GHD Global Help Desk ATV71 on Profibus with Siemens CPU 315-2 PN/DP

# Configuration with TIA Portal V11

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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											1			
PPO type 3														
PPO type 4											]			
PPO type 5											<u>.</u>			
PPO type 6									[					
PPO type 7													1	
PPO type 8													2	

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	
608 I	[Scan. IN1 address]     Address of the 1 <sup>st</sup> input word.	3201
~N#2	[Scan. IN2 address]     Address of the 2 <sup>nd</sup> input word.	8604
0.0.8.3	[Scan. IN3 address]     Address of the 3 <sup>rd</sup> input word.	0
0.0.8.4	[Scan. IN4 address]     Address of the 4 <sup>th</sup> input word.	0
nRS	[Scan. IN5 address]     Address of the 5 <sup>th</sup> input word.	0
a N A 6	[Scan. IN6 address]     Address of the 6 <sup>th</sup> input word.	0
0.0.8.7	[Scan. IN7 address]     Address of the 7 <sup>th</sup> input word.	0
<u>0    R B</u>	[Scan. IN8 address]     Address of the 8 <sup>th</sup> input word.	0
	[COM. SCANNER OUTPUT]     Only accessible via graphic display terminal	
o E A I	[Scan.Out1 address]     Address of the 1 <sup>st</sup> output word.	8501
n [ R 2	[Scan.Out2 address]     Address of the 2 <sup>nd</sup> output word.	8602
n E R 3	U IScan Out3 address]	٥
	Address of the 3 <sup>rd</sup> output word.	
n E A 4	Address of the 3 <sup>rd</sup> output word.	0
o[84 o[85	Address of the 3 <sup>rd</sup> output word.	0
0ER4 0ER5 0ER5	Address of the 3 <sup>rd</sup> output word.	0 0 0
0ER4 0ER5 0ER5 0ER5	Address of the 3 <sup>rd</sup> output word.	0 0 0 0



# **PLC** configuration

## **PLC** configuration

Create a new project

Create new project	
Project name:	ATV32 - Profibus example
Path:	D/Temp/ITA portal
Author:	ADU
Comment:	A
	3
	Create

Configure the device



✤ Add a new device





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)

🖻 Tele0956.gsd

# Profibus DPV1 card (ref : VW3A3307S371) Interpretation of the second s

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

ATVJZ-FIUTIDUS example V FLC_1	ICFO JIJ-2 FINL	, r j								
								🛃 Topology view	📥 Network view	Device view
# PLC_1	🖽 🚮 🖽 🍳 ±	100%	•							
<sub>م</sub> دي	:									
RoiLO		5 6	7	8	9	10	11			

Configure the interface type to Profibus and a add new subnet

MPI/DP interface_1	
General	
General     PROFIBUS address	PROFIBUS address
Clock SYNC/FREEZE	Interface networked with Subnet: PROFIBUS_1
Diagnostics addr	Add new subnet
	Parameters
	Interface type:     PROFIBUS       Address:     2
	Highest address: 126  Transmission speed: 1.5 Mbps

In network view, add the ATV71 device from catalogue

🕨 🧊 PLC	
🕨 🫅 HMI	
🕨 🛅 PC systems	
🕨 🧊 Drives & starters	
Image:	PLC_1
🕨 🛅 Detecting & Monitoring	CPU 315-2 PN/DP
🕨 🛅 Distributed I/O	
Field devices	
🕶 🛅 Other field devices	
PROFINET IO	PROFIBUS_1
🕶 🛅 PROFIBUS DP	
🕶 🧊 Drives	
🕨 🛅 Siemens AG	
🕨 🛅 Schneider Electric	
🕶 🛅 Telemecanique	Slave_1
🕨 🧊 Tele	ATV71-Profibus 🔲 DP-NORM
TELE	Not assigned
🕶 🛅 ATV71-Profibus-DPV1-Modular	
ATV71-Profibus-DPV1-Modular	
🕨 🧰 Gateways	
🕨 🧊 General	
🕨 🛅 Ident systems	



 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.

Device overview								
🔐 Module		Rack	Slot	I address	Q addre	Туре	Order no.	Firmware
Slave_	1	0	0			ATV71-Profibus-DPV1-Modular		V1.2
Period	c(10-10) Aperiodic(4	. 0	1			Periodic(10-10) Aperiodic(4-4)		
Period	c(10-10) Aperiodic(4	0	2			Periodic(10-10) Aperiodic(4-4)		

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

Device overview						
📸 Module		Rack	Slot	laddress	Q addre	Туре
Slave_	1	0	0			ATV71-Profibus-DPV1-Modular
Periodi	c(10-10) Aperiodic(4	0	1			Periodic(10-10) Aperiodic(4-4)
Periodi	c(10-10) Aperiodic(4	0	2			Periodic(10-10) Aperiodic(4-4)
Slave_1						
General						
✓ General Catalog infor	PROFIBUS addr	ess _				
Identification	Interface net	vorked	with			
PROFIBUS address						
General DP para			Subnet:	PROFIBUS	_1	T
Hex parameter a		· ·		Add	new subne	et .
Watchdog						
SYNC/FREEZE	Parameters					
Diagnostics addr	. diamotoro					
	•		Address:	1	-	
	F F	lighest	address:	126	-	
	, Tran:	smissio	n speed:	1.5 Mbps	-	

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

NCA1	= 8501	(CMD)
NCA2	= 8602	(LFRD)

NMA1 = 3201(ETA) 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

PLC_1 CPU 315-2 PN/DP			Slave_1 ATV71-Profibus DP-NORM Not sessioned Select master: PLC_1.MPI/DP interface_1	
		PROFIBUS_1		

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.







The PPO type 5 input / output began at address 256 Device overview

· ***	Module	Rack	Slot	I address	Q addre	Туре
	Slave_1	0	0	2044*		ATV71-Profibus-DPV1-Modular
	Periodic(10-10) Aperiodic(4	0	1	256263	256263	Periodic(10-10) Aperiodic(4-4)
	Periodic(10-10) Aperiodic(4	0	2	264283	264283	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.

Address

Retain Visibl... Acces...

#### The PLC TAG are now define

# ATV71 PPO type 5 Name Data type

1	-00	Input_PKE	Word	%IW256	<b>~</b>	$\sim$
2	-	Input_R/W	Word	%IW258	<b>~</b>	$\checkmark$
3	-	Input_PWE1	Word	%IW260	$\checkmark$	$\checkmark$
4	-	Input_PWE2	Word	%IW262	$\checkmark$	$\checkmark$
5	-	NMA1 (ETA)	Word	%IW264	$\checkmark$	$\checkmark$
6	-	NMA2 (RFRD)	Word	%IW266	<b>~</b>	$\checkmark$
7	-	NMA3	Word	%IW268	$\checkmark$	$\checkmark$
8	-	NMA4	Word	%IW270	<b>~</b>	$\checkmark$
9	-	NMA5	Word	%IW272	<b>~</b>	$\checkmark$
10	-	NMA6	Word	%IW274	<b>~</b>	$\checkmark$
11	-	NMA7	Word	%IW276	<b>~</b>	$\checkmark$
12	-	NMA8	Word	%IW278	<b>~</b>	$\checkmark$
13	-	Output_PKE	Word	%QW256	<b>~</b>	$\checkmark$
14	-	Output_RW	Word	%QW258	<b>~</b>	$\checkmark$
15	-	Output_PWE1	Word	%QW260	$\checkmark$	$\checkmark$
16	-	Output_PWE2	Word	%QW262	<b>~</b>	$\checkmark$
17	-	NCA1(CMD)	Word	%QW264	$\checkmark$	$\checkmark$
18	-	NCA2(LFRD)	Word	%QW266	$\checkmark$	$\checkmark$
19	-	NCA3	Word	%QW268	$\checkmark$	$\checkmark$
20	-	NCA4	Word	%QW270	$\checkmark$	$\checkmark$
21	-	NCA5	Word	%QW272	$\checkmark$	$\checkmark$
22	-	NCA6	Word	%QW274	<b></b>	<b>~</b>
23	-	NCA7	Word	%QW276	<b>~</b>	$\checkmark$
24	-	NCA8	Word	%QW278	$\checkmark$	$\checkmark$

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.

i	Name	Address	Display format	Monitor value	Modify value	9
1	"Input_PKE":P	%IW256:P	Hex			2 %
2	"Input_RW":P	%IW258:P	Hex			0 %
3	"Input_PWE1":P	%IW260:P	Hex			2 %
4	"Input_PWE2":P	%IW262:P	Hex			2 %
5	"NMA1 (ETA)":P	%IW264:P	Hex			2 %
6	"NMA2 (RFRD)":P	%IW266:P	Hex			0 %
7	"NMAS":P	%IW268:P	Hex			2 %
8	"NMA4":P	%IW270:P	Hex			2 %
9	"NMA5":P	%IW272:P	Hex			2 %
10	"NMA6":P	%IW274:P	Hex			2 %
11	"NMA7":P	%IW276:P	Hex			2 %
12	"NMA8":P	%IW278:P	Hex			2 %
13	"Output_PKE":P	%QW256:P	Hex	000		
14	"Output_R/W":P	%QW258:P	Hex	<b>BBBBBBBBBBBBB</b>		
15	"Output_PWE1":P	%QW260:P	Hex	00		
16	"Output_PWE2":P	%QW262:P	Hex	5		
17	"NCA1 (CMD)":P	%QW264:P	Hex	50		
18	"NCA2(LFRD)":P	%QW266:P	Hex	00		
1.9	"NCA3":P	%QW268:P	Hex	oo oo		
20	"NCA4":P	%QW270:P	Hex	CO CO		
21	"NCA5":P	%QW272:P	Hex	00		
22	"NCA6":P	%QW274:P	Hex	00		
23	"NCA7":P	%QW276:P	Hex	CO CO		
24	"NCA8":P	%QW278:P	Hex	00		

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

Result after Download and connect:

ATV71_Profibus → Devices & networks		
		🛃 Topology view 🛛 🛔 Network view
Network 🔛 Connections HMI connection	🗏 🟥 🔍 ± 100% 🔽	
M	<b>V6</b>	
PLC_1 CPU 315-2 PN/DP	Slave_1 ATV71-Profibus DP.NOPM	
	PLC_1	
PROFIBUS_1		



### Monitor and command the ATV71

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

1 10 9, 9. 27 Name i Address Display format Monitor value Modify value 9 1 "Input PKE":P %IW256:P Hex 16#0000 % 2 "Input\_RW":P %IW258:P Hex 16#004E % 8 "Input\_PWE1":P % %IW260:P Hex 16#0000 4 %IW262:P % "Input\_PWE2":P 16#0000 Hex "NMA1 (ETA)":P 🔳 %IW264:P 5 % Hex ▼ 16#0250 6 "NMA2 (RFRD)":P %IW266:P Hex 16#0000 % 73 "NMA3":P %IW268:P 16#0000 90 Hex 8 "NMA4":P %IW270:P Hex 16#0000 % 9 "NMA5":P %IW272:P 16#0000 % Hex 10 %IW274:P % "NMA6":P Hex 16#0000 11 "NMA7":P %IW276:P Hex 16#0000 30 12 "NMA8":P %IW278:P Hex 16#0000 % 00 13 "Output\_PKE":P %QW256:P Hex 000 14 "Output\_RW":P %QW258:P Hex 000 15 "Output\_PWE1":P %QW260:P Hex 000 16 "Output PWE2":P %QW262:P Hex 60 17 "NCA1(CMD)":P %OW264:P Hex 000 18 "NCA2(LFRD)":P %QW266:P Hex 000 "NCA3":P 19 %QW268:P Hex 00 "NCA4":P %QW270:P 20 Hex 09 09 09 21 "NCA5":P %QW272:P Hex 22 "NCA6":P %QW274:P Hex 23 "NCA7":P %QW276:P Hex 24 "NCA8":P %QW278:P Hex 60 25 «Add news

### 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.

"NCA1(CMD)":P 🔳	%QW264:P	Hex	- 8	16#0006				Madifuta 0	owl, chife, o
"NCA2(LFRD)":P	%QW266:P	Hex	8	16#0300		louny		Modify to 0	Ctrl+Shilt+0
"NCA3":P	%QW268:P	Hex	6		🌄 М	onitor all		Modify now	CEN+SHIRE+1
"NCA4":P	%QW270:P	Hex	8		1 M	lonitor now		Modify with tric	Ider
"NCA5":P	%QW272:P	Hex	8		Xo	ut	Ctrl+X	B Enable periph	eral outputs
"NCA6":P	%QW274:P	Hex	00		🛅 0	ору	Ctrl+C	~	
"NCA7":P	%QW276:P	Hex	8		💼 Pi	aste	Ctrl+V		
"NCA8":P	%QW278:P	Hex	8		X D	elete	Del		
	<add new=""></add>				Re	ename	F2		
						unandad M			
						xpanded Mi	ode		

#### Step 1

write CMD = 16#6 and LRFD = 16#300								
"NCA1(CMD)":P	%QW264:P	Hex	0	16#0006	<b></b>			
"NCA2(LFRD)":P	%QW266:P	Hex	00	16#0300		<u>^</u>		

The ATV71 status word change

Schneider						ŦĮĮ,			
"NMA1 (ETA)":P	%IW264:P	Hex		16#02	231				%
<b>Step 2</b> I write CMD = 16	#7								
"NCA1 (CMD)":P	%QW264:P		Hex		00		16#0007		
The ATV71 statu "NMA1 (ETA)":P	s word change %IW264:P		Hex		16#0233				
<b>Step 3</b> Finally I write CM	ID = 16#F							_	
"NCA1(CMD)":P	%QW264:P	Hex	_	0		16#000F	:		4
The ATV71 Start "NMA1 (ETA)":P	. We can monitor %IW264:P	the Hex	status word	and th	ne output sp	beed			10
"NMA2 (RFRD)":P	%IW266:P	Hex		16#03	00			$\square$	%

### 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  $\rightarrow$  30 (for 3.0 sec)

			· /		
Name	Address	Display format	Monitor value	Modify value	
"Input_PKE":P	%IW256:P	DEC_unsigned	9001		
"Input_RW":P	%IW258:P	DEC_unsigned	1		
"Input_PWE1":P	%IW260:P	DEC_unsigned	0		
"Input_PWE2":P	%IW262:P	DEC_unsigned	30 🔶	1	-Reading Result
"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	-Address to read
"Output_RW":P	%QW258:P	DEC_unsigned	0	1 🗲	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	0	9001		<ul> <li>Address to write</li> </ul>
"Output_RW":P	%QW258:P	DEC_unsigned	8	2	<b></b>	- Write command
"Output_PWE1":P	%QW260:P	DEC_unsigned	8			
"Output_PWE2":P	%QW262:P	DEC_unsigned	<b>0</b>	35	<b></b>	<ul> <li>Value to write</li> </ul>

#### We can check the result

"Input_PKE":P	%IW256:P	DEC_unsigned	9001	-
"Input_RW":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.