GHD Global Help Desk

ATV71 on Profibus with Siemens CPU 315-2 PN/DP

Configuration with TIA Portal V11

11/2012

Schneider Electric

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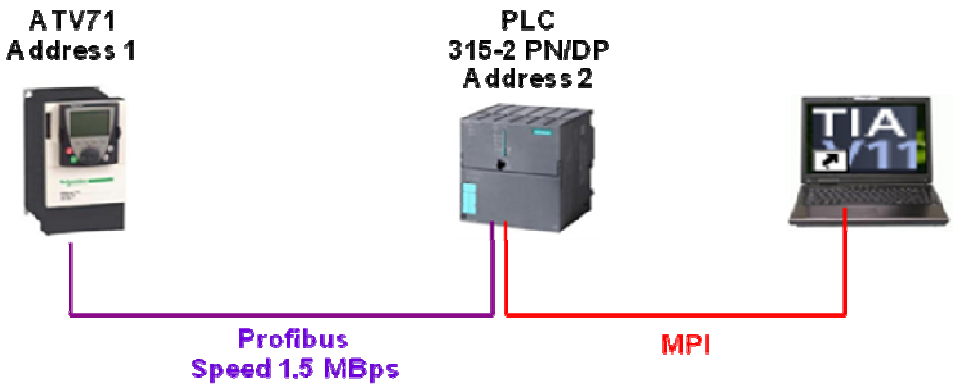
The goal of this document is to describe the configuration of ATV71 on Profibus with Siemens CPU 315-2 PN/DP with TIA Portal V11.

Network Topology used for this example



ATV71 configuration

Telegram Overview

The Profibus DPv1 card **(VW3A3307S371)** for Altivar 61 / 71 drives only supports types 3, 4, 5 and 8 PPO format (Parameter-Process Data-Object)

	PKW length (word)				PZD length (word)									
	1	2	3	4	1	2	3	4	5	6	7	8	9	10
PPO type 1														
PPO type 2														
PPO type 3														
PPO type 4														
PPO type 5														
PPO type 6														
PPO type 7														
PPO type 8														

PPO cyclic frames contain the periodic variables that are used for 2 types of service:

- I/O exchanges (PZD)
- Aperiodic exchanges (PKW) for parameter setting, configuration and diagnostics

PKW aperiodic exchanges are included in the cyclic frames and do not require special frames. An aperiodic exchange is used to read or write a parameter. The Altivar 61 / 71 PKW service does not conform to Profidrive.

For PPO type 5 and 8, there are 10 PZD for input and output in the frame, but only 8 in input and 8 in output can be used with ATV71. The 2 last PZD are not used.

Drive configuration

In this example, we will configure the PPO type 5.
The cyclic data by default will be kept.

NCA1 = 8501 (CMD) NMA1 = 3201(ETA)
NCA2 = 8602 (LFRD) NMA2 = 8604(RFRD)

The drive will be configured to be command by PLC via Profibus.

Drive command menu

CHCF = SIM
FR1 = COM card

Drive Communication scanner menu

	[COM. SCANNER INPUT] Only accessible via graphic display terminal	
nMA1	[Scan. IN1 address] Address of the 1st input word.	3201
nMA2	[Scan. IN2 address] Address of the 2nd input word.	8604
nMA3	[Scan. IN3 address] Address of the 3rd input word.	0
nMA4	[Scan. IN4 address] Address of the 4th input word.	0
nMA5	[Scan. IN5 address] Address of the 5th input word.	0
nMA6	[Scan. IN6 address] Address of the 6th input word.	0
nMA7	[Scan. IN7 address] Address of the 7th input word.	0
nMA8	[Scan. IN8 address] Address of the 8th input word.	0
	[COM. SCANNER OUTPUT] Only accessible via graphic display terminal	
nCA1	[Scan.Out1 address] Address of the 1st output word.	8501
nCA2	[Scan.Out2 address] Address of the 2nd output word.	8602
nCA3	[Scan.Out3 address] Address of the 3rd output word.	0
nCA4	[Scan.Out4 address] Address of the 4th output word.	0
nCA5	[Scan.Out5 address] Address of the 5th output word.	0
nCA6	[Scan.Out6 address] Address of the 6th output word.	0
nCA7	[Scan.Out7 address] Address of the 7th output word.	0
nCA8	[Scan.Out8 address] Address of the 8th output word.	0

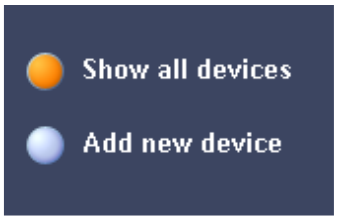
PLC configuration

PLC configuration

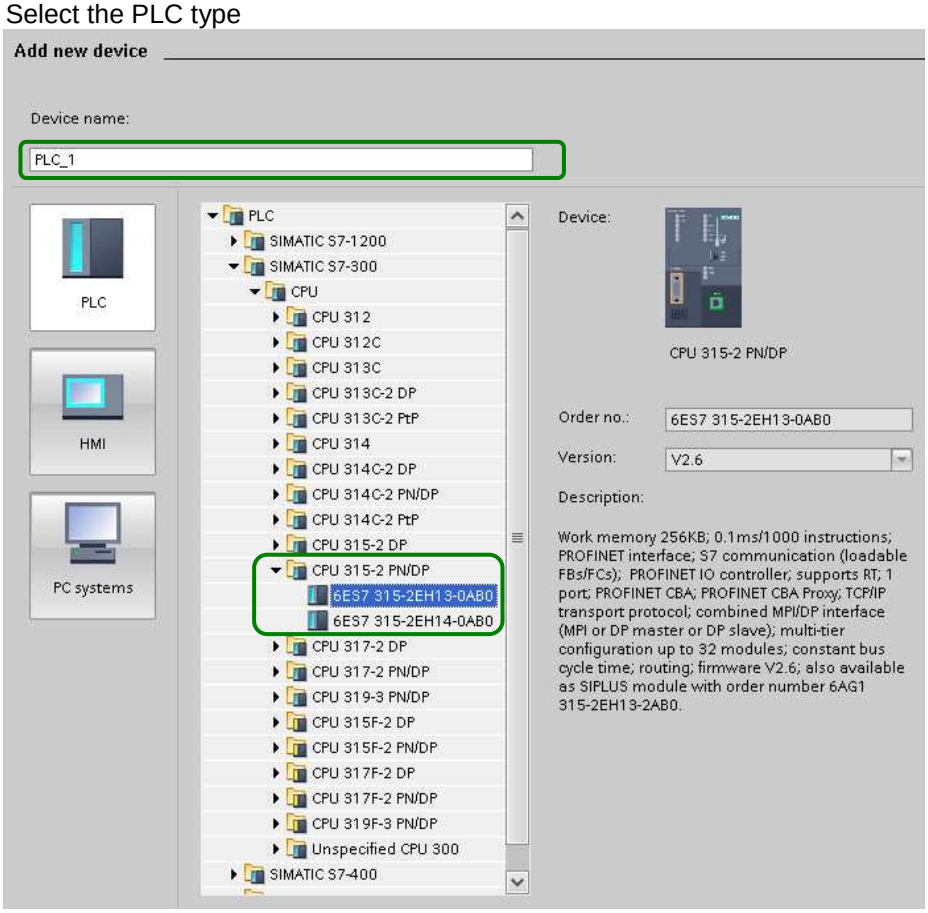
- Create a new project

- Configure the device

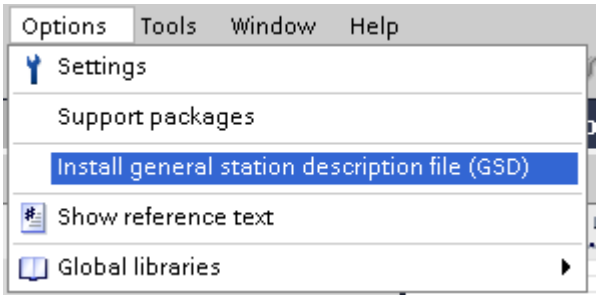
- Add a new device



❖ Select the PLC type



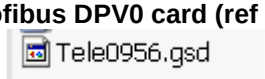
❖ Add the ATV71 Profibus GSD file



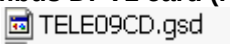
Follow the instruction to add the GSD file

Note:
For the ATV71 we have 2 type of Profibus card.
It's important to use the GSD file corresponding to your Profibus card.

- **Profibus DPV0 card (ref : VW3A3307)**



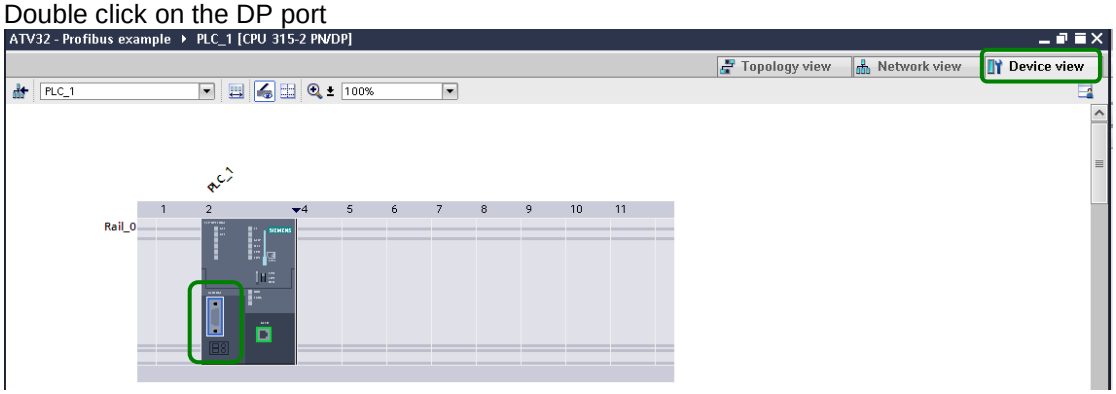
- **Profibus DPV1 card (ref : VW3A3307S371)**



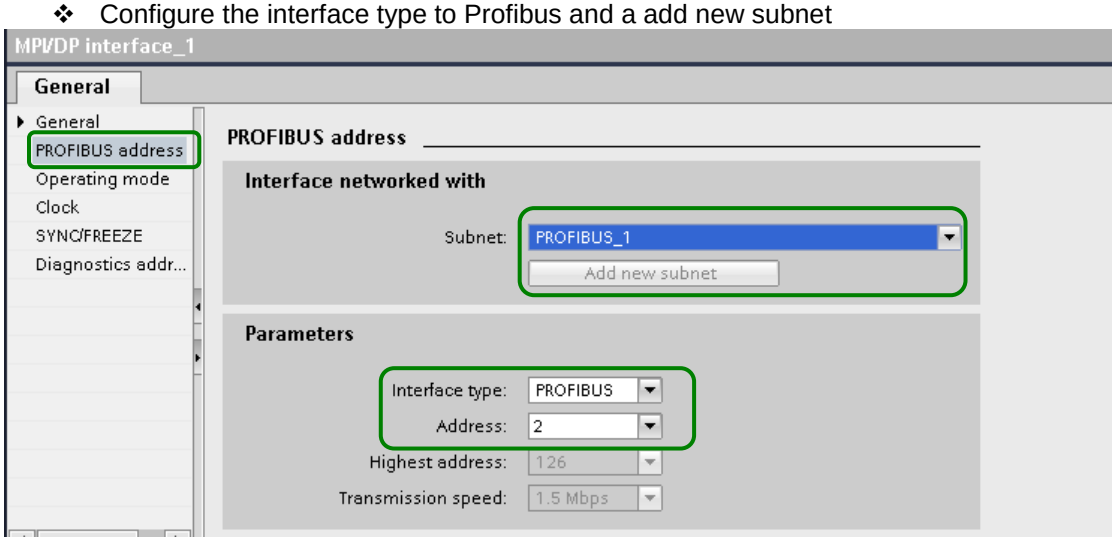
If you don't use the GSD file in relation with your card reference, the network will not work.

❖ Configure the DP port

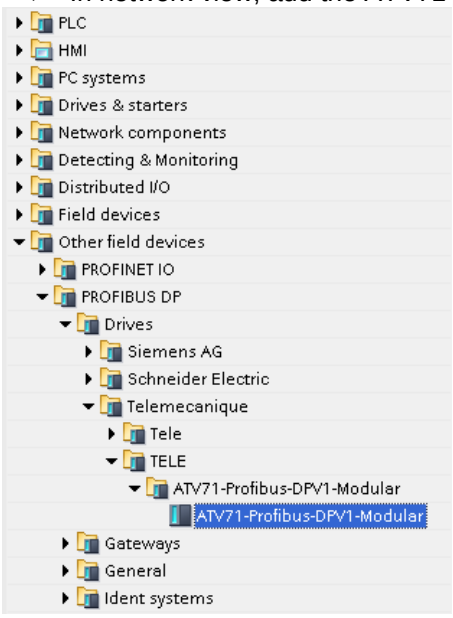
Double click on the DP port

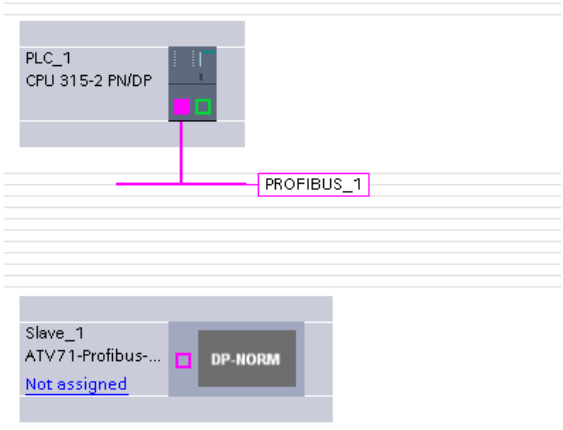


❖ Configure the interface type to Profibus and a add new subnet

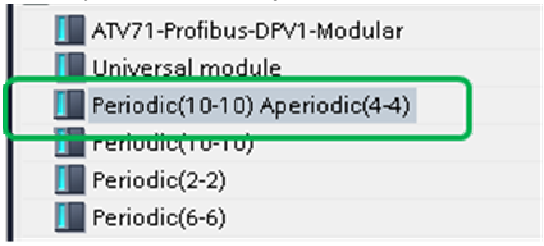


❖ In network view, add the ATV71 device from catalogue

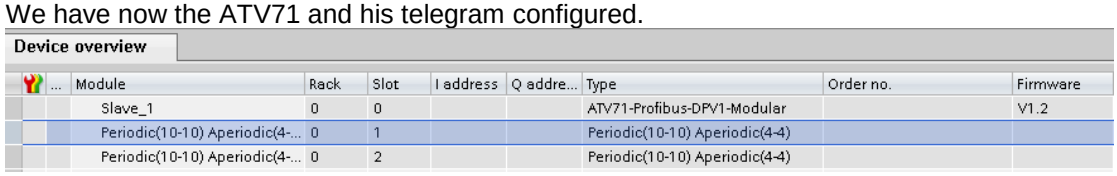




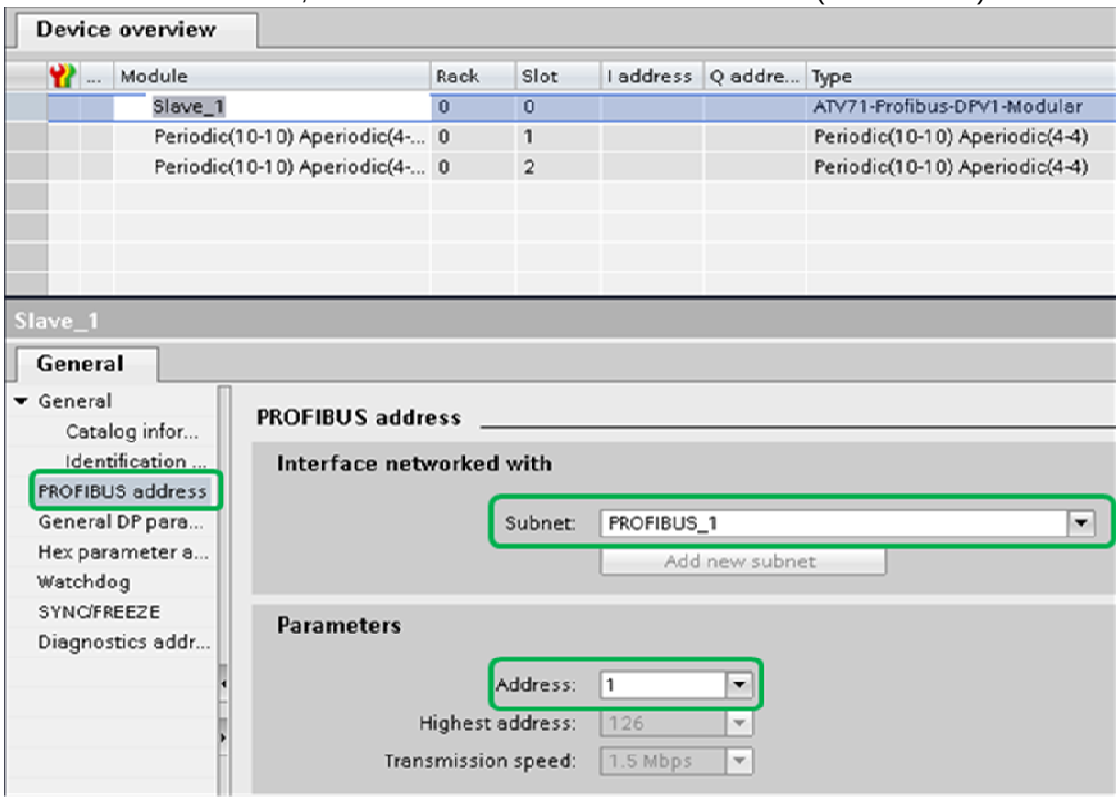
- In the ATV71 device view, we select the Telegram to be used
  Here PPO type 5 – 4 aperiodic and 10 periodic



We have now the ATV71 and his telegram configured.



- Inside the ATV71, define the Subnet and the device address (in our case 1)



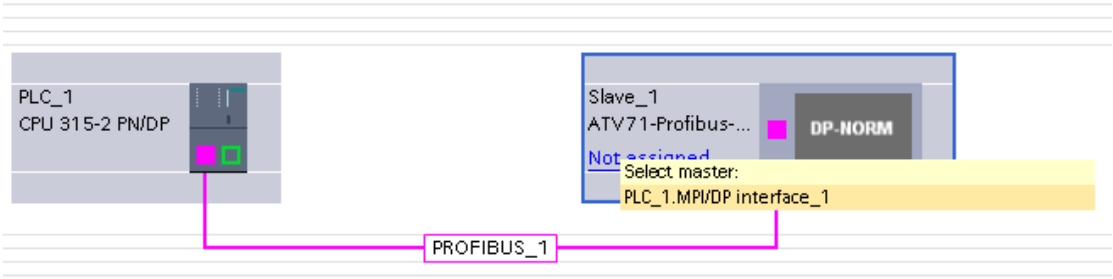
- The cyclic exchange have to be configured in the drive (in communication scanner menu)

NCA1 = 8501 (CMD) NMA1 = 3201(ETA)
NCA2 = 8602 (LFRD) NMA2 = 8604(RFRD)

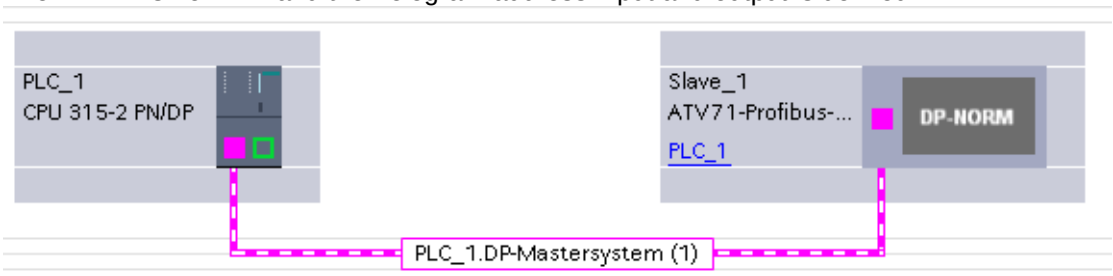
Here we kept the default value, but drive parameter can be added in empty field.

❖ In the network, view assign the PLC1 as master for the ATV71

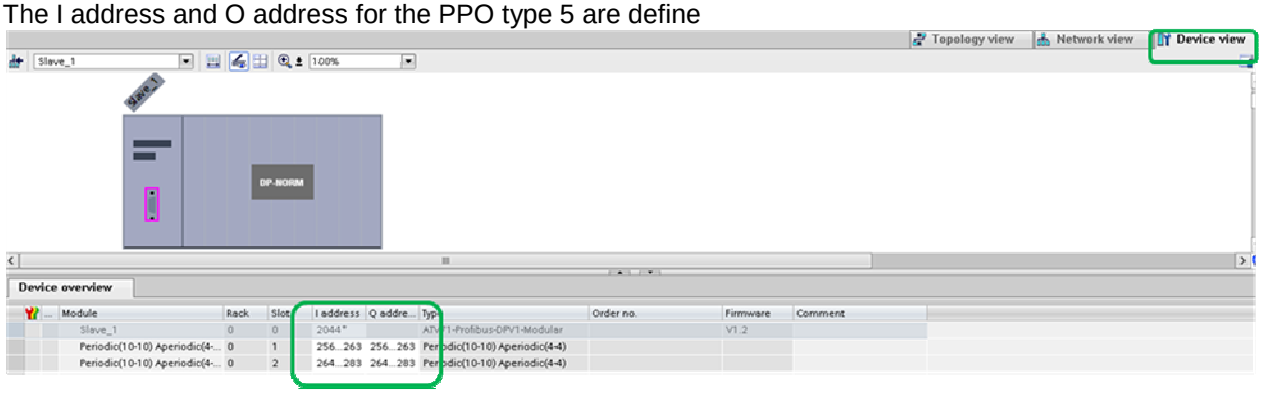
Click on “Not assigned” in ATV71 and select the PLC interface



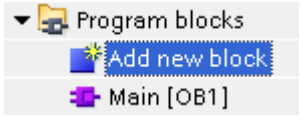
The ATV71 is now link and the Telegram address Input and output is defined.



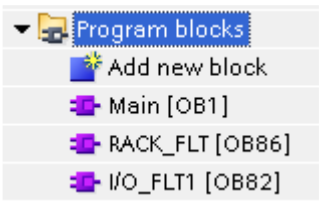
The I address and O address for the PPO type 5 are define



❖ Add OB block to avoid PLC stop in case of rack fault of I/O fault.

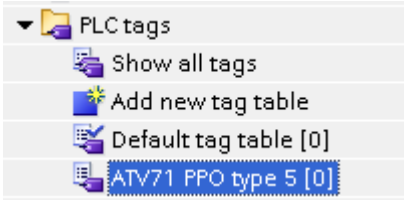


We will add OB82 and OB86



❖ Create PLC tag

Add a new PLC tag and rename it



The PPO type 5 input / output began at address 256

Device overview

	...	Module	Rack	Slot	I address	Q addre...	Type
		Slave_1	0	0	2044*		ATV71-Profibus-DPV1-Modular
		Periodic(10-10) Aperiodic(4-...	0	1	256...263	256...263	Periodic(10-10) Aperiodic(4-4)
		Periodic(10-10) Aperiodic(4-...	0	2	264...283	264...283	Periodic(10-10) Aperiodic(4-4)

The PKW part will be 256 up to 263 and cyclic exchange (NCAx and NMAx) will be 264 up to 282.

The PLC TAG are now define

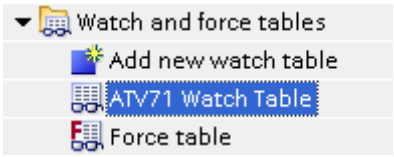
ATV71 PPO type 5

	Name	Data type	Address	Retain	Visibl...	Acces...
1	Input_PKE	Word	%IW256		☑	☑
2	Input_R/W	Word	%IW258		☑	☑
3	Input_PWE1	Word	%IW260		☑	☑
4	Input_PWE2	Word	%IW262		☑	☑
5	NMA1 (ETA)	Word	%IW264		☑	☑
6	NMA2 (RFRD)	Word	%IW266		☑	☑
7	NMA3	Word	%IW268		☑	☑
8	NMA4	Word	%IW270		☑	☑
9	NMA5	Word	%IW272		☑	☑
10	NMA6	Word	%IW274		☑	☑
11	NMA7	Word	%IW276		☑	☑
12	NMA8	Word	%IW278		☑	☑
13	Output_PKE	Word	%QW256		☑	☑
14	Output_R/W	Word	%QW258		☑	☑
15	Output_PWE1	Word	%QW260		☑	☑
16	Output_PWE2	Word	%QW262		☑	☑
17	NCA1(CMD)	Word	%QW264		☑	☑
18	NCA2(LFRD)	Word	%QW266		☑	☑
19	NCA3	Word	%QW268		☑	☑
20	NCA4	Word	%QW270		☑	☑
21	NCA5	Word	%QW272		☑	☑
22	NCA6	Word	%QW274		☑	☑
23	NCA7	Word	%QW276		☑	☑
24	NCA8	Word	%QW278		☑	☑

Even if in this table we have a monitoring mode, it's does not allow monitoring and using the input and output.

To do monitoring and writing of telegram, we have to use the “Watch and Force” table.

- Create a new table and rename it.

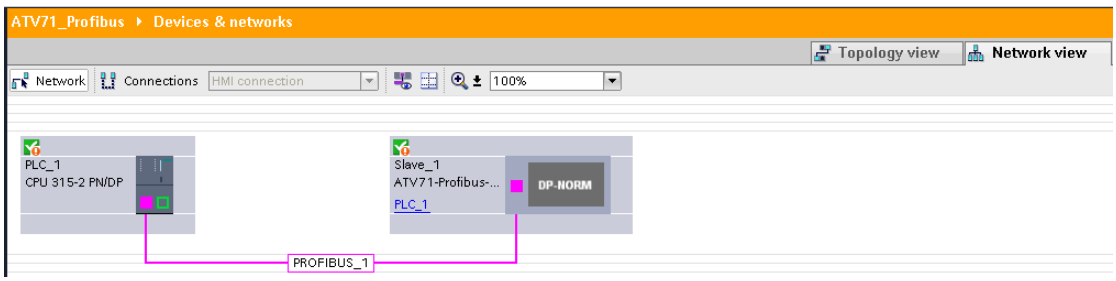


Inside this table we will add the tag define previously but we special syntaxes for using.
We add the same tag name but in adding **“:p”** at the end.

	Name	Address	Display format	Monitor value	Modify value
1	"Input_PKE":P	%IW256:P	Hex		
2	"Input_R/W":P	%IW258:P	Hex		
3	"Input_PWE1":P	%IW260:P	Hex		
4	"Input_PWE2":P	%IW262:P	Hex		
5	"NMA1 (ETA)":P	%IW264:P	Hex		
6	"NMA2 (RFRD)":P	%IW266:P	Hex		
7	"NMA3":P	%IW268:P	Hex		
8	"NMA4":P	%IW270:P	Hex		
9	"NMA5":P	%IW272:P	Hex		
10	"NMA6":P	%IW274:P	Hex		
11	"NMA7":P	%IW276:P	Hex		
12	"NMA8":P	%IW278:P	Hex		
13	"Output_PKE":P	%QW256:P	Hex		
14	"Output_R/W":P	%QW258:P	Hex		
15	"Output_PWE1":P	%QW260:P	Hex		
16	"Output_PWE2":P	%QW262:P	Hex		
17	"NCA1(CMD)":P	%QW264:P	Hex		
18	"NCA2(LFRD)":P	%QW266:P	Hex		
19	"NCA3":P	%QW268:P	Hex		
20	"NCA4":P	%QW270:P	Hex		
21	"NCA5":P	%QW272:P	Hex		
22	"NCA6":P	%QW274:P	Hex		
23	"NCA7":P	%QW276:P	Hex		
24	"NCA8":P	%QW278:P	Hex		

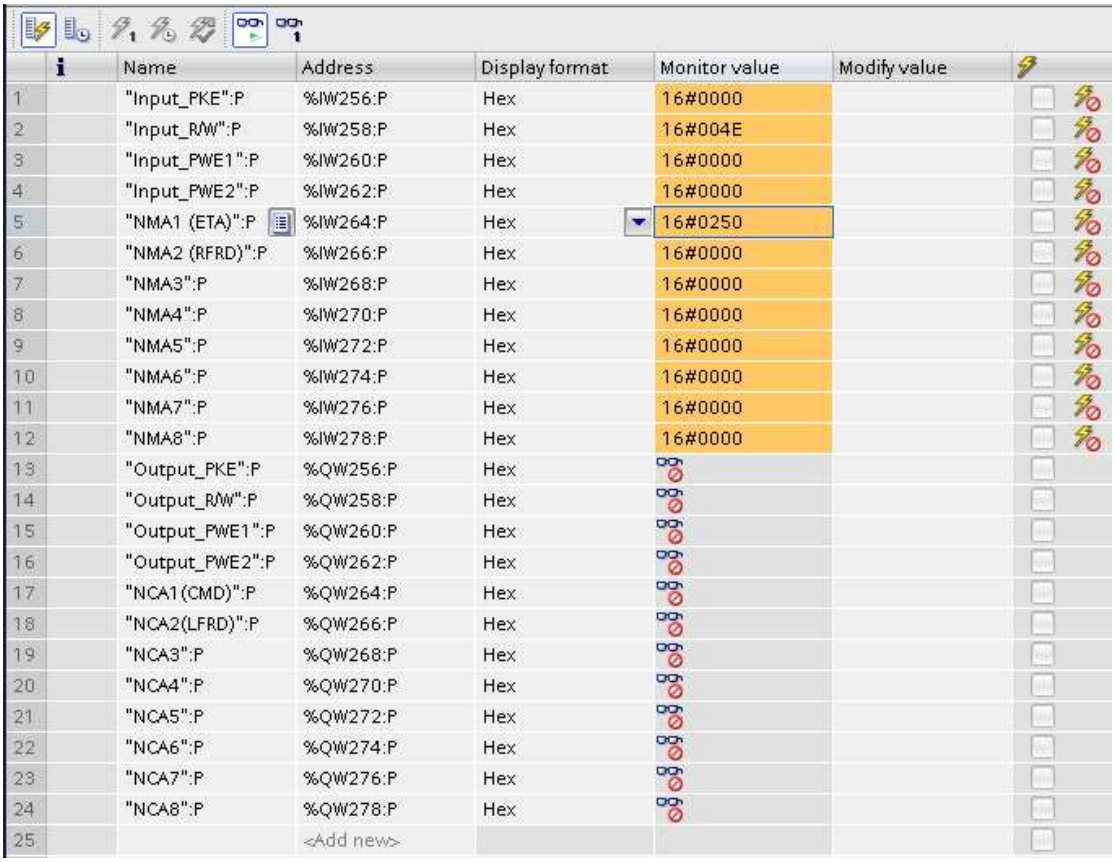
At this step the configuration is done. We can compile and download the program to the PLC.

Result after Download and connect:



Monitor and command the ATV71

When the monitoring is activated
We can see the ATV71 status word NMA1 = 16#250

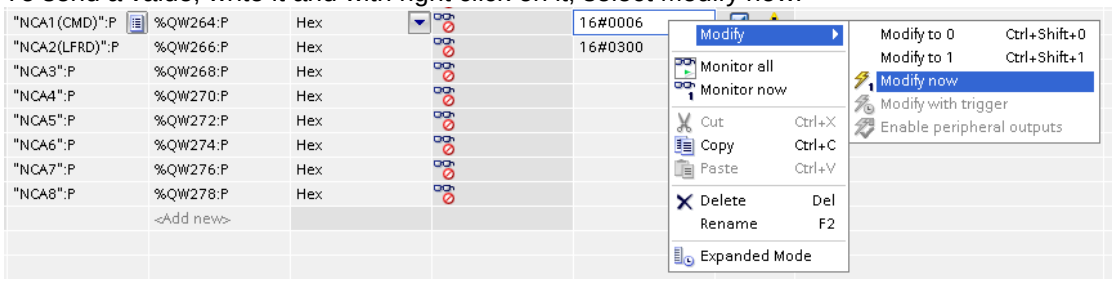


	i	Name	Address	Display format	Monitor value	Modify value	
1		"Input_PKE":P	%IW256:P	Hex	16#0000		
2		"Input_R/W":P	%IW258:P	Hex	16#004E		
3		"Input_PWE1":P	%IW260:P	Hex	16#0000		
4		"Input_PWE2":P	%IW262:P	Hex	16#0000		
5		"NMA1 (ETA)":P	%IW264:P	Hex	16#0250		
6		"NMA2 (RFRD)":P	%IW266:P	Hex	16#0000		
7		"NMA3":P	%IW268:P	Hex	16#0000		
8		"NMA4":P	%IW270:P	Hex	16#0000		
9		"NMA5":P	%IW272:P	Hex	16#0000		
10		"NMA6":P	%IW274:P	Hex	16#0000		
11		"NMA7":P	%IW276:P	Hex	16#0000		
12		"NMA8":P	%IW278:P	Hex	16#0000		
13		"Output_PKE":P	%QW256:P	Hex			
14		"Output_R/W":P	%QW258:P	Hex			
15		"Output_PWE1":P	%QW260:P	Hex			
16		"Output_PWE2":P	%QW262:P	Hex			
17		"NCA1(CMD)":P	%QW264:P	Hex			
18		"NCA2(LFRD)":P	%QW266:P	Hex			
19		"NCA3":P	%QW268:P	Hex			
20		"NCA4":P	%QW270:P	Hex			
21		"NCA5":P	%QW272:P	Hex			
22		"NCA6":P	%QW274:P	Hex			
23		"NCA7":P	%QW276:P	Hex			
24		"NCA8":P	%QW278:P	Hex			
25			<Add new>				

Start the Drive

With PPO type 5, the drive follow the CIA 402, so to start we need to give a speed reference (in NCA2) and send the value, 16#6, 16#7 and then 16#F in the NCA1.

To send a value, write it and with right click on it, select Modify now.



Step 1
I write CMD = 16#6 and LRFD = 16#300

"NCA1(CMD)":P	%QW264:P	Hex		16#0006
"NCA2(LFRD)":P	%QW266:P	Hex		16#0300

The ATV71 status word change

"NMA1 (ETA)":P	%IW264:P	Hex	16#0231

Step 2

I write CMD = 16#7

"NCA1(CMD)":P	%QW264:P	Hex		16#0007

The ATV71 status word change

"NMA1 (ETA)":P	%IW264:P	Hex	16#0233

Step 3

Finally I write CMD = 16#F

"NCA1(CMD)":P	%QW264:P	Hex		16#000F

The ATV71 Start. We can monitor the status word and the output speed

"NMA1 (ETA)":P	%IW264:P	Hex	16#0637
"NMA2 (RFRD)":P	%IW266:P	Hex	16#0300

Using of PKW to read and write drive parameters

The following table lists the controller-to-drive parameters in the input PKW area

PKW nr	PKW1	PKW2	PKW3	PKW4
PKE Name	PKE	R/W	PWE	PWE
Description	The Modbus address of the parameter is detailed here.	Request code: 0: no request 1: read 2: write	Not used	Parameter value

The following table lists the drive-to-controller parameters in the output PKW area

PKW nr	PKW1	PKW2	PKW3	PKW4
PKE Name	PKE	R/W	PWE	PWE
Description	Copy of the input PKE	Request code: 0: no request 1: read done 2: write done 7: read or write error	Not used	If the request is successful the parameter value is copied here.

Example to read ACC parameters (address 9001)

In Output PKE we write 9001 (dec)
In Output R/W we write 1 (for read request)

The result is located in Input PWE2 → 30 (for 3.0 sec)

Name	Address	Display format	Monitor value	Modify value
"Input_PKE":P	%IW256:P	DEC_unsigned	9001	
"Input_R/W":P	%IW258:P	DEC_unsigned	1	
"Input_PWE1":P	%IW260:P	DEC_unsigned	0	
"Input_PWE2":P	%IW262:P	DEC_unsigned	30	
"NMA1 (ETA)":P	%IW264:P	Hex	16#0250	
"NMA2 (RFRD)":P	%IW266:P	Hex	16#0000	
"NMA3":P	%IW268:P	Hex	16#0000	
"NMA4":P	%IW270:P	Hex	16#0000	
"NMA5":P	%IW272:P	Hex	16#0000	
"NMA6":P	%IW274:P	Hex	16#0000	
"NMA7":P	%IW276:P	Hex	16#0000	
"NMA8":P	%IW278:P	Hex	16#0000	
"Output_PKE":P	%QW256:P	DEC_unsigned		9001
"Output_R/W":P	%QW258:P	DEC_unsigned		1

Reading Result
Address to read
Read command

Example to Write ACC parameters (address 9001)

In Output PKE we write 9001 (dec)
In Output R/W we write 2 (for write request)
In Output PWE2 we write 35 (to write 3.5sec in ACC)

"Output_PKE":P	%QW256:P	DEC_unsigned		9001
"Output_R/W":P	%QW258:P	DEC_unsigned		2
"Output_PWE1":P	%QW260:P	DEC_unsigned		
"Output_PWE2":P	%QW262:P	DEC_unsigned		35

Address to write
Write command
Value to write

We can check the result

"Input_PKE":P	%IW256:P	DEC_unsigned	9001
"Input_R/W":P	%IW258:P	DEC_unsigned	2
"Input_PWE1":P	%IW260:P	DEC_unsigned	0
"Input_PWE2":P	%IW262:P	DEC_unsigned	35

We have ATV71 cyclic communication OK. The NCAX and NMAX can be used inside a program.
It's also possible to manage the PKW in order to read and write other drive parameters.