Dok1 - M... Automation 14:42

Project tree

MyFirstProject

Devices & networks

PLC [CPU 1214C DC/DC/DC]

Device configuration

Online & diagnostics

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Show all tags

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Default tag table [39]

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COM [RS232/PI multi-master cable]

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PC Adapter [MP]

PC internal [Local]

PLCCM [PIUS]

Details view

Name	Data type	Details	Comm...
Port_1	Hw_Interface	65	
Local	Hw_SubModule	50	
Local-AL_2_1	Hw_SubModule	258	
Local-AQ_1x12BIT_1	Hw_SubModule	267	
Local-DI_14_DQ_10_1	Hw_SubModule	257	
Local-HSC_1	Hw_Hsc	259	
Local-HSC_2	Hw_Hsc	260	
Local-HSC_3	Hw_Hsc	261	
Local-HSC_4	Hw_Hsc	262	
Local-HSC_5	Hw_Hsc	263	
Local-HSC_6	Hw_Hsc	264	
Local-Pulse_1	Hw_Pwm	265	
Local-Pulse_2	Hw_Pwm	266	
Local-PROFINET_interface_1	Hw_Interface	64	
Port_1	Hw_Interface	65	
Local-AQ_1x12BIT_1	Hw_SubModule	267	

Default tag table

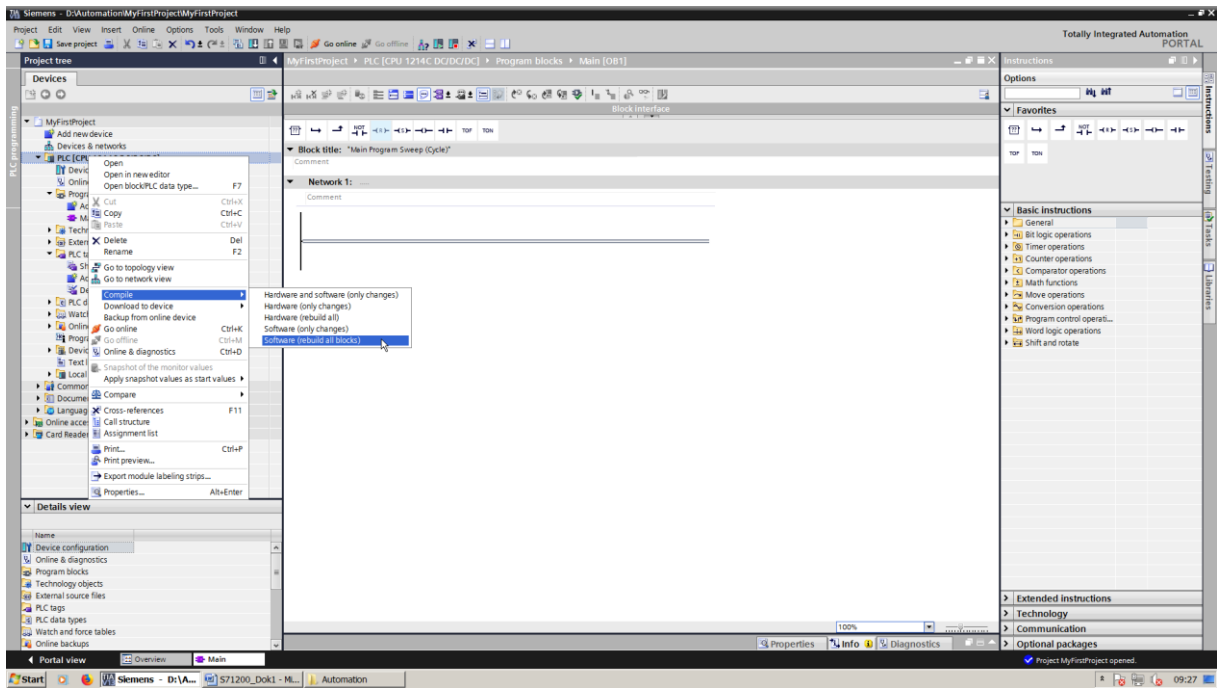
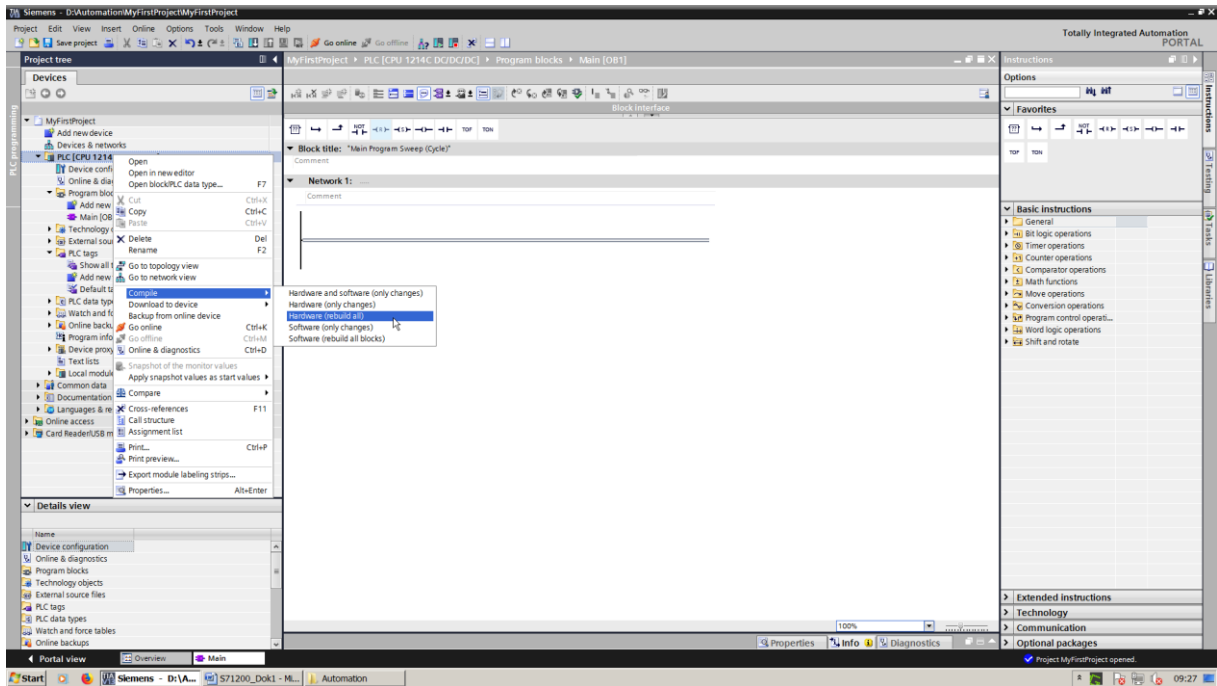
Name	Data type	Value	Comment
1 OB_Main	OB_PC_CYCLE	1	
2 Local-DI_14_DQ_10_1	Hw_SubModule	257	
3 Local-AL_2_1	Hw_SubModule	258	
4 Local	Hw_SubModule	50	
5 Local-HSC_1	Hw_Hsc	259	
6 Local-HSC_2	Hw_Hsc	260	
7 Local-HSC_3	Hw_Hsc	261	
8 Local-HSC_4	Hw_Hsc	262	
9 Local-HSC_5	Hw_Hsc	263	
10 Local-HSC_6	Hw_Hsc	264	
11 Local-Pulse_1	Hw_Pwm	265	
12 Local-Pulse_2	Hw_Pwm	266	
13 Local-PROFINET_interface_1	Hw_Interface	64	
14 Port_1	Hw_Interface	65	
15 Local-AQ_1x12BIT_1	Hw_SubModule	267	

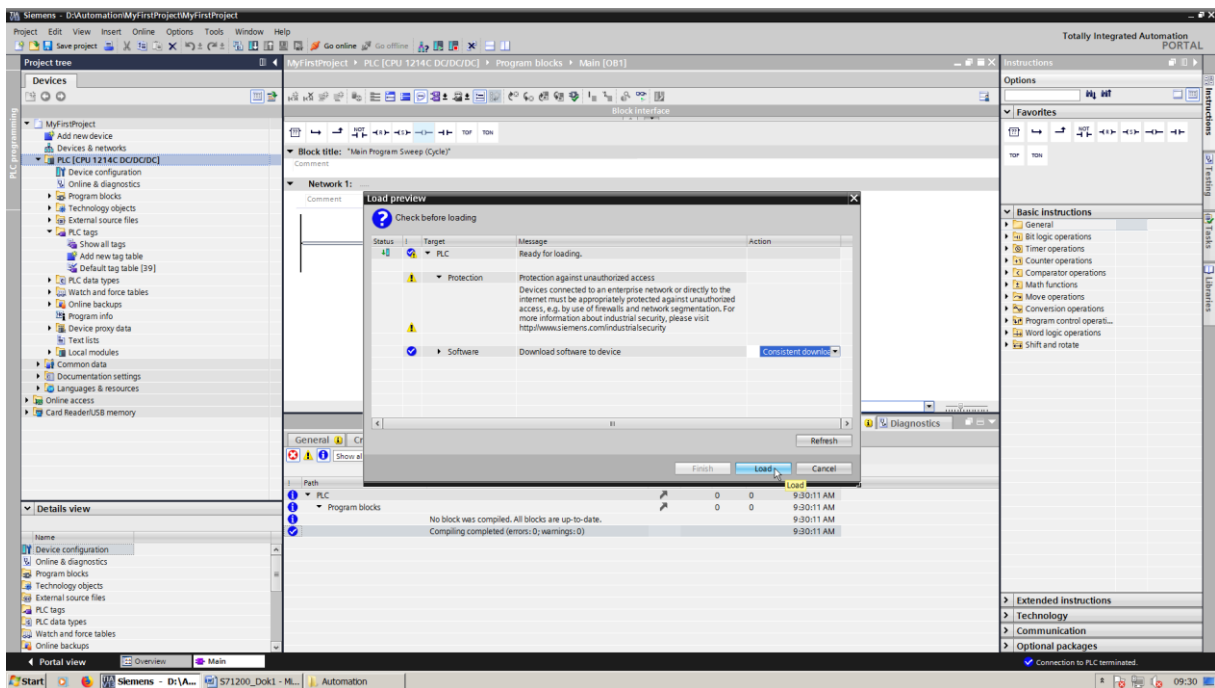
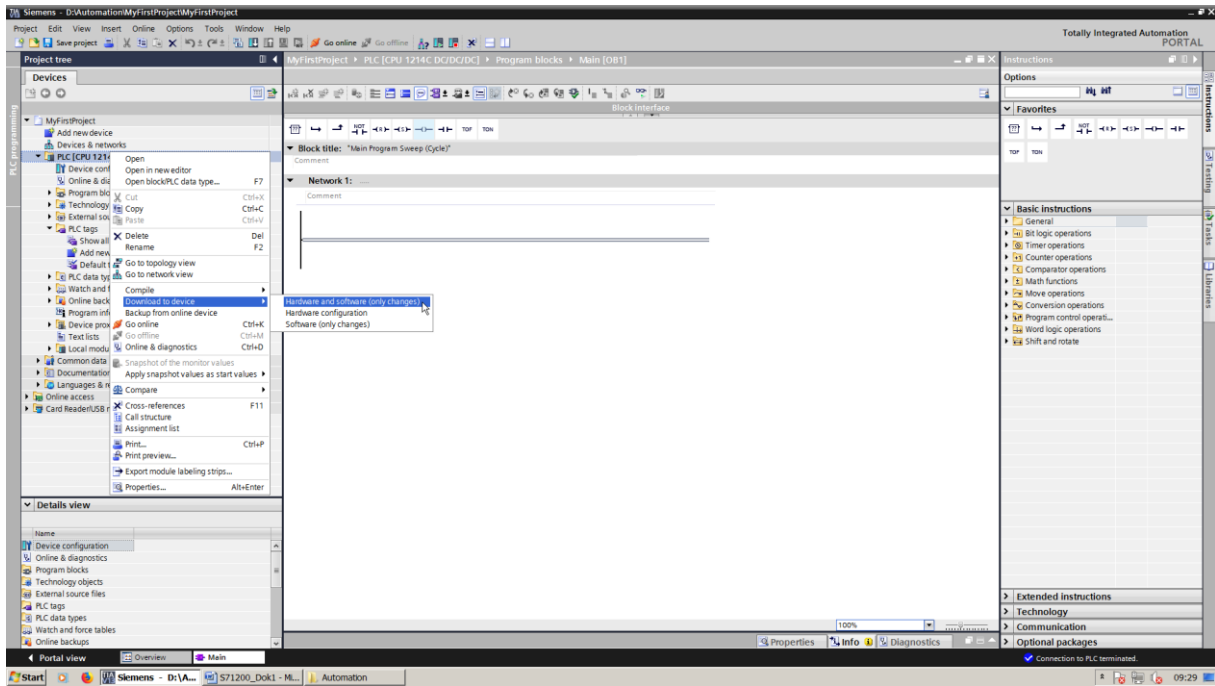
Properties Info Diagnostics

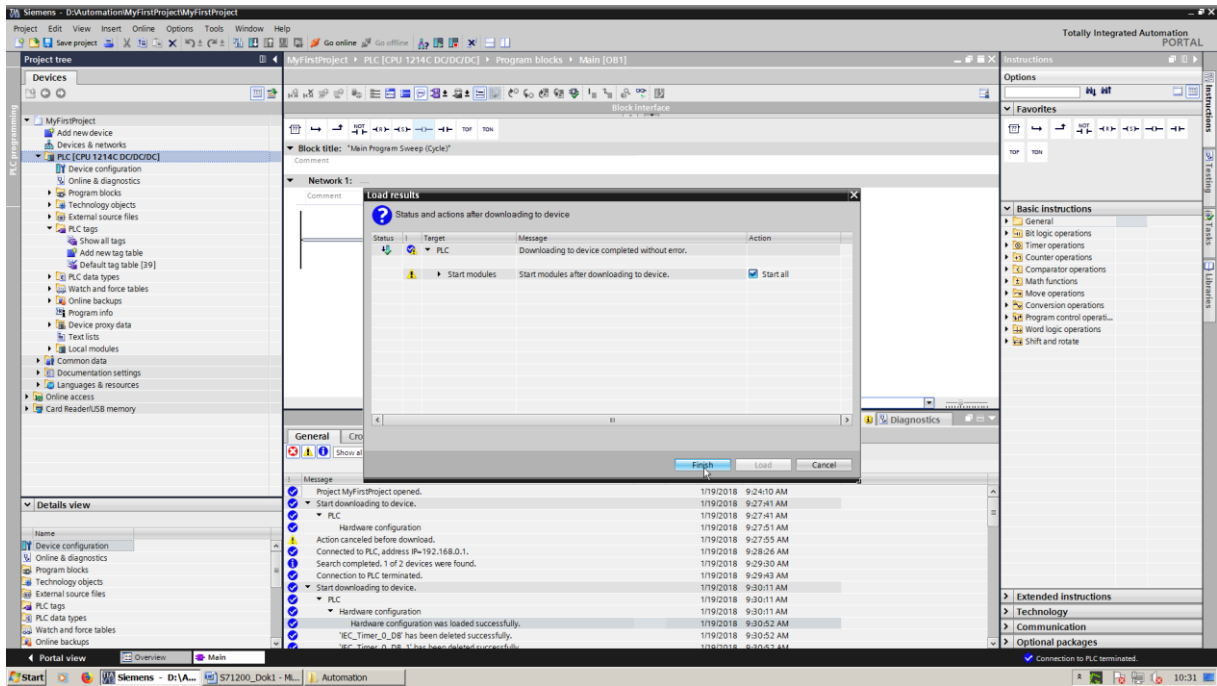
Language & resources

The project MyFirstProject was saved s...

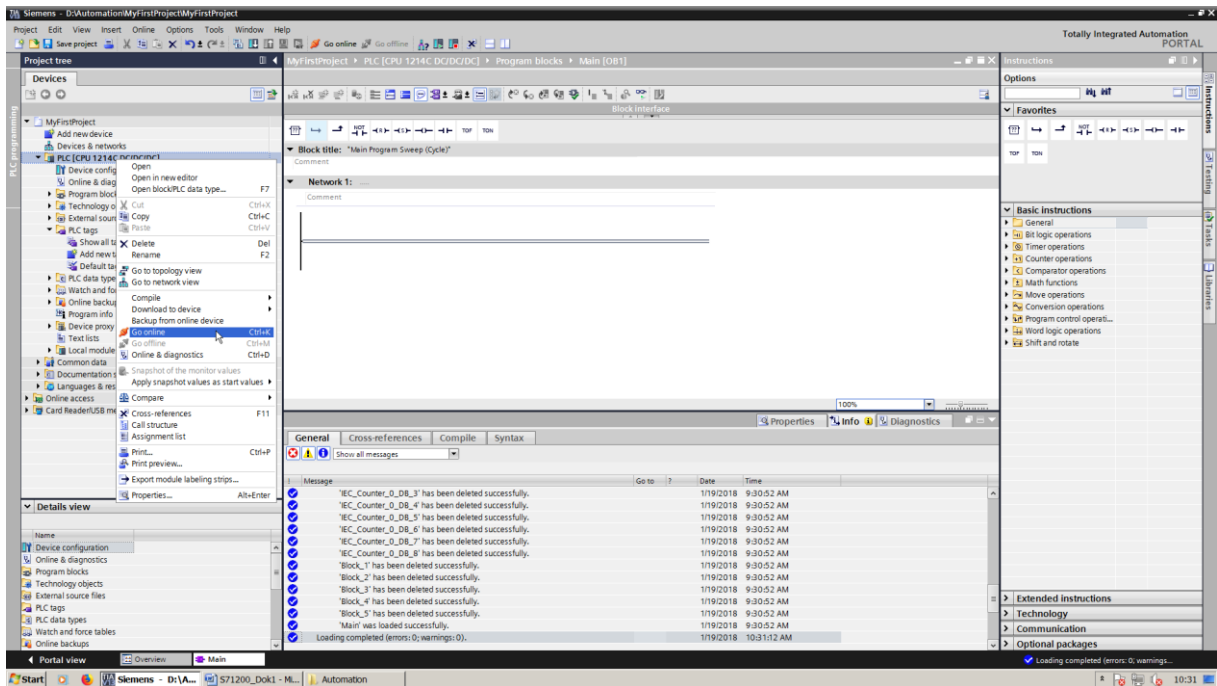
## 12. Zapis programu do PLC

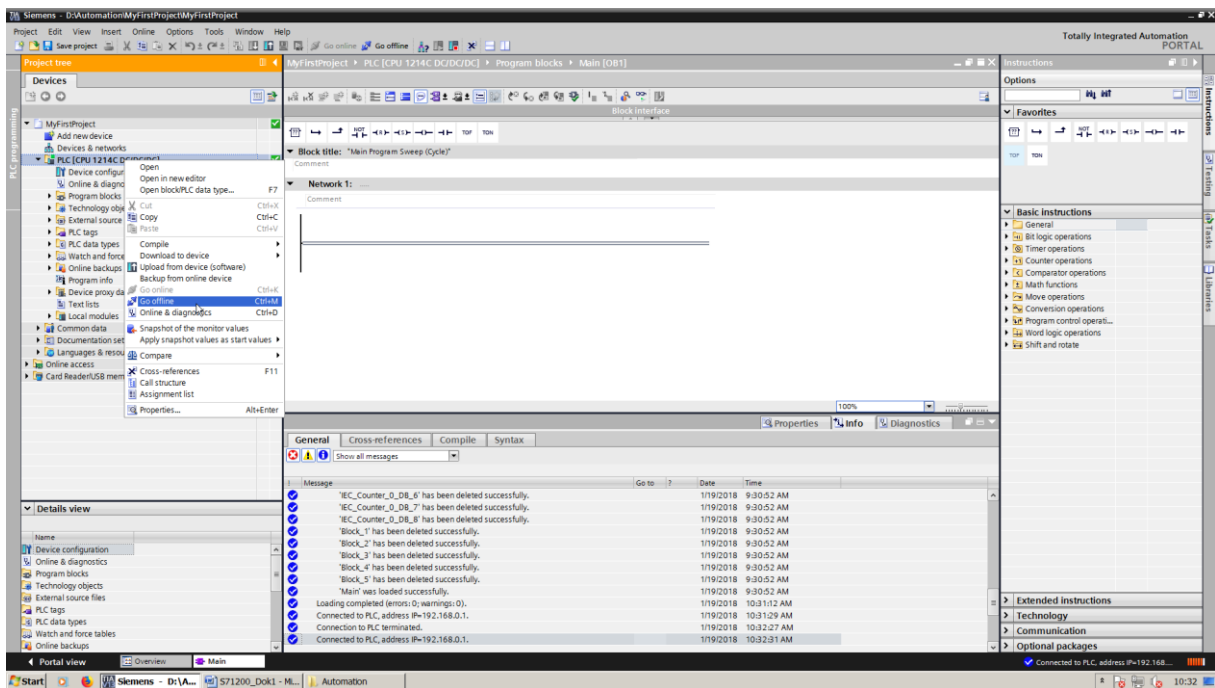
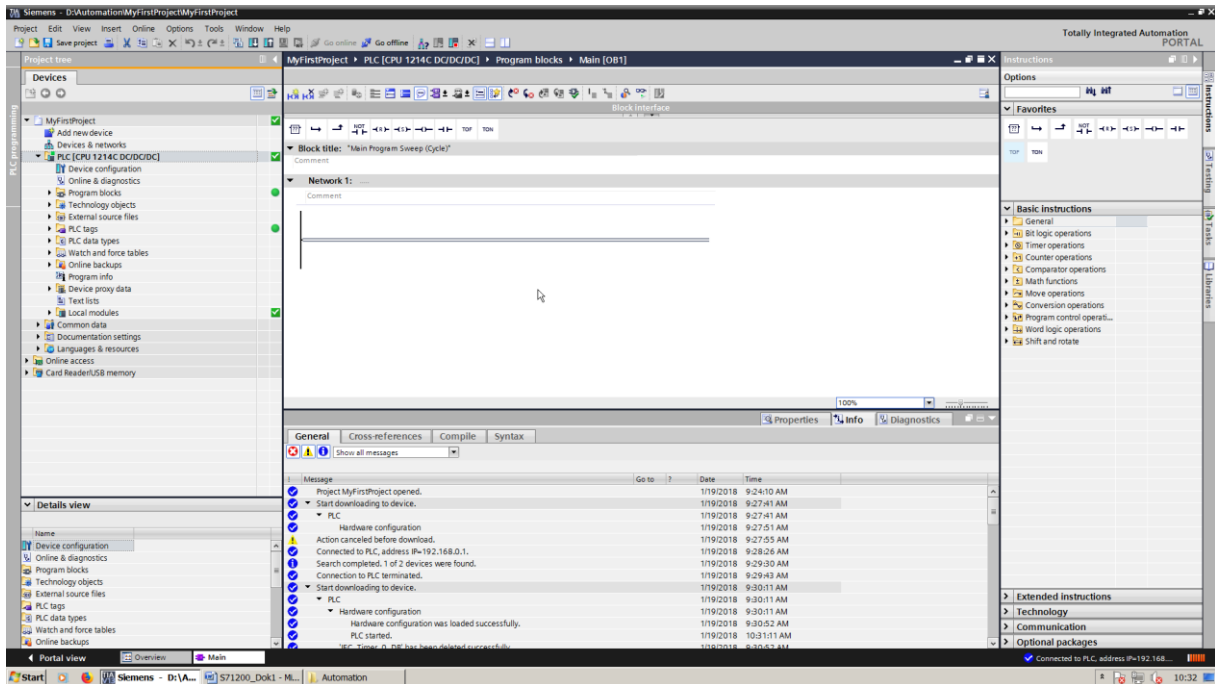






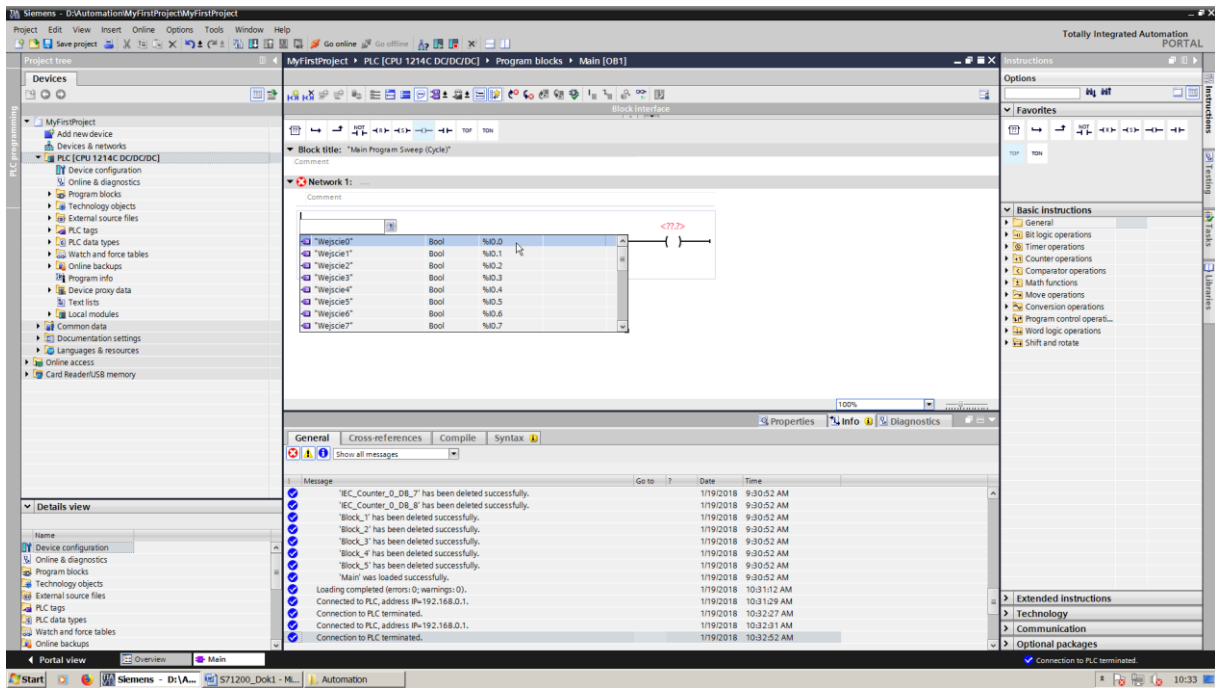
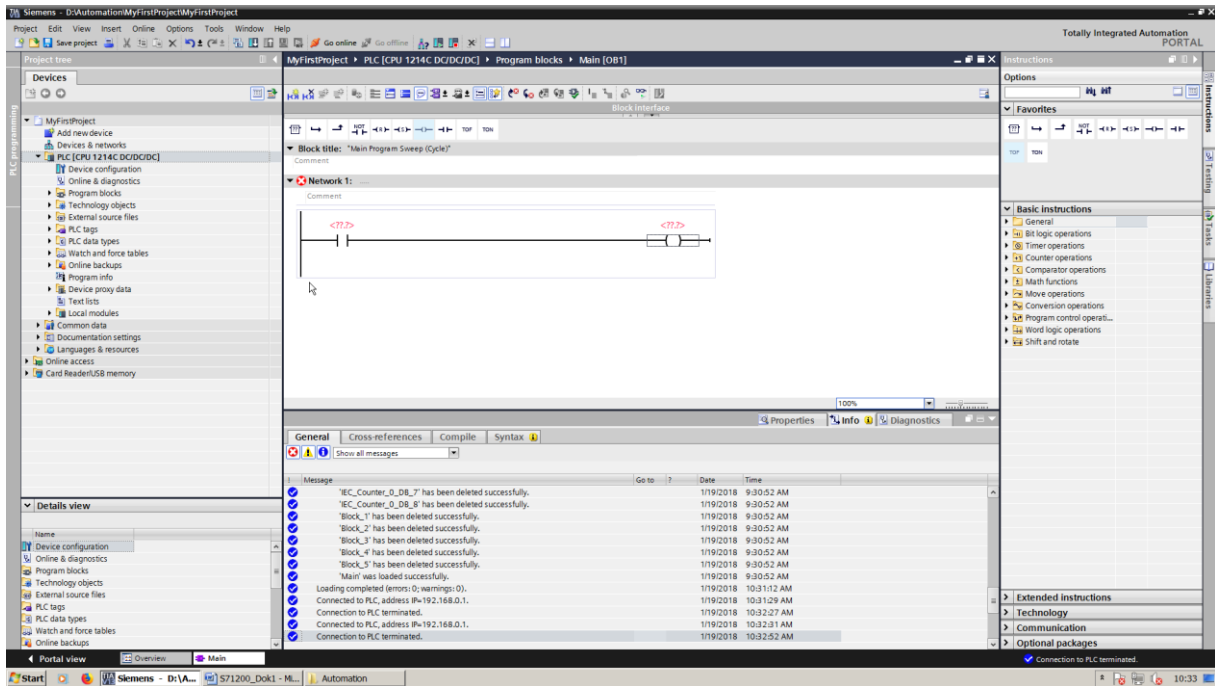
### 13. Pogląd online







# 14. Tworzenie prostego programu



The screenshot shows the Siemens TIA Portal interface. The main window displays a ladder logic diagram for a block titled "Main Program Sweep (Cycle)". The diagram consists of a normally open contact labeled "%Q0.0 'Wyscie0'" connected to a coil labeled "%Q0.0 'Wyscie0'". The message log at the bottom shows several messages, including successful deletions of blocks and successful connections to the PLC.

Message	Date	Time
"EC_Counter_0_DB_7" has been deleted successfully.	1/19/2018	9:30:52 AM
"EC_Counter_0_DB_8" has been deleted successfully.	1/19/2018	9:30:52 AM
"Block_1" has been deleted successfully.	1/19/2018	9:30:52 AM
"Block_2" has been deleted successfully.	1/19/2018	9:30:52 AM
"Block_3" has been deleted successfully.	1/19/2018	9:30:52 AM
"Block_4" has been deleted successfully.	1/19/2018	9:30:52 AM
"Block_5" has been deleted successfully.	1/19/2018	9:30:52 AM
"Main" was loaded successfully.	1/19/2018	9:30:52 AM
Loading completed (errors: 0; warnings: 0).	1/19/2018	10:31:52 AM
Connected to PLC, address IP=192.168.0.1.	1/19/2018	10:31:59 AM
Connection to PLC, address IP=192.168.0.1.	1/19/2018	10:32:27 AM
Connected to PLC, address IP=192.168.0.1.	1/19/2018	10:32:31 AM
Connection to PLC terminated.	1/19/2018	10:32:52 AM

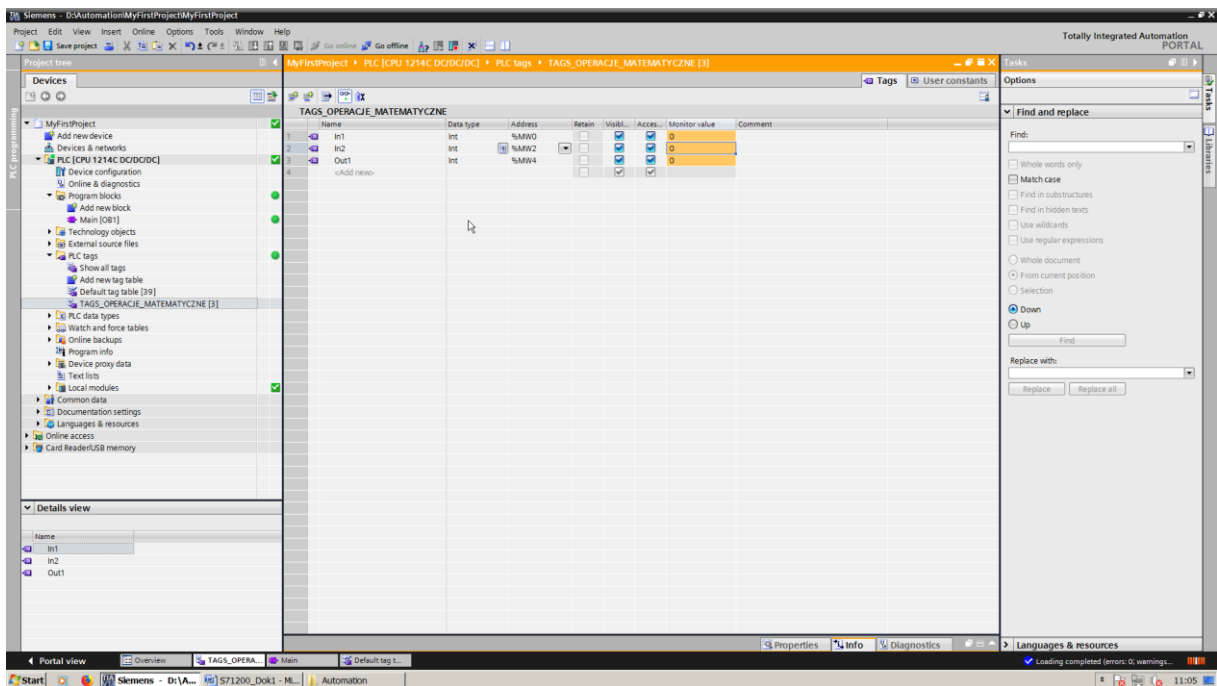
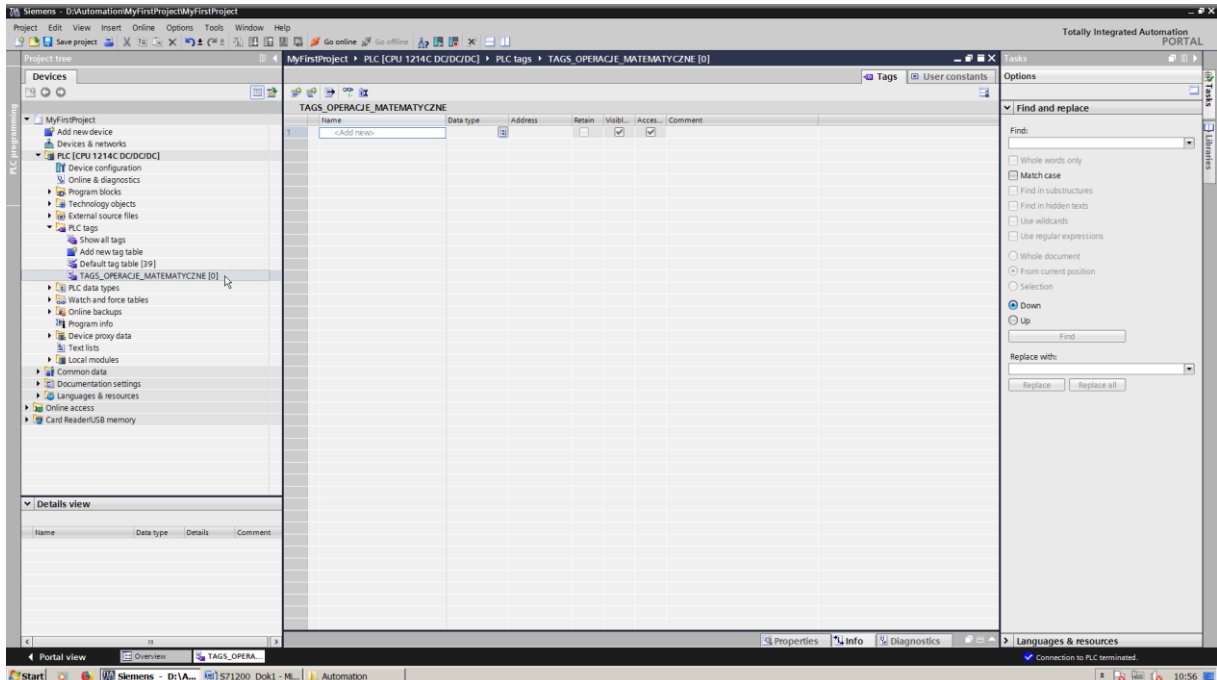
The screenshot shows the Siemens TIA Portal interface. The main window displays a ladder logic diagram for a block titled "Main Program Sweep (Cycle)". The diagram consists of a normally open contact labeled "%Q0.0 'Wyscie0'" connected to a coil labeled "%Q0.0 'Wyscie0'". The message log at the bottom shows several messages, including successful loading of the main program and successful connections to the PLC.

Message	Date	Time
"Main" was loaded successfully.	1/19/2018	9:30:52 AM
Loading completed (errors: 0; warnings: 0).	1/19/2018	10:31:52 AM
Connected to PLC, address IP=192.168.0.1.	1/19/2018	10:31:59 AM
Connection to PLC, address IP=192.168.0.1.	1/19/2018	10:32:27 AM
Connected to PLC, address IP=192.168.0.1.	1/19/2018	10:32:31 AM
Connection to PLC, address IP=192.168.0.1.	1/19/2018	10:32:52 AM
Start downloading to device.	1/19/2018	10:35:12 AM
PLC		
"Main" was loaded successfully.	1/19/2018	10:35:15 AM
The hardware configuration has not been loaded, because it is up-to-date.	1/19/2018	10:35:15 AM
Hardware configuration	1/19/2018	10:35:15 AM
Loading completed (errors: 0; warnings: 0).	1/19/2018	10:35:17 AM
Connected to PLC, address IP=192.168.0.1.	1/19/2018	10:35:22 AM

Wykonać następujące operacje logiczne

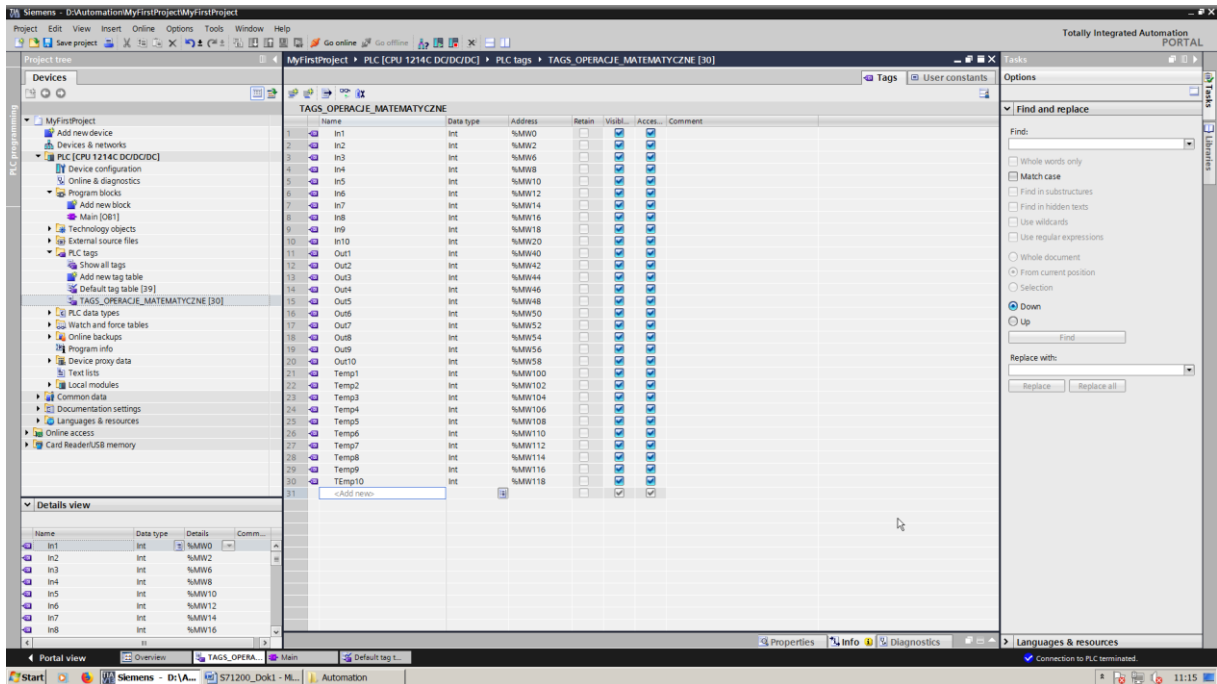
1.  $I0.0 \text{ AND } I0.1 \text{ AND } I0.2 \text{ THEN } Q0.0$
2.  $I0.0 \text{ AND NOT } I0.1 \text{ AND NOT } I0.2 \text{ THEN } Q0.1$
3.  $\text{NOT } I0.0 \text{ AND NOT } I0.1 \text{ OR NOT } I0.2 \text{ THEN } Q0.2$
4.  $I0.0 \text{ OR } I0.2 \text{ OR } I0.3 \text{ AND NOT } I0.4 \text{ AND } I0.5 \text{ THEN } Q0.3$
5.  $I0.0 \text{ AND } I0.1 \text{ OR } I0.1 \text{ AND NOT } I0.2 \text{ AND NOT } I0.3 \text{ THEN } Q0.4$
6.  $I0.0 \text{ AND } I0.1 \text{ AND NOT } I0.3 \text{ OR NOT } I0.0 \text{ AND NOT } I0.1 \text{ AND } I0.4 \text{ OR } I0.5 \text{ AND } I0.6 \text{ AND NOT } I0.7 \text{ THEN } Q0.5$
7.  $I0.0 \text{ AND NOT } I0.1 \text{ AND NOT } I0.2 \text{ OR NOT } I0.0 \text{ AND } I0.1 \text{ AND NOT } I0.2 \text{ OR NOT } I0.0 \text{ AND NOT } I0.1 \text{ AND } I0.2 \text{ THEN } Q0.5$
8.  $I0.0 \text{ AND } I0.1 \text{ AND } I0.2 \text{ AND } I0.3 \text{ NOT } I0.4 \text{ NOT } I0.5 \text{ OR } I0.6 \text{ AND NOT } I0.7 \text{ THEN } Q0.5$

## 15. Dodawanie zmiennych oraz operacja matematyczne na liczbach stałoprzecinkowych



The screenshot shows the Siemens TIA Portal interface. The main workspace displays a ladder logic network titled "Main Program Sweep (Cycle)". Network 1 contains two MOVE blocks. The first MOVE block has an EN input connected to a normally open contact labeled "%Q.0 Wejście0" and an IN input connected to "10". Its ENO output is connected to the IN input of the second MOVE block. The second MOVE block has an IN input connected to "20" and its ENO output connected to "20". The OUT1 output of the first MOVE block is connected to the IN1 input of an ADD block, and the OUT2 output of the second MOVE block is connected to the IN2 input of the same ADD block. The ADD block's OUT output is connected to "30". The right-hand pane shows the "Options" menu with "CPU operator panel", "Call environment", "Breakpoints", and "Call hierarchy" options. The status bar at the bottom indicates "Connected to PLC, address IP:192.168..."

This screenshot shows the same Siemens TIA Portal interface, but the main workspace now displays a single ladder logic network. Network 1 contains an ADD block. The EN input of the ADD block is connected to a normally open contact labeled "%Q.0 Wejście0". The IN1 input is connected to "10" and the IN2 input is connected to "20". The OUT output of the ADD block is connected to "30". The right-hand pane and status bar are identical to the previous screenshot, showing the "Options" menu and "Connected to PLC, address IP:192.168..." status.

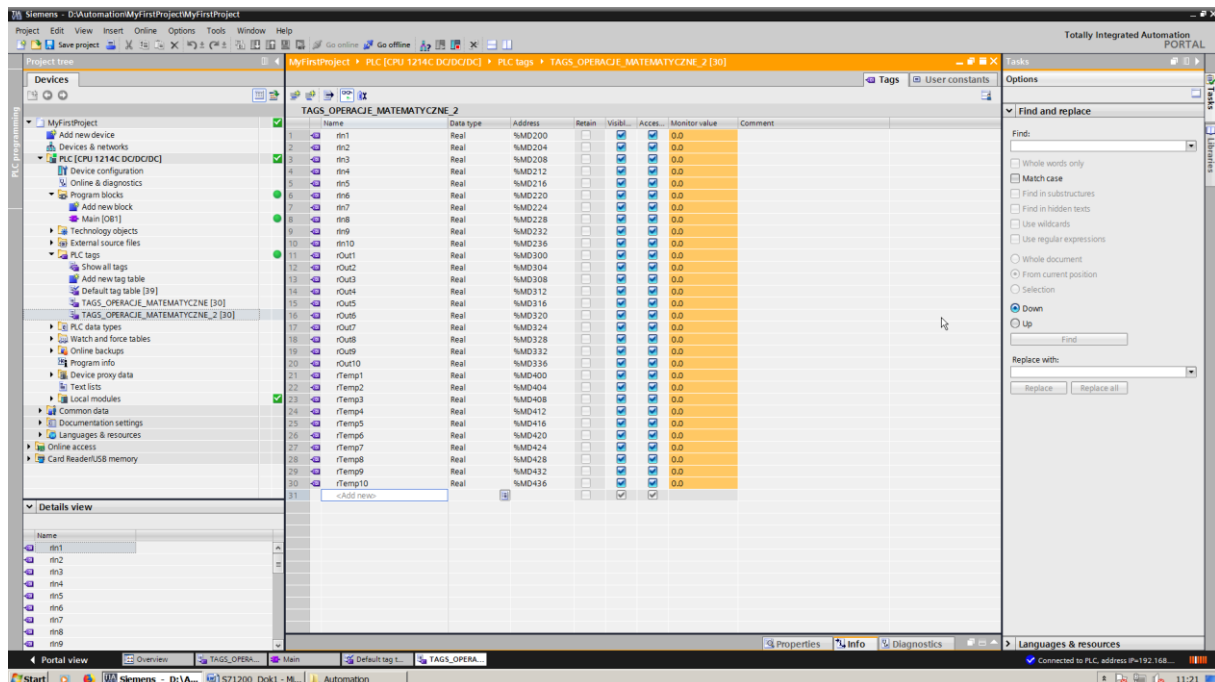


Wykonać następujące operacje matematyczne (**Pamiętaj aby przepisać wartości liczbowe do poszczególnych zmiennych In1,In2,...In10 za pomocą operacji MOVE**)

1.  $In1+In2 = Out1$
2.  $In1+In2 +In3+In4+In5+In6= Out2$
3.  $(In1-In2) +(In3-In4)+(In5-In6)= Out3$
4.  $In1*In2 = Out4$
5.  $In1*In2 + (In3+In4) = Out5$
6.  $In1*In2 + (In3+In4) *In5/In6= Out6$
7.  $(In1*In2)/In3 + (In4+In5) *In6/In7= Out7$
8.  $(In1*In2) + In3 + (In4+In5) *In6 +In7 + (In8+In9) = Out8$
9.  $(In1*In2)*(In3-In4) + (In4+In5) *(In6-In7) + In8+In9-In10= Out9$
10.  $(In1*In2)*(In3-In4) + (In4+In5) *(In6-In7) + In8+In9-In10= Out9$
11.  $((In1*In2)*(In3-In4) + (In4+In5) *(In6-In7) + (In8+In9-In10))/(In1+In2+In3)= Out10$

Wykonać powyższe operacja z wykorzystaniem bloku „CALCULATE”

## 16. Dodawanie zmiennych oraz operacja matematyczne na liczbach zmiennoprzecinkowych



Wykonać następujące operacje matematyczne (**Pamiętaj aby przypisać wartości liczbowe do poszczególnych zmiennych rIn1,rIn2,...rIn10 za pomocą operacji MOVE**)

1.  $\text{Sin}(rIn1) + \text{Sin}(rIn2) = rOut1$
2.  $\text{Sin}(rIn1) + \text{Cos}(rIn2) + \text{Sin}(rIn3) + \text{Cos}(rIn4) + \text{Sin}(rIn5) + \text{Cos}(rIn6) = rOut2$
3.  $\text{Sin}(rIn1) - \text{Sqrt}(rIn2) + \text{Sqrt}(\ln 3r - \ln 4 + rIn5 - rIn6) = rOut3$
4.  $\text{Sqrt}(rIn1 * rIn2) = rOut4$
5.  $\text{Cos}(\text{Sin}(rIn1 * rIn2) + (rIn3r + rIn4)) = rOut5$
6.  $\text{Sqrt}(rIn1 * rIn2) + (rIn3 + rIn4) * \text{Sqrt}(rIn5 / \text{Sin}(rIn6)) = rOut6$
7.  $(\text{Sin}(rIn1) * \text{Cos}(rIn2)) / \text{Sin}(rIn3) + (rIn4 + rIn5) * \text{Sqrt}(rIn6 / rIn7) = rOut7$
8.  $\text{Sin}(rIn1 * \text{Cos}(rIn2)) + \text{Sqrt}(rIn3) + \text{Cos}(rIn4 + rIn5) * \text{Sin}(rIn6) + rIn7 + \text{Sqrt}(rIn8 + rIn9) = rOut8$
9.  $\text{Sqrt}((rIn1 * rIn2) * (rIn3 - rIn4) + (rIn4 + rIn5) * (rIn6 - rIn7) + rIn8 + rIn9) - rIn10 = rOut9$
10.  $\text{Sin}((rIn1 * rIn2) * (rIn3 - rIn4)) + \text{Cos}((rIn4 + rIn5)) * \text{Cos}((rIn6 - rIn7)) + \text{Sqrt}(rIn8 + rIn9 - rIn10) = rOut9$

Wykonać powyższe operacja z wykorzystaniem bloku „CALCULATE”

## 16. Dodawanie zmiennych oraz operacja bitowe

The screenshot shows the 'TAGS\_OPERACJE\_LOGICZNE' table in the TIA Portal. The table lists various tags with their names, data types, addresses, and other properties.

Name	Data type	Address	Retain	Visibl.	Access	Comment
1	win1	Word	%MW500			
2	win2	Word	%MW502			
3	win3	Word	%MW504			
4	win4	Word	%MW506			
5	win5	Word	%MW508			
6	win6	Word	%MW510			
7	win7	Word	%MW512			
8	win8	Word	%MW514			
9	win9	Word	%MW516			
10	win10	Word	%MW518			
11	wOut1	Word	%MW600			
12	wOut2	Word	%MW602			
13	wOut3	Word	%MW604			
14	wOut4	Word	%MW606			
15	wOut5	Word	%MW608			
16	wOut6	Word	%MW610			
17	wOut7	Word	%MW612			
18	wOut8	Word	%MW614			
19	wOut9	Word	%MW616			
20	wOut10	Word	%MW618			
21	wTemp	Word	%MW620			
22	wTemp2	Word	%MW622			
23	wTemp3	Word	%MW624			
24	wTemp4	Word	%MW626			
25	wTemp5	Word	%MW628			
26	wTemp6	Word	%MW630			
27	wTemp7	Word	%MW632			
28	wTemp8	Word	%MW634			
29	wTemp9	Word	%MW636			
30	wTemp10	Word	%MW638			
31	<Add new>					

The screenshot shows the 'Main [OB1]' block interface in the TIA Portal. The 'Basic Instructions' panel is open, highlighting the 'AND' instruction.

**AND logic operation**  
ANDs the value at the IN1 input with the value at the IN2 input bit by bit and outputs the result at the OUT output.  
S7-1200, S7-1500

**AND\_AND logic operation**



The screenshot displays the Siemens TIA Portal software interface for a PLC project. The main workspace shows two networks of a ladder logic program:

- Network 1:** A comment reads "Main Program Sweep (Cycle)". It contains two MOVE instructions. The first MOVE instruction has an EN input from a normally open contact labeled "%I0.0 'Wejście0'" and an ENO output connected to the IN input of the second MOVE instruction. The second MOVE instruction has an IN input from a normally open contact labeled "I6K0078 '%MW500'" and an OUT output labeled "wOut1".
- Network 2:** A comment reads "AND Word". It contains an AND Word instruction with two normally open contacts as inputs: "I6K0078 '%MW500'" (labeled IN1) and "I6K0017 '%MW502'" (labeled IN2). The output of the AND instruction is labeled "wOut1".

The interface includes a project tree on the left, a top menu bar, and a right-hand options panel with sections for "CPU operator panel", "Call environment", "Breakpoints", and "Call hierarchy". The status bar at the bottom indicates the software is connected to a PLC at address IP:192.168... and the time is 11:55.