PNOZmulti 2 Profinet communication with S7-1500 PLC in TIA Portal V13



Product Type: Name:

Manufacturer:

PNOZmulti 2 PNOZ m ES Profinet Pilz GmbH & Co. KG, Safe Automation

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Release	Date	Changes	Chapter
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Validity of Application Note

This present Application Note is valid until a new version of the document is published. This and other Application Notes can be downloaded in the latest version and for free from <u>www.pilz.com</u>.

For a simple search, use our <u>content document (1002400)</u> or the <u>direct search function</u> in the download area.

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We are grateful for any feedback on the contents.

November 15

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Abbreviations

GSD	General Station description file
SFB	System function block
SCL	Structured control language

1. Useful documentation

Reading the documentation listed below is necessary for understanding this application note. The availability of the indicated tools and safe handling are also presupposed with the user.

1.1. Documentation from Pilz GmbH & Co. KG

No.	Description	Item No.
1	Pilz international homepage, download section	www.pilz.com
2	PNOZmulti 2 Communication Interfaces	1002971-EN-XX
3	Operating Manual PNOZ m B0	1002660-EN-XX
4	Operating Manual PNOZ m ES Profinet	1003386-EN-XX

1.2. Documentation from other sources of information

No.	Description	Item No.
1	SIMATIC portal "Automation Systems" (international)	
	Internet-Link to "www.automation-siemens.com"	

2. Configuration

2.1. Used Hardware

No.	Descriptions	Order number	Version	Number
1	Siemens SIMATIC S7-1518F-4 PN/DP	-	1.6	1
2	PNOZ m B0	772100	1.2	1
3	PNOZ m ES Profinet	772138	1.0	1

2.2. Used Software

No.	Descriptions	Order number	Version
1	Siemens TIA Portal	-	13 Update 1
2	PNOZmulti Configurator	-	9.4.0 build 6

2.3. Profinet specific parameters

For a basic communication, the default parameters of the engineering tool are used. Only for the addressing purpose we assign specific Profinet names to each device.

2.4. Device properties

No.	Device	Profinet name	IP-Address	Subnet mask
1	Siemens SIMATIC S7-1518F-4 PN/DP	6es7	169.254.60.151	255.255.0.0
2	PNOZ m ES Profinet	mes-dp-net	169.254.0.1	255.255.0.0

2.5. Topology



Fig. 1: Topology of Profinet

3. Preface

This document provides a Step by Step example how to communicate between Siemens S7-1500 and PNOZ multi 2 with Profinet connection.

- Prepare PNOZ m B0 base module for Profinet communication (see Chapter 4.1)
- Build up a simple Profinet connection in TIA Portal (see Chapter 4.2)

The initial S7-Hardware configuration is not part of this "Application Note".

In order to reproduce this application, the prerequisites must be met as described in Chapter 2

4. Application Task

4.1. Prepare PNOZ m B0 base module for Profinet communication

Start PNOZmulti Configurator and create the hardware configuration

j Untitled0* - PNOZmulti Configura	tor						
roject Edit Tools Windows H	Help						
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🖥 Hardware Configuration 🛛 🔪	📋 User Program						
Modules		E Repos	ition Module				E
a 🧼 Base Units (RS 232)		0	Drag/Drop module to new position I	etween/at the end of	f existing modules		
Base Unit PNUZ mIp Base Unit Not Expandabl	e PNOZ m0p						
🚞 Base Unit Presses PNOZ	m2p						
Base Unit Burner Manage Base Units (Ethernet)	ement PNOZ m3p						
Base Unit PNOZ m1p ET	4						
Base Unit Not Expandabl Rese Unit Process DNO7	e PNOZ mûp ETH						
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a 🍥 Base Units (Mini)		and the local division of the					
Base Unit Mini PNOZ mr Base Unit Mini PNOZ mr	n0p-T						
🚦 Base Unit Mini PNOZ mr	n0.1p						
Base Unit Mini PNOZ mr A ^(O) Base Units (PNOZmulti 2)	n0.2p	pilz					
🚦 Base Unit PNOZ m B0							
Module Description							
A Description of the		* Config	gured Hardware				
		E	Module Name	Version	Equipment Identifier	Location Description	
	DNO7 m B0						×
(四百万万万日, 四日,	FILOE III DO						×
ER R R R B B B B B	PROZINIBO						1 X
	Product number: 772100						×
	Product number: 772100						
	Product number: 772100						
	Product number: 772100					,	

Fig. 2: Drag and drop the "Base Unit PNOZ m B0" to the workspace



Fig. 3: Drag and drop the "Fieldbus module PNOZmulti 2" left beside the base module

Create a user program for the base module. At least one security function must exist in the user program.

🔋 User Program						
🗕 Project Manager 🕼 🏼 🖉	📋 (Page 1) 🛛 🔶					🥵 💼 🔪
PNOZ_m_B0_Profinet.mpn					Les De st.ce	Function Elements
User Program (Page 1)		1 🗾				E-STOP
	(st. 199	je –				Safety Gate
						Light Curtain
		J	 	 		Two-Hand Button
	<u></u>	R I				Enable Switch

Fig. 4: Example for a user program for the base module

💌 ເ	Intitled0* - PNOZmulti Configurator			
Pro	ect Edit Tools Windows Help			
1	New	Ctrl+N	1	41 🏟 🚔 Com4 (USB) 🚽 📲 🔚 🍓 🙂 🛛 🕐
6	Open	Ctrl+O		
	Close	Ctrl+W		
	Save	Ctrl+S		Complete naturale
	Save As		Î	You can extend/reduce the number of virtual I/Os by toggling the extended/reduced number in the table's I/O column.
2	Import	•		
4	Export	+		
8	Create and Print Reports	Ctrl +P		
	Change password level		-	
6	Write-Protect			
æ	Read-Protect			
0-	Project Properties		=	
-1-1-1	Configure Project Ethernet Connection			
-9	Exit	Alt+F4		
•	Semiconductor Output Module P	NOZ m EF 8DI	4D(+	

Fig. 5: Save the actual configuration

😸 Set Passwords 🛛 💌
Level 1
Password:
Confirmation:
Level 2
Password:
Confirmation:
Level 3
Password:
Confirmation:
<u>OK</u> <u>C</u> ancel <u>H</u> elp

Fig. 6: Define password for each security level

Save A	5		×
Details			
Name:	PNOZ_m_B0_Profinet	Ι	
Path:	C:\Users\cs-sat-lab\Pilz		Browse

Fig. 7: Define the name of the project to save

Choose the USB connection which applies to the base module and go online.



Fig. 8: USB connection with base module

> Download hardware configuration and user program to base module

PNOZ_m_B0_Profinet.mpnoz - PNOZmulti Configurator	
Project Edit View Tools PNOZmulti Windows Macro Diagnostics Help	
🗂 🗁 🔄 🖕 👘 🏦 🗙 🖓 🏷 🔍 🍳 🖏 🚳 📣 🤜 🚳 🌆	🖓 🐴 🌠 🌰 🕼 COM4 (USB) 🚽 🖓 🚱 💻
	Download to Hardware

Fig. 9: Download to hardware

4.2. Build up a simple Profinet connection in TIA Portal

Install the GSD-file for the fieldbus module into TIA.

M Siemens - PNOZ m ES Profinet				_ - ×
Project Edit View Insert Online	Options Tools Window Help		-	atally Integrated Automation
📑 🎦 🔚 Save project 🔳 🐰 🗐 🛛	Y Settings	Go online 🖉 Go offline 🛛 🛔 🖪 🤰	< = II	PORTAL
Project tree 🛛	Support packages	rks	_ # = ×	Hardware catalog 🛛 🗊 🕨 🕨
Devices	Install general station description file (GSD)	🚪 Topology view	🚠 Network view 📑 Device view	Options 😐
100	Show reference text		Topology overview	Har
1 ks	Global libraries	^	Port interconnection	✓ Catalog
PNOZ m ES Profinet Add new device Devices 3 networks Devices antworks Devices onfiguration Donine & diagnostics Safety Administration Donine & diagnostics Safety Administration Device configuration Device configuration	6es7 CPU 1518F4 PN	-	Y Device / port Slot > \$71500/ET200MP-Station_1	csearchs Image: Controllers • Iffler • Image: Controllers • Image: Controllers • Image: Controllers <

Fig. 10: Start installing GSD-file

Install general s	station descript	ion file			×
Source path:	C:\Temp\2014-07	7-24			
Content of im	ported path				
File		Version	Language	Status	Info
GSDML-V2.3-	MES-PROFINET-2	06/05/2014 16:47:00	English	Not yet installed	mES Interface Module
				_	nstall Cancel

Fig. 11: Navigate to the directory where the GSD-file is stored¹ and start installation

Add the "PNOZ m ES Profinet" device to the project



Fig. 12: Adding "PNOZ m ES Profinet" device from the hardware catalogue

¹ The GSD-file can be downloaded from the Pilz homepage

- Mi Siemens PNOZ m ES Profinet a x Totally Integrated Automation PORTAL 🧏 🔒 Save project 🚢 🗶 🏥 🗈 🗙 🏷 🖕 🥂 🎜 🔛 🖬 🖉 🕼 e 🔊 Go of PNOZ m ES Profinet > Unassigned devices > mes-profinet _ # = X 🛃 Topology view Device view Devices A Network view Options 900 Device overview ╆ mes-profine 🔽 🖽 🛋 🖼 🖬 ~ ₩ Module • mes ✓ Catalog PNOZ m ES Profinet mes-profinet
 PN-IO
 4 Input Bytes, Bits 0..31_1 ini jinit PNOZ m ES Profinet
 Add new device
 Comparison of the service
 Comparison of the service
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 Im Field devices
 Im Field devices
 Im Additional Ethernet (
 Im PROFINET IO
 Im Drives
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 Im Encoders 4 Input Bytes, Bits 0.31_1 4 Input Bytes, Bits 32.63_1 4 Input Bytes, Bits 43.95_1 4 Input Bytes, Bits 44.95_1 4 Output Bytes, Bits 0.31_1 4 Output Bytes, Bits 0.32_63_1 4 Output Bytes, Bits 9.4.95_1 4 Output Bytes, Bits 9.4.95_1 1 Output Bytes, Bits 9.12_1.1 1 Output Bytes, Dits 26.12_1.1 2 In-16 Output, FNO2 Table... Online tools General
 General Description
 Descript Tasks Pilz GmbH & Co. KG ♥ Pilz GmbH & Co. KG ♥ PNOZmulti 2 ▶ PNOZmulti 2 ♥ PNOZmulti 2 ♥ PNOZmulti 2 LC data types
 Watch and force tables
 Traces
 Traces
 Program info
 PLC alarms
 Text lists
 Local modules
 Watch and modules I 2
 Module
 4 input Bytes, Bit...

 4 input Bytes, Bit...
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 4 output Bytes, Bit...
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 4 Output Bytes,...
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 4 Output Bytes,...
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 4 Output Bytes,...
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 2 Output Bytes,...
 1 Output Bytes,...
 Libraries Imassigned devices
 Image: Common data • 🛅 Documentation settings Card Reader/USB memory 1 2 In- 15 Outpit, P... 🕨 🛅 Ident
- > Add available modules to the "PNOZ m ES Profinet" device

Fig. 13: Adding modules to the "PNOZ m ES Profinet" device

Define PROFINET device name to use for the "PNOZ m ES Profinet" device

mes-profinet [Module]	💁 Properties 🖄 Info 😵 Diagnostics 💿 🗉	-	
General IO tags	System constants Texts		
▼ General	 IP address is set directly at the device 	▲ n	100
Catalog information		Ties	200
 PROFINET interface [X1] 	PROFINET		
General			ſ
Ethernet addresses	Generate PROFINET device name automatically	Ξ	
 Advanced options 	PROFINET device name mes-do-net		
Interface options			
Media redundancy	Converted name: mes-ap-net L ₂ 2		
Isochronous mode	Device number: 0		



> Search online for accessible devices and assign name to the PNOZ m ES Profinet device



Fig. 15: Start searching for accessible devices

Accessible devices	Accessible nodes of	Type of the PG/PC inte PG/PC inte the selected interface:	erface: 🕊 PN/IE erface: 🚺 Realto	ek PCIe GBE Family Co	× ntroller ▼
	Device	Device type	Туре	Address	MAC address
	Accessible device	PNOZ m ES Profinet	ISO	-	C8-3E-A7-00-00-85
	6es7	CPU 1518F-4 PN/DP	PN/IE	169.254.60.151	28-63-36-80-02-E3
E shakara					
Flash LED					
					<u>R</u> efresh
Online status information	n:				
range and the second se	ormation				^
Scan and information	n retrieval completed.				
					*
Display only problem	reports				
				E	<u>S</u> how <u>C</u> ancel

Fig. 16: List of found devices

Mi Siemens - PNOZ m ES Profinet								_ # ×
Project Edit View Insert Online Options Tools Window Help								
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Project tree	∎ ◀ Online access → Rea	Itek PCIe GBE Family (Controller	Accessible devi	ice [C8-3E-A7-00-00-	85]		× (
Devices								
	Diagnostics General	Assign name						Online t
🚊 🕨 🏣 PLC tags	✓ Functions							0
PLC data types	Assign IP address							~
Watch and force tables	Assign name			Con	figured PROFINET d	evice		
Traces	Reset to factory setting	ngs			PROFINET device name:	mes-dp-net		
Device proxy data					Type	PhiOZ m ES P	rofinet	ask
 Program info 					·39-2-	Internet	Ionnec	~
🖂 PLC alarms								
Text lists								
Local modules								ibr
Unassigned devices								arie
🕨 🙀 Common data								ŝ
Documentation settings				Dev	ice filter			
Languages & resources					Only show devices o	f the same type		
🗢 🚂 Online access								
Y Display/hide interfaces	=				Only show devices w		er settings	
USB [S7USB]		- A			Only show devices w	ithout names		
COM [RS232/PPI multi-master cable]								
▼ □ Realtek PCIe GBE Family Controller		Erreich	nbare Teilne	hmer im Netzwerk:				
Update accessible devices		IP add	ress	MAC address	Туре	Name	Status	
• 6es7 [169.254.60.151]								
 Accessible device [C8-3E-A7-00-00-85] 								
Online & diagnostics								
 Intel(R) Centrino(R) Advanced-N 6205 	×							
Intel(R) 82579LM Gigabit Network Conne								
VirtualBox Host-Only Ethernet Adapter								
C Adapter [MPI]								
< III	>				flashes	Update	Assign name	
✓ Details view							1	
								-

Fig. 17: Assign Profinet device name to accessible PNOZ m ES Profinet device



Fig. 18: Initiate updating list of accessible devices



Fig. 19: Updated list of accessible devices

Connect controller with the PNOZ m ES Profinet device in the network view

M Siemens - PNOZ m ES Profinet					_ # X
Project Edit View Insert Online Options T 📑 🎦 🔚 Save project 昌 🐰 🗐 🗊 🗙 🏹 🕏	ools Window Help (** 🙀 🖥 🗓 🖬 🖳 🧖 Go	online 🖉 Go offline 🛔 🖪 🖪 👫 🛨 🛄		Totally Integrated A	utomation PORTAL
Project tree	🗉 🖣 PNOZ m ES Profinet 🕨 Device	es & networks			_ • • × <
Devices			🚽 Topology view	🛔 Network view 📑 Dr	avice view 🛛 🖭
000	📸 💦 Network 🔡 Connections 🗏	MI connection 💌 👯 🔛 🍳 🕈		Network overview	→ Har
		4 IO system: 6es7.PROFINET IO-S	system (100)	W Device	Type
🗧 👻 🛅 PNOZ m ES Profinet	<u>^</u>			 S71500/ET200MP-Station 	1 \$71500/ET
🚊 📑 Add new device				▶ 6es7	CPU 1518F-
🕆 📩 Devices & networks	CPU 1E19E4 PM	mes-profinet	=	 GSD device 1 	GSD device
🗧 🔻 🛅 6es7 [CPU 1518F-4 PN/DP]	CIO 131014 HK	TNO2 THEST TOT DP-NORM		▶ mes-profinet	PNOZ m ES
Device configuration		bes/			
🖳 🖳 Online & diagnostics		-			8
 Safety Administration 		7 PROFINET 10 Surtes			9
Program blocks		raviender norsystem.			Ē
Technology objects					et
h 📴 Comment annual Allan	=				0

Fig. 20: Controller connected with Profinet device

> Compile configuration and initiate download to the controller

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Recommended printer settings

Adobe Acrobat Reader (<u>www.adobe.com</u>)

Print
Page Sizing & Handling 👔
Size Poster Size Booklet
O Actual size
O Shrink oversized pages
Custom Scale: 100 %
Choose paper source by PDF page size
Orientation:
Auto po <u>r</u> trait/landscape
OPortrait
○ Landscape

PDF-XChange Viewer (<u>www.tracker-software.com</u>)

Print		
Page Scaling		
Scaling Type:	Fit to printer margins	~
	100,0%	
	Auto-rotate sheets	
	Auto-centre pages in sheets	
	Choose paper source by PDF-page size	

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Americas

Brazil +55 11 97569-2804 Canada +1 888-315-PILZ (315-7459) Mexico +52 55 5572 1300 USA (toll-free) +1 877-PILZUSA (745-9872)

Asia

China +86 21 60880878-216 Japan +81 45 471-2281 South Korea +82 31 450 0680 Australia

+61 3 95446300

Europe

Austria +43 1 7986263-0 Belgium, Luxembourg +32 9 3217575 France +33 3 88104000 Germany +49 711 3409-444 Ireland +353 21 4804983 Italy +39 0362 1826711 Scandinavia +45 74436332 Spain +34 938497433 Switzerland +41 62 88979-30 The Netherlands +31 347 320477 Turkey +90 216 5775552 United Kingdom +44 1536 462203

You can reach our international hotline on: +49 711 3409-444 support@pilz.com



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Pilz GmbH & Co. KG Felix-Wankel-Straße 2 73760 Ostfildern, Germany Tel.: +49 711 3409-0 Fax: +49 711 3409-133 info@pilz.com www.pilz.com

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PILZ The spirit of safety

Pilz develops environmentally-friendly products using ecological materials and energy-saving technologies. Offices and production facilities are ecologically designed, environmentally-aware and energy-saving. So Pilz offers sustainability, plus the security of using energy-efficient products and environmentally-friendly solutions.

