



PDP67 IOLS PROFINET with PROFIsafe Profile on a SIMATIC PLC S7-1500 with TIA Portal

PILZ
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Product

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May 2026

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Perform a risk assessment in accordance with VDI/VDE 2182 or IEC 62443-3-2 and plan the security measures with care. If necessary, seek advice from [Pilz Customer Support](#).

Abbreviations

Abbreviation / term	Description	Source
AN	A pplication N ote	 AN content (1002400)">www.pilz.com > AN content (1002400)
PNOZ	Pilz E-STOP positive-guided (DE: Pilz NOT -AUS-Zwangsgeführt)	 PNOZ">www.pilz.com > PNOZ
PSS	Programmable control system (DE: Programmierbares S teuerungs S ystem)	 PSS">www.pilz.com > PSS
PSS u2	PSS universal, 2 nd generation	 PSS u2">www.pilz.com > PSS u2
POU	P rogram O rganisation U nit	
TIA	T otally I ntegrated A utomation (SIMATIC)	
TCI	T ool C alling I nterface (SIMATIC)	
PN	P ROFINET, P rocess F ield N etwork	 PROFINET">en.wikipedia.org > PROFINET
PROFenergy	Technology from PROFINET	 PROFenergy">en.wikipedia.org > PROFenergy
PROFIsafe	Technology from PROFINET	 PROFIsafe">www.profibus.com > PROFIsafe
PROFINET IRT	Technology from PROFINET: I sochronous R eal T ime	
PII	P rocess I mage of I nputs	
PIO	P rocess I mage of O utputs	
IOL	Standard I O- L ink	 Start">io-link.com > Start
IOLS	I O- L ink S afety	 IO-Link Safety">io-link.com > IO-Link Safety
IOLD	I O- L ink D evice	
IODD	I O D evice D escription	 IODDfinder">io-link.com > IODDfinder
PQI	P ort Q ualifier I nformation	
DIO	D igital I nterface O utput (SIO Mode)	
FDI	F ailsafe D igital I nterface	
FDO	F ailsafe D igital O utput (single pole)	
FDIO	F ailsafe D igital I nterface O utput (single pole)	
SDO	S tandard D igital O utput (single pole)	
HiZ	High-Impedance	
NC	N ormally C losed	
NO	N ormally O pen	
OC	O pen C ircuit	

Definition of symbols

- Information that is particularly important is identified as follows:



CAUTION!

This refers to a hazard that can lead to a less serious or minor injury plus material damage, and also provides information on preventive measures that can be taken.



NOTICE

This describes a situation in which the product or devices could be damaged and also provides information on preventive measures that can be taken. It also highlights areas within the text that are of particular importance.



INFORMATION

This gives advice on applications and provides information on special features.

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1 Useful documentation

Reading the documentation listed below is necessary for understanding this Application Note. The availability of the software used and its safe handling are also presupposed for the user.

1.1 Documentation from Pilz GmbH & Co. KG

No.	Description	Item No. /Download
1	Pilz international homepage, download section	www.pilz.com > Support > Downloads
2	Software <i>PASconfig</i> , Online help and readme file Pilz international Webportal > Products and Industries > Controllers > I/O systems Support for this PDP67 device only starts from PASconfig version V6.1.0. Please use the latest version at the link beside. or the device under section 'Software'	www.pilz.com > Products and Industries > Controllers > Overview I/O systems www.pilz.com > Download PASconfig 4R000004 (Order number device) www.pilz.com > Download 4R000004
3	Operation manual PDP67 PN 8FDIO 4IOLS Product modification PDP67 PN 8FDIO 4IOLS Hardware version 01 GSD file under section "Device description file" MDF file under the section "Firmware"	1006758-EN-xx www.pilz.com > Download 1006758 1007208-EN-xx www.pilz.com > Download 1007208 4R000004 (Order number device) www.pilz.com > Download 4R000004
4	Application Note 'PSSu 312043 Profinet with Simatic S7' Document for PSSu system (1 st Generation) with SIMATIC STEP 7 Classic	1001907-EN-xx www.pilz.com > Download 1001907
5	Application Note 'PSS u2 Profinet S7 TIA' Document for PSS u2 system with head module PSS u2 P0 F/S PN	1004479-EN-xx www.pilz.com > Download 1004479
6	Application Note 'PSS u2 328062 Profinet with Simatic S7' Document for PSS u2 system with head module PSS u2 P0 F/S PN2	1005258-EN-xx www.pilz.com > Download 1005258
7	Application Note 'PDP67 FDIO Profinet S7 TIA' Document for PDP67 device PDP67 PN 6FDI 6FDIO 2FDOTP (4R000001)	1005313-DE-xx www.pilz.com > Download 1005313
8	Application Note 'PSS u2 IO-Link S7 1500' Document for PSS u2 module PSS u2 ES 4IOL (328770)	1005142-EN-xx www.pilz.com > Download 1005142

► Note

Please refer to:

- the file *Readme* belonging to the software version under number '2' and
- the updated document *Product modification* under number '3'.

1.2 Documentation from other sources of information

No.	Description	Item No. / Download
1	IO-Link Community IO-Link downloads: Access to resources and documentation	io-link.com > Downloads
2	PI Portal (PROFIBUS and PROFINET International)	https://www.profibus.com/
3	Siemens Homepage, Safety integrated	new.siemens.com > Safety Integrated
4	Siemens Homepage, SCE Training Curriculum (TIA)	new.siemens.com > MCMS/SCE
5	SIMATIC Industrial Software SIMATIC Safety - Configuring and Programming Programming and Operating Manual	54110126; 04/2021 support.industry.siemens.com > 54110126
6	Siemens Homepage, PROFINET network analyzer PRONETA	https://www.siemens.com/proneta

2 Used hardware and software

2.1 Pilz products

No.	Descriptions	Order number	Version	Number
1	Product type: <i>PDP67 PN 8FDIO 4IOLS</i> Hardware Decentralised field device Failsafe and standard, IP67, PROFINET IO DEVICE with PROFIsafe, Conformance Class C (CC-C), PROFlenergy, IRT/RT, data set I&M 0 and 1-4, digital inputs and outputs, integrated webserver	4R000002	01	1
2	Product type: <i>µSD Memory Card 512MB M12A</i> Hardware Memory card (nickel-plated brass casing) Accessory, microSD, industrial version	4R000002	--	(1) optional
3	Product type: <i>Cable/FC/M12-5SMX/M12-5SFX/A/003/0Q34/BK</i> Hardware field connection cable (assembled) M12 plug to M12 socket, 5-pin, A-coded, PUR black, drag chain compatible, IOL-S compatible, 5 × 0.34 mm ² , 3 m	C1000016	--	(N) depending on sensor or actuator
4	Product type: <i>Cable/FC/XXX-XXXX/M12-5SFX/A/003/0Q34/BK</i> Hardware field connection cable (assembled) Open cable end to M12 socket, 5-pin, A-coded, PUR black, drag chain compatible, IOL-S compatible, 5 × 0.34 mm ² , 3 m	C1000039	--	(N) depending on sensor or actuator
5	Product type: <i>RJ45 Connector</i> Hardware Ethernet-Plug Male RJ45, 8-pin, straight, in accordance with the standard IEC 60603-7-1, Cat.6a	380401	--	2 for PG cable to PC
6	Product type: <i>SafetyNET p Kabel</i> Hardware Ethernet-Kabel (sold by the meter) Cat5e (100mBit/s), PUR, Gelb RAL1003, 2x2x0,35	380000	--	1 (x1 meter) for PG cable to PC
7	Product type: <i>Cable/PN/M12-4SMX/M12-4SMX/D/003/Q324/GN</i> Hardware Ethernet cable (assembled) M12 plug to M12 plug, 4-pin, PUR shielded green (Profinet), Cat5e, drag chain compatible, 3 m	C1000006	--	(1) for IP67 wiring
8	Product type: <i>Cable/PN/RJ45-4SM/M12-4SMX/D/003/Q324/GN</i> Hardware Ethernet cable (assembled) RJ45 plug to M12 plug, 4-pin, PUR shielded green (Profinet), Cat5e, drag chain compatible, 3 m	C1000001	--	(1) for IP20 connection
9	Product type: <i>Cable/PW/M12-5SMX/M12-5SFX/L/0,5/1Q50/BK</i> Hardware power supply cable (assembled) M12 plug to M12 socket, 5-pin, L-coded, PUR black, drag chain compatible, 5 × 1.5 mm ² , 3 m	C1000011	--	(1) for IP67 wiring
10	Product type: <i>Cable/PW/M12-5SFX/XXX-5XXX/L/003/1Q50/BK</i> Hardware power supply cable (assembled) M12 socket to open cable end, 5-pin, L-coded, PUR black, drag chain compatible, 5 × 1.5 mm ² , 3 m	C1000027	--	(1) for IP20 connection
11	Product type: <i>PASconfig</i> System software for decentralised fieldbus devices	--	6.1.0	--
12	Product type: <i>Acc/MA/label plates/IP67</i> Accessories Plastic labelling plates, PU 10 pieces	C1000033	--	(1) optional
13	Product type: <i>Caps for IP67 moduls</i> Accessories End caps for M12 ports, A- and D-coded, IP67, black, PU 4 pieces	328324	--	(1) optional
14	Product type: <i>Acc/MA/caps L-coded/M12</i> Accessories, End caps for M12 ports, L-coded, IP67, grey, PU 2 pieces	328328	--	(1) optional

► Notes:

- An overview of available accessories can be found in the operating manual of the instrument under the chapter **Order reference** (www.pilz.com > Download OM document no. 1006758).
- Here are already extensive accessories for IP65/67/68 from the **PDP67 and PSS67 assortment** in Pilz eshop: [O.No. 3802xx](#) , [O.No. 3803xx](#) , [O.No. 3807xx](#) , [O.No. 6302xx](#) , [O.No. 6303xx](#) .

2.2 Third-party products

No.	Descriptions	Order number	Version	Number
1	Product type: <i>IODDfinder</i> Website: io-link.com > <i>IODDfinder</i>	--	--	--
2	Product type: <i>IODD Viewer</i> Software	--	V1.4	--
3	Product type: <i>CPU 1511F-1 PN</i> Hardware PLC	6ES7511-1FL03-0AB0	V3.0	1
4	Product type: <i>SIMATIC STEP 7 Professional</i> Software	--	V19.0	--
5	Product type: <i>SIMATIC STEP 7 Safety</i> Software	--	V19.0	--
6	Product type: <i>PRONETA Basic</i> Software	--	V3.8	--



INFORMATION for SIMATIC and PROFINET/PROFIsafe

The *Totally Integrated Automation Portal*, or TIA Portal for short, is the central software platform for the engineering modules of Siemens automation technology.

- ▶ Required tool version:
Siemens SIMATIC Industrial Software **TIA Portal V18 or higher required.**
- ▶ Required hardware:
Siemens SIMATIC **F-CPU** (configured as FS controller) **with at least Safety System Version 2.5 required.** The minimum requirements must be met for:
 - the PROFINET IO specification V2.42 and
 - the protocol version of PROFIsafe V2.6.

2.3 Structure of the application (schematic)



Figure 1: Application – Structure of the hardware (schematic)

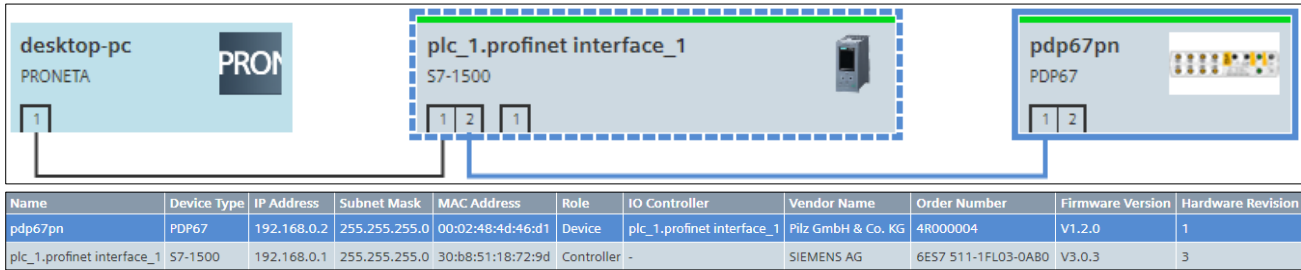


Figure 2: Application – Hardware structure » Network analysis with PRONETA

3 Preface

This Application Note basically describes the commissioning of a PDP67 Remote I/O devices system on a current SIMATIC F-CPU, using the automation software *TIA Portal*.

Both devices communicate with each other via PROFINET/PROFIsafe.

In this case, the user program of the F-CPU controls the failsafe input and output modules of the PDP67 electronic modules for the safety functions.

The essential procedure for a successful basic configuration is shown step-by-step, usually with screenshots.



NOTICE

- ▶ A detailed explanation of safety functions used in the failsafe application and its evaluation regarding functional safety are not a part of this document.
- ▶ This document only describes the procedure for use of the Remote I/O-device PDP67 with the order number **4R000004** and is not intended as a technical documentation for general use of the SIMATIC STEP 7 Professional for Siemens *TIA Portal*.
- ▶ The Pilz device will only be supported from *PASconfig* version V6.1.0.

4 Technical notes about the Pilz PDP67 device

A PDP67 device is a decentralised fieldbus device with PROFINET interface with PROFIsafe.

The *PASconfig* system software is available for Pilz decentralized field devices.

This tool provides support as you select, configure and commission components.

A PDP67 device consists of:

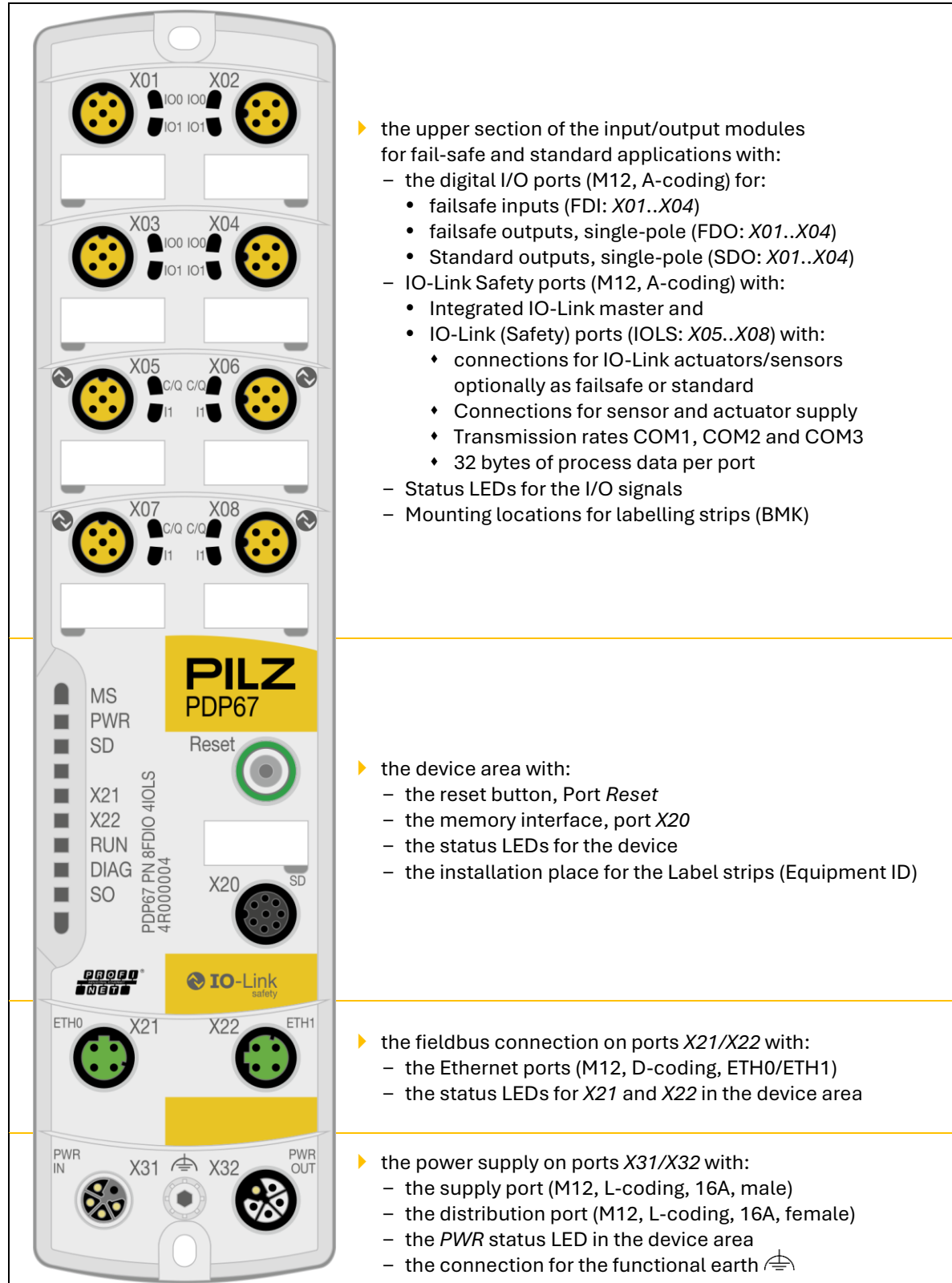


Figure 3: PDP67 – Modular structure of the PDP67 device

5 Application description

The aim is to show how a basic PROFINET/PROFIsafe communication and Siemens S7-1500 PLC can be built up to form a remote I/O device PDP67.

This is followed by a description of the basic commissioning of the I/O area of the PDP67 device, in particular the configuration and commissioning of the IO-Link ports with a fail-safe and standard application respectively.

For this fieldbus communication, the standard default parameters from the *TIA Portal* are used. Only the parameters for the addressing of the devices are adjusted.

The detailed hardware configuration for the S7-CPU is not part of this Application Note.

- ▶ Detailed information on this subject can be found in the manual or online help for the *TIA Portal*.
 - see [Chapter 1.2 Documentation from other sources of information](#) [📖 6]

6 Hardware configuration

6.1 Used hardware

6.1.1 Pilz devices

- ▶ The used Pilz modules are listed in the table of the following link:
 - [Chapter 2.1 Pilz products](#) [📖 7]
- ▶ The relevant important documents are named and linked here:
 - [Chapter 1.1 Documentation from Pilz GmbH & Co. KG](#) [📖 6]

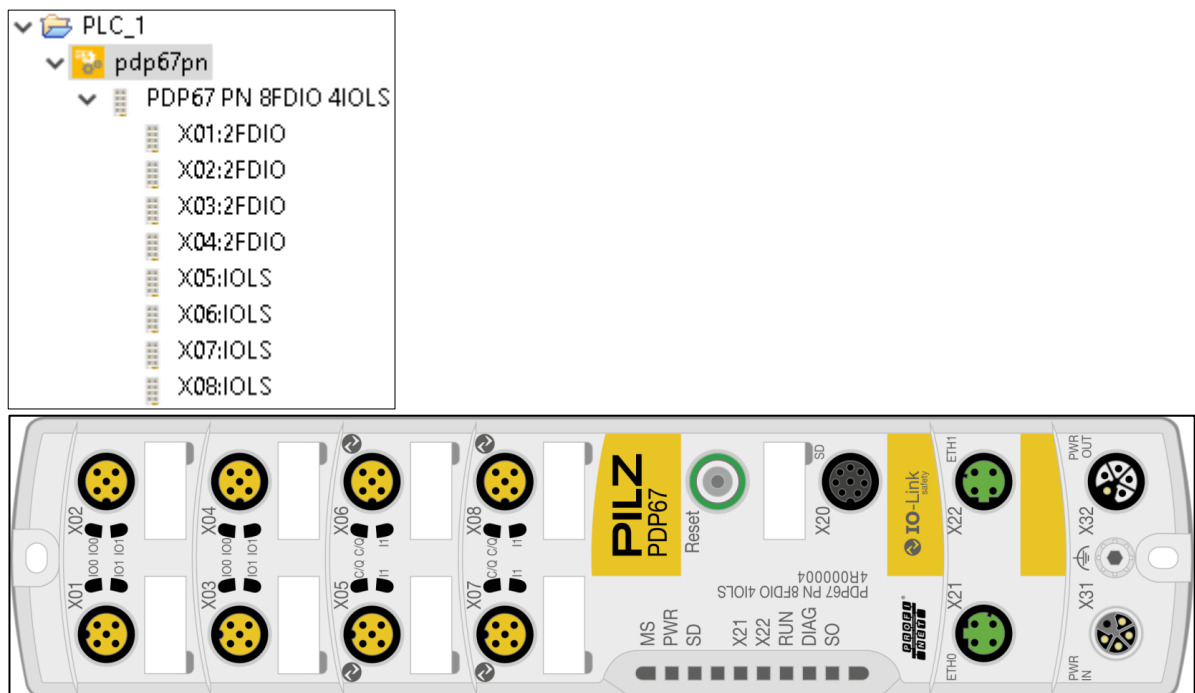


Figure 4: PDP67 – Hardware » Overview of used modules

6.1.2 Siemens devices

- ▶ The used SIMATIC devices are listed in the table of the following link:
 - [Chapter 2.2 Third-party products](#) [📖 8]
- ▶ The relevant important documents are named and linked here:
 - [Chapter 1.2 Documentation from other sources of information](#) [📖 6]

6.2 Basic characteristics of the PDP67 device

6.2.1 IO range of the hybrid ports X01..X04

6.2.1.1 Failsafe and standard I/O process image

- ▶ The digital I/O address ranges of the four hybrid ports X01..X04 consist of:
(see also [Chapter 8.2.2 Adding the I/O containers of the PDP67 device](#) [84]).
 - **Input bytes** with:
 - 3 bytes of fail-safe input data
 - 1 byte PROFIsafe status
 - 4 bytes PROFIsafe CRC (container channel-granular passivation, Slot 11)
 - 1 byte standard output data (optional, ST container, Slot 10)
 - **Output bytes** with:
 - 1 byte failsafe output data
 - 1 byte PROFIsafe control
 - 4 bytes PROFIsafe CRC (container channel-granular passivation, Slot 11)
 - 2 bytes of standard output data (optional, ST container, Slot 10)

6.2.1.2 Variable I/O address assignment

The following examples show the main configuration options for the PDP67 device; the first is the default basic configuration. The I/O functions can be parameterised on a port-by-port basis but can also be activated or deactivated and adjusted individually on a bit-by-bit basis.

▶ Configuration example 1:	8 FS-DI	-----	-----
▶ Configuration example 2:	4 FS-DI	-----	4 FS-DO
▶ Configuration example 3:	4 FS-DI	4 ST-DO	-----
▶ Configuration example 4:	4 FS-DI	4 ST-DO	4 FS-DO
▶ Configuration example 5:	8 FS-DI	8 ST-DO	-----
▶ Configuration example 6:	4 FS-DI	2 ST-DO	2 FS-DO
▶ Configuration example 7:	1 FS-DI	1 ST-DO	1 FS-DO

*) Examples 1...6 are maximum configurations with different signal types, the last one is a possible minimum configuration with 1 signal per type.

- ▶ Important note:
 - The effects of the device configuration in *PASconfig* on the **actual presence of the I/O addresses on the I/O ports** are described in an example in sections 6.2 and 9.3 of the Application Note »AN PDP67 FDIO Profinet S7 TIA 1005313« below.
 - The peculiarity in examples 4 & 5, each with 2 FDI and 2 SDO signals per FDI(O) port, is shown in:
 - [Figure 141: PDP67 – Wiring » Pin assignment X01..X08 \(M12, female, A coded\)](#) [84].

Overviews and notes on configuration and possible start-up errors of the FDIO functions are described in the Application Note »PDP67 I/O PROFINET with PROFIsafe profile on SIMATIC S7-1500 with TIA Portal«:

- ▶ The corresponding important document »AN PDP67 FDIO Profinet S7 TIA 1005313« is linked here:
 - [Chapter 1.1 Documentation from Pilz GmbH & Co. KG](#) [6].



INFO

The PDP67 device has I/O modules with different address requirements for:

- ▶ ST containers for standard process data on Slot 10 (default setting)

Module	...	Rack	Slot	I add...	Q a...	Type
ST container 8DI 12DO_1		0	10	8	6...7	ST container 8DI 12DO

- ▶ FS containers for PROFIsafe process data with channel-granular passivation in accordance with PROFIsafe specification version 2.6 on Slot 11 (default setting)

Module	...	Rack	Slot	I add...	Q a...	Type
FS container FDIO, channel granular_1		0	11	0...7	0...5	FS container FDIO, channel granular

6.2.2 IO-Link Safety Ports X05..X08

As a general rule, the “*Port IOL*” operating mode is used for the four ports X05..X08.

The process data for IOL/IOLS is assigned to a Slot for each port, divided into:

- ▶ Standard process data (IOL) in sub-slot 1 and
- ▶ Failsafe process data (IOLS) in sub-slot 2.

Note:

If a port is configured as “*Port DIO (SIO Mode)*” operating mode, the ST process data in the “*ST container 8DI 12DO*” to Slot 10.

The IO-Link Safety ports can have the following configuration options for:

- ▶ Subslot 1:
 - IO-Link inputs “*IOL_Inn_PQI*” with:
 - 1, 2, 4, 8, 16 or 32 bytes of input data
 - or
 - IO-Link inputs and outputs “*IOL_IOnn_PQI*” with:
 - 1, 2, 4, 8, 16 or 32 bytes of input data
 - and
 - 1, 2, 4, 8, 16 or 32 bytes of output data
 - or
 - IO-Link outputs “*IOL_Onn_PQI*” with:
 - 1, 2, 4, 8, 16 or 32 bytes of output data
- ▶ Subslot 2:
 - IO-Link Safety inputs and outputs “*IOLS_SPnn*” with:
 - 3, 11 or 25 bytes of input data
 - and
 - 3, 11 or 25 bytes of output data
- ▶ ST container 8DI 12DO:
 - digital ST inputs/outputs in operating mode “*Port DIO (SIO Mode)*” as:
 - 2 digital ST inputs
 - or
 - 1 digital ST output



INFO

- ▶ The exact structure of the process data with some application examples is described in the operating manual PDP67 PN 8FDIO 4IOLS in the chapter “Process image”, which is named and linked here:
 - [Chapter 1.1 Documentation from Pilz GmbH & Co. KG \[6\]](#).

7 Configuration of Siemens S7 F-CPU

7.1 Basic information

- ▶ The following requirements are necessary for the TIA Portal software in this IOLS application:
 1. Siemens SIMATIC Industrial Software TIA Portal version 18 or higher mandatory.
 2. Siemens SIMATIC F-CPU, configured as FS controller, with the minimum:
 - Safety system version 2.5 mandatory,
 - PROFINET IO specification version 2.42 and
 - Protocol version of PROFIsafe version 2.6.
 3. GSDML file for the PDP67 device is installed.

7.2 Creation of new project in TIA Portal

- ▶ First you start the software *TIA Portal* and create a new project:

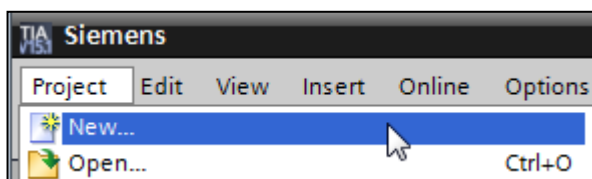


Figure 5: TIA Portal – Create a new project (Part 1, Start)

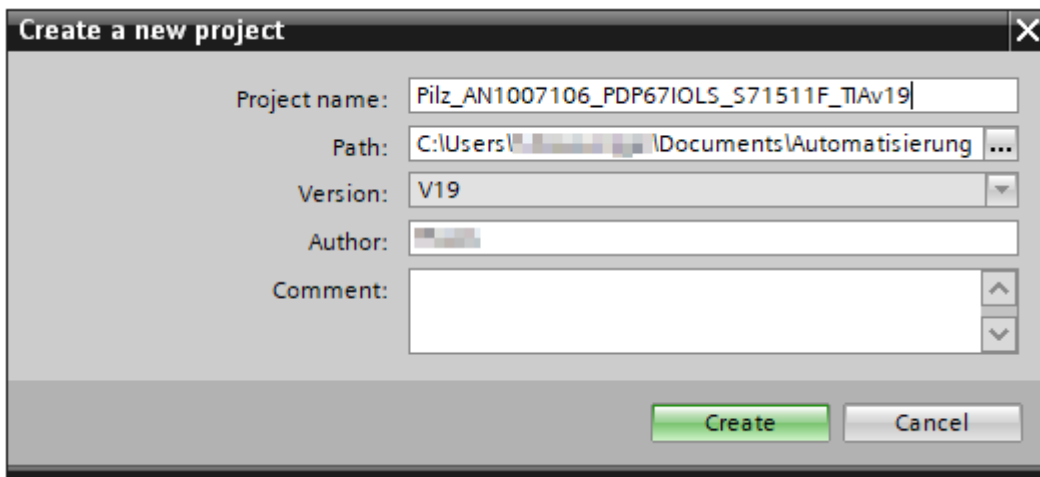


Figure 6: TIA Portal – Create a new project (Part 2, Creation)

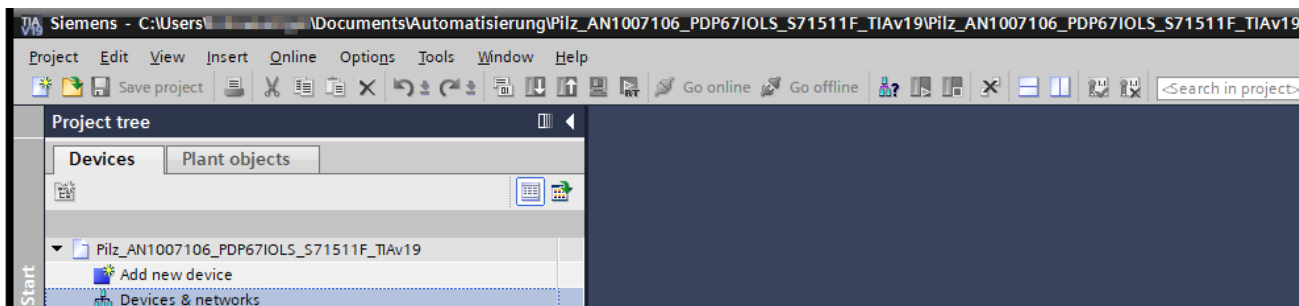


Figure 7: TIA Portal – Create a new project (Part 3, Finalization)

7.3 Select and configure the S7 F-CPU

- Selecting and configuring the S7 F-CPU:

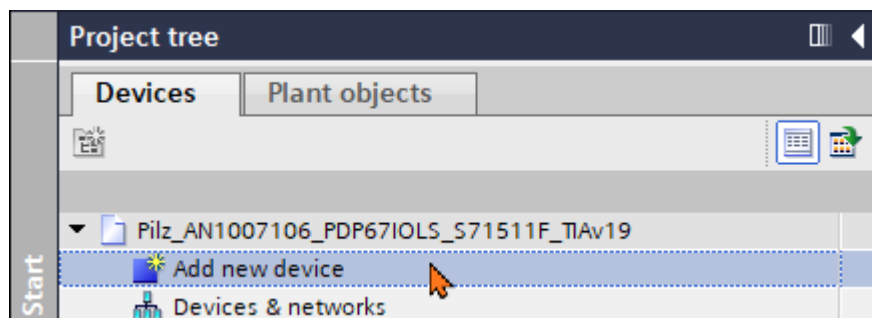


Figure 8: TIA Portal – Add new device (Part 1, Start)

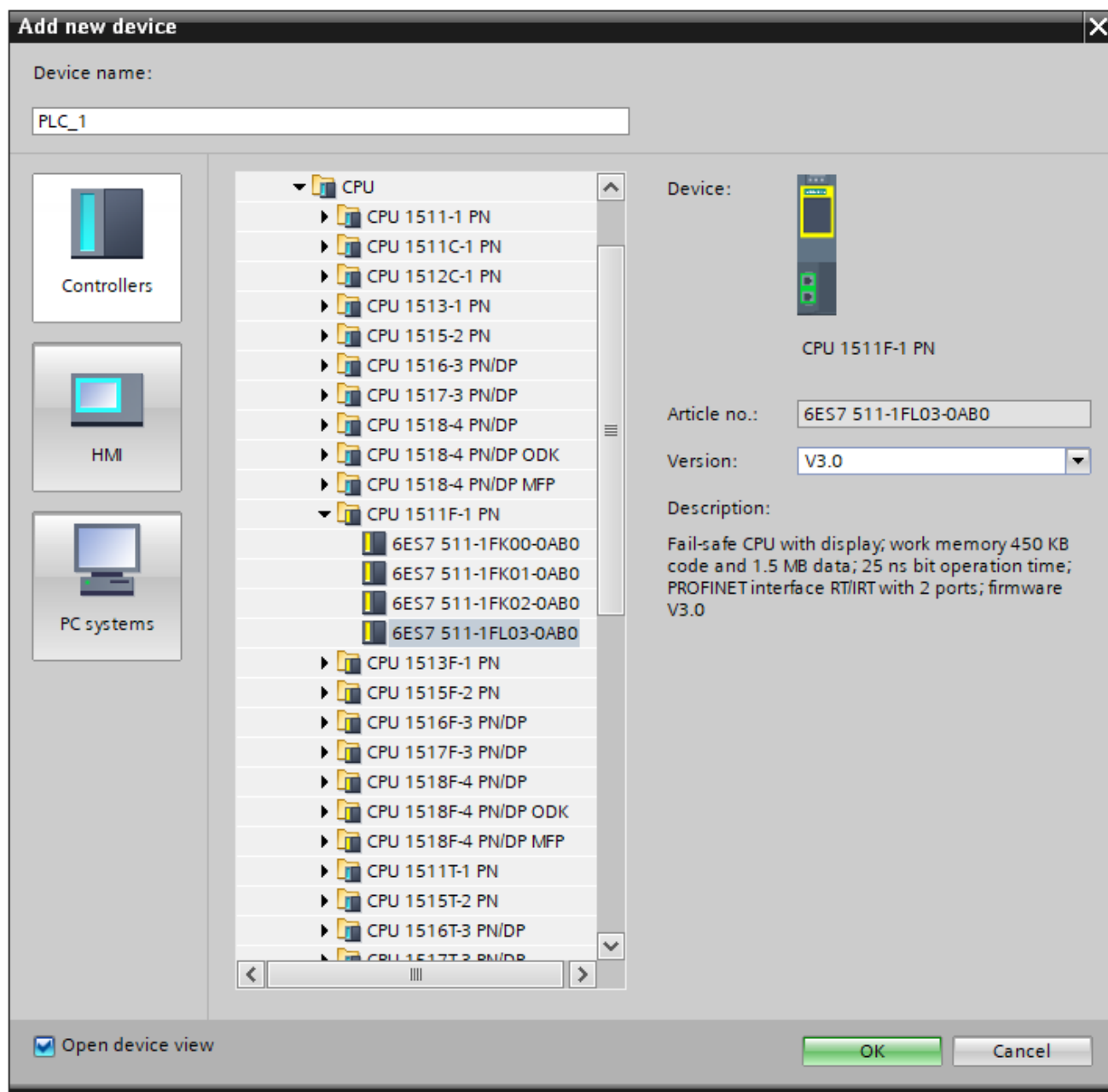


Figure 9: TIA Portal – Add new device (Part 2, PLC “CPU 1511F-1 PN”)

- ▶ Switch to “Device view” (if not previously selected) and select the device **PLC_1**:

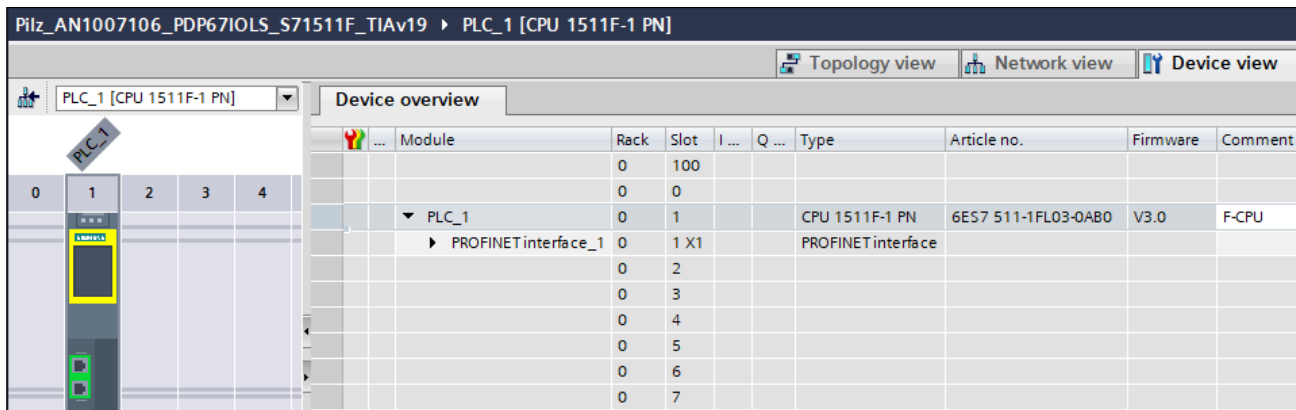
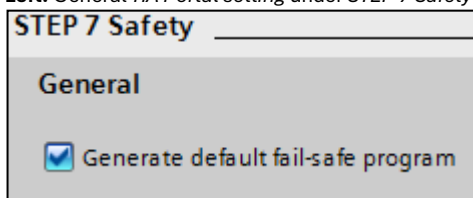


Figure 10: TIA Portal – Add new device (Part 3, Finalization)

- ▶ Switch to “Fail-safe” in the “General” tab.
- ▶ Enable the »F-capability of the F-CPU« including selection of the “Access level for the PLC”:

Left: General TIA Portal setting under STEP 7 Safety



Right: Enable the F-capability of the F-CPU

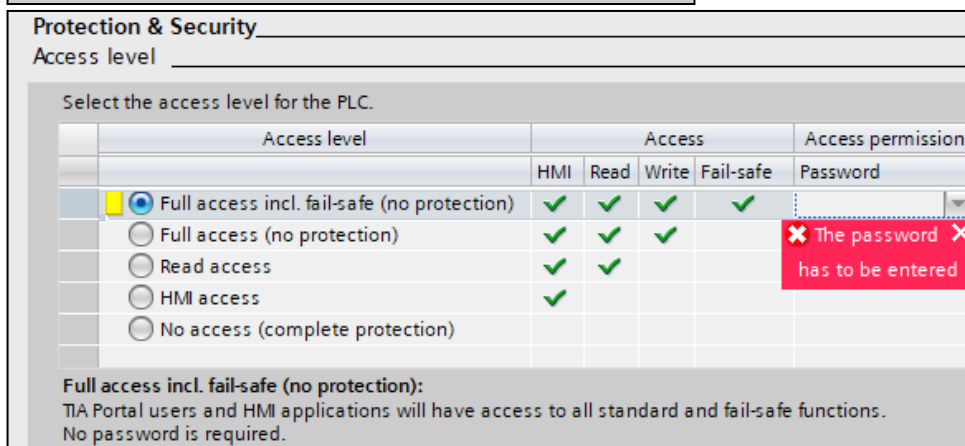
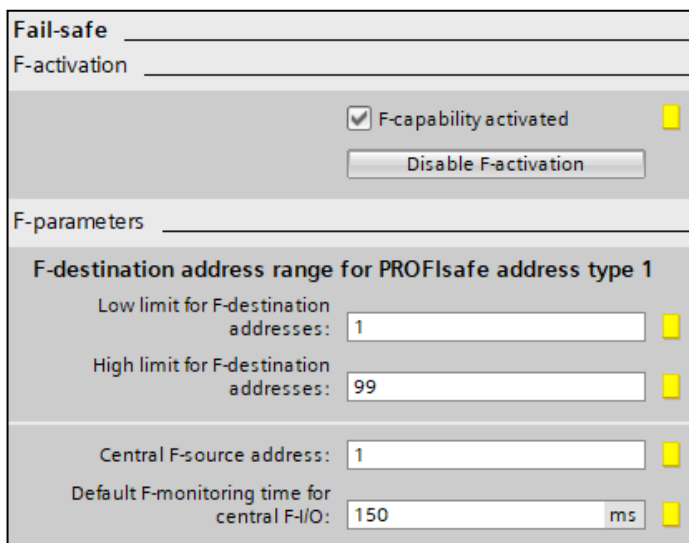
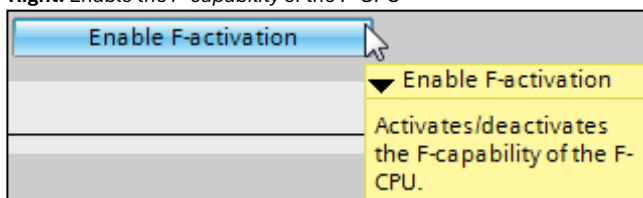


Figure 11: TIA Portal – PLC » Enabling F-capability and select access level

7.4 Setting up the Ethernet adapter

Figure 12 schematically illustrates the wiring of the Ethernet connections:

- ▶ Top → S7 X1 P1 R & X1 P2 R: **192.168.0.1** / 255.255.255.0 (MAC ADD1)
 - SIMATIC S7-PLC with PROFINET interface (X1) with 2 ports (F-CPU 1511F-1 PN)
 - Connection to programming device with PG/PC interface (TIA Portal)
 - Connection to remote I/O device PDP67 with PROFINET interface ETH0 (X21)
- ▶ Bottom / Left → PC-ETH-Adapter: **192.168.0.13** / 255.255.0.0
 - Programming device with PG/PC interface (TIA Portal / PASconfig)
 - Connection to SIMATIC S7-PLC with PROFINET interface (X1 P1 R)
- ▶ Bottom / Right → PDP67 X21: **192.168.0.2** / 255.255.255.0
 - Remote I/O device PDP67 with PROFINET interface ETH0 (X21)
 - Connection to SIMATIC S7-PLC with PROFINET interface (X1 P2 R)

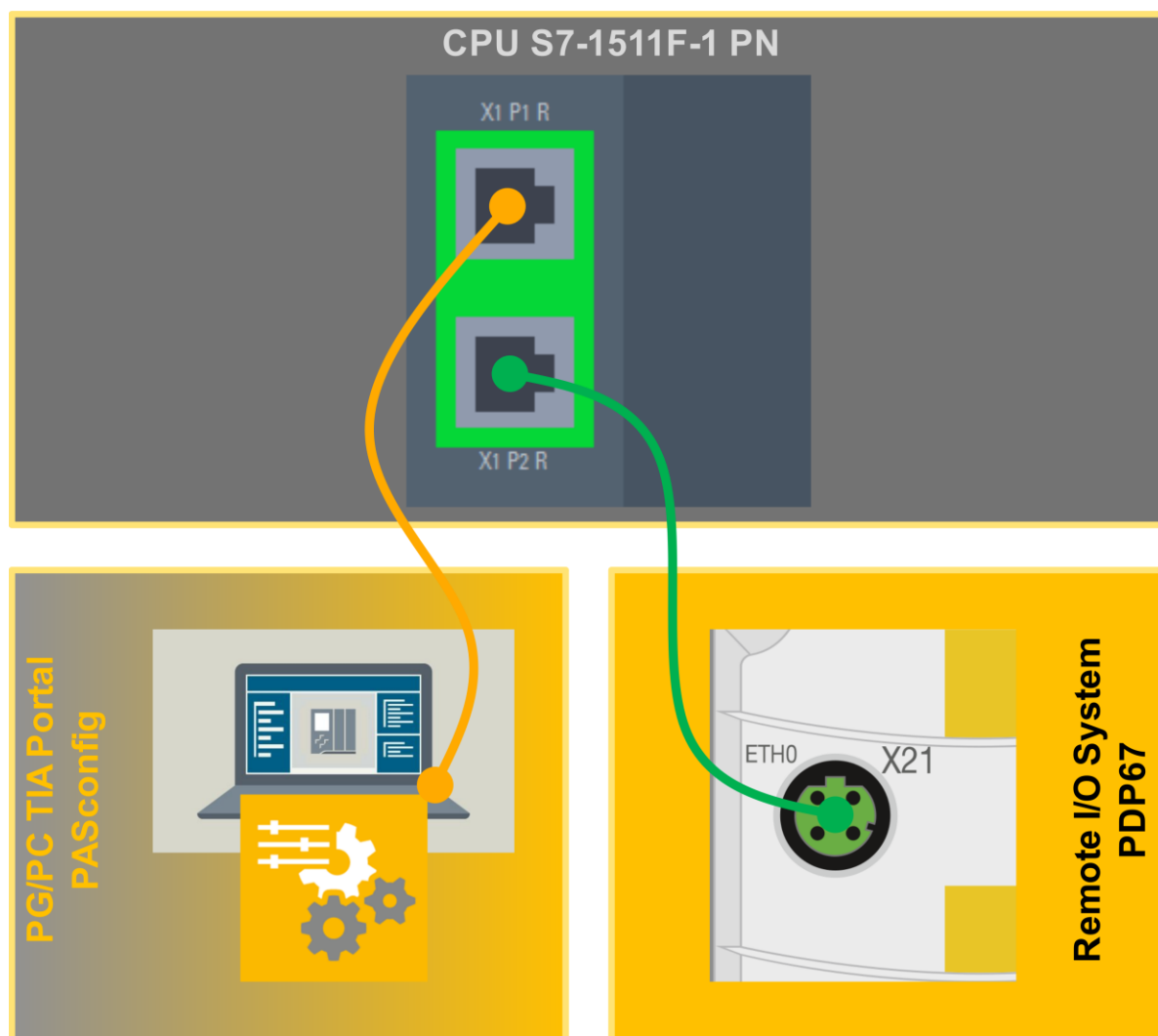


Figure 12: Application – Wiring of Ethernet connections (schematic)

Notes:

- ▶ Observe the (partly different) technical properties of the individual PROFINET interfaces for the SIMATIC CPUs (see SIMATIC CPU manual).
- ▶ In TIA, you can first search and display the “Accessible devices ...” in the network in order to change the configuration for the used F-CPU.
In this example, the default network address is used for the F-CPU.
- ▶ The default IP address of the PDP67 fieldbus devices when delivered: **0.0.0.0** (:18080 / 0.0.0.0).
(applies only to the PROFINET version)

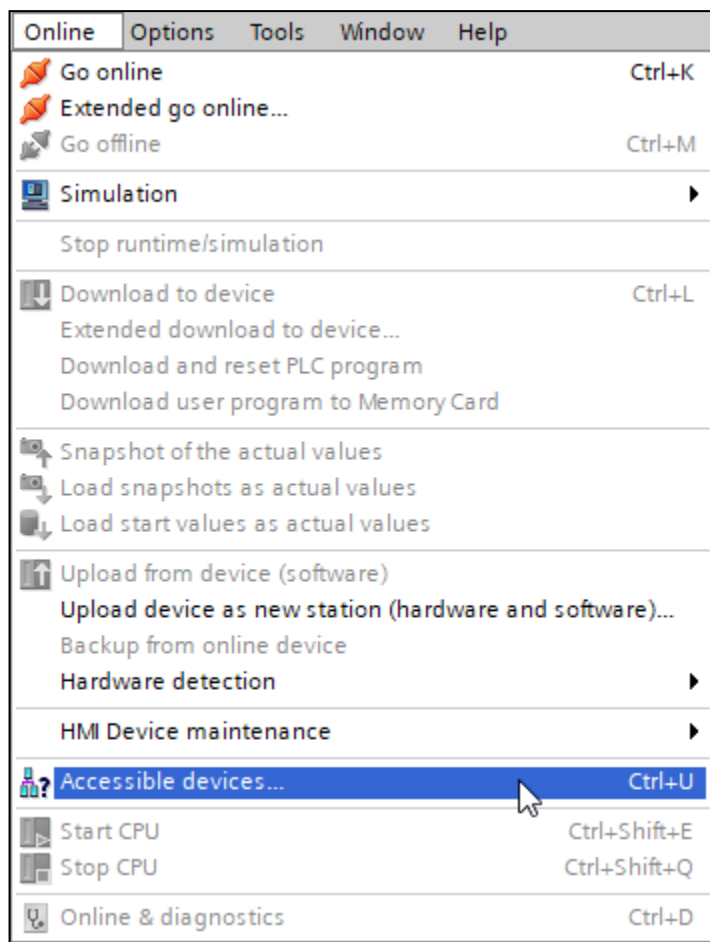


Figure 13: TIA Portal – Search for “Accessible devices...” (Part 1, Start)

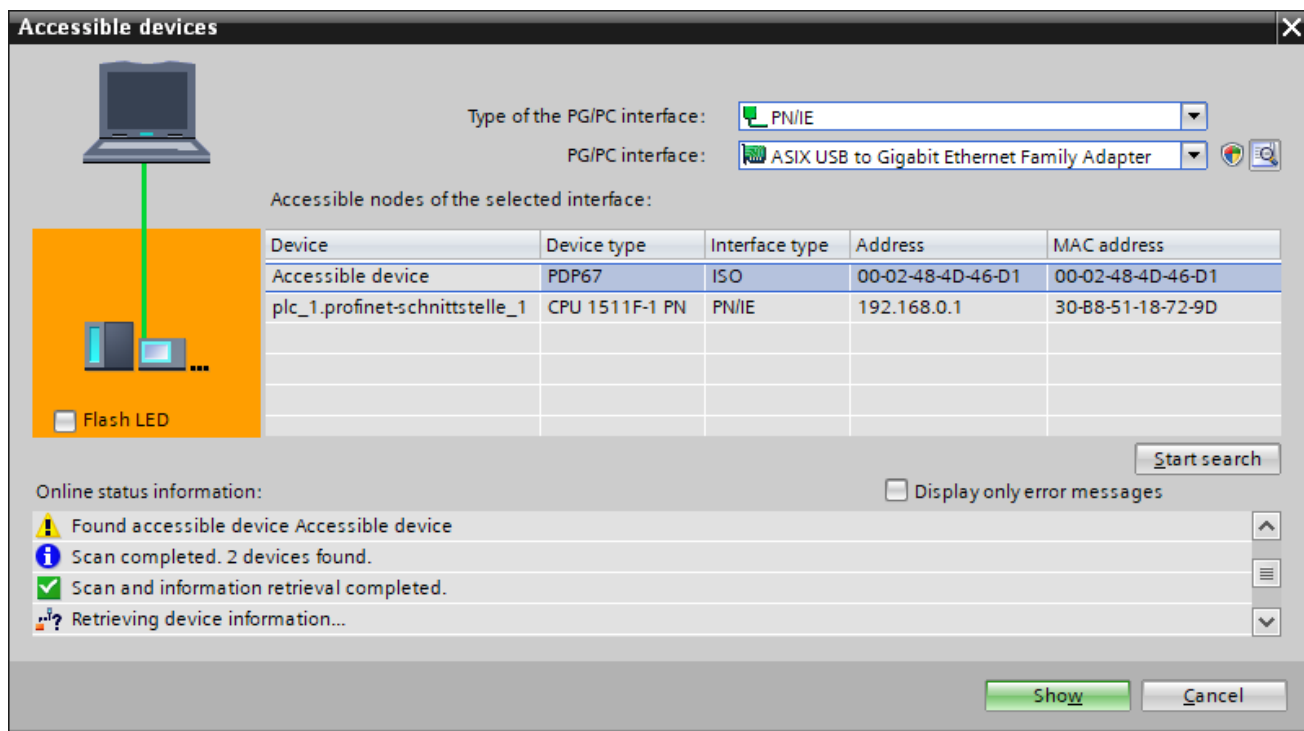


Figure 14: TIA Portal – List of “Accessible devices ...” (Part 2, Overview)

- ▶ Switch to “Device view” (if not previously selected) and select the device **PLC_1**:
- ▶ Open “Properties” window.
- ▶ Switch to the section ‘PROFINET Interface_1 [X1]’ in the “General” tab and check its settings:

PROFINET-Schnittstelle_1 [X1]

Ethernet addresses

Interface networked with

Subnet: ▼

Internet protocol version 4 (IPv4)

☒ Set IP address in the project

IP address:

Subnet mask:

☐ Use router

Router address:

☐ IP address from DHCP server

Mode: ▼

Client ID:

☒ Client ID can be changed during runtime

☐ IP address is set directly at the device

PROFINET

☐ PROFINET device name is set directly at the device

☒ Generate PROFINET device name automatically

PROFINET device name:

Converted name:

Device number: ▼

Figure 15: TIA Portal – Properties of PLC-PROFINET interface [X1] » General



INFORMATION

The PDP67 device must be connected to the F-CPU. Normally, there is a switch on a PLC that automatically connects the network segments to each other.

F-CPU's of the 1500 series can have several separate Ethernet controllers.

Hence the Note:

- ▶ For your application, observe the specifications for commissioning, especially with reference to IT security and here in particular the possible deactivation (through incorrect configuration) of the separation of networks with different IP address ranges.

Function: Activate IRT function 'Sync master' (see also "Sync slave", [Figure 32](#) [[book icon](#) 27])

- ▶ Only use the IRT function when it is really needed; the default setting is 'Unsynchronized'.
- ▶ To activate the IRT function, select the synchronization role "Sync master" in the same section "PROFINET Interface[X1]" under "Real time Settings":

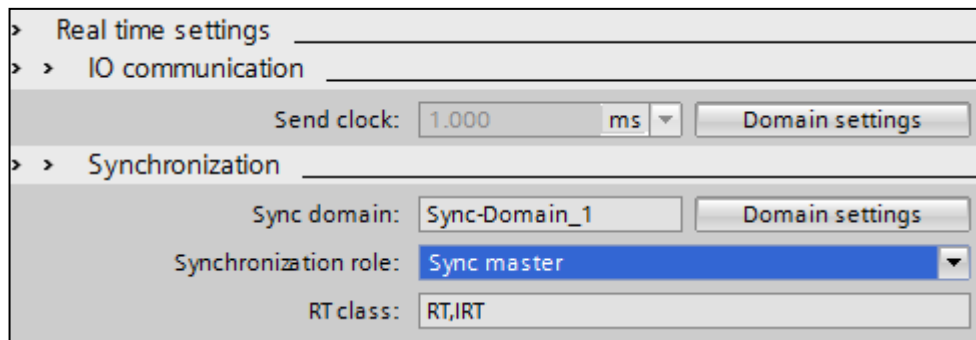


Figure 16: TIA Portal – Properties of PLC-PROFINET interface [X1] » Real time (IRT)

8 Configuration of the PDP67 failsafe device

8.1 Device description file GSDML of the PDP67 fieldbus device

8.1.1 Download the GSDML file and the PASconfig tool

For the integration of the Pilz PROFINET input/output modules in the *TIA Portal*, the installation of a device description file (GSDML file) and the *PASconfig* tool for the configuration of PDP67 device are necessary.

- ▶ Download the latest GSDML file (in XML format) and the *PASconfig* tool from the Pilz homepage. You can find it in the download area (*Support » Downloads*) at:
<https://www.pilz.com/en-INT/support/downloads>
- ▶ Use the order number of the PDP67 device for the search: **4R000004**.

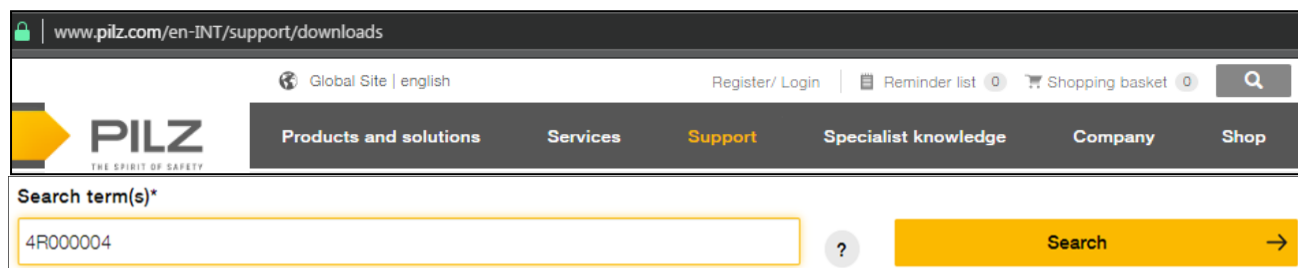


Figure 17: Pilz Homepage (www.pilz.com) – Search for “GSDML” and “PASconfig”

- ▶ The GSDML file can be found in the section “*Device description file*” and the two files for the tool with its ‘Readme file’ in the “*Software*” section.

There is currently no registration required to download the GSDML file, but for the download the *PASconfig* software, for whose version V5.1.x no license is required yet.

- ▶ Log in with your access data at *Login*:

Figure 18: Pilz Homepage (www.pilz.com) – E-Shop Login

- ▶ The three ZIP files are downloaded to the computer and have to be unpacked.
- ▶ The software *PASconfig* must be installed according to the Siemens software *TIA Portal*.

8.1.2 Manage general station description files GSDML in TIA

- ▶ Open the function “Manage general station description files (GSD)” in the menu “Options”:

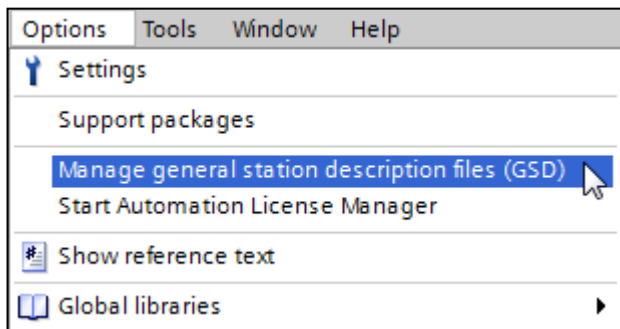


Figure 19: TIA Portal – Manage general station description files GSDML (Part 1, Start)

- ▶ Install the downloaded GSDML file:

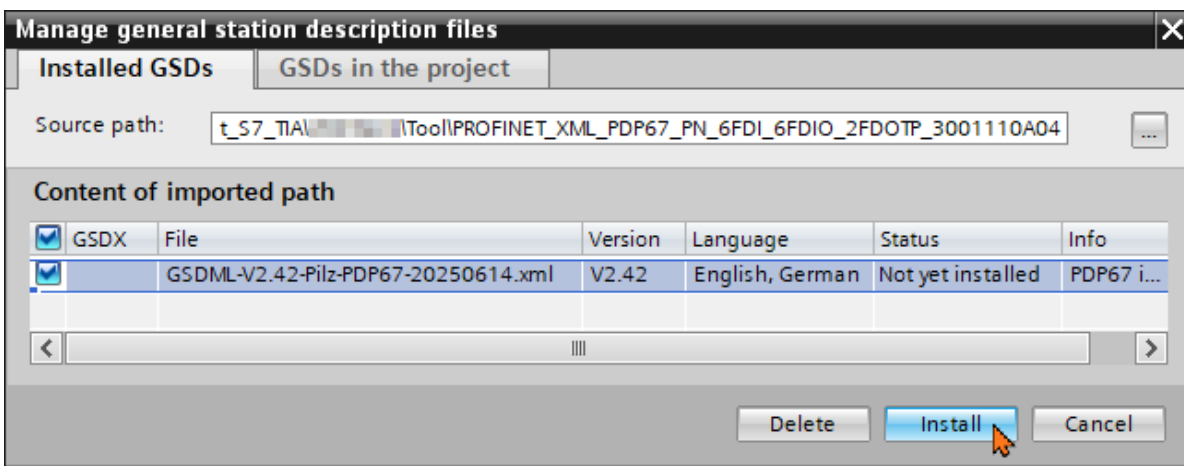


Figure 20: TIA Portal – Manage general station description files GSDML (Part 2, Installation)

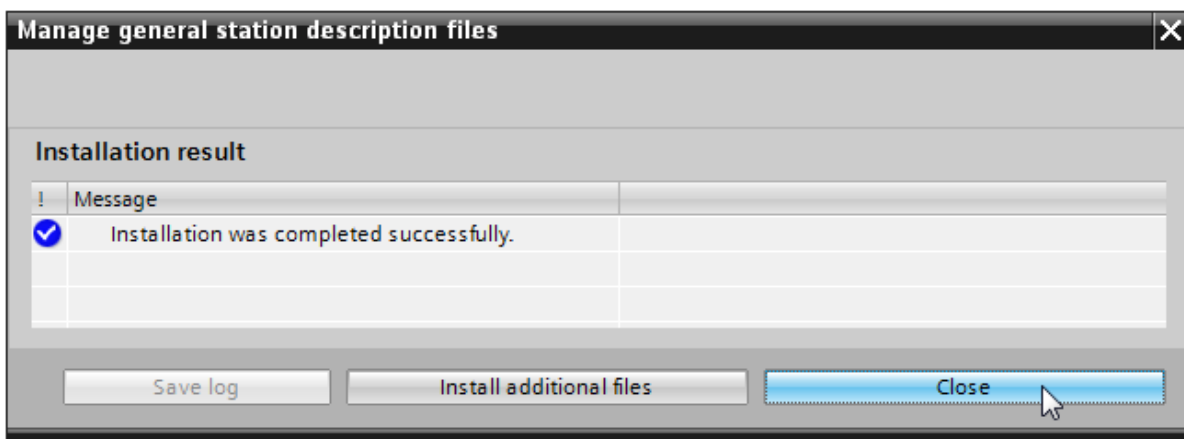


Figure 21: TIA Portal – Manage general station description files GSDML (Part 3, Finalization)

8.2 TIA Portal – Device configuration of PDP67 device

8.2.1 Create and configure the PDP67 fieldbus device

- ▶ Open the function “Devices & networks” in “Project tree”:

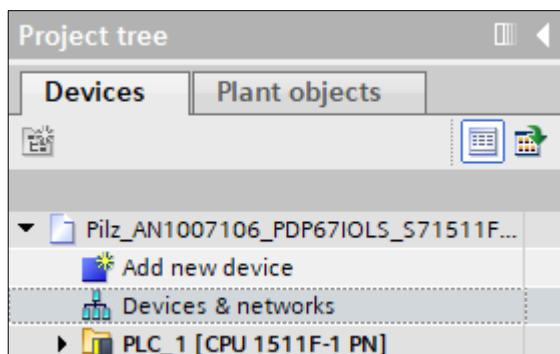


Figure 22: TIA Portal – Open the function “Devices & networks” (Part 1, Start)

- ▶ Switch to the “Topology view”.
- ▶ Inserting the PDP67 fieldbus device through the following path:
Catalog » Other field devices » PROFINET IO » I/O » Pilz GmbH u. Co. KG » PDP67 (» Head module) »..
..» PDP67 PN 8FDIO 4IOLS Vn.n (Link to current version in [Chapter 1.1 No.3 \[6\]](#)).

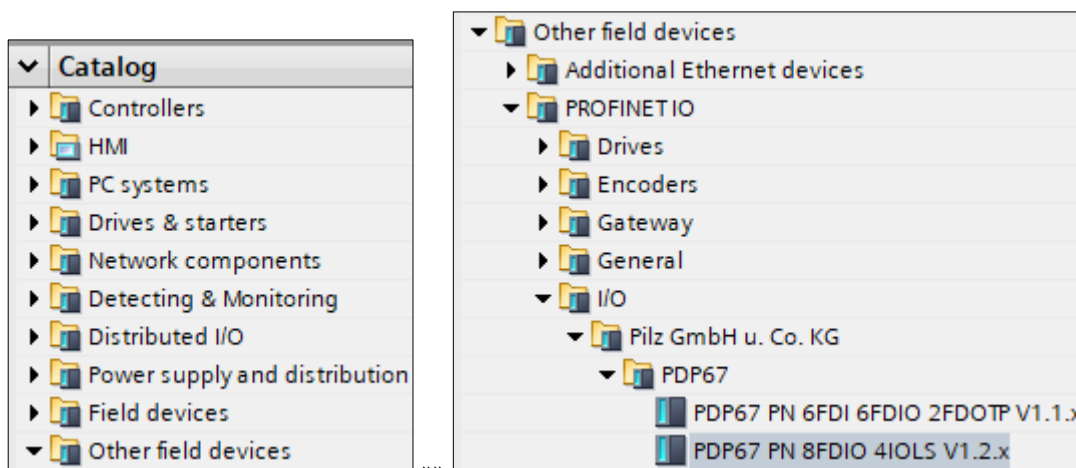


Figure 23: TIA Portal – Inserting the PDP67 fieldbus device (Part 2a, Selection)

Note:

- ▶ If several GSDs are installed, please select the desired one in the “Information” window.
It is recommended to select the latest version!

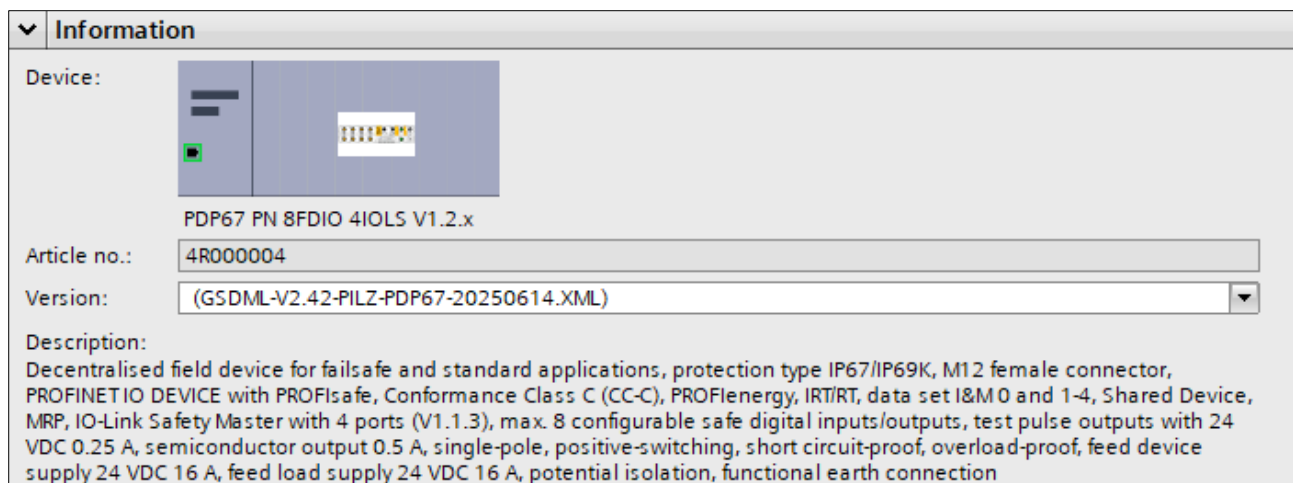


Figure 24: TIA Portal – Inserting the PDP67 fieldbus device (Part 2b, Information)



Figure 25: TIA Portal – Inserting the PDP67 fieldbus device (Part 2c, Finalization)

- ▶ The preset device name **pdp67pn** is still used, but it can also be changed in the properties of the device, e. g. in the Equipment identifying symbol (EIS):

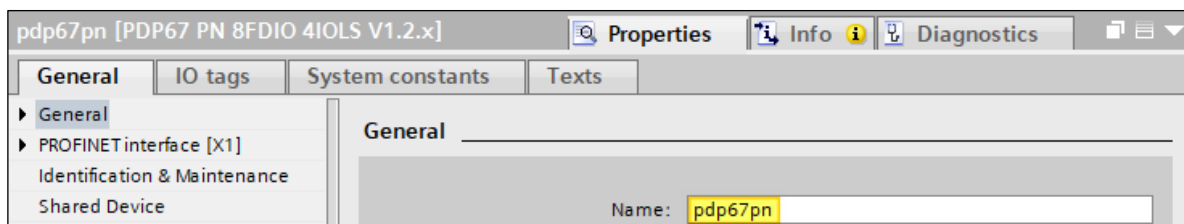


Figure 26: TIA Portal – Assigning the device name 'pdp67pn' of the PDP67 fieldbus device

- ▶ Connect the S7-CPU and the I/O device in accordance with [Figure 12: Application – Wiring of Ethernet connections \(schematic\) \[18 \]](#):

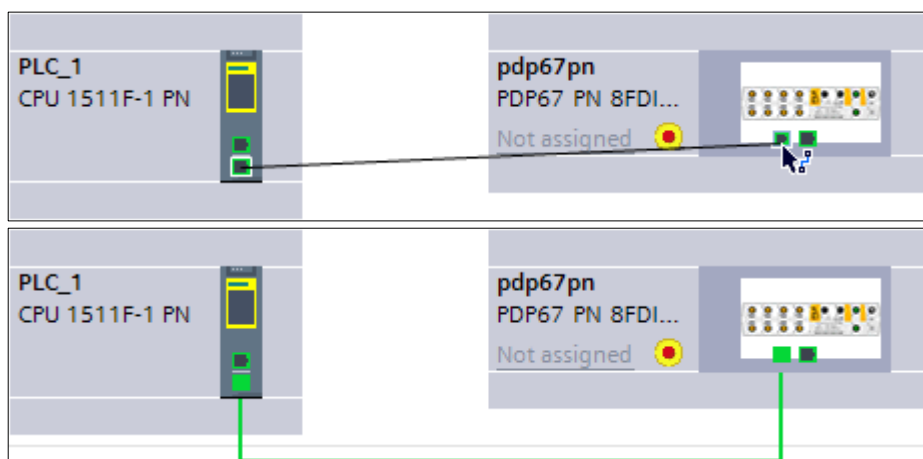


Figure 27: TIA Portal – Connect the S7-CPU and the I/O device

- ▶ Switch to the “Network view”:
The two devices are networked in the subnet “PN/IE_1”.

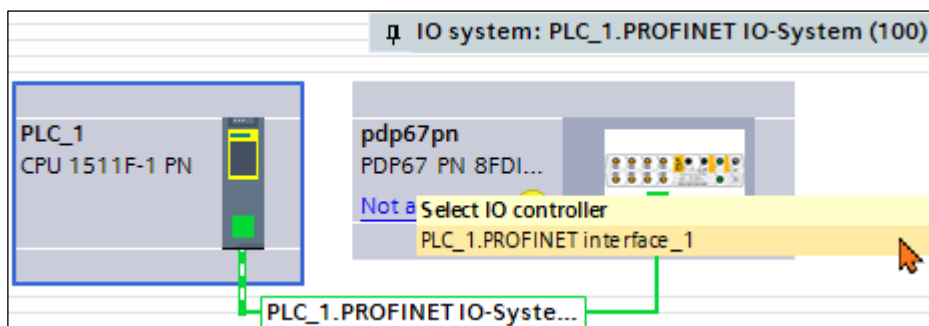


Figure 28: TIA Portal – Assigning the I/O device to the S7 CPU (Part 1, Start)

- ▶ Assign the I/O device with the preset device name **pdp67pn** to the **PLC_1**:

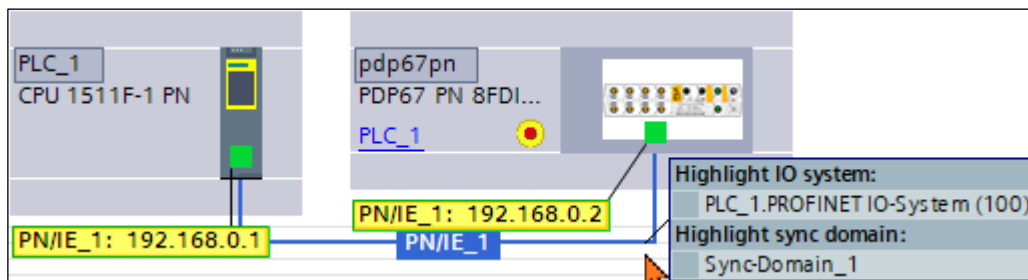


Figure 29: TIA Portal – Assigning the I/O device to the S7 CPU (Part 2, Link-up)

Topology view Network view Device view							
Network overview Connections I/O communication VPN TeleControl							
Device	Type	Address in subnet	Subnet	Master / IO system	Device number	Comment	
▼ S7-1500/ET200MP station_1	S7-1500/ET200MP stati...						
▼ PLC_1	CPU 1511F-1 PN					F-CPU	
▼ PROFINET interface_1	PROFINET interface	192.168.0.1	PN/IE_1	PROFINET IO-System			
Port_1	Port						
Port_2	Port						
▼ GSD device_1	GSD device						
▼ pdp67pn	PDP67 PN 8FDIO 4IOLS...					PDP67	
▼ PROFINET IO	pdp67pn	192.168.0.2	PN/IE_1	PROFINET IO-System	1		
X21	X21						
X22	X22						

Figure 30: TIA Portal – Assigning the I/O device to the S7 CPU (Part 3, Finalization)

- ▶ Switch to “Device view” (if not previously selected) and select the device **pdp67pn** [...] (see Figure 33 [28]).
- ▶ Switch to the section in the tab “General”:
 - “PROFINET Interface [X1]” (corresponds to ETH port *ETH0* / X21 on the PDP67 device):

Figure 31: TIA Portal – Properties of PDP67-PROFINET interface [X1] » General

Note:

- ▶ The default IP address of the PDP67 devices when delivered: **0.0.0.0** (:18080/0.0.0.0). (applies only to the PROFINET version)

Function: Activate IRT function ‘Sync slave’ (see also “Sync master”, [Figure 16](#) [[book](#) 21])

- ▶ Only use the IRT function when it is really needed; the default setting is “RT”/‘Unsynchronized’.
- ▶ To activate the IRT function, the RT class “IRT” is selected under “Real-time settings”; the new synchronization role “Sync slave” is then automatically defined:

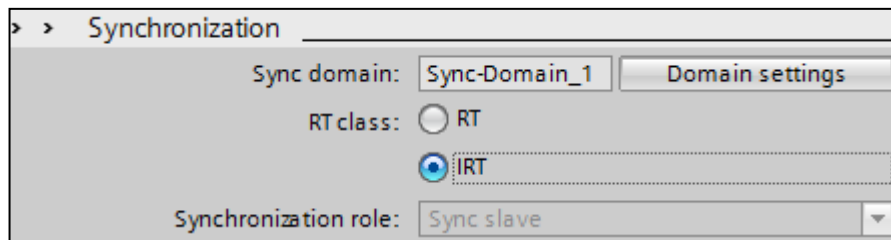


Figure 32: TIA Portal – Properties of PDP67-PROFINET interface [X1] » Real time (IRT)

8.2.2 Adding the I/O containers of the PDP67 device

- ▶ Switch to “Device view” and select the device **pdp67pn**:

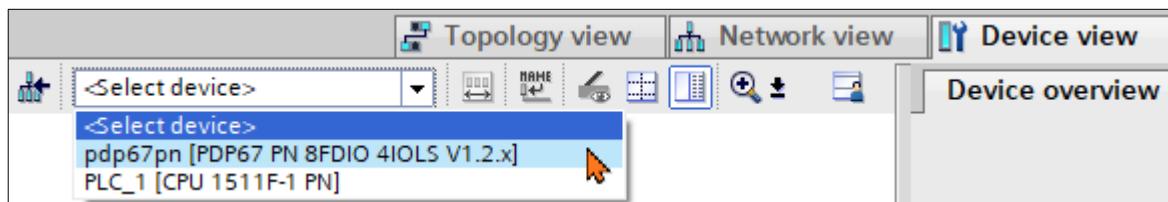


Figure 33: TIA Portal – Adding the I/O containers to the PDP67 device (Part 1, Start)

- ▶ Open the section “Module” in the Catalog tree.

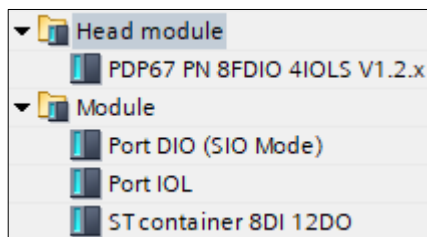


Figure 34: TIA Portal – Adding the PROFIsafe Group to the PDP67 Device (Part 2)

As described in the [Chapter 6.2.1.1 Failsafe and standard I/O process image](#) [13], the default configuration can be changed here.

The container for PROFIsafe process data is preset on **Slot 11**:

- ▶ **FS container FDIO, channel granular** (passivation)
 - » according to PROFIsafe specification version 2.6

Note:

A container for PROFIsafe process data with module-granular passivation according to PROFIsafe specification version 2.4 is not possible.

The container for digital ST process data can be added to **Slot 10**:

- ▶ **ST container 8DI 12DO**

The optional configuration of the GSDML file is used for the example:

Module	...	Rack	Slot	I add...	Q a...	Type	Article number
▼ pdp67pn		0	0			PDP67 PN 8FDIO 4IOLS V1.2.x	4R000004
▼ PROFINET IO		0	0 X1			pdp67pn	
X21		0	0 X...			X21	
X22		0	0 X...			X22	
Port 2FDIO_1		0	1			Port 2FDIO	
Port 2FDIO_2		0	2			Port 2FDIO	
Port 2FDIO_3		0	3			Port 2FDIO	
Port 2FDIO_4		0	4			Port 2FDIO	
		0	5				
		0	6				
		0	7				
		0	8				
		0	9				
ST container 8DI 12DO_1		0	10	8	6...7	ST container 8DI 12DO	
FS container FDIO, channel granular_1		0	11	0...7	0...5	FS container FDIO, channel granular	
		0	12				

Figure 35: TIA Portal – Adding the I/O containers to the PDP67 device (Part 3, Finalization)

8.2.3 Setting up the PROFIsafe address of the PDP67 fieldbus device

Basic information of PROFIsafe addresses

- ▶ Each F-address may only be used once on a PROFINET device with PROFIsafe.
The values of the F-addresses of the single devices do not have to be consecutive.
 - The permissible range of software F-addresses is: **1 ... 65 534**.
These values are positive integers.
- ▶ The F-destination address of the Pilz device is a software address and to define it, the same value must be entered in the following two configuration dialogue boxes, otherwise fault-free operation is not possible:
 1. in the *TIA Portal* tool under the properties of the *PROFIsafe group* of the PDP67 device (see [Figure 36](#))
 - and**
 2. in the *PASconfig* software
see [Chapter 8.4.2 Setting up the PROFIsafe address of the PDP67 device](#) [[36 ff](#)]
 - see online help for software
 - Prerequisite:
 - » There is an online connection to the PDP67 device.
(see [Chapter 11.3 Notes on establishing the online connection to the PDP67](#) [[75 ff](#)])
- ▶ The preset F-address of the PDP67 fieldbus devices on delivery is: 1
(applies only to the PROFINET version)
- ▶ Should the changed value of the F-address is to be accepted; a reset must always be executed.
This is done automatically in the *PASconfig* tool when the software address is changed or by pressing the reset button (Restart by Warm Reset).
 - see [Chapter 11.7.1 Carrying out of a restart \(warm reset\) by means of the Reset button](#) [[82](#)]

The PROFIsafe address 'F_Dest_Add' for the fieldbus device in the *TIA Portal* tool must be set always.

- ▶ The following PROFIsafe address is specified for this application:
 - F_Desr_Add: **5** (default F-destination address is 1)
- ▶ To do this, select the properties of the PROFIsafe group in the “Device view” of *pdp67pn* (see [Figure 35](#) [[28](#)]) and
- ▶ set the value for *F-destination address* under the section “PROFIsafe”:

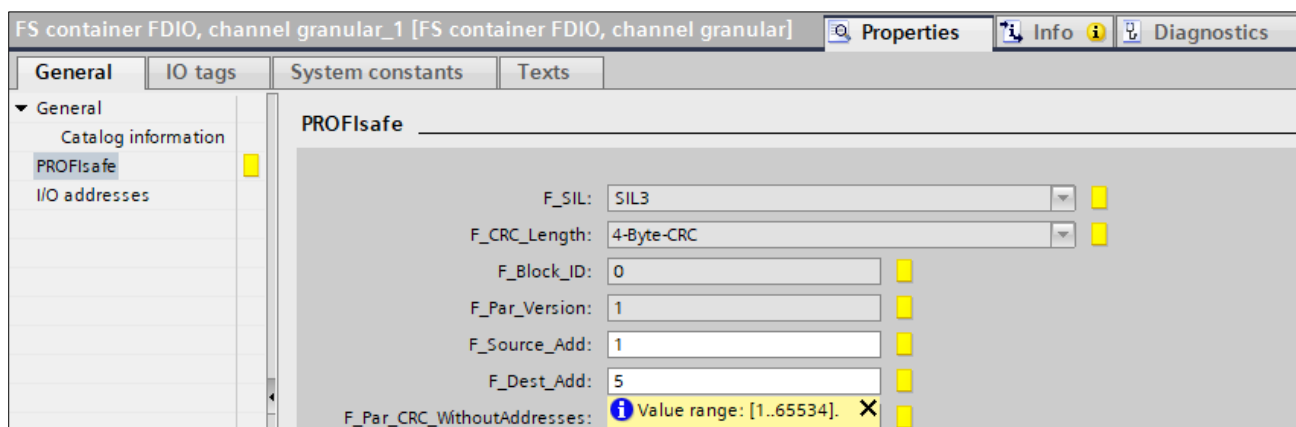


Figure 36: TIA Portal – PROFIsafe-Group » Setting up of PROFIsafe address “F_Dest_Add”

Note:

- ▶ The F-address is also required to establish the Ethernet connection between the PASconfig PC and the PSS u2 I/O device.

8.2.4 Assign the device name to the PDP67 device

For the used PROFINET system, a device name must be assigned to the PDP67 Remote I/O device (IO device) so that the IO controller of the F-CPU can communicate with it.

► For further details, see the *TIA Portal online help*, chapter “Addressing PROFINET devices”.

Now you can begin assigning the device name.

- Select the device **pdp67pn** under “Devices and networks” (see [Figure 30 \[26\]](#)).
- Right click on the device icon and select the function »Assign device name«:

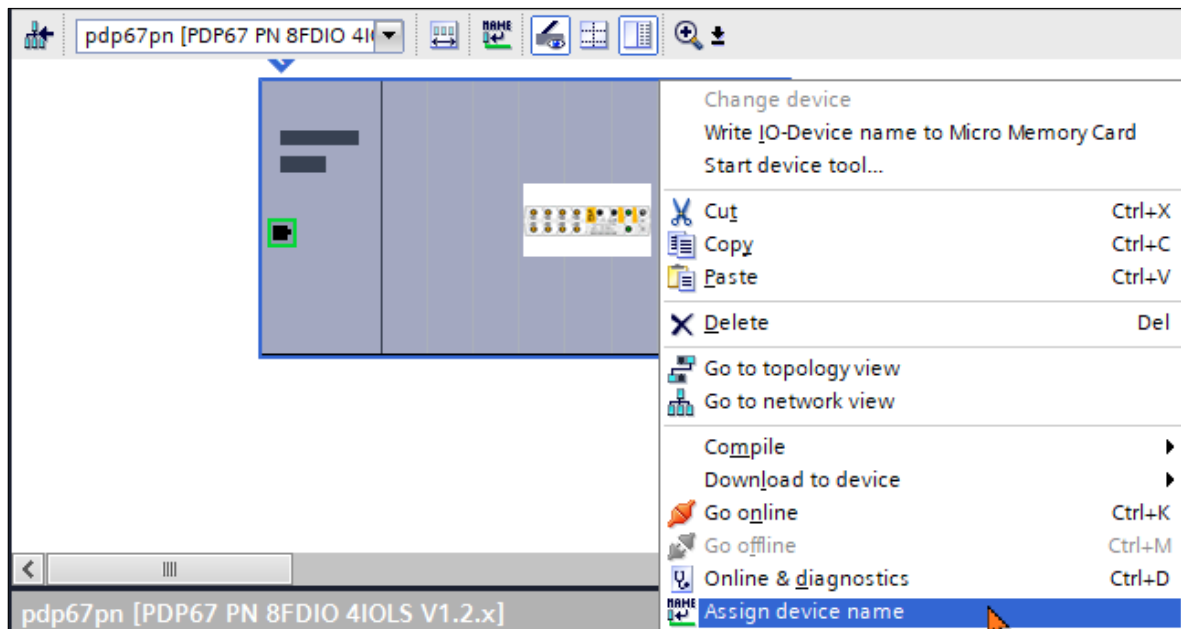


Figure 37: TIA Portal – Assign device name » Select function (Part 1, Start)

- The PDP67 device, that is to be named, can be uniquely identified by MAC address and IP address. The “Devices MAC address” is lasered on the front of the fieldbus device to the left of the reset push-button (see left picture in [Figure 38](#)).
- For the unique device identification, the displayed device can be selected and the »Flash LED« function can be activated.
 - Activated: LEDs *RUN* and *DIAG* flash green in the same mode
 - Deactivated: LEDs *RUN* and *DIAG* displayed the current system status

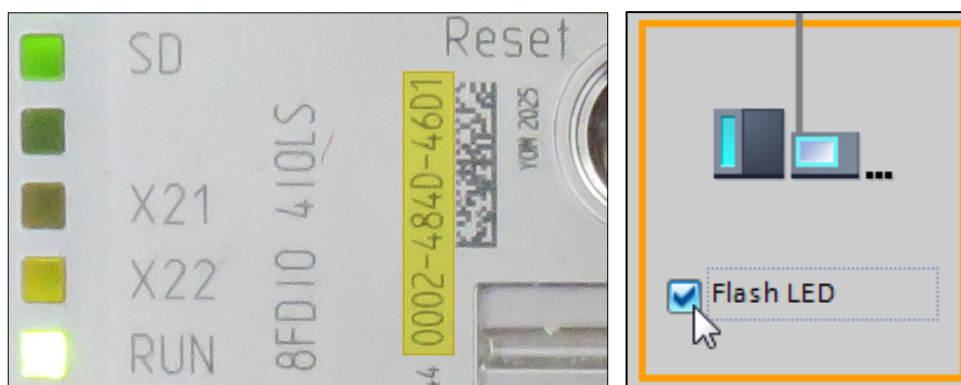


Figure 38: TIA Portal – Assign device name » MAC / Function »Flash LED« (Part 2, Identification)

- ▶ The selected PDP67 device must be marked in the table and you click on the button »Assign name«:

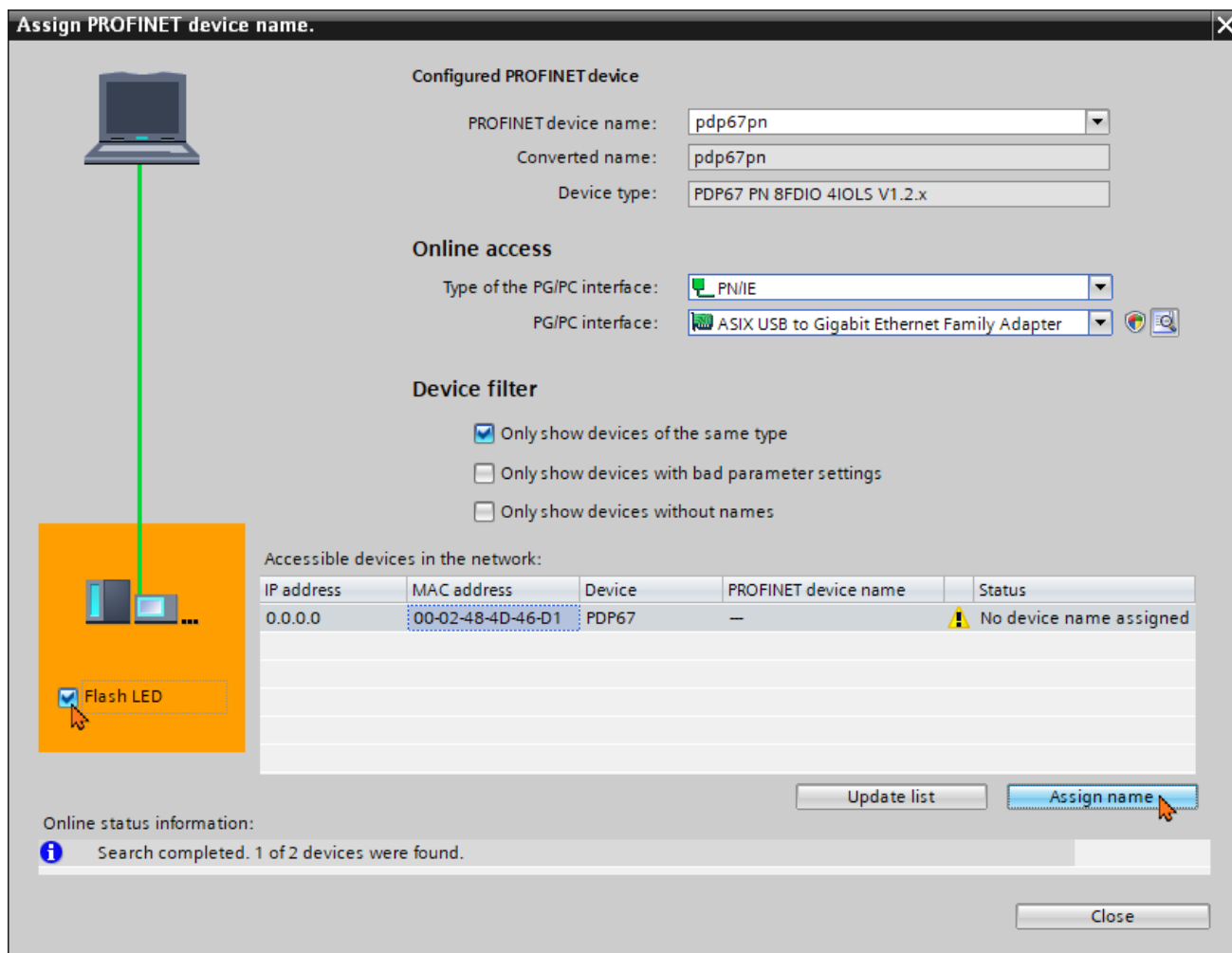


Figure 39: TIA Portal – Assign device name » Select function (Part 3, Assignment)

- ▶ At the end, the “Online status information” is used to indicate whether the operation was successful:

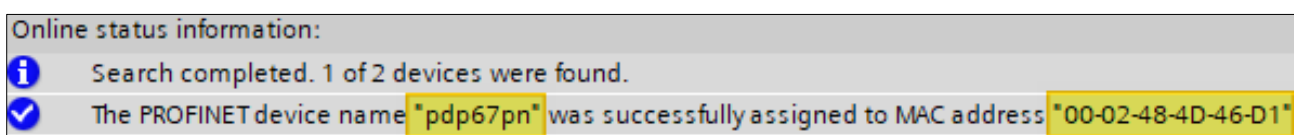


Figure 40: TIA Portal – Assign device name » Select function (Part 4, Finalization)

- ▶ You can close the window now.

8.3 TIA Portal – Transferring the configuration to the S7 F-CPU

- ▶ After closing the PASconfig software, the TIA project is saved first:

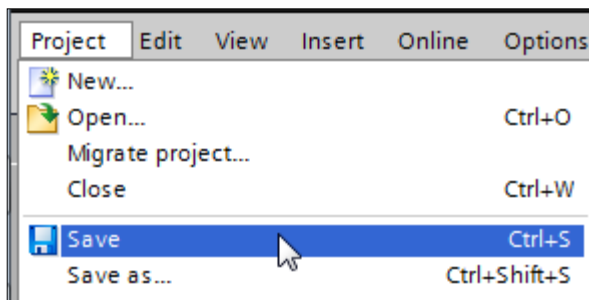


Figure 41: TIA Portal – Transfer configuration » Save project (Part 1, Start)

- ▶ Now select the F-CPU in the project tree and compile the TIA project:

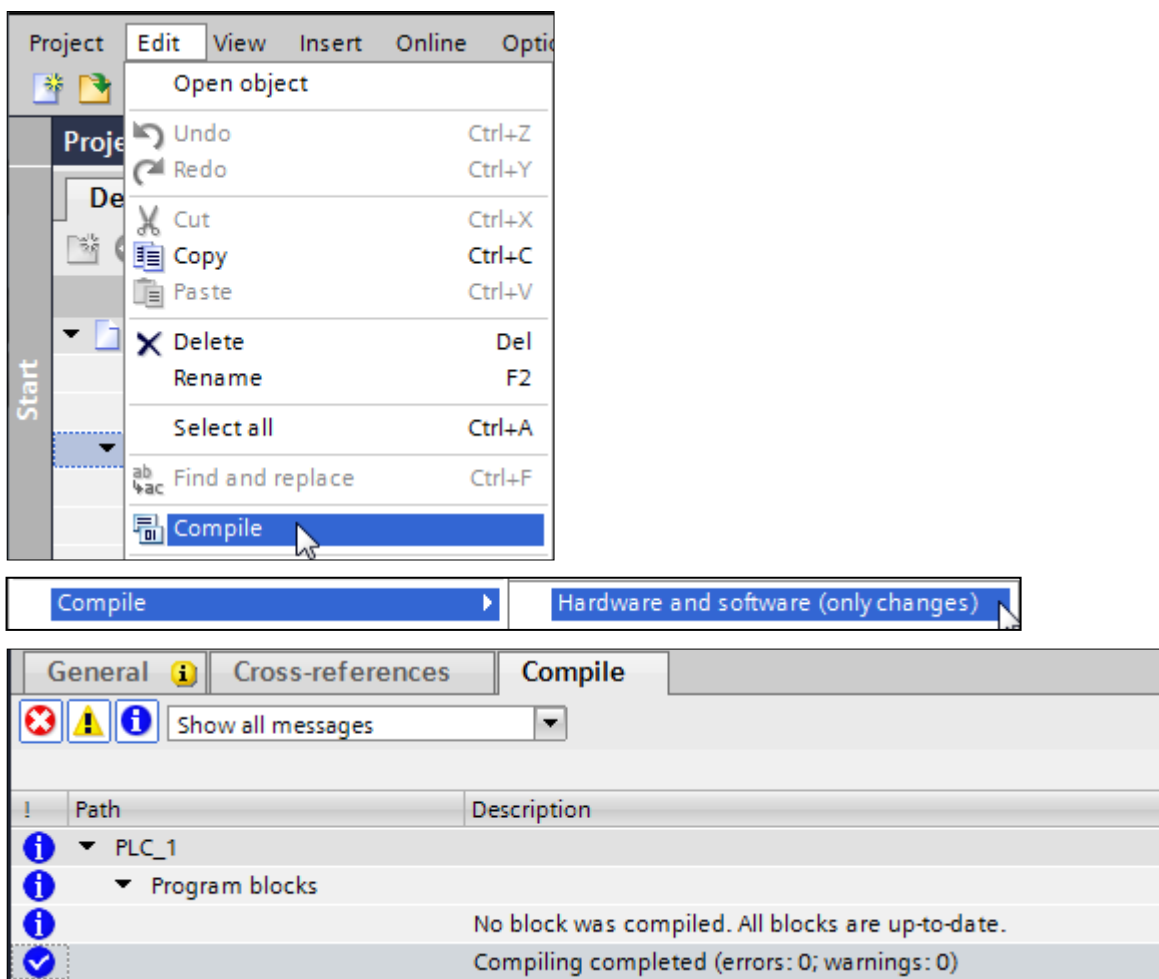


Figure 42: TIA Portal – Transfer configuration » Translate project (Part 2)

- ▶ The *TIA project* is then loaded into the F-CPU:

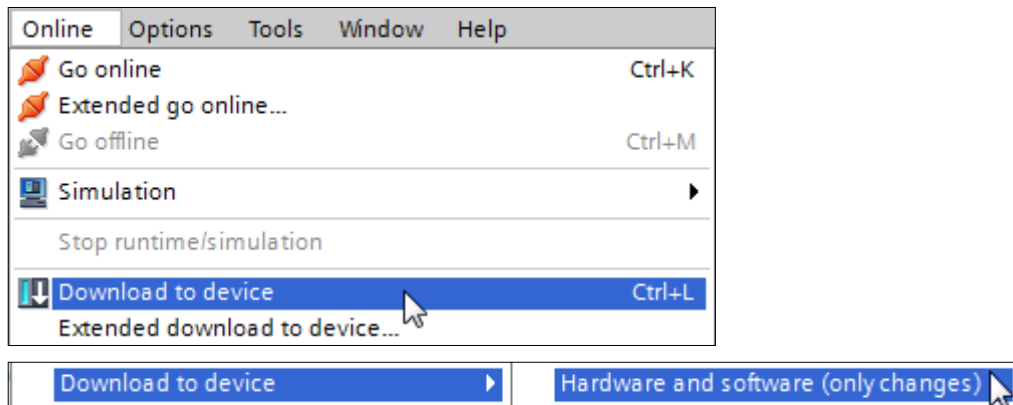


Figure 43: TIA Portal – Transfer configuration » Load project into device (Part 3)

- ▶ The F-CPU can now be set to *RUN* operating mode.
The F-CPU and the PDP67 device still display an error because the configuration is not yet complete:



Figure 44: F-CPU / PDP67 – LED displays with configuration not yet complete

8.4 PASconfig – Device configuration of PDP67 device

The basic configuration is already in place; the data is generated automatically using the settings previously made in the *TIA Portal*.

- see [Chapter 8.2 TIA Portal – Device configuration of PDP67 device \[24 ff.\]](#).

8.4.1 Start of PASconfig via TIA Portal device configuration

- ▶ Open the function “Devices & networks” in “Project tree”.
- ▶ Switch to “Device view” and select the device **pdp67pn**.
- ▶ Right click on the device icon and select the function »Start device tool...« using the access point “Configuration”:

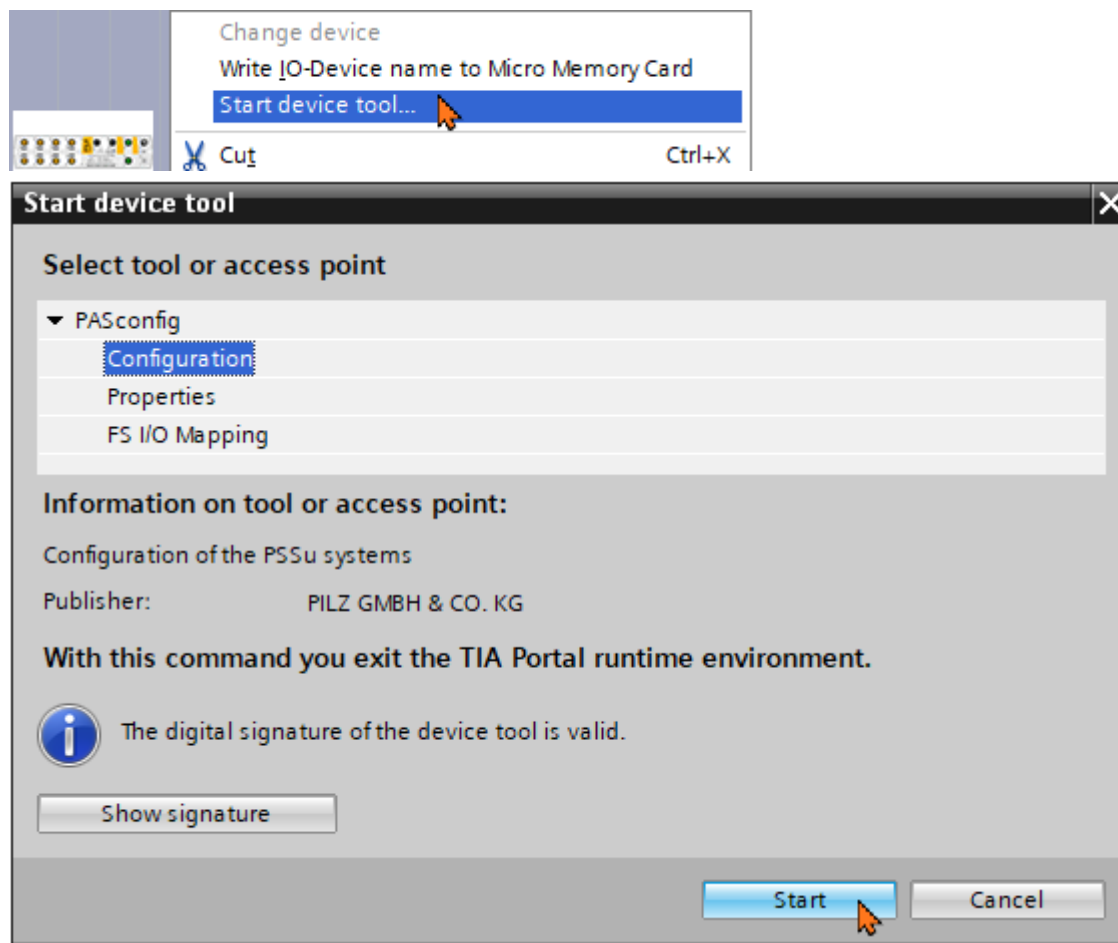


Figure 45: PASconfig – Start device tool from TIA Portal » Access point “Configuration”

Note:

- ▶ The *PASconfig* tool opens with the ‘User interface language’ set in the *TIA*. In version 6.1.0, only the two languages *German* and *English* are supported.
- ▶ Now, for the first time, an attempt is made via the *PASconfig* tool to establish an online connection to the configured PDP67 device:

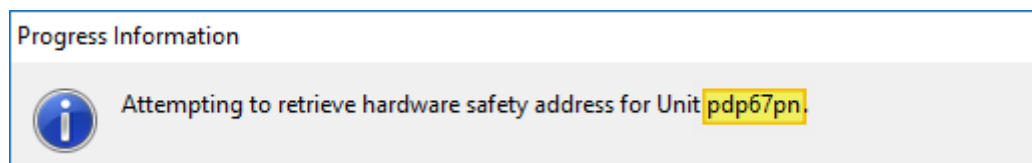


Figure 46: PASconfig – Status message ‘Read F-address for Ethernet connection’



NOTICE

- ▶ If the device's IP address does not match the one stored in the F-CPU configuration, please refer to the application tips in:
 - [Chapter 11.3 Notes on establishing the online connection to the PDP67](#) [75 ff]
- ▶ For specific information on the Ethernet connection, see:
 - [Subchapter 11.3.1 Determining the IP address and port number \(PROFINET\)](#) [75]

8.4.2 Setting up the PROFIsafe address of the PDP67 device

After assigning the IP address to the PDP67 device, when the TCI function “Configuration” (Figure 45 [34]) is called up again, the F-address of the PROFIsafe group saved in the device is checked first; in the factory setting, the default F-destination address is “[1]”.

If this is different from the F-destination address “[5]” configured and transferred by the TIA project (Figure 36 [29]), an automatic procedure is executed at the PASconfig tool.

- ▶ Start with Function “Download Project F-address”:

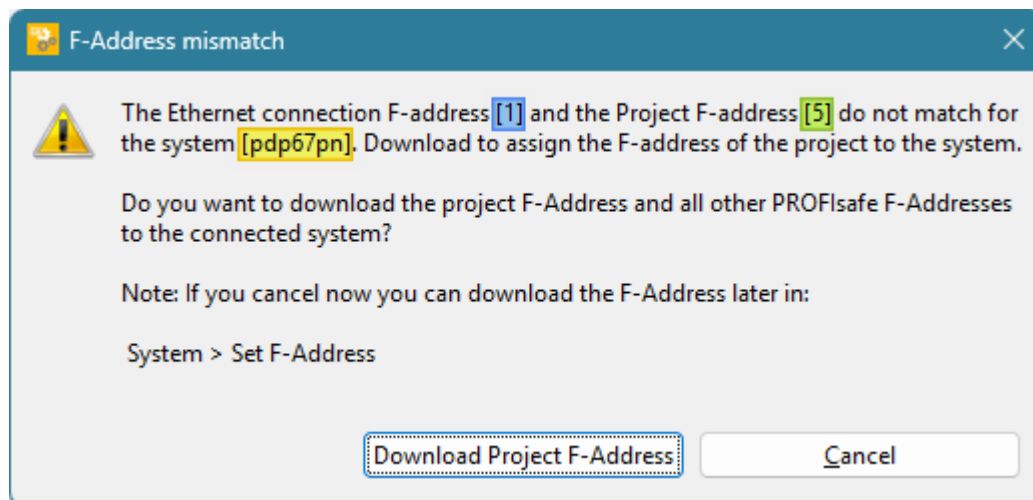


Figure 47: PASconfig – Function “Download Project F-address” (Part 1, Start)

- ▶ After this, the PDP67 device must be restarted to accept the values:

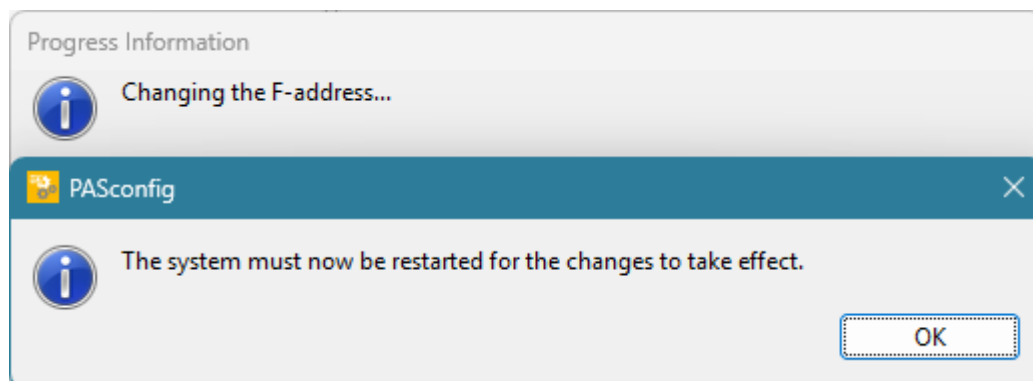


Figure 48: PASconfig – Function “Set F-addresses” (Part 2, Restart)

- ▶ The successful restart of the device is displayed:

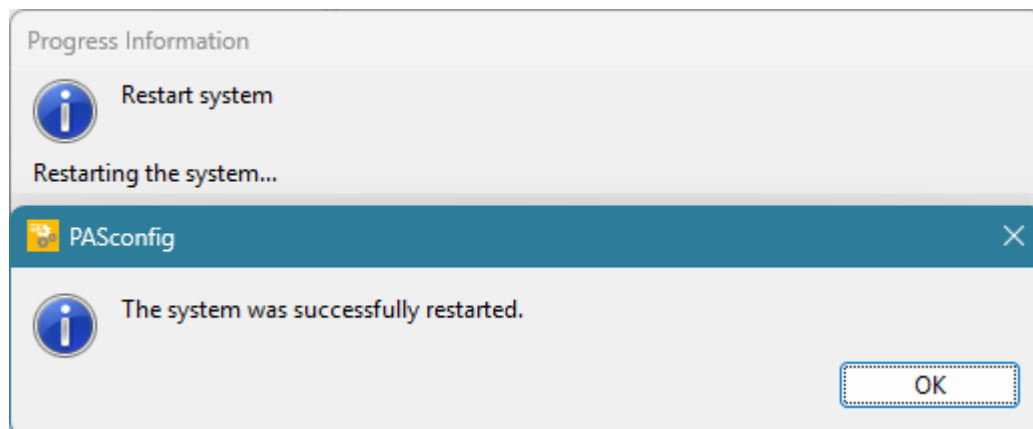


Figure 49: PASconfig – Function “Set F-addresses” (Part 3, Finalization)

- After the restart, the device “PLC_1:pdp67pn” transferred from the *TIA project* is displayed:

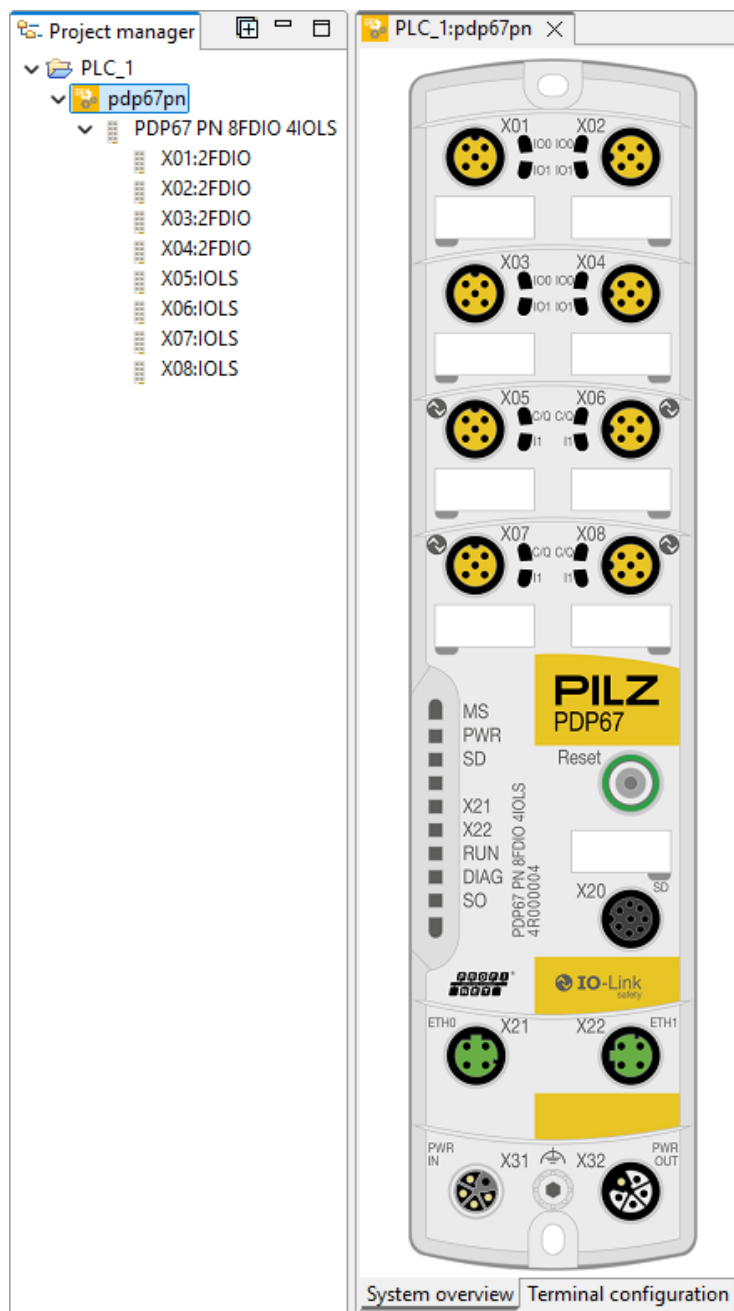


Figure 50: PASconfig – I/O device “PLC_1:pdp67pn”



NOTICE

- If the device’s PROFIsafe address(es) do not match those stored in the F-CPU configuration, please refer to the Application Notes in:
 - [Chapter 11.3 Notes on establishing the online connection to the PDP67](#) [75 ff]
- For further details on F addresses, please see:
 - [Subchapter 11.3.2 Determination and temporary assignment of the F-address \(PROFIsafe\)](#) [76]
- If the first F-destination address for the device’s PROFIsafe communication is not changed (default value: 1), the F-addresses will not be automatically transferred to the PASconfig project. This also applies if only the F-addresses of the IOLS ports are added or changed at a later stage.
In that case, the new F-addresses must be transferred manually to the PDP67 device:
 - [Subchapter 11.3.3 Manual assignment of F-addresses \(IOLS\)](#) [77 ff].

8.4.3 Download the configuration to PDP67 device

- ▶ The configuration you have just created must now be saved.

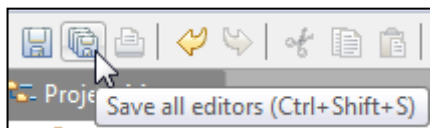


Figure 51: PASconfig – Save configuration » Save all editors

- ▶ After that, start with the function »Download configuration data«:

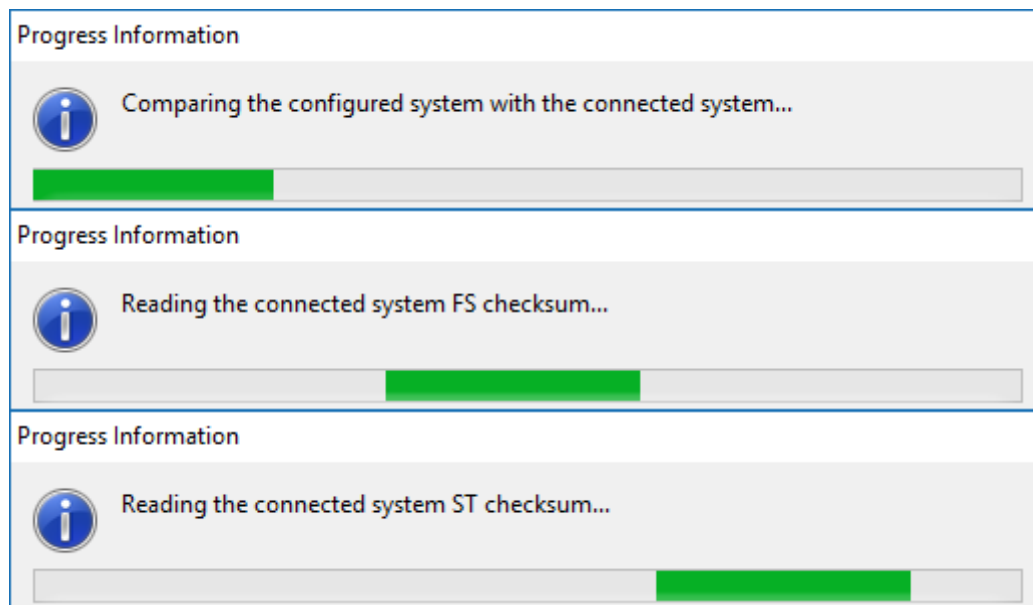
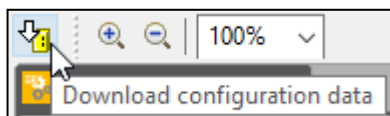


Figure 52: PASconfig – Download configuration » Reading the connected PDP67 device (Part 1)

A password is required to transfer the FS configuration.

The default password is “pssu”.

- ▶ It can be changed via the menu item ‘System’ » ‘Change FS password ...’.

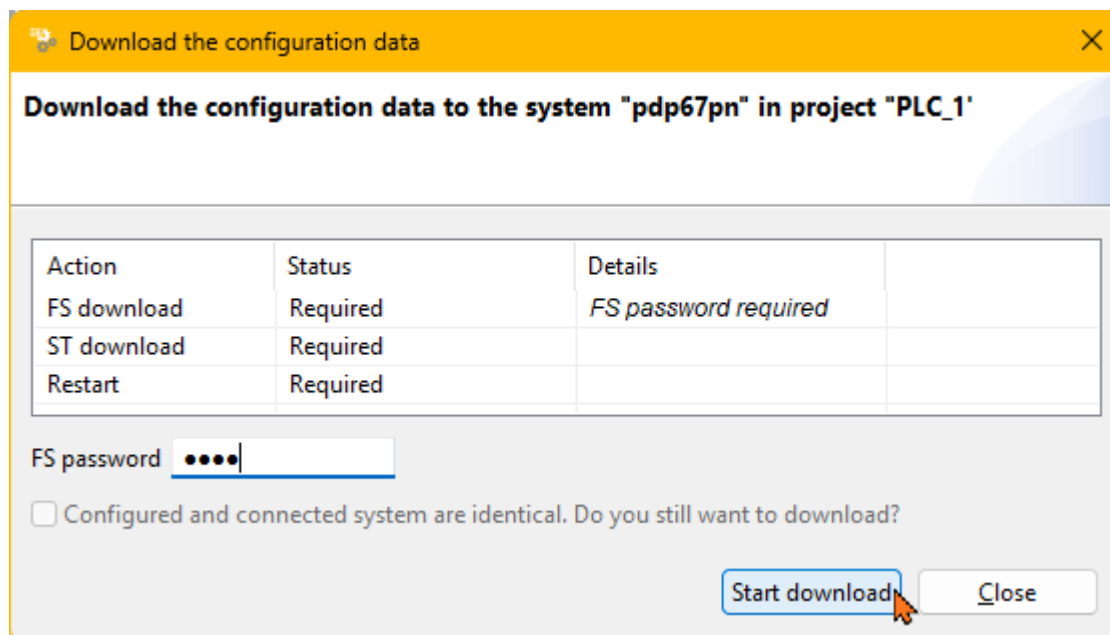


Figure 53: PASconfig – Download configuration » Entering the password (Part 2)

- ▶ Confirm the change to the safety configuration.
- ▶ Now the download of the configuration data and the automatic restart is executed:

Action	Status	Details
FS download	Success	Finished
ST download	Success	Finished
Restart		Restarting...

Figure 54: PASconfig – Download configuration » Download FS data and restart device (Part 3)

- ▶ The download window can now be closed:

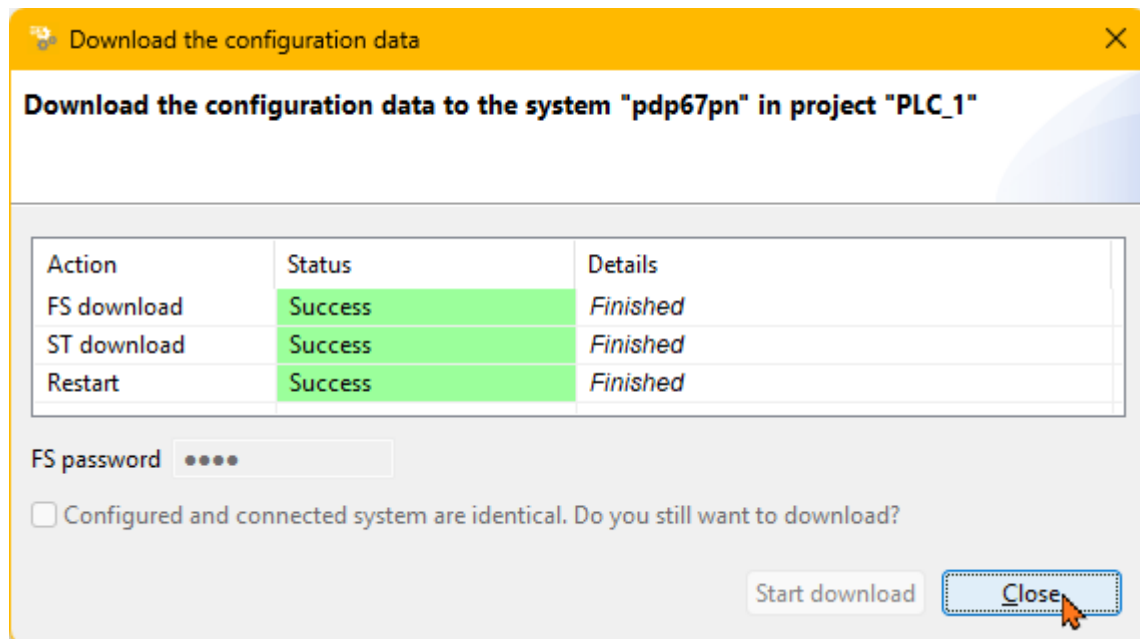


Figure 55: PASconfig – Download configuration » Close download window (Part 4)

- ▶ The PASconfig tool can now be closed:

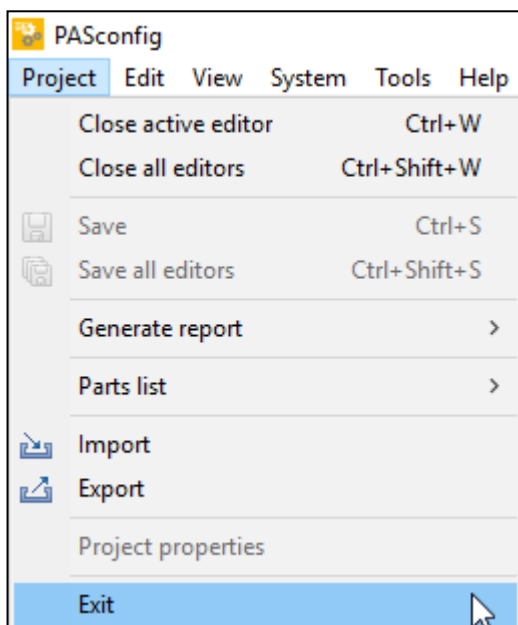


Figure 56: PASconfig – Close tool

8.5 Error-free system start-up

- ▶ There should now be no more error messages in the PDP67 device diagnostics:

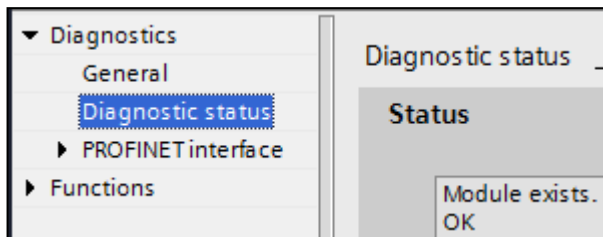


Figure 57: TIA Portal – Transfer configuration » Check diagnostic status

- ▶ The error-free status of both devices can also be identified by their LEDs:
 - The 'SO' LED on the Pilz device only lights up green if the container is configured for PROFIsafe process data and the PROFIsafe connection to the F-CPU is active.
 - The current fail-safe process image only becomes visible in the online view of the PLC variables in the TIA Portal when read/write access to these fail-safe signals is performed in the program of an F function block that is assigned to an active F sequence group of the F-CPU. Otherwise, for example, there is no read access to a failsafe input or its associated valid bit and therefore no real status display; both signals then always have the value 'zero' in the online display.

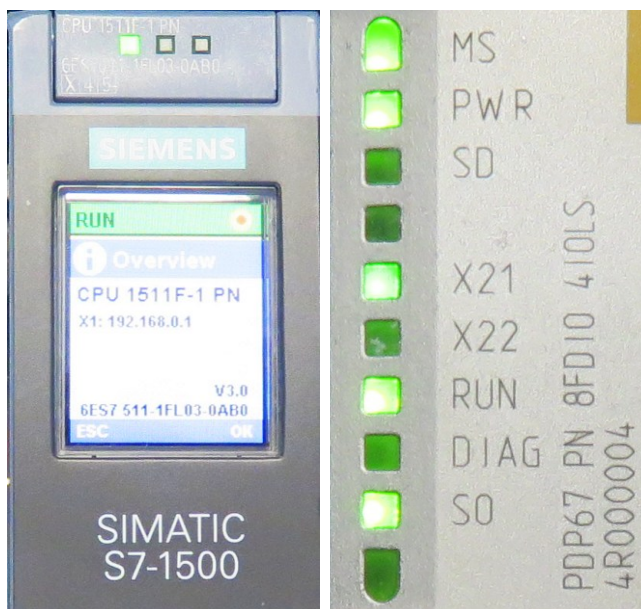


Figure 58: F-CPU / PDP67 – LED displays with error-free configuration

9 Configuration of the hybrid IO ports (FDIO)

- ▶ The **four digital IO ports X01..X04** on the PDP67 PN 8FDIO 4IOLS device described here correspond to the three FDIO ports on the PDP67 PN 6FDI 6FDIO 2FDOTP device:
 - Hybrid ports X02, X04, X06.

Overviews and notes on configuration and possible start-up errors of the FDIO functions are described in the Application Note »PDP67 I/O PROFINET with PROFIsafe profile on SIMATIC S7-1500 with TIA Portal«:

- ▶ The corresponding document »AN PDP67 FDIO Profinet S7 TIA **1005313**« is linked here:
 - [Chapter 1.1 Documentation from Pilz GmbH & Co. KG \[6\]](#).

X01:2FDIO		X02:2FDIO	
Property	Value	Property	Value
Port state	FS input	Port state	FS output
FS input		FS input	
Test pulses and ST outputs		Test pulses and ST outputs	
T0		T0	
Pin state, if this test pulse is not assigned to an input	24 V	Pin state, if this test pulse is not assigned to an input	24 V
Test pulse duration (0.3 ... 10.0) [ms]	3.0	Test pulse duration (0.3 ... 10.0) [ms]	3.0
T1		T1	
Pin state, if this test pulse is not assigned to an input	24 V	Pin state, if this test pulse is not assigned to an input	24 V
Test pulse duration (0.3 ... 10.0) [ms]	3.0	Test pulse duration (0.3 ... 10.0) [ms]	3.0
Discrepancy monitoring		Discrepancy monitoring	
Use discrepancy monitoring	☒	Use discrepancy monitoring	☐
Reintegration after discrepancy time	With restart interlock	Reintegration after discrepancy time	With restart interlock
Sensor type	Non-equivalent	Sensor type	Non-equivalent
Discrepancy behaviour	Set value to zero	Discrepancy behaviour	Set value to zero
Discrepancy time (30 ... 30000) [ms]	100	Discrepancy time (30 ... 30000) [ms]	100
Switch-on delay time (0 ... 5000) [ms]	0	Switch-on delay time (0 ... 5000) [ms]	0
Bounce monitoring time (1 ... 30) [s]	5	Bounce monitoring time (1 ... 30) [s]	5
Inputs and outputs		Inputs and outputs	
I0		I0	
Pin state	On	Pin state	On
Software filter time (0 ... 10.0) [ms]	1.0	Software filter time (0 ... 10.0) [ms]	1.0
Pulse stretching (0 ... 255) [ms]	0	Pulse stretching (0 ... 255) [ms]	0
Test pulse	T0	Test pulse	T0
I1		I1	
Pin state	On	Pin state	On
Software filter time (0 ... 10.0) [ms]	1.0	Software filter time (0 ... 10.0) [ms]	1.0
Pulse stretching (0 ... 255) [ms]	0	Pulse stretching (0 ... 255) [ms]	0
Test pulse	T1	Test pulse	T1
ST output O0		ST output O0	
Substitute value	Output switched off	Substitute value	Output switched off
ST output O1		ST output O1	
Substitute value	Output switched off	Substitute value	Output switched off
FS output		FS output	
Port		Port	
Repetition of on test in error-free operation (0 ... 255) [s]	0	Repetition of on test in error-free operation (0 ... 255) [s]	0
Repetition of on test in the event of an error (0 ... 255) [s]	30	Repetition of on test in the event of an error (0 ... 255) [s]	30
Repetition of off test (0 ... 255) [s]	0	Repetition of off test (0 ... 255) [s]	0
O0		O0	
Pin state	On	Pin state	On
Switch-off delay (0 ... 65535) [ms]	0	Switch-off delay (0 ... 65535) [ms]	0
Off tests	☒	Off tests	☒
On tests	☒	On tests	☒
Max. test duration (0.1 ... 12.7) [ms]	3.0	Max. test duration (0.1 ... 12.7) [ms]	3.0
O1		O1	
Pin state	On	Pin state	On
Switch-off delay (0 ... 65535) [ms]	0	Switch-off delay (0 ... 65535) [ms]	0
Off tests	☒	Off tests	☒
On tests	☒	On tests	☒
Max. test duration (0.1 ... 12.7) [ms]	3.0	Max. test duration (0.1 ... 12.7) [ms]	3.0

Figure 59: PASconfig – Configuration PDP67 FS input and FS output (default values)

10 Configuration of the IO-Link Safety Ports (IOLS)

10.1 Basics of the IO-Link Configurator

- ▶ The **four IO-Link ports X05..X08** cannot be selected directly.
To do this, click on the lower device area of the image in the central work area of PASconfig.
The display changes in the 'Properties' window. You will now see the following for these ports:
 - the values of the fieldbus assignment (here PROFINET), Slots of the TIA device view 'Slot 5 ... 8', and
 - the standard input and output data, Slot of the TIA Portal device view 'Slot 10':

The screenshot shows the PASconfig interface. On the left, a rack of modules is displayed, with the PDP67 module highlighted. On the right, the 'Properties' window is open, showing the 'PDP67 PN 8FDIO 4IOLS' configuration. The 'General' tab is selected, and the 'IOL-PROFINET assignment (slot 5 ... 8)' is expanded. The table below shows the default values for the IO-Link data.

System	Property	Value
General	IOL-PROFINET assignment (slot 5 ... 8)	
	Slot 5, subslot 1 - Submodule type	Empty
	Slot 5, subslot 1 - PII data length	0
	Slot 5, subslot 1 - PIO data length	0
	Slot 5, subslot 2 - Submodule type	Empty
	Slot 5, subslot 2 - PII data length	0
	Slot 5, subslot 2 - PIO data length	0
	Slot 6, subslot 1 - Submodule type	Empty
	Slot 6, subslot 1 - PII data length	0
	Slot 6, subslot 1 - PIO data length	0
	Slot 6, subslot 2 - Submodule type	Empty
	Slot 6, subslot 2 - PII data length	0
	Slot 6, subslot 2 - PIO data length	0
	Slot 7, subslot 1 - Submodule type	Empty
	Slot 7, subslot 1 - PII data length	0
	Slot 7, subslot 1 - PIO data length	0
	Slot 7, subslot 2 - Submodule type	Empty
	Slot 7, subslot 2 - PII data length	0
	Slot 7, subslot 2 - PIO data length	0
	Slot 8, subslot 1 - Submodule type	Empty
	Slot 8, subslot 1 - PII data length	0
	Slot 8, subslot 1 - PIO data length	0
	Slot 8, subslot 2 - Submodule type	Empty
	Slot 8, subslot 2 - PII data length	0
Slot 8, subslot 2 - PIO data length	0	
	ST input/output data (slot 10)	On

Figure 60: PASconfig – PDP67 configuration » IOL data (default values)

- ▶ Right-click on the device area and select the function 'Start IO-Link Configurator...':

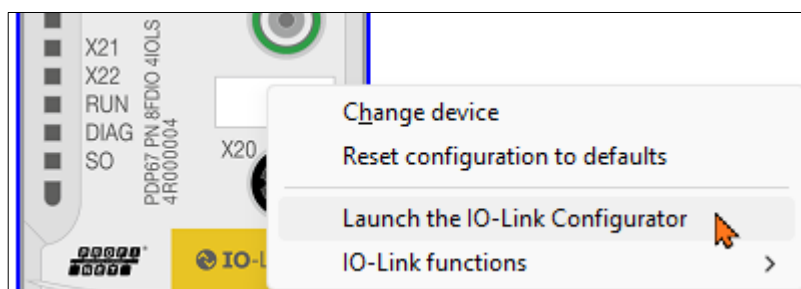


Figure 61: PASconfig – Start IO-Link Configurator

- ▶ When starting the IO-Link Configurator for the first time, a new IO-Link project must be created:

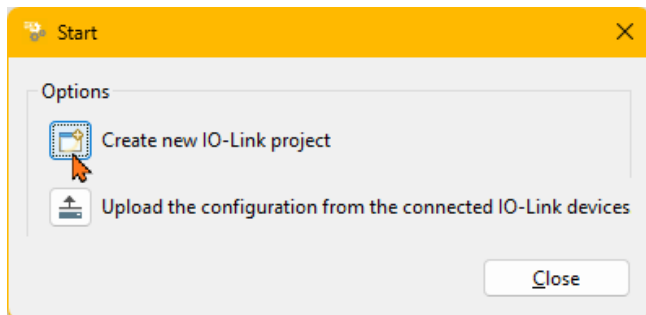


Figure 62: IO-Link Configurator – Create new IO-Link project

Note: If an IO-Link project is already linked, the IO-Link Configurator opens directly.

- ▶ The IO-Link Configurator is started:

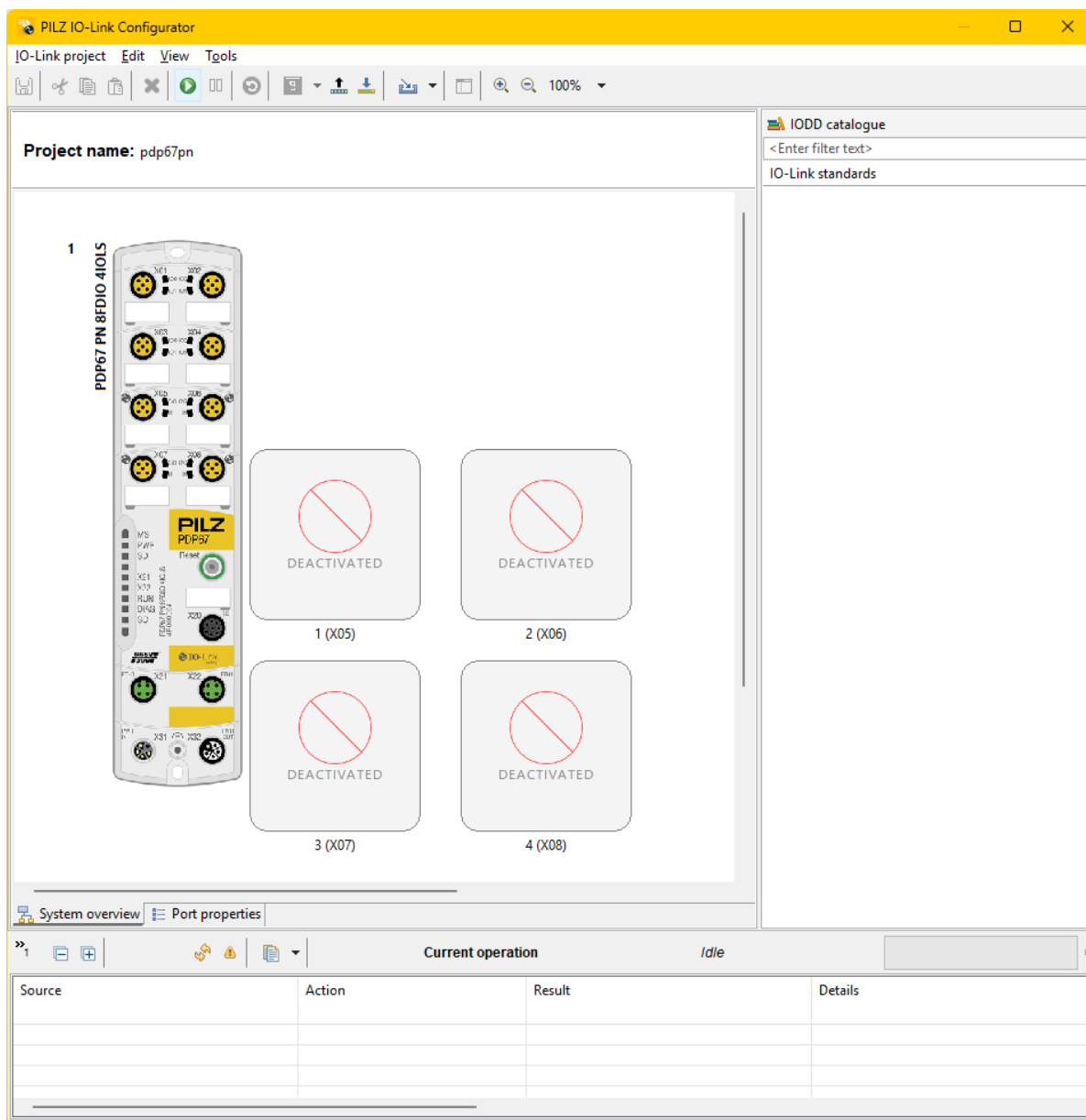


Figure 63: IO-Link Configurator – Overview

Note:

- ▶ When the PDP67 device is **delivered**, the following settings are active:
 - the IO-Link safety ports are deactivated and
 - the corresponding C/Q LEDs are switched off.

10.1.1 Download the IODD device description files

The IO-Link organisation has the website: <https://io-link.com>.

There is a database called **IODDfinder** ([link](#)) that can be used to find device information and download IODD files. This includes the **IODD Viewer** tool for viewing these files.

- ▶ First, you need to enter the data for the IOL device, including information about the manufacturer, product type, item number and IO-Link device ID.
- ▶ Open the IODDfinder and enter the data, using the **ifm RA3100** sensor as an example:

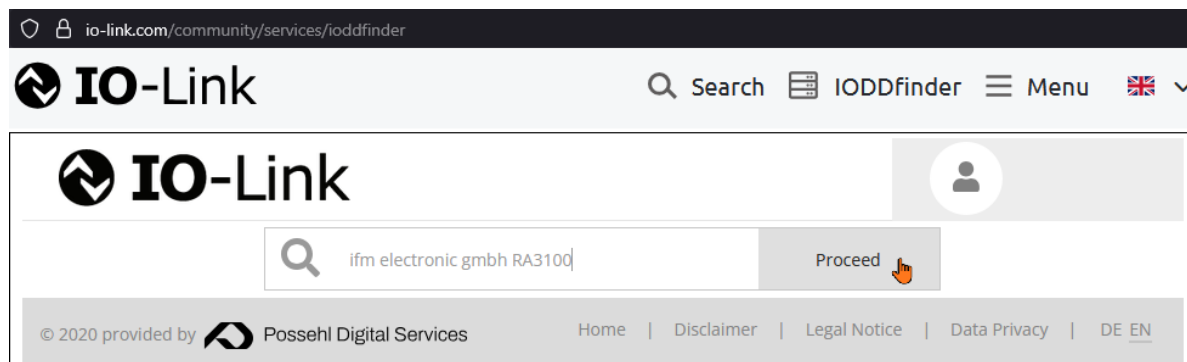


Figure 64: IO-Link Organisation – IODDfinder » Search for the IODD of the ifm sensor

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- ▶ The search may return many results. You can use the filter functions to narrow down the results and then start downloading and displaying the device description file:

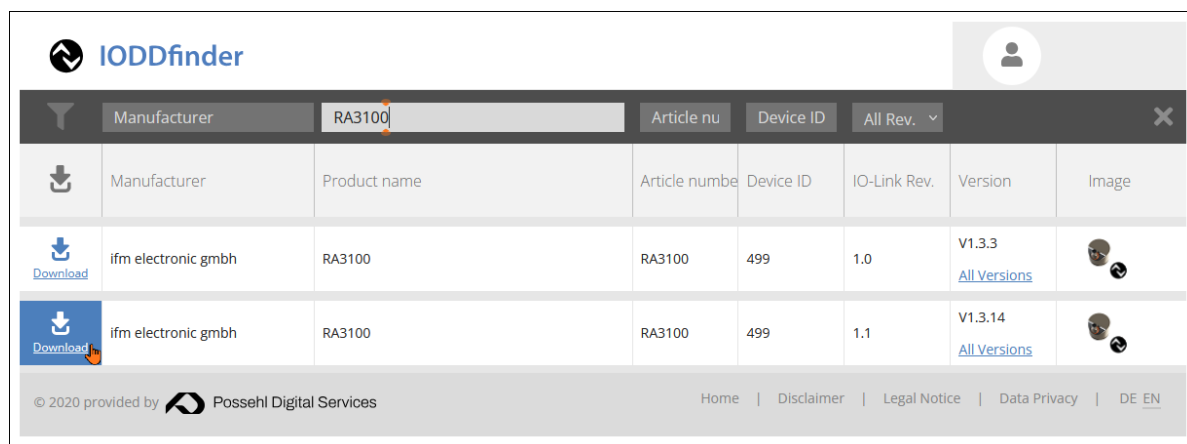


Figure 65: IO-Link Organisation – IODDfinder » Download the IODD of the ifm sensor

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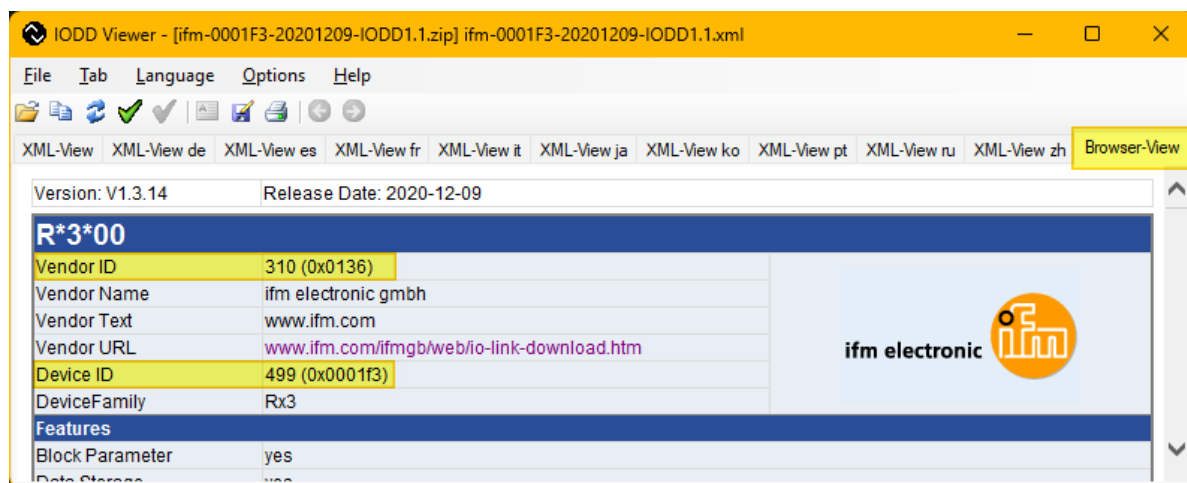


Figure 66: IODD Viewer – Browser view » Display of the IODD of the ifm sensor

10.1.2 Managing the IODD device description files in the IO-Link Configurator

To integrate IO-Link devices into the IOL fieldbus assignment (here PROFINET), the corresponding device description file (IODD) must be installed in the IO-Link Configurator for configuration.

- ▶ Open the “Import IODD » from ZIP file” function in the “Extras” menu or toolbar:

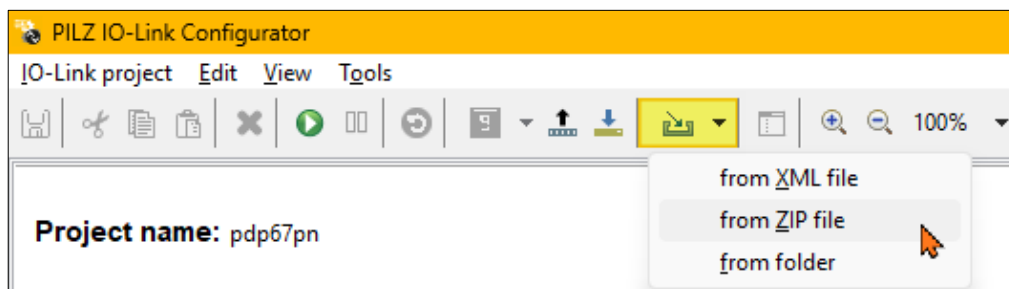


Figure 67: IO-Link Configurator – Manage device description files IODD (Part 1, beginning)

- ▶ Select and install the downloaded IODD file, using the **Pilz PITgatebox** as an example:

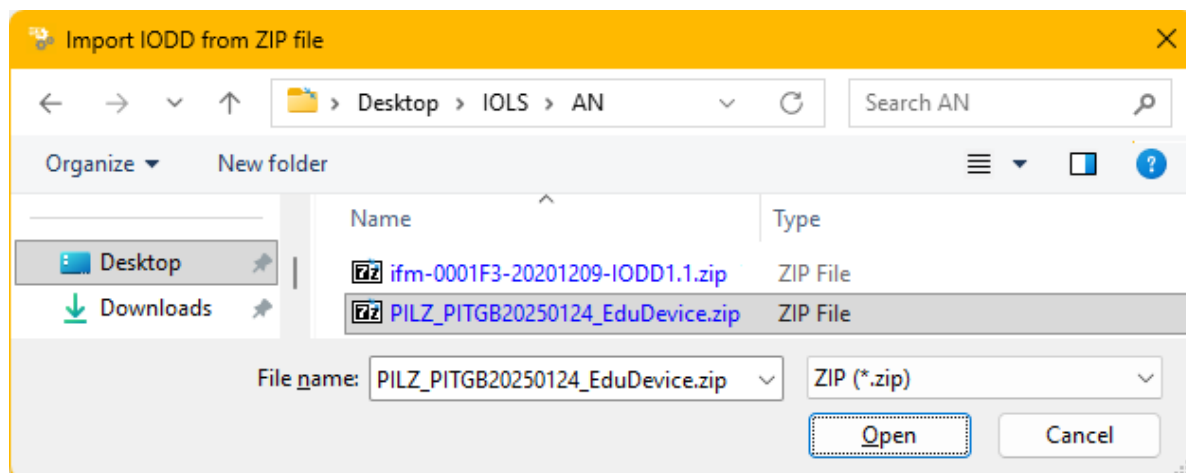


Figure 68: IO-Link Configurator – Manage IODD device description files (Part 2, installation)

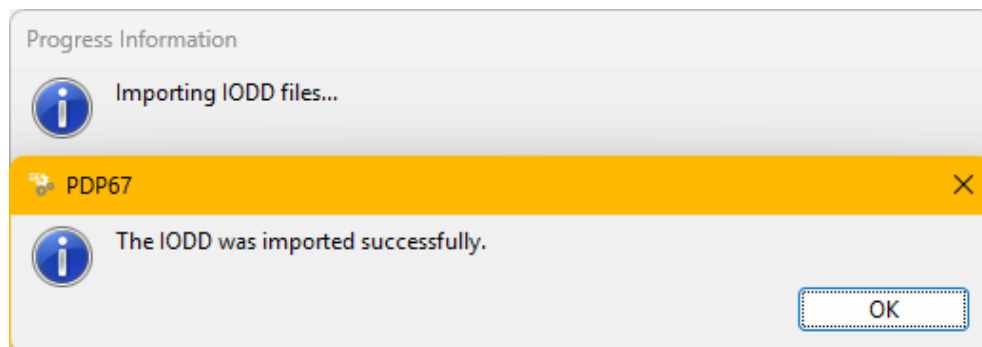


Figure 69: IO-Link Configurator – Managing IODD device description files (Part 3, conclusion)

- ▶ The imported device description files are now available in the IODD catalogue:

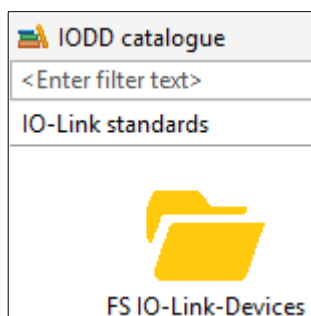


Figure 70: IO-Link Configurator – IODD catalogue » Available device description files

10.1.3 Functions of the download manager

A central component of the IO-Link Configurator is the download manager. All downloads for IO-Link devices are carried out here.

- ▶ The download manager is divided into three parts:

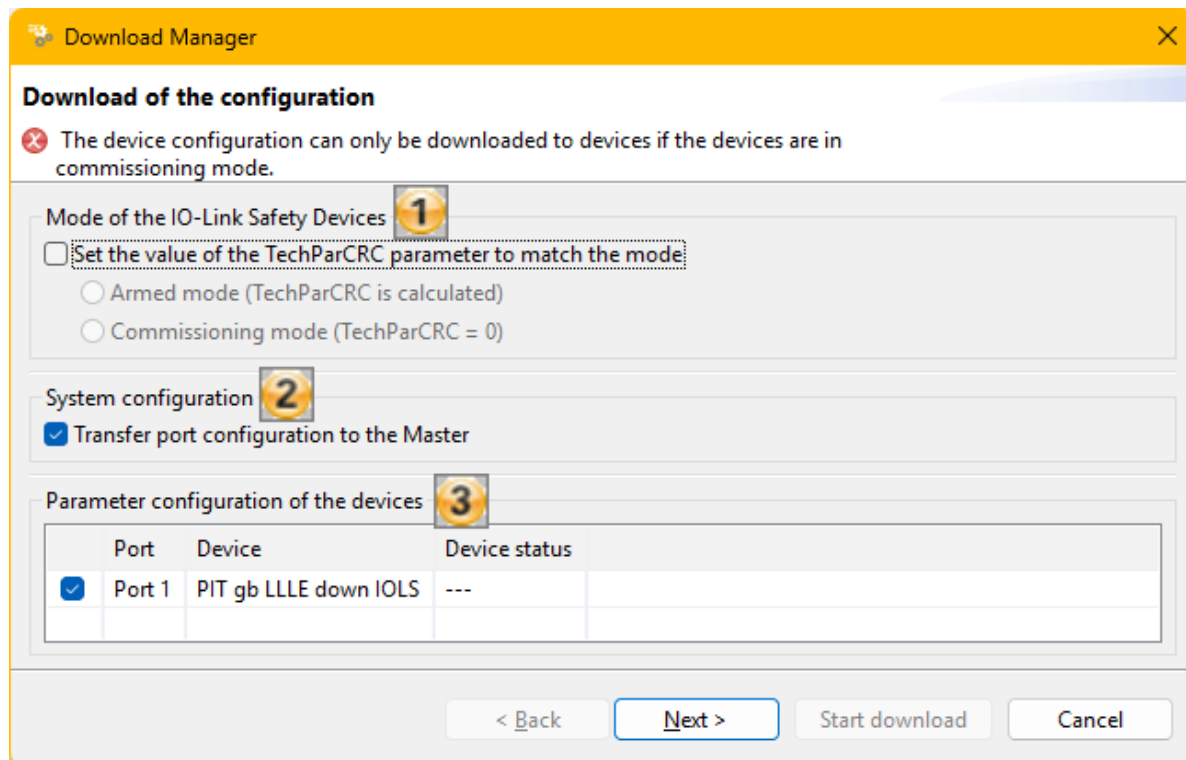


Figure 71: IO-Link Configurator – Download Manager » Overview

- ▶ Mode of the IO-Link safety devices **1**
 - Changing the **TechParCRC** values of the IO-Link safety device to switch between
 - the operating mode (armed mode) and
 - commissioning mode.
 - The system configuration (middle section) is always downloaded when this section is activated.
- ▶ System configuration **2**
 - Downloading the port configuration to the IO-Link Safety Master (PDP67 device).
 - The port configuration of an IO-Link device is imported with the IODD.
 - see [Chapter 10.1.1 Download the IODD device description files \[44\]](#).
- ▶ Parameter configuration of the devices **3**
 - Download the parameter configuration to the IOLS devices selected in the table.
 - The 'Device status' is displayed in the last column:

Device status	Description
Port unconnected	The IOL port is switched off in the port configuration (port mode: disabled).
---	The status of the IO-Link safety device is unknown. This means that the IOLS device is: » in its delivery state, see note at Figure 63 [43] or » NOT in armed mode and NOT in commissioning mode or » a standard IO-Link device is connected.
Commissioning mode	The IO-Link Safety Device is in parameterisation mode for commissioning. The parameters on the IO-Link Safety Device can now be changed.
Armed mode	The IO-Link Safety Device is in operating mode.
No matching device	The following is possible: » The wrong IO-Link Safety IODD is being used or » Autostart is activated for a standard IO-Link device on the IOL port (port mode: IO-Link autostart).



INFO

- ▶ The download manager usually remains open after the individual configuration steps; it must be closed deliberately by pressing the **[Cancel]** button:

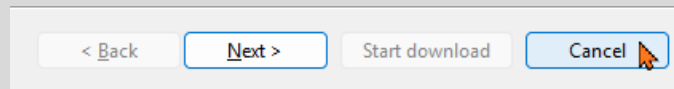


Figure 72: IO-Link Configurator – Download Manager » Close with 'Cancel'

- ▶ The download manager should not be opened immediately after a previous download (and restart of the PDP67 device). Otherwise, the status of the device will be displayed as **»Port unconnected«** because the device is not yet ready:

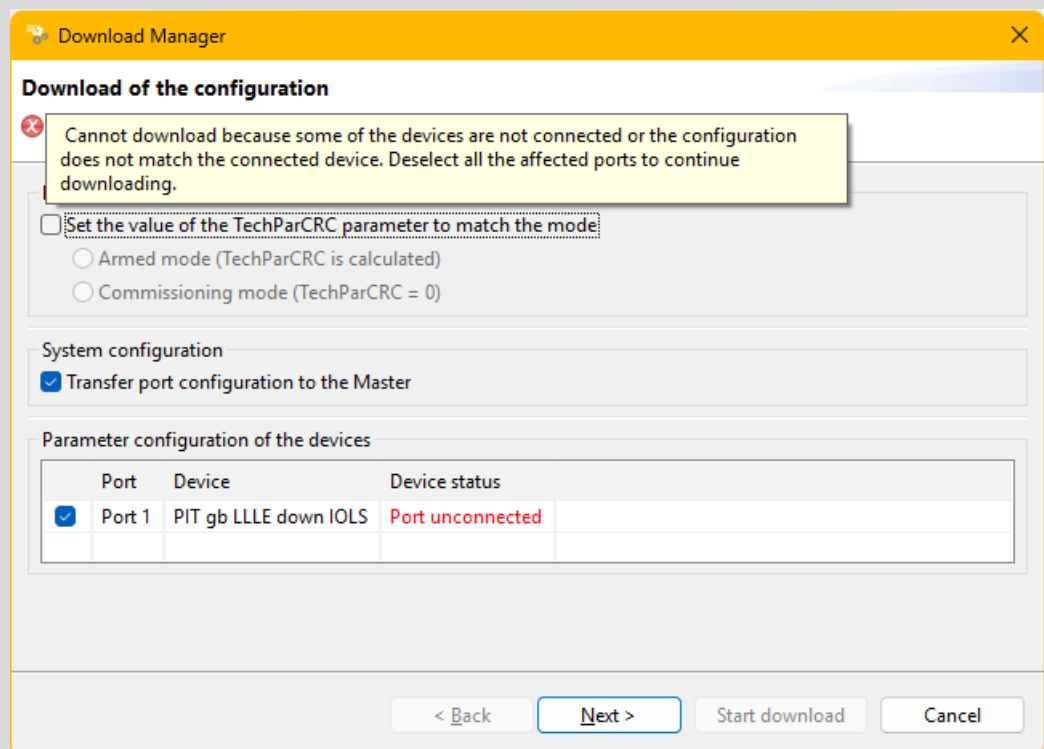


Figure 73: IO-Link Configurator – Download Manager » Status 'Port not connected'

- ▶ **Restarting** the IO-Link master and the IOL ports can take **up to 15 seconds** before the next function can be executed. This is indicated by the following message:

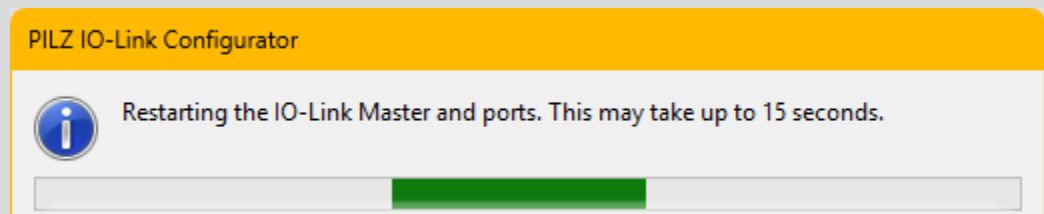


Figure 74: IO-Link Configurator – Download Manager » Restart notice

10.2 Configuration of an IOLS command and message device (FS)

10.2.1 TIA Portal – FS IO-Link device configuration of the PDP67 device

When the PDP67 fieldbus device is created, the modules and submodules of the IO-Link ports are created in the TIA Portal 'Hardware catalog' in addition to the already configured header module:

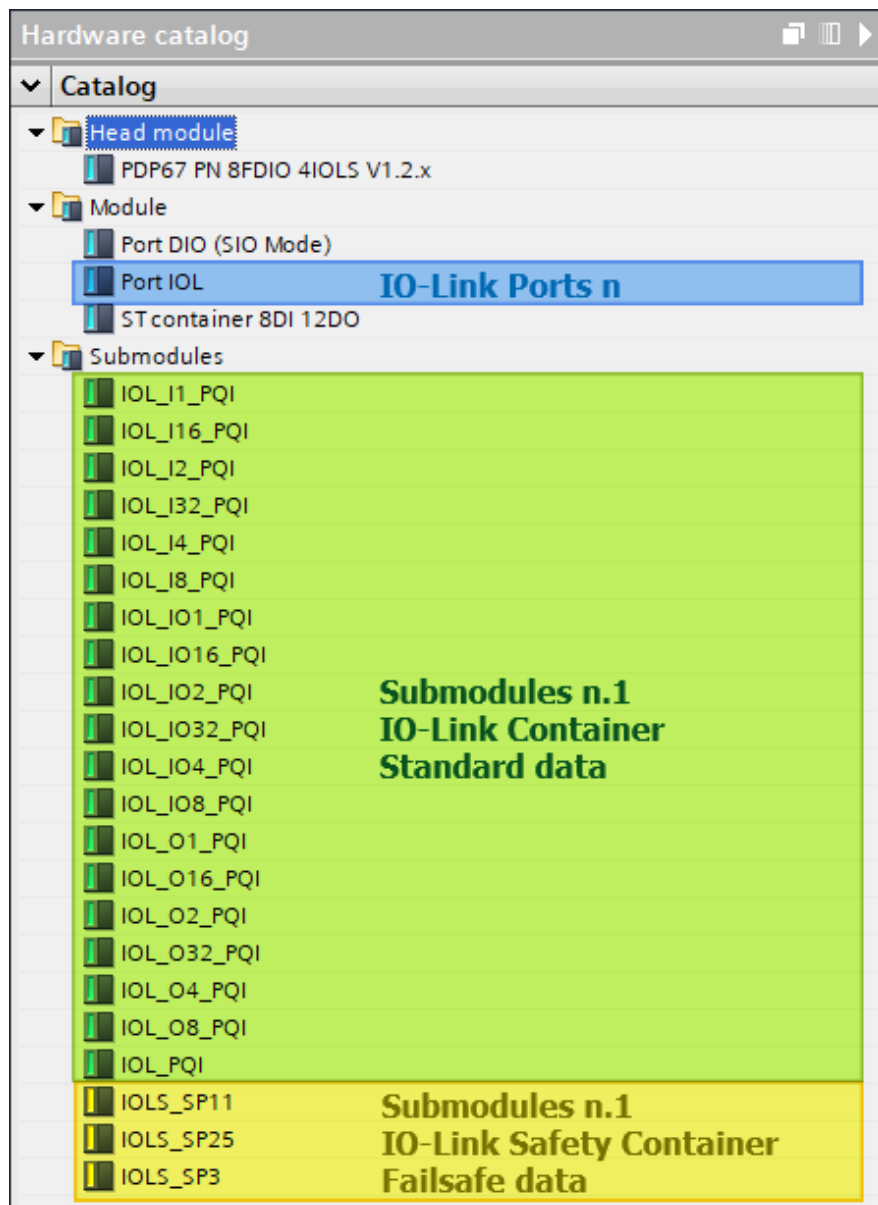


Figure 75: TIA Portal – Hardware catalogue » Modules and submodules of the IO-Link ports

The allocation of the "IOL ports n" to the Slots is as follows:

► PROFINET IO	0	0 X1		pdp67pn
Port 2FDIO_1	0	1		Port 2FDIO
Port 2FDIO_2	0	2		Port 2FDIO
Port 2FDIO_3	0	3		Port 2FDIO
Port 2FDIO_4	0	4		Port 2FDIO
	0	5		IOL Port 1 (X05)
	0	6		IOL Port 2 (X06)
	0	7		IOL Port 3 (X07)
	0	8		IOL Port 4 (X08)

Figure 76: TIA Portal – Device view » Assignment of IO-Link ports on the PDP67 device

The procedure requires the system to be configured and commissioned according to [Chapters 7 and 8](#).

The IOLS pushbutton unit **Pilz PITgatebox** is connected to the PDP67 device connection **X05**.

► To do this, the I/O containers (submodules) must be configured according to the operating manual:

1. The sensor is configured on **Slot 5: 'Port IOL_1'**.
 - Description: For IO-Link FS/ST process data and for diagnostic purposes.
2. The standard IO-Link container is assigned to **Subslot 5.1: 'IOL_IO32_PQI'**.
 - Description: 32 bytes PAE plus 1 byte PQI, 32 bytes PAA
3. The fail-safe IO-Link Safety Container is assigned to **Subslot 5.2: 'IOLS_SP3'**.
 - Description: 3 bytes PAE plus 5 bytes PROFIsafe data, 3 bytes PAA plus 5 bytes PROFIsafe data
 - Note: If this submodule is used on a port, an ST submodule must be configured on the same port on Subslot x.1, with at least 1 byte PQI.

► Switch to 'Device view' (if not already selected) and select the device »**pdp67pn [...]**« (see [Figure 33](#) [[book](#) 28]).

► Now carry out the three steps mentioned above one after the other:

Module	...	Rack	Slot	I address	Q address	Type
▼ pdp67pn		0	0			PDP67 PN 8FDIO 4IOLS V1.2.x
► PROFINET IO		0	0 X1			pdp67pn
Port 2FDIO_1		0	1			Port 2FDIO
Port 2FDIO_2		0	2			Port 2FDIO
Port 2FDIO_3		0	3			Port 2FDIO
Port 2FDIO_4		0	4			Port 2FDIO
Port IOL_1		0	5			Port IOL
IOL_IO32_PQI		0	5 1			
		0	5 2			
		0	6			
IOL_IO32_PQI		0	5 1	9...41	8...39	IOL_IO32_PQI
IOLS_SP3		0	5 2			
		0	6			
		0	7			

Figure 77: TIA Portal – Device view » Adding the submodules for the Pilz PITgatebox

► Now the data containers of the submodules are assigned to the Slots (Subslots):

Device overview										
Module	...	Rack	Slot	I address	Q address	Type	Article number	Firmware	Comment	Access
▼ pdp67pn		0	0			PDP67 PN 8FDIO 4IOLS V1.2.x	4R000004	V1.2.x	PDP67	PLC_1
► PROFINET IO		0	0 X1			pdp67pn				PLC_1
Port 2FDIO_1		0	1			Port 2FDIO				PLC_1
Port 2FDIO_2		0	2			Port 2FDIO				PLC_1
Port 2FDIO_3		0	3			Port 2FDIO				PLC_1
Port 2FDIO_4		0	4			Port 2FDIO				PLC_1
Port IOL_1		0	5			Port IOL			PITgb Gatebox	PLC_1
IOL_IO32_PQI		0	5 1	9...41	8...39	IOL_IO32_PQI			ST Submodule	PLC_1
IOLS_SP3		0	5 2	42...49	42...49	IOLS_SP3			FS Submodule	PLC_1
		0	6							
		0	7							
		0	8							
		0	9							
ST container 8DI 12DO_1		0	10	8	6...7	ST container 8DI 12DO				PLC_1
FS container FDIO, channel granular_1		0	11	0...7	0...5	FS container FDIO, channel granular				PLC_1
		0	12							

Figure 78: TIA Portal – Device view » Overview of Subslots for the Pilz PITgatebox

The PROFIsafe address (“F_Dest_Add”) for the FS submodule ‘**IOLS_SP3**’ in **Subslot 5.2** on the Pilz PITgatebox must always be set.

- ▶ The following PROFIsafe address is specified for this application:
 - F_Dest_Add: **10**
- ▶ To do this, select the properties of the PROFIsafe group in the “Device overview” for the **IOLS_SP3** submodule [IOLS_SP3] (see [Figure 78 \[49\]](#)) and
- ▶ enter the value for the F-destination address in the “PROFIsafe” section:

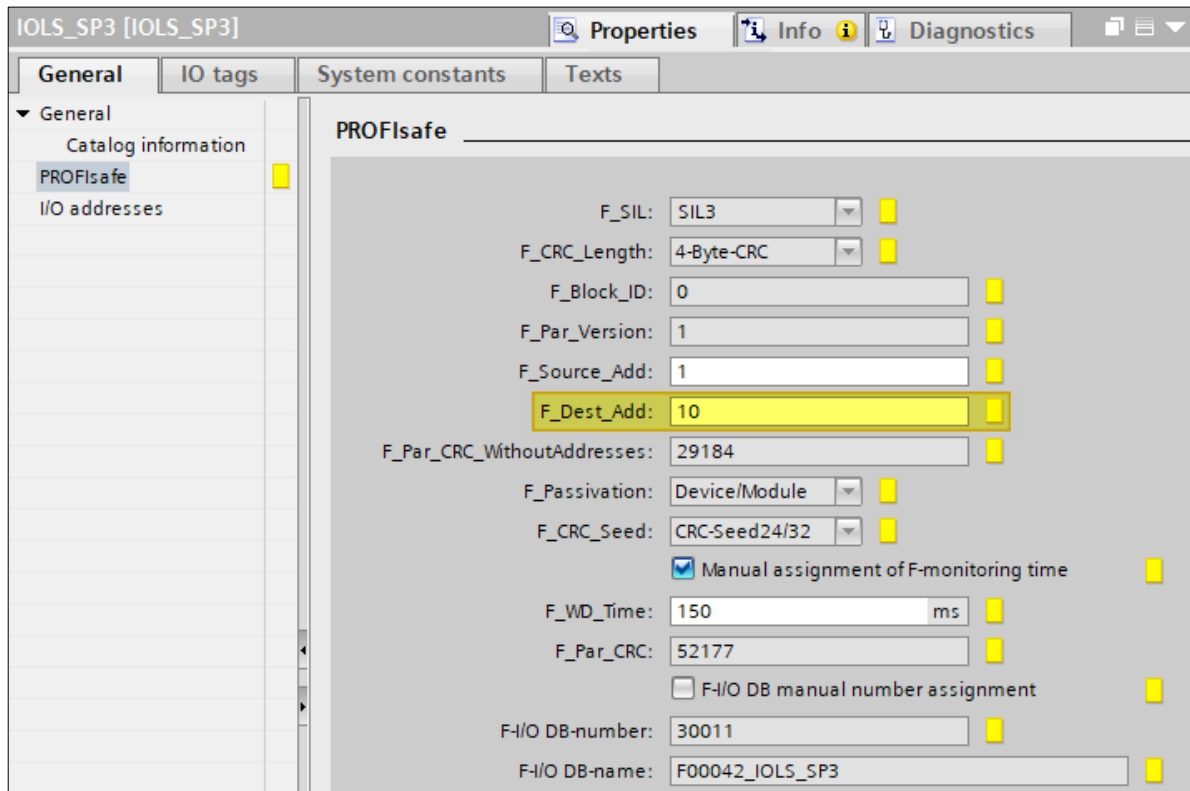


Figure 79: TIA Portal – FS submodule IOLS_SP3 » Entering the PROFIsafe address “F_Dest_Add”

- ▶ Now the *TIA project* must be saved, translated and loaded into the F-CPU, and the F-CPU must then be set to *RUN* mode as described in:
 - [Chapter 8.3 TIA Portal – Transferring the configuration to the S7 F-CPU \[32 f\]](#).

10.2.2 PASconfig – FS IO-Link device configuration of the PDP67 device

- ▶ PASconfig is now started:
 - see [Chapter 8.4.1 Start of PASconfig via TIA Portal device configuration](#) [34].
- and
- ▶ the F addresses are transferred from the TIA project:
 - see [Chapter 8.4.2 Setting up the PROFIsafe address of the PDP67 device](#) [36].
- ▶ The F addresses can be checked under the menu item 'System' » 'Enter F addresses':

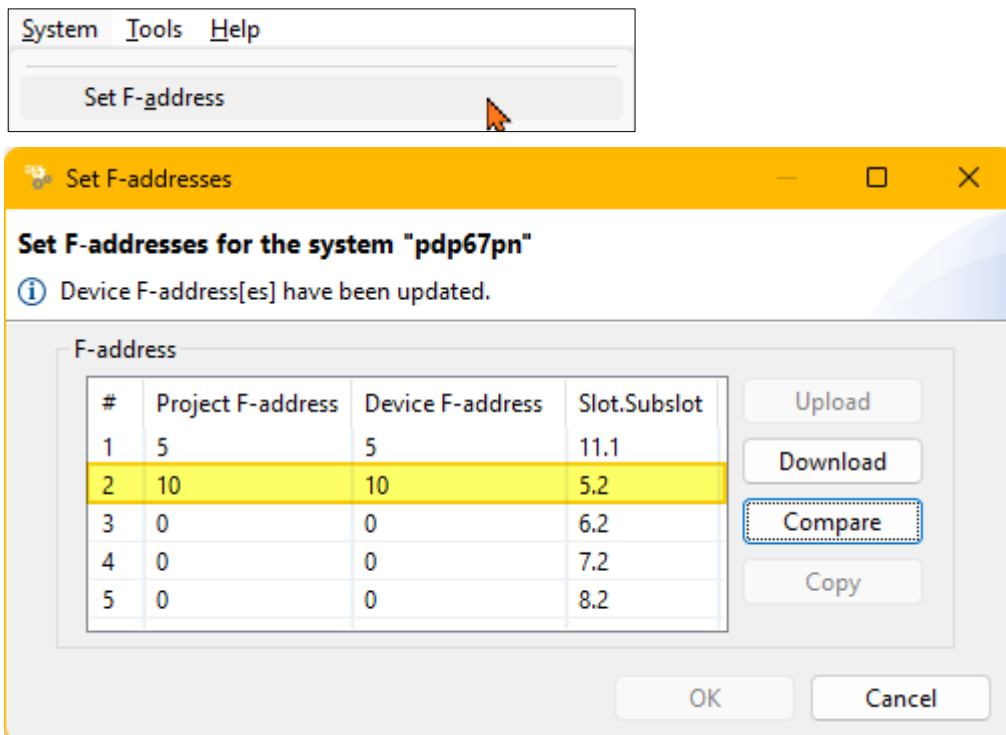


Figure 80: PASconfig – Compare F addresses of the project and the device » Subslot 5.2

- ▶ The changed IOL-PROFINET assignment of **Slot 5** with its two Subslots is displayed in the 'Properties' window:

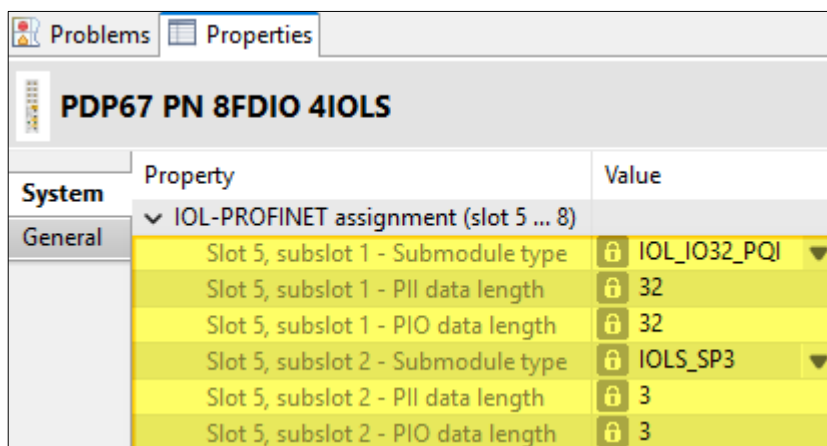


Figure 81: PASconfig – Compare IOL-PROFINET assignment » Slot 5 with Subslots

- ▶ The configuration is saved and loaded onto the PDP67 device:
 - see [Chapter 8.4.3 Download the configuration to PDP67 device](#) [38 f].

10.2.3 IO-Link Configurator – FS IO-Link device configuration of the PITgatebox pushbutton unit

- ▶ To configure the **Pilz PITgatebox**, start the IO-Link Configurator:
 - see [Chapter 10.1 Basics of the IO-Link Configurator](#) [42].
- and
- ▶ First, import the IODD device description file as described here:
 - [Chapter 10.1.2 Managing the IODD device description files in the IO-Link Configurator](#) [45].
- ▶ Now search for the correct product type for the PITgatebox in the IODD catalogue and drag and drop the appropriate IODD onto IO-Link Safety Port 1 (X05):
 - IO-Link port 1 (X05) » PIT gb LLE down IOLS (G1000023)

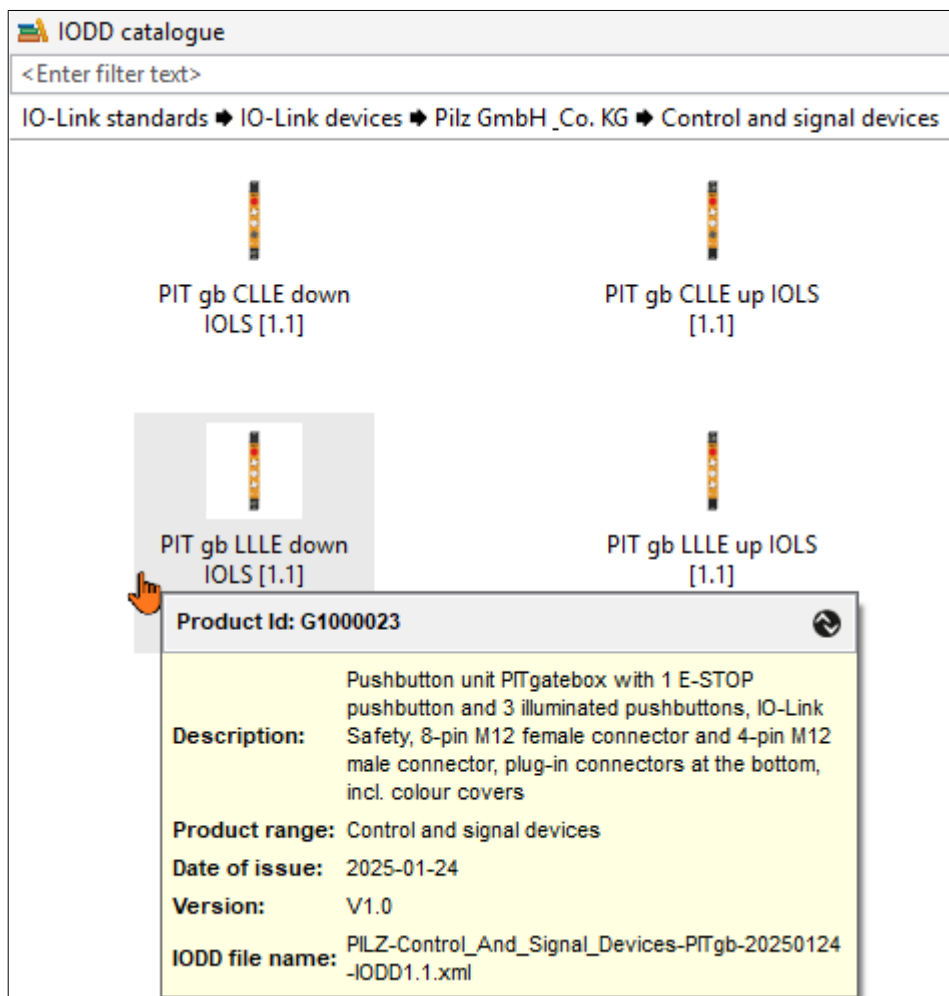


Figure 82: IO-Link Configurator – IODD catalogue » Selection of the PITgatebox pushbutton unit

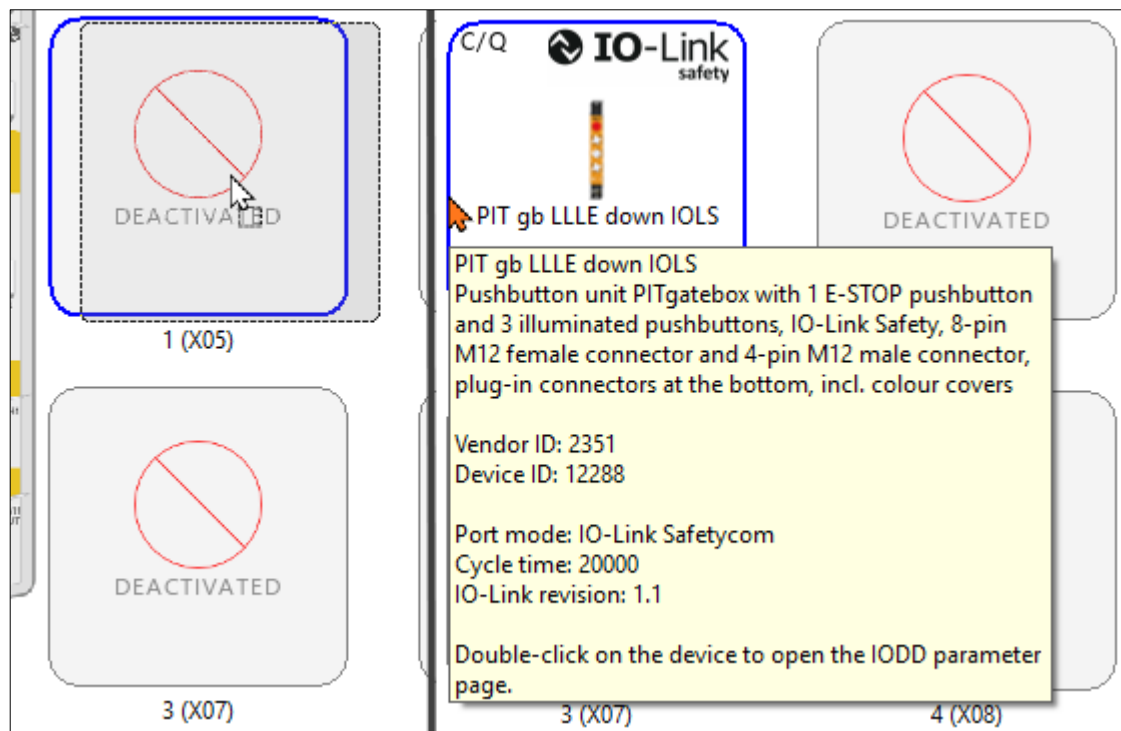


Figure 83: IO-Link Configurator – Inserting the PITgatebox pushbutton unit

- ▶ Save the changed configuration with the menu item 'IO-Link project' » 'Save'.
- ▶ The next step is to commission the IOL port and the IOLS device connected to it using the download manager of the IO-Link Configurator:
 - see [Chapter 10.1.3 Functions of the download manager](#) [46].

The use of the fail-safe extension “IO-Link Safety System Extension” required here necessitates the application of:

IO-Link Safety operating modes

- ▶ An IO-Link safety device has the following operating modes:
 1. the operating mode, referred to as “Armed mode” in the tool, and
 2. the parameterisation mode, referred to as ‘Commissioning mode’ in the tool.
- ▶ **Armed mode**
 - In this mode, the device exchanges data cyclically.
 - Based on the set parameters, a checksum called **TechParCRC** is created. This checksum must be identical on the device and in the port configuration of the IO-Link Safety Master; only then can secure data exchange take place.
 - The device does not accept any parameter changes in this mode. These must be set in commissioning mode.
- ▶ **Commissioning mode**
 - This is the commissioning mode for safe parameterisation.
 - The **TechParCRC** of the device and the IOL port must be set to '0'.



INFO

- ▶ If IO-Link Safety devices are delivered preconfigured in armed mode, they must first be switched to commissioning mode in order to change parameters.

- ▶ Open the Download Manager.
The 'Device status' shows 'Port not connected' because 'Port 1' has not yet been activated.
- ▶ Download the '**System configuration**' to activate the configured IO-Link port:

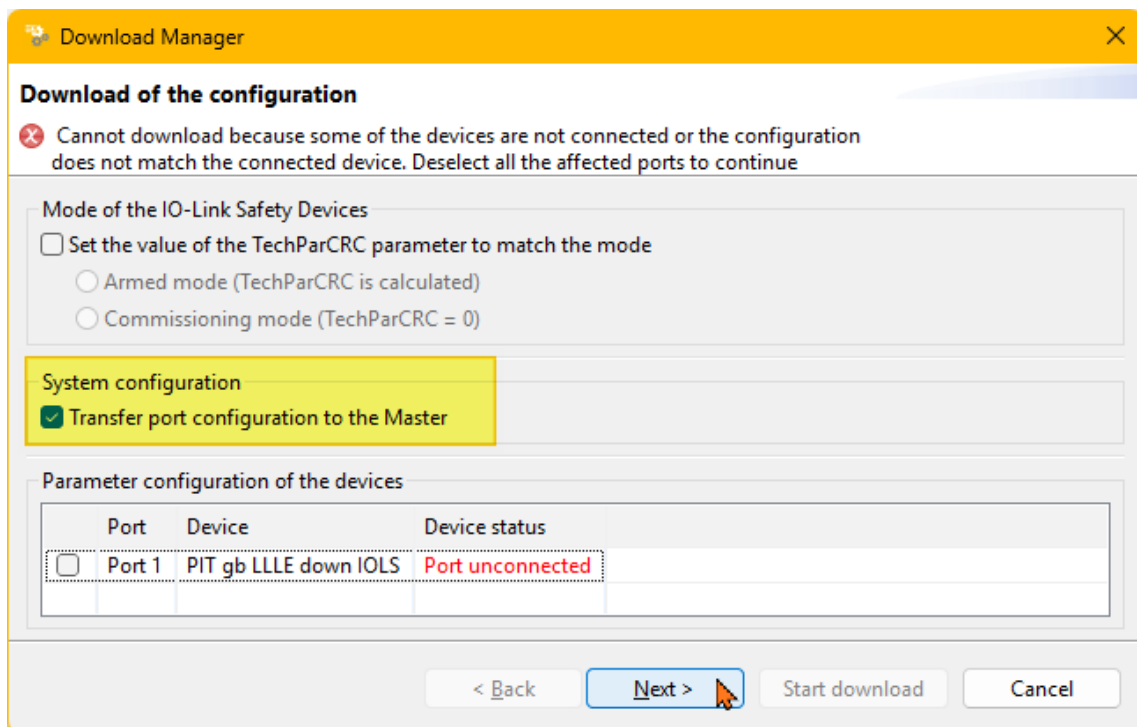


Figure 84: IO-Link Configurator – Download Manager » Transfer 'System configuration' (Port 1)

- ▶ The change to the security configuration must also be confirmed:

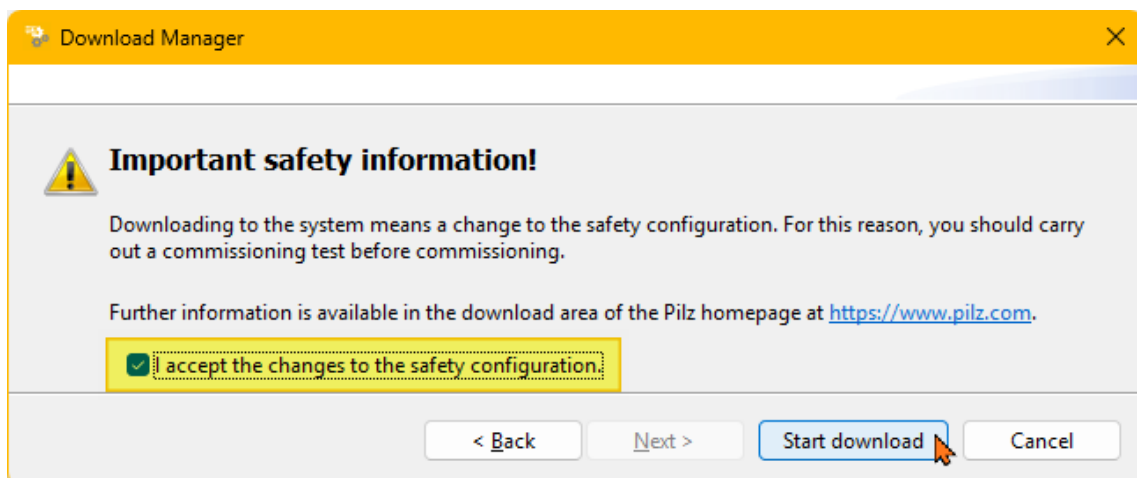


Figure 85: IO-Link Configurator – Download Manager » Accept security prompt

An 'FS password' is required to transfer the 'System configuration'.
The default password is "pssu" (see also note at Figure 53 [38]).

- ▶ Enter the 'FS password' and ...

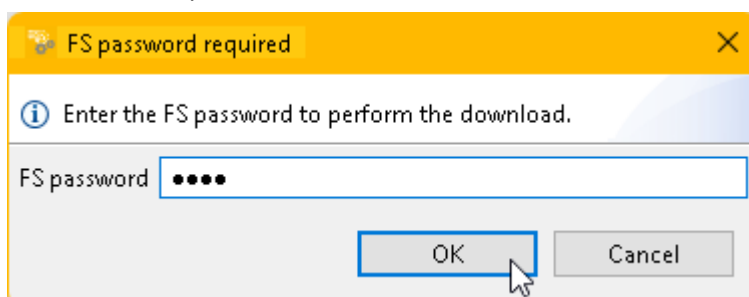


Figure 86: IO-Link Configurator – Download Manager » Confirm security prompt

- ... confirm restart of the PDP67 device:

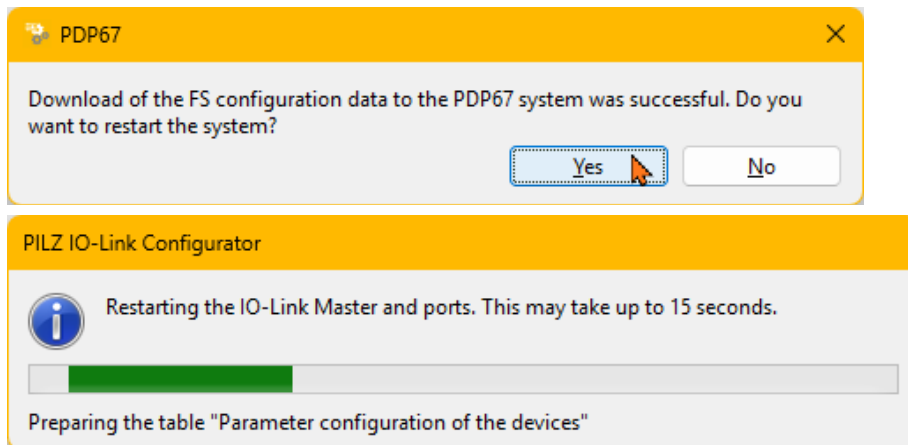


Figure 87: IO-Link Configurator – Restarting the IO-Link master

- After downloading and restarting the PDP67 PN, IOLS port 1 (X05) is activated:



Figure 88: PDP67 – Activation of the IOLS ports » Port 1 (X05)

In the download manager, which is still open, the 'Device status' of 'Port 1' now reads: "---".

- Select 'Port 1' and the value '**TECHPARCRC = 0**' so that the PITgatebox can be put into '**Commissioning mode**' with the new download:

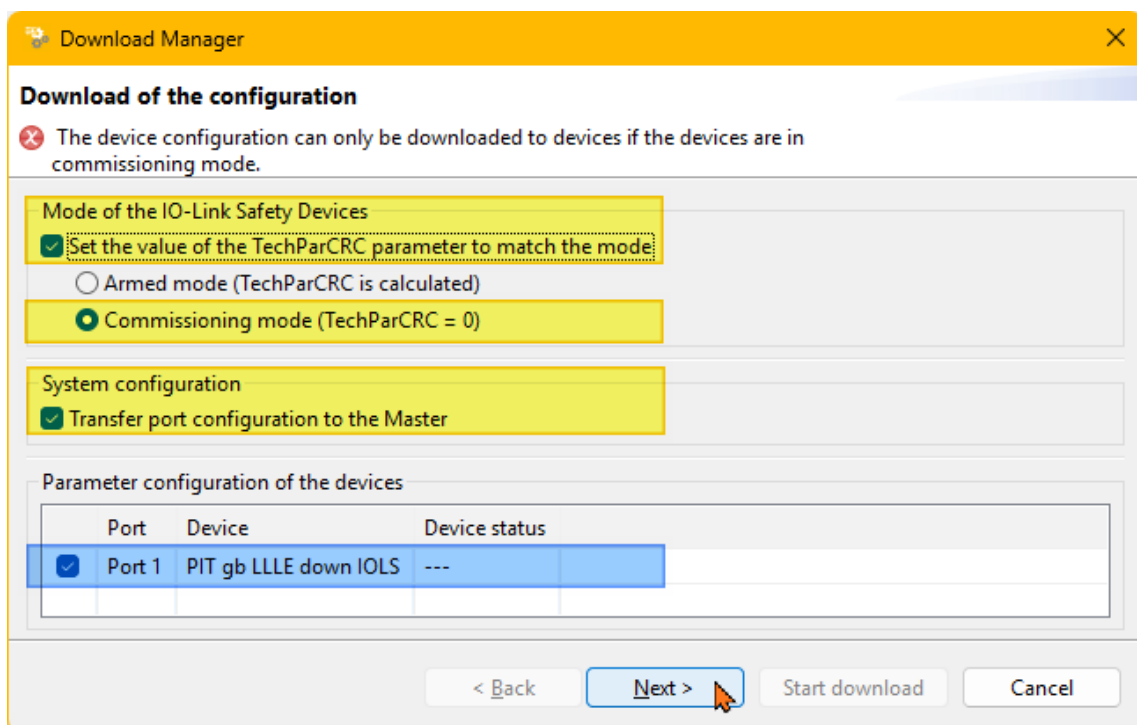


Figure 89: IO-Link Configurator – Download Manager » Start 'Commissioning mode' (Port 1)

- Here, too, the value of 'FS Authenticity CRC' must be confirmed:

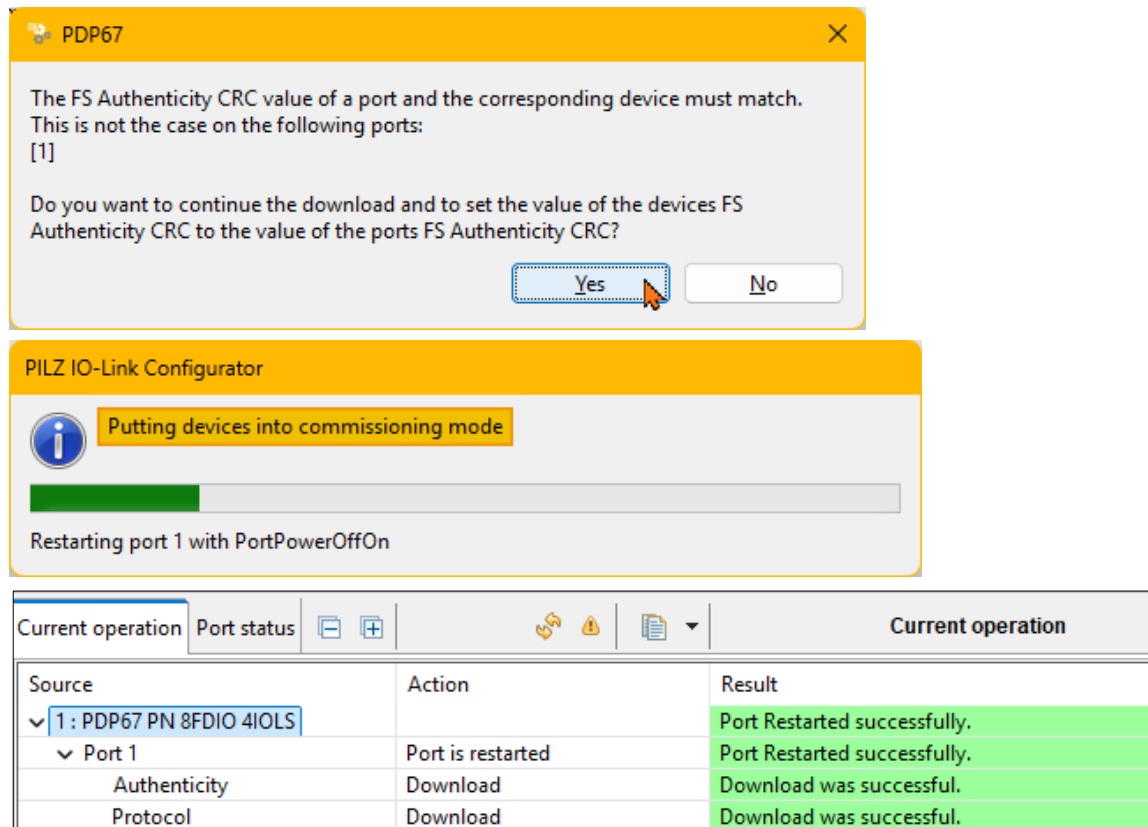


Figure 90: IO-Link Configurator – Download Manager » Activate 'Commissioning mode' (Port 1)

In the Download Manager, the 'Device Status' of 'Port 1' now reads: "Commissioning Mode".

- Select 'Port 1' and set the value of 'TECHPARCRC = 1' so that the PITgatebox can be put into 'Armed mode' with the new download:

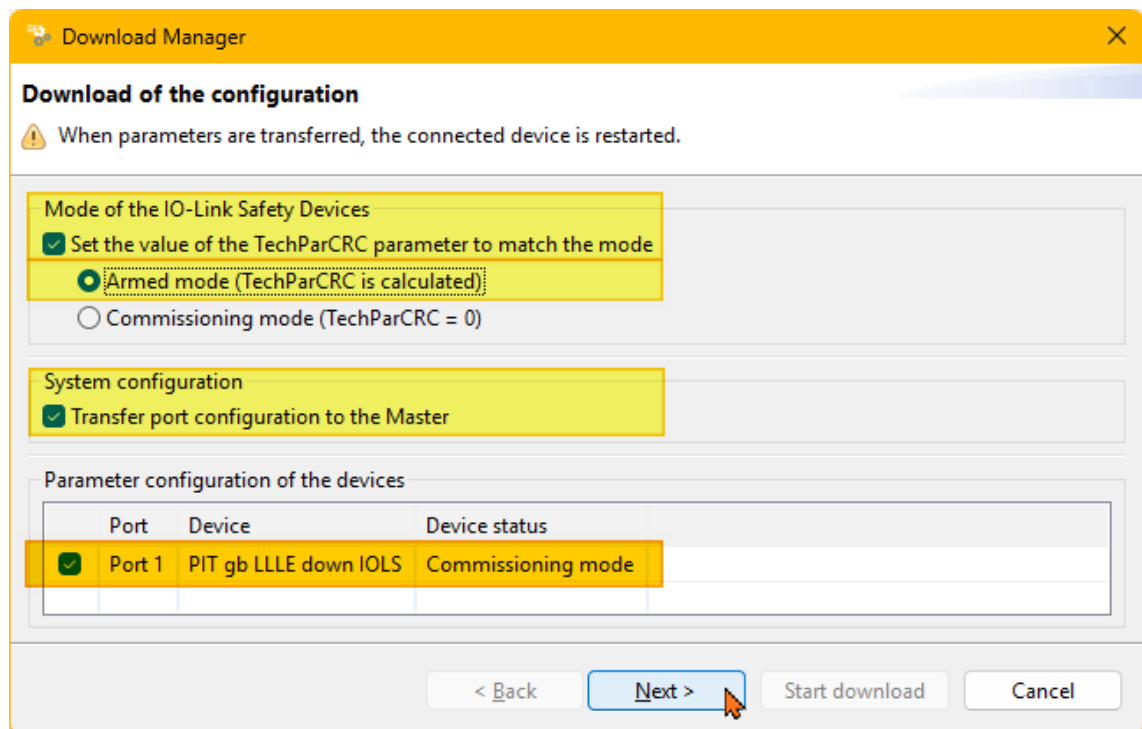


Figure 91: IO-Link Configurator – Download Manager » Start 'Armed Mode' (Port 1)

- Set the **TECHPARCRC** and ...

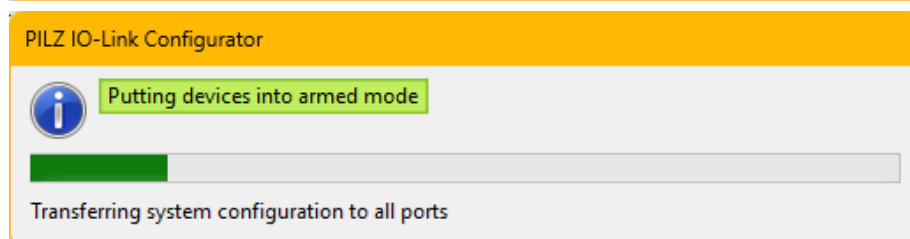
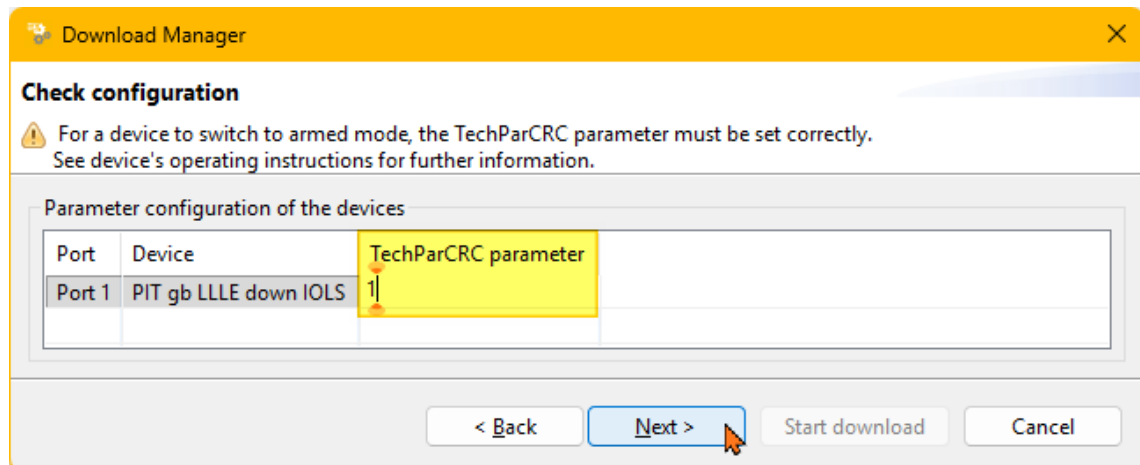


Figure 92: IO-Link Configurator – Download Manager » Activate 'Armed mode' (Port 1)

- ... Confirm restart of the PDP67 device:

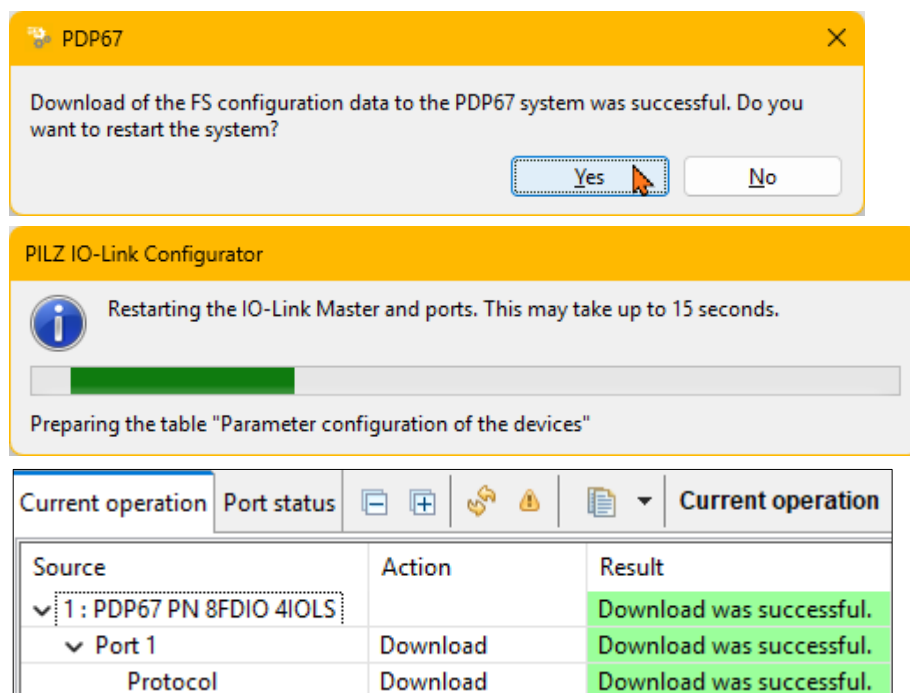


Figure 93: IO-Link Configurator – Restarting the IO-Link master

The download manager now displays "Armed mode" for the 'Device status' of 'Port 1'.

- Check the 'Device status' in the Download Manager and close the window with the **[Cancel]** button (no download):

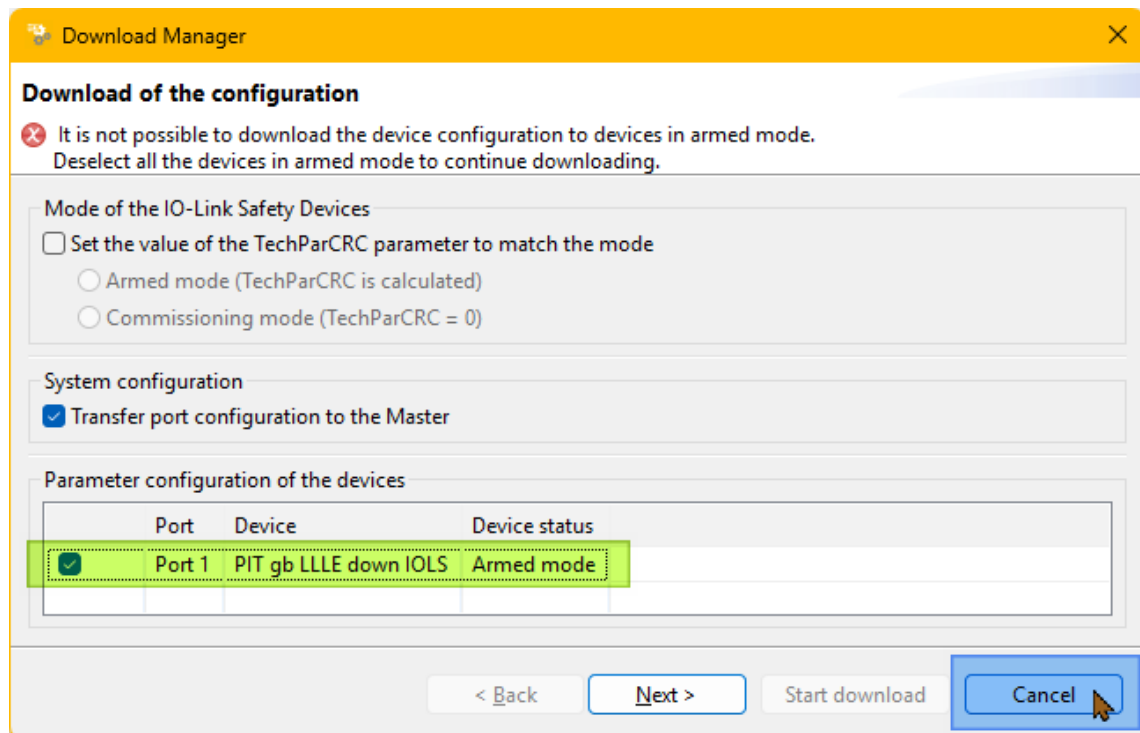


Figure 94: IO-Link Configurator – Download Manager » Check 'Armed mode' (Port 1)

The Pilz PITgatebox is now ready for operation in Armed mode.

- The 'Device' LED indicates the IO-Link safety status:



Figure 95: Pilz PITgatebox – IO-Link safety status » 'Device' LED

10.2.4 FS IO-Link process data of the Pilz PITgatebox

- ▶ In the *TIA Portal* tool, the **activated F-activation of the F-CPU** (Figure 11 [49]) certain F function blocks for an F sequence group are inserted into the project navigation.
 - see the menu item Extras » Settings » Section ‘STEP 7 Safety’ in TIA.
- ▶ The **processing of the FS process data** must be programmed in the ‘Main_Safety_RTG1 [FB1]’ program block; see notes in the Chapter 8.5 Error-free system start-up [40].

The Operating Manual for the Pilz devices *PIT gb CLLE/LLLE up/down IOLS* (OM No. 1006657) contain tables for assigning the FS and ST data of the device in the chapter ‘IO-Link Safety Process Data’, specifically in the section ‘IO-Link Safety Master to IO-Link Safety Device’.

The addresses for the respective signals are based on the start value “0.0”:

Device address (IOLD)	Signal name	Project address (TIA)	Description
FS input I0.0	FS_SafetyRelease1	%I42.0	Enable signal for safety output 1
FS input I0.1	FS_SafetyRelease2	%I42.1	Enable signal for safety output 2
FS input I0.2	FS_E_Stop	%I42.2	Emergency stop status
FS output O0.0	FS_SafetyPowerOutput32	%Q42.0	Control of safety output 32
FS output O0.1	FS_SafetyPowerOutput42	%Q42.1	Control of safety output 42

- ▶ The **start addresses** in the *TIA Portal* for submodule 5.2 ‘IOLS_SP3’ are: **%I42.0** and **%Q42.0**.
 - Figure 78: *TIA Portal – Device view » Overview of Subslots for the Pilz PITgatebox* [49].

This fulfils the requirements for the F-CPU to exchange fail-safe process data with the Pilz PITgatebox via the PDP67 device:

Default tag table								
	Name	Data type	Address	Retain	Access...	Write...	Visibl...	Monitor value
2	IOL_Port1_PITgb_FDI_I0.0	Bool	%I42.0	☐	☒	☒	☒	☒ TRUE
3	IOL_Port1_PITgb_FDI_I0.1	Bool	%I42.1	☐	☒	☒	☒	☒ TRUE
4	IOL_Port1_PITgb_FDI_I0.2	Bool	%I42.2	☐	☒	☒	☒	☒ TRUE
5	IOL_Port1_PITgb_FDO_Q0.0	Bool	%Q42.0	☐	☒	☒	☒	☒ TRUE
6	IOL_Port1_PITgb_FDO_Q0.1	Bool	%Q42.1	☐	☒	☒	☒	☐ FALSE

Figure 96: *TIA Portal – Online mode » Process data from the Pilz PITgatebox*

The process data can be displayed online in advance in the IO-Link Configurator tool:

- ▶ Double-click on the icon for the PITgatebox port ‘1 (X05)’ to open the device data.
- ▶ Then connect the device online **(1)** and switch to the “Process data” section **(2)**:

Process data (2)									
Name	Data types	Subindex	Bit offset	R/W	Dynamic	Value on device	Value on device	Value in project	Value in project
▼ FS process data In									
SafetyEnable1	BooleanT	1	168	ro	✓	Inactive	Active	Inactive	Active
SafetyEnable2	BooleanT	2	169	ro	✓	Inactive	Active	Inactive	Active
E_Stop	BooleanT	3	170	ro	✓	Inactive	Active	Inactive	Active
▼ ST process data In									
Bitset Status Button1	UIntegerT	133	72	ro	✓	0	0	0	0
Bitset Status Button2	UIntegerT	134	88	ro	✓	32768	32768	32768	32768
Bitset Status Button3	UIntegerT	135	104	ro	✓	0	0	0	0
▼ FS process data Out									
SafetyPowerOutput32	BooleanT	1	168	ro	✓	Inactive	Active	Inactive	Active
SafetyPowerOutput42	BooleanT	2	169	ro	✓	Active	Inactive	Active	Inactive

Figure 97: *IO-Link Configurator – Online mode » Process data of the Pilz PITgatebox*

- ▶ Do not forget to disconnect the online connection afterwards!



10.3 Configuration of an IOL sensor (ST)

10.3.1 TIA Portal – ST IO-Link device configuration of the PDP67 device

The procedure requires the system to be configured and commissioned according to [Chapters 7 and 8](#).

The **ifm RA3100** IOL sensor is connected to the PDP67 device connection **X06**.

- ▶ To do this, the I/O containers (submodules) must be configured in accordance with the operating instructions:

1. The sensor is configured on **Slot 6: 'Port IOL_2'**.
 - Description: For IO-Link FS/ST process data and for diagnostic purposes.
2. The standard IO-Link container is assigned to **Subslot 6.1: 'IOL_I2_PQI'**.
 - Description: 2 bytes PAE plus 1 byte PQI, 0 bytes PAA
3. No fail-safe IO-Link Safety container is assigned on **Subslot 6.2**.

- ▶ Switch to “Device view” (if not already selected) and select the device “**pdp67pn [...] [...] (see [Figure 33](#) [28])**”.

- ▶ Now carry out the two steps mentioned above one after the other:

Module	...	Rack	Slot	I address	Q address	Type
▼ pdp67pn		0	0			PDP67 PN 8FDIO 4I...
▶ PROFINET IO		0	0 X1			pdp67pn
Port 2FDIO_1		0	1			Port 2FDIO
Port 2FDIO_2		0	2			Port 2FDIO
Port 2FDIO_3		0	3			Port 2FDIO
Port 2FDIO_4		0	4			Port 2FDIO
▼ Port IOL_1		0	5			Port IOL
IOL_IO32_PQI		0	5 1	9...41	8...39	IOL_IO32_PQI
IOLS_SP3		0	5 2	42...49	42...49	IOLS_SP3
Port IOL		0	6			
		0	7			
		0	8			
▼ Port IOL_2		0	6			Port IOL
IOL_I2_PQI		0	6 1			
		0	6 2			
		0	7			

Figure 98: TIA Portal – Device view » Adding the submodules for the ifm RA3100

- ▶ The data container of the submodule is now assigned to the Slot (Subslot):

Device overview										
Module	...	Rack	Slot	I address	Q address	Type	Article number	Firmware	Comment	Access
▼ pdp67pn		0	0			PDP67 PN 8FDIO 4IOLS V1.2.x	4R000004	V1.2.x	PDP67	PLC_1
▶ PROFINET IO		0	0 X1			pdp67pn				PLC_1
Port 2FDIO_1		0	1			Port 2FDIO				PLC_1
Port 2FDIO_2		0	2			Port 2FDIO				PLC_1
Port 2FDIO_3		0	3			Port 2FDIO				PLC_1
Port 2FDIO_4		0	4			Port 2FDIO				PLC_1
▼ Port IOL_1		0	5			Port IOL			PITgb Gatebox	PLC_1
IOL_IO32_PQI		0	5 1	9...41	8...39	IOL_IO32_PQI			ST Submodule	PLC_1
IOLS_SP3		0	5 2	42...49	42...49	IOLS_SP3			FS Submodule	PLC_1
▼ Port IOL_2		0	6	50...52		Port IOL			ifm RA3100	PLC_1
IOL_I2_PQI		0	6 1	50...52		IOL_I2_PQI			ST Submodule	PLC_1
		0	6 2							
		0	7							
		0	8							
		0	9							
ST container 8DI 12DO_1		0	10	8	6...7	ST container 8DI 12DO				PLC_1
FS container FDIO, channel granular_1		0	11	0...7	0...5	FS container FDIO, channel granular				PLC_1
		0	12							

Figure 99: TIA Portal – Device view » Overview of Subslots for the ifm RA3100

- ▶ Now the TIA Portal project must be saved, translated and loaded into the F-CPU, and the F-CPU must then be set to **RUN** mode as described in:
 - [Chapter 8.3 TIA Portal – Transferring the configuration to the S7 F-CPU \[32 f\]](#).

10.3.2 PASconfig – ST IO-Link device configuration of the PDP67 device

- ▶ PASconfig is now started:
 - see [Chapter 8.4.1 Start of PASconfig via TIA Portal device configuration](#) [34].

Note:

The F addresses from the *TIA project* are checked again when the programme is started and, if they have been changed, they are adopted:

- see [Chapter 8.4.2 Setting up the PROFIsafe address of the PDP67 device](#) [36].
 - see [Figure 80](#) [51].
- ▶ The changed IOL-PROFINET assignment of **Slot 6** with its two Subslots is displayed in the 'Properties' window:

Problems		Properties
PDP67 PN 8FDIO 4IOLS		
System	Property	Value
General	▼ IOL-PROFINET assignment (slot 5 ... 8)	
	Slot 5, subslot 1 - Submodule type	IOL_IO32_PQI
	Slot 5, subslot 1 - PII data length	32
	Slot 5, subslot 1 - PIO data length	32
	Slot 5, subslot 2 - Submodule type	IOLS_SP3
	Slot 5, subslot 2 - PII data length	3
	Slot 5, subslot 2 - PIO data length	3
	Slot 6, subslot 1 - Submodule type	IOL_I2_PQI
	Slot 6, subslot 1 - PII data length	2
	Slot 6, subslot 1 - PIO data length	0
	Slot 6, subslot 2 - Submodule type	Empty
	Slot 6, subslot 2 - PII data length	0
	Slot 6, subslot 2 - PIO data length	0

Figure 100: PASconfig – Compare IOL-PROFINET assignment » Slot 6 with Subslots

- ▶ The configuration is saved and loaded onto the PDP67 device:
 - see [Chapter 8.4.3 Download the configuration to PDP67 device](#) [38 f].

10.3.3 IO-Link Configurator – ST IO-Link device configuration of the ifm RA3100 sensor

- ▶ To configure the **ifm RA3100**, start the IO-Link Configurator:
 - see [Chapter 10.1 Basics of the IO-Link Configurator](#) [42].
- and
- ▶ First, import the IODD device description file as described here:
 - [Chapter 10.1.2 Managing the IODD device description files in the IO-Link Configurator](#) [45].
- ▶ Now search for the correct product type of the rotary encoder in the IODD catalogue and drag and drop the appropriate IODD onto IO-Link port 2 (X06):
 - IO-Link port 2 (X06) » RA3100 [1.1] (RA31000)

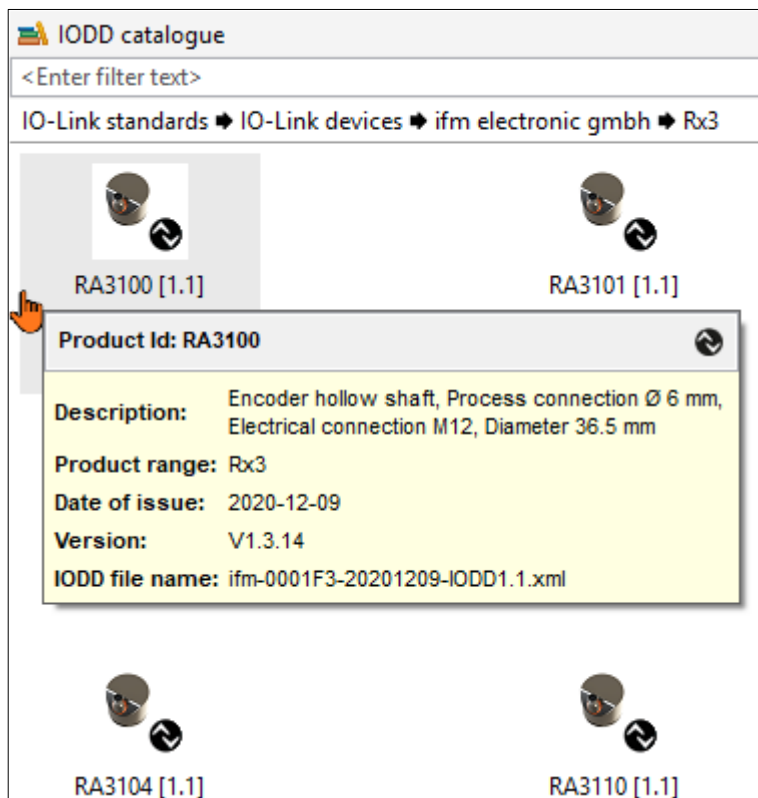


Figure 101: IO-Link Configurator – IODD catalogue » Selection of the ifm RA3100

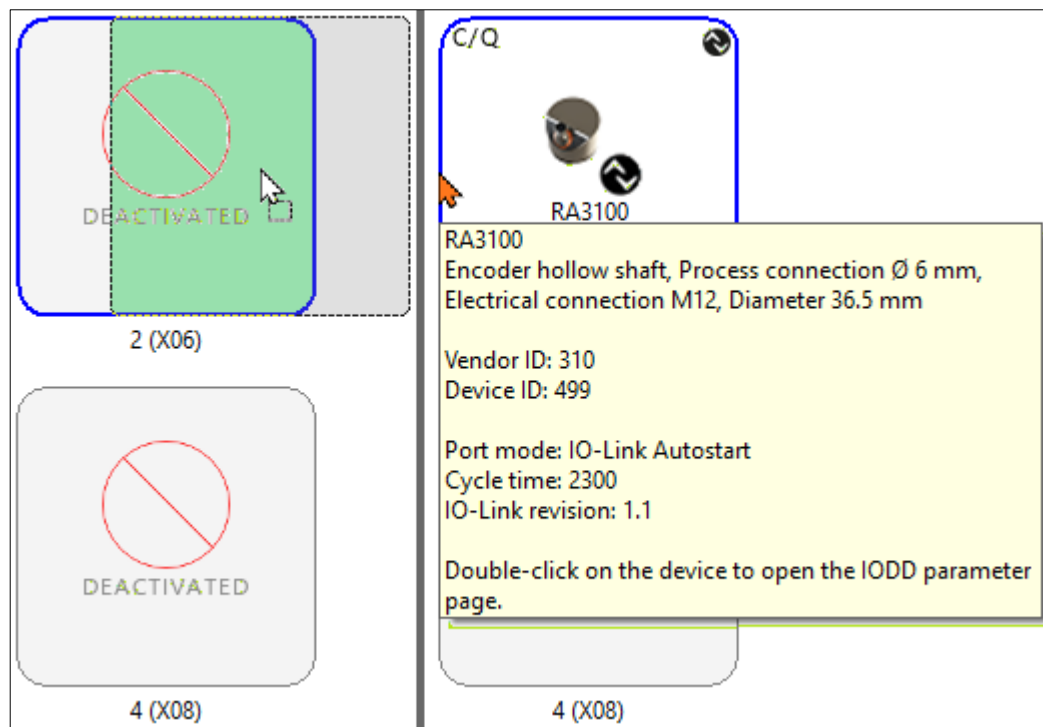


Figure 102: IO-Link Configurator – Inserting the ifm RA3100

- ▶ Save the changed configuration with the menu item 'IO-Link project' » 'Save'.
- ▶ The next step is to commission the IOL port and the IOL device connected to it using the download manager of the IO-Link Configurator:
 - see [Chapter 10.1.3 Functions of the download manager](#) [46].
- ▶ Opening the download manager.
- ▶ The 'Device status' shows "----" because 'Port 2' is not yet activated.
- ▶ Download the '**System Configuration**' to activate the configured IO-Link port:

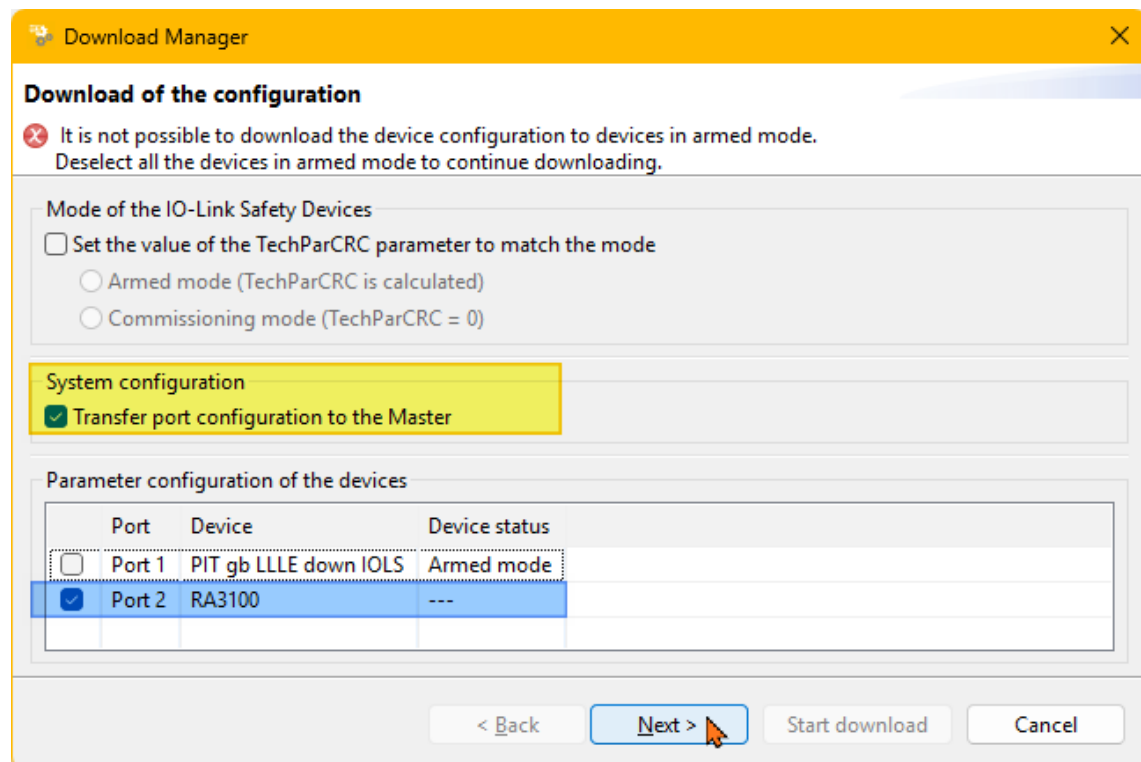


Figure 103: IO-Link Configurator – Download Manager » Transfer 'System configuration' (Port 2)

- The change to the safety configuration must also be confirmed:

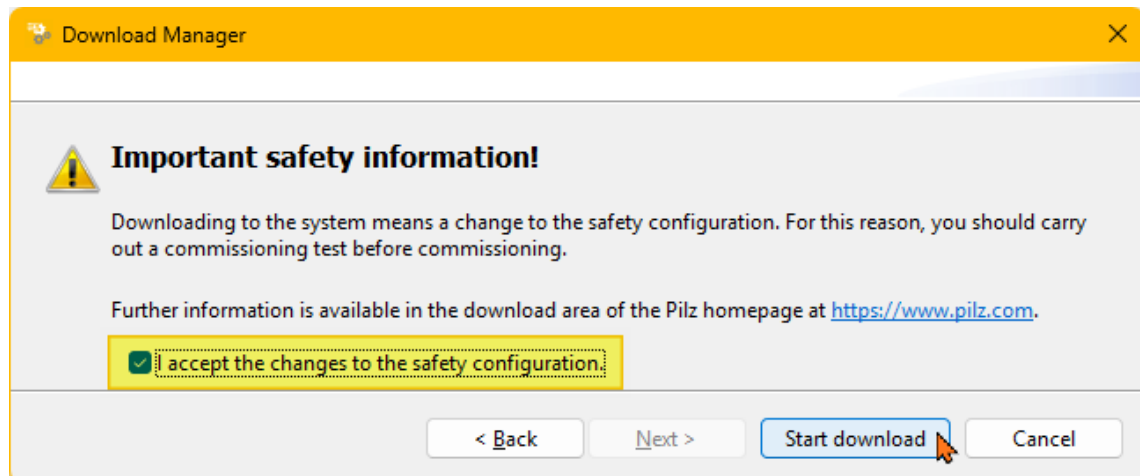


Figure 104: IO-Link Configurator – Download Manager » Accept security prompt

- The port configuration is being downloaded:

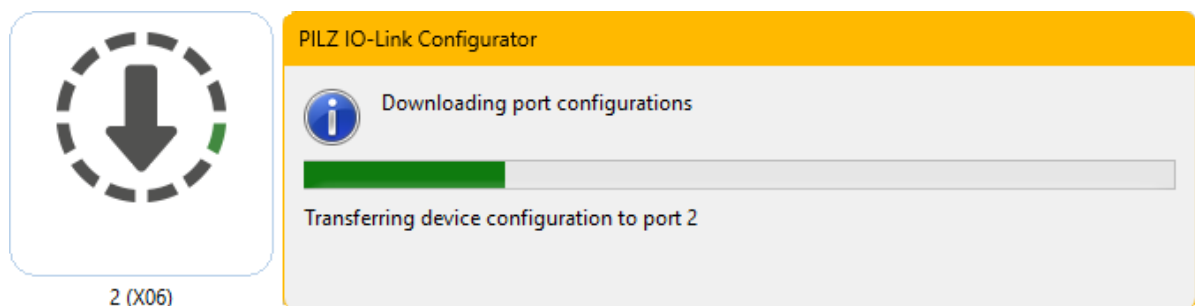


Figure 105: IO-Link Configurator – Download Manager » Port configuration (Port 2)

- Confirm restart of the PDP67 device:

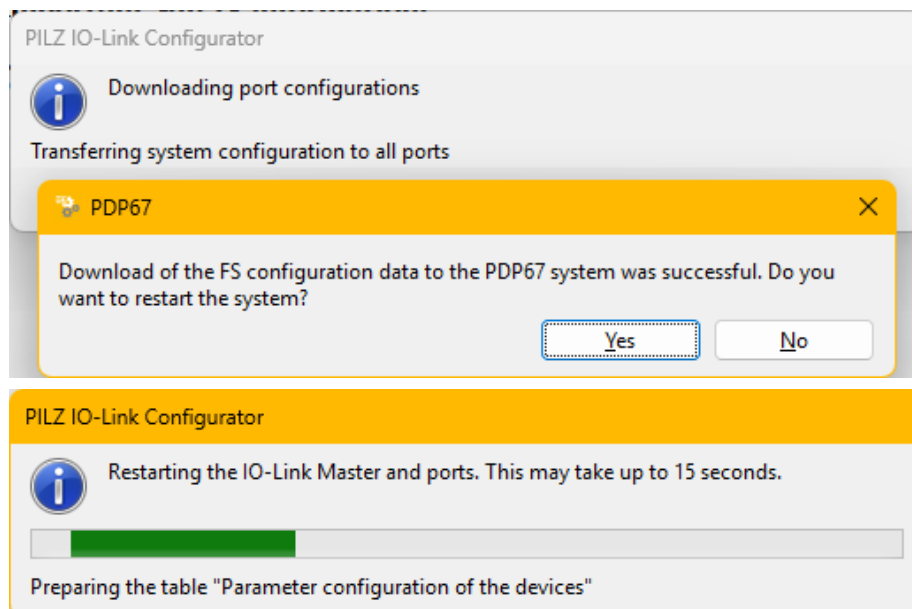


Figure 106: IO-Link Configurator – Restart of the IO-Link master

- After downloading and restarting the PDP67 device, IOL port 2 (X06) is activated:

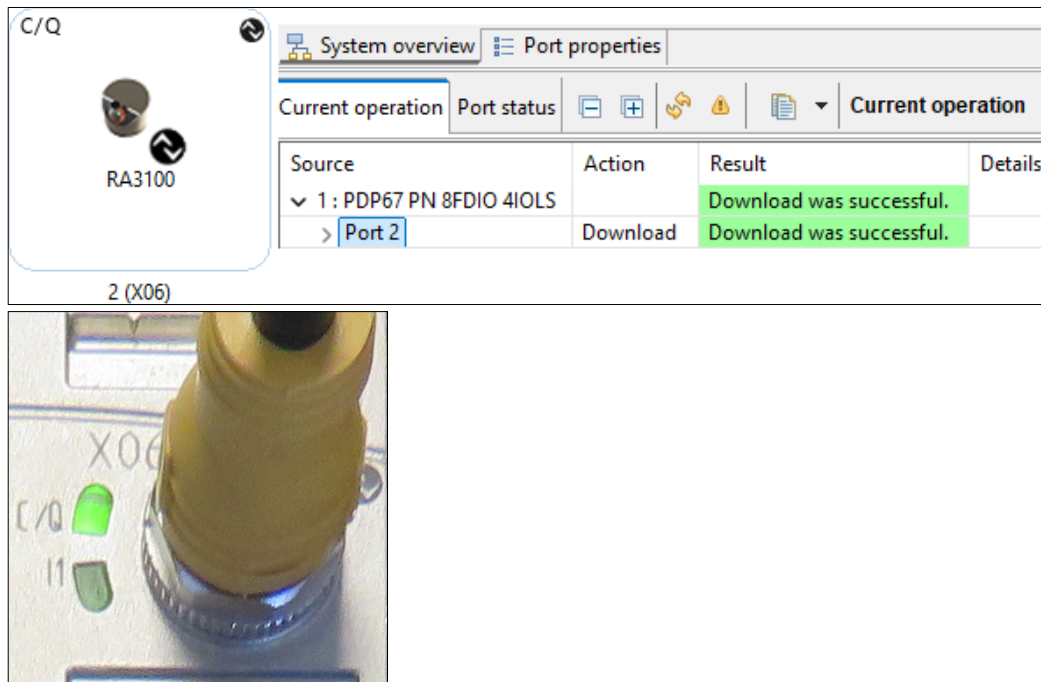


Figure 107: PDP67 – Activation of the IOL ports » Port 2 (X06)

- Now you can establish an online connection to the ports:

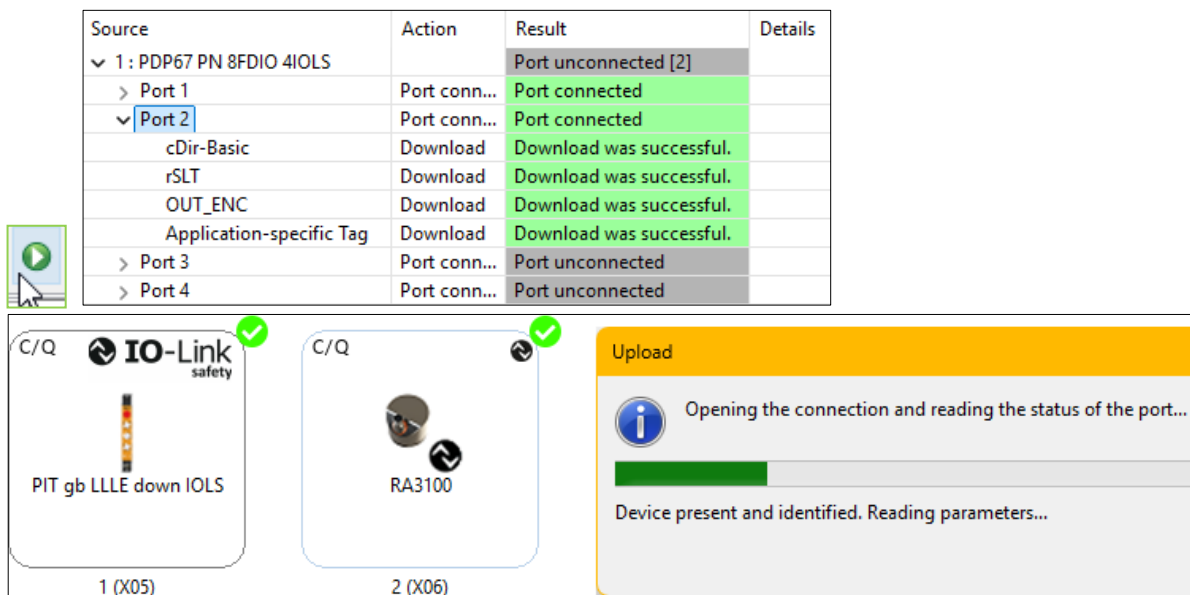


Figure 108: IO-Link Configurator – Online display » Port status (Part 1)

and ...

► ... display the port data:

Project name: pdp67pn

Project properties	Value
▼ Master	
FSCP Authenticity 1	🔒
▼ Port 1	
Port mode	🔒 IO-Link Safetycom
Manufacturer ID	🔒 2351
Device ID	🔒 12288
Pin 2 operating mode	🔒 Not supported
Port cycle time	🔒 0
Validation and Backup	🔒 No Device Check
FSCP Authenticity 1	🔒 10
FSCP Authenticity 2	🔒 0
FSP Authenticity CRC	🔒 39536
Watchdog time	🔒 2000
Protocol Version	🔒 1
Protocol Mode	🔒 2
IOStructCRC	🔒 48987
TechParCRC	🔒 1
ProtParCRC	🔒 22197
Time to Ready	🔒 500
Min Shutdown Time	🔒 200
IO Description Version	🔒 1
▼ Port 2	
Port mode	🔒 IO-Link Autostart
Manufacturer ID	🔒 310
Device ID	🔒 499
Pin 2 operating mode	🔒 Not supported
Port cycle time	🔒 0
> Port 3	
> Port 4	

System overview | Port properties

Current operation | Port status | | Current operation Online

Source	Property	Value
▼ 1 : PDP67 PN 8FDIO 4IOLS		
▼ Port 1		
	Device status	Armed
	Information about port status	SCL active
	Master cycle time	103
	Information about port quality	VALID / PDOUTVALID
	Transmission rate	COM2
	Number of diagnostic messages	0
	Vendor ID	2351
	Device ID	12288
	Revision ID	0x11
	Length of input data	0x0F
	Length of output data	0x0F
▼ Port 2		
	Device status	Precommissioning
	Information about port status	Operate
	Master cycle time	49
	Information about port quality	VALID / PDOUTVALID
	Transmission rate	COM2
	Number of diagnostic messages	0
	Vendor ID	310
	Device ID	499
	Revision ID	0x11
	Length of input data	0x02
	Length of output data	0x00

Figure 109: IO-Link Configurator – Online display » Port status (Part 2)

► Don't forget to disconnect the online connection afterwards!



10.3.4 ST IO-Link process data of the ifm RA3100

- ▶ The **processing of the ST process data** must be applied in the TIA Portal programm.
- ▶ The **start address** in the *TIA Portal Portal* for submodule 6.1 'IOL_I2_PQI' is: **%IW50**.
 - see [Figure 99: TIA Portal – Device view » Overview of Subslots for the ifm RA3100 \[60\]](#).

This fulfils the requirement for the S7 CPU to exchange process data with the ifm RA3100 via the PDP67 device:

Default tag table								
	Name	Data type	Address	Retain	Acces...	Writa...	Visibl...	Monitor value
1	IOL_Port2_ifm-Sensor	Int	%IW50	☐	☒	☒	☒	973

Figure 110: TIA Portal – Online mode » Process data of the ifm RA3100

The process data can be displayed online in advance in the IO-Link Configurator tool:

- ▶ Double-click on the icon for the RA3100 port '2 (X06)' to open the device data.
- ▶ Then connect the device online **1** and switch to the "Process data" section **2**:

Process data 2										
Name	Data types	Subindex	Bit offset	R/W	Dynamic	Value on device	Value in project	State	Unit	Description
▼ ST process data In				ro	✓					
Counter	UIntegerT	1	0	ro	✓	973	973	Uploaded		

Figure 111: IO-Link Configurator – Online mode » Process data of the ifm 3100

- ▶ Do not forget to disconnect the online connection afterwards! 

10.4 Automatic detection

- ▶ If the device connected to the IOL port is unknown, you can use:
 - the port mode **“IO-Link Autostart”** to read out the ‘Vendor ID’ and the ‘Device ID’:

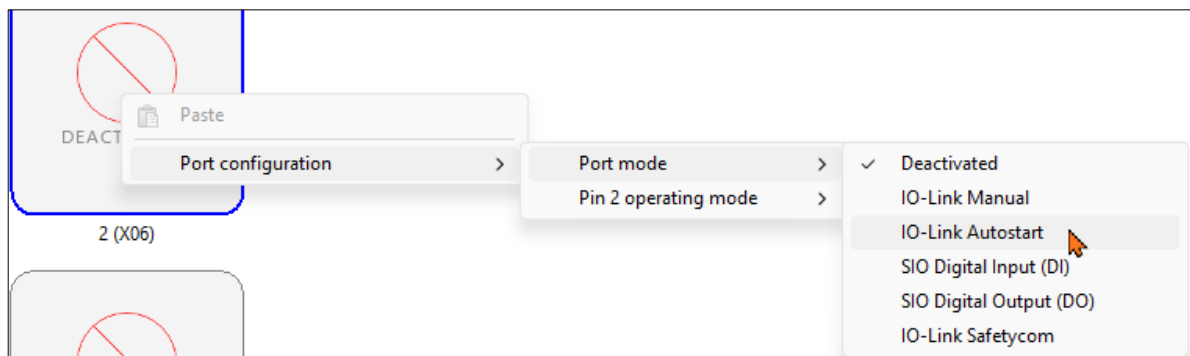


Figure 112: IO-Link Configurator – Port mode “IO-Link Autostart”

- ▶ Open the download manager; ‘Port 2’ is now not visible.
- ▶ Download the **‘System Configuration’** to activate the autostart function on the IO-Link port:

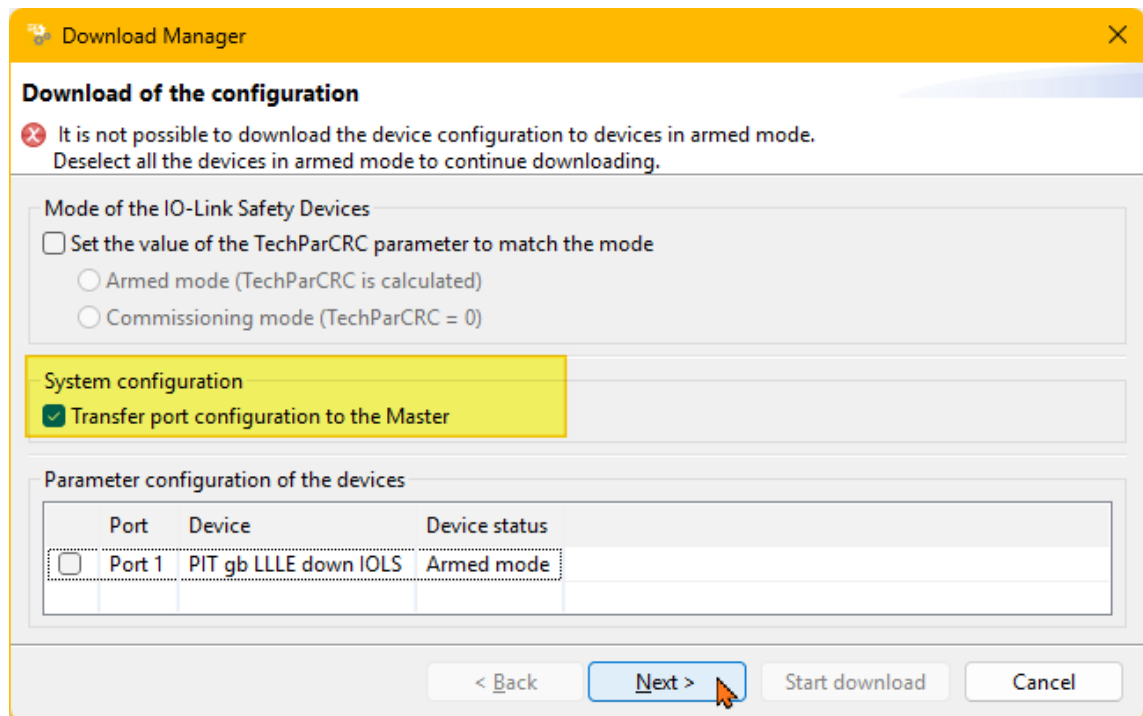


Figure 113: IO-Link Configurator – Download Manager » Transfer ‘System configuration’

- ▶ Next, confirm the change to the security configuration as shown in [Figure 104 \[64\]](#),
- ▶ enter the ‘FS password’
 - The default password is “pssu” (see also note at [Figure 53 \[38\]](#)).

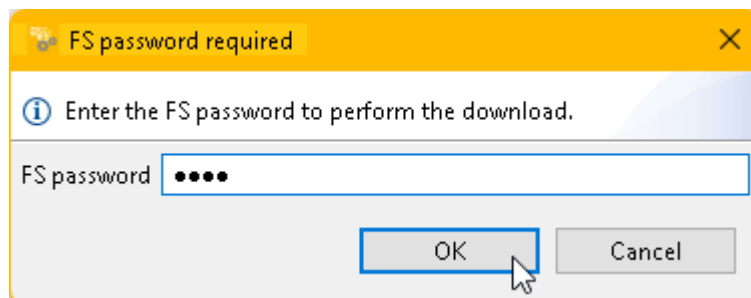


Figure 114: IO-Link Configurator – Download Manager » Confirm security prompt
and ...

- ... confirm the restart of the PDP67 device:

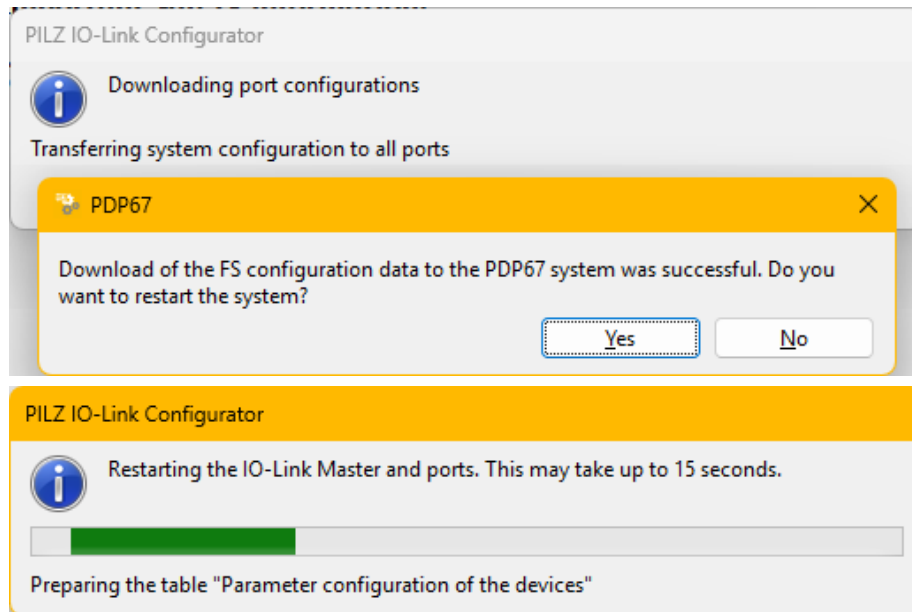


Figure 115: IO-Link Configurator – Restart of the IO-Link master

- Now establish an online connection to the ports and
- read out the **“Vendor ID [310]”** and **“Device ID [499]”** of the sensor:

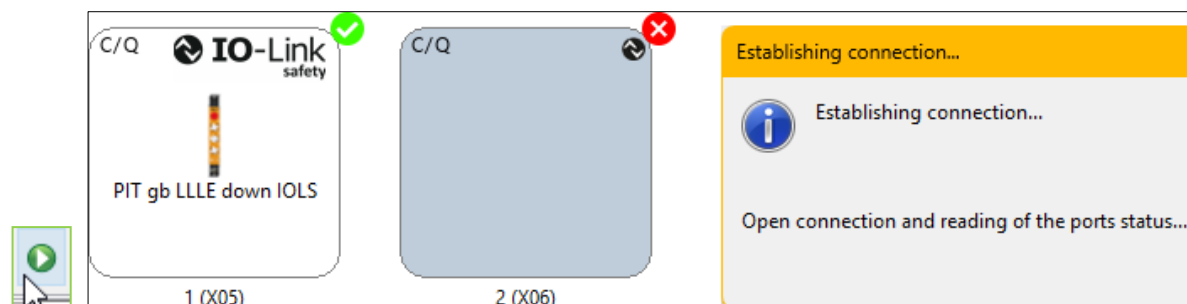


Figure 116: IO-Link Configurator – Establish online connection

System overview		Port properties	
Current operation	Port status	Current operation	
Source	Action	Result	Details
✓ 1 : PDP67 PN 8FDIO 4IOLS		No device match [3]	
> Port 1	Port connection	Port connected	
> Port 2	Device ID	No device match	Vendor ID [310] Device ID [499]
> Port 3	Port connection	Port unconnected	
> Port 4	Port connection	Port unconnected	

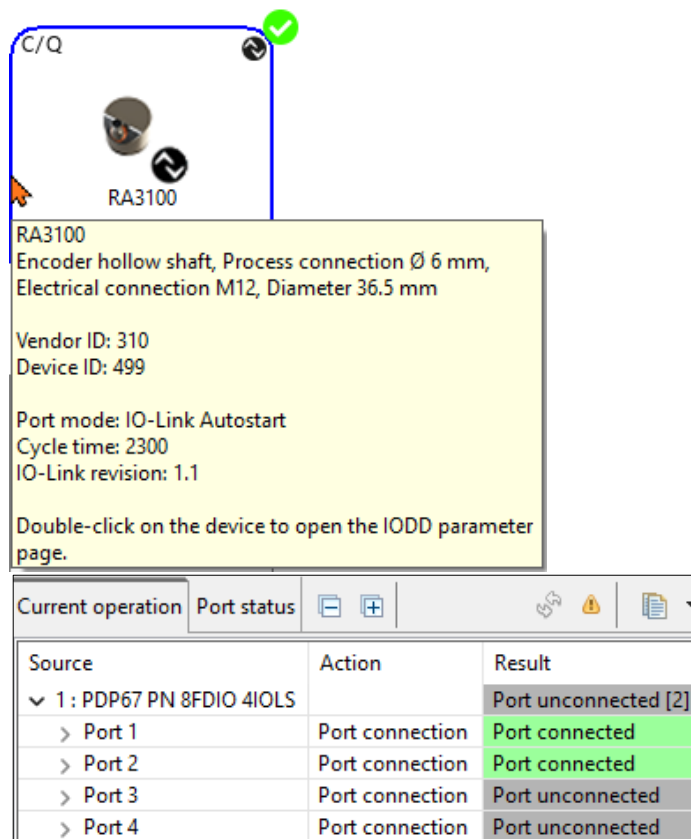
Figure 117: IO-Link Configurator – Online mode » Read out Vendor ID and Device ID

- Do not forget to disconnect the online connection afterwards!



- Now you can determine and download the corresponding IODD,
 - see [Chapter 10.1.1 Download the IODD device description files](#) [44].
- You can then commission the IO-Link device step by step,
 - see [Chapter 10.3 Configuration of an IOL sensor \(ST\)](#) [60 ff].

- ▶ If the device is already included in the 'IODE catalogue' of the IO-Link Configurator, the corresponding IODE is automatically integrated into the relevant port:



The screenshot shows the IO-Link Configurator interface. At the top, a device icon for RA3100 is highlighted with a green checkmark. Below it, a yellow tooltip box contains the following information:

RA3100
Encoder hollow shaft, Process connection Ø 6 mm,
Electrical connection M12, Diameter 36.5 mm

Vendor ID: 310
Device ID: 499

Port mode: IO-Link Autostart
Cycle time: 2300
IO-Link revision: 1.1

Double-click on the device to open the IODE parameter page.

Below the tooltip, there is a table with the following columns: Current operation, Port status, and a toolbar. The table data is as follows:

Source	Action	Result
▼ 1 : PDP67 PN 8FDIO 4IOLS		Port unconnected [2]
> Port 1	Port connection	Port connected
> Port 2	Port connection	Port connected
> Port 3	Port connection	Port unconnected
> Port 4	Port connection	Port unconnected

Figure 118: IO-Link Configurator – Automatic device integration

- ▶ Do not forget to disconnect from the online connection afterwards! 

11 Helpful functions for commissioning and maintenance

11.1 Security functions

In order to protect plants, systems, machines and networks from cyber threats, it is necessary to implement and continuously maintain a holistic industrial security concept that corresponds to the current state of the art.

The EU's binding Cyber Resilience Act (CRA) defines rules for information security, which are also being gradually integrated into the hardware and software for automation systems through additional measures.

Two functions relevant to this Application Note are shown here.

- ▶ Digital signature of the *PASconfig* software when starting from *TIA Portal*.
 - see [Chapter 8.4.1 Start of PASconfig via TIA Portal device configuration](#) [34].

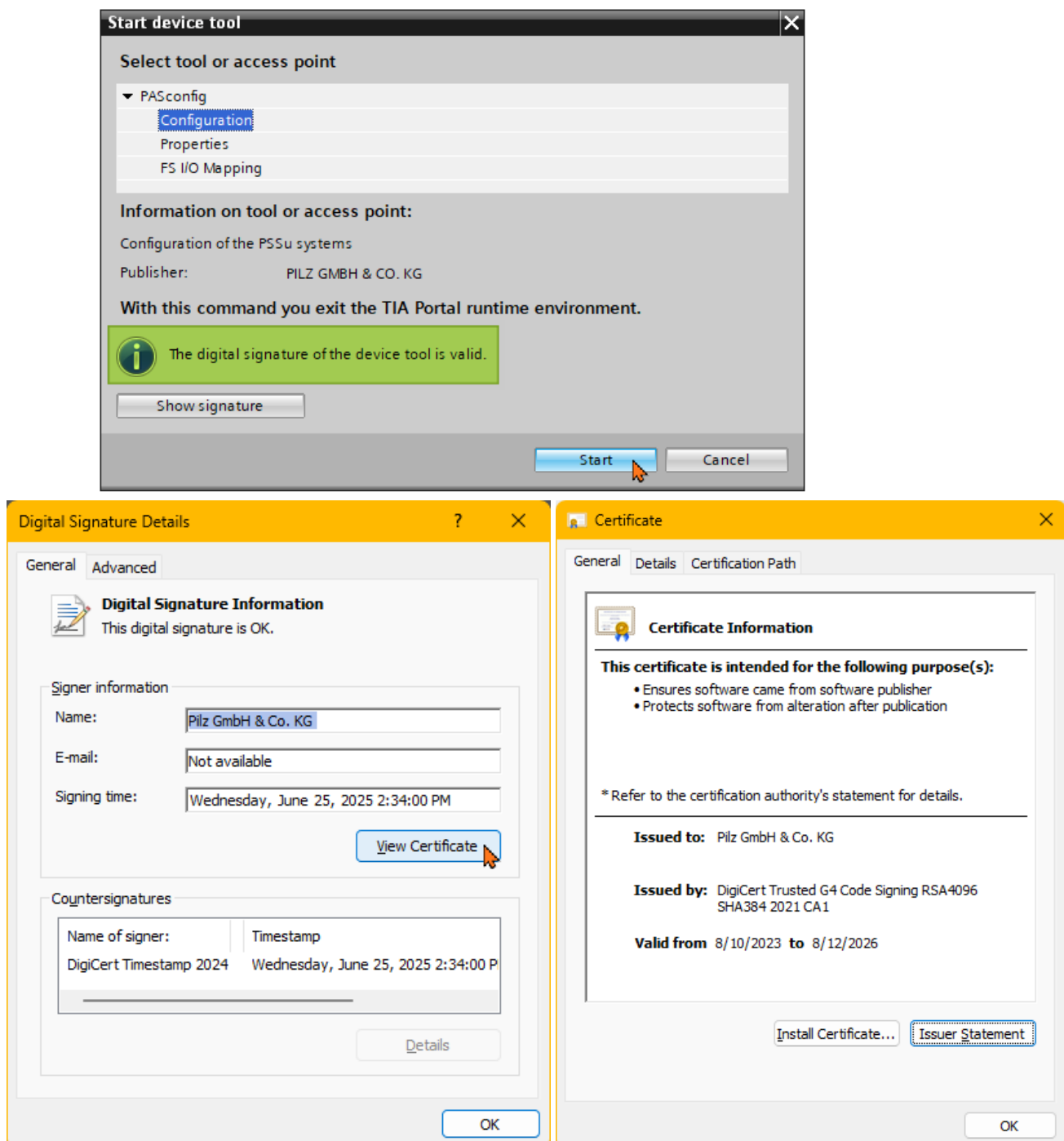


Figure 119: PASconfig – Security » Digital signature with certificate

► Secure identification of the F-controller 'PLC_1':

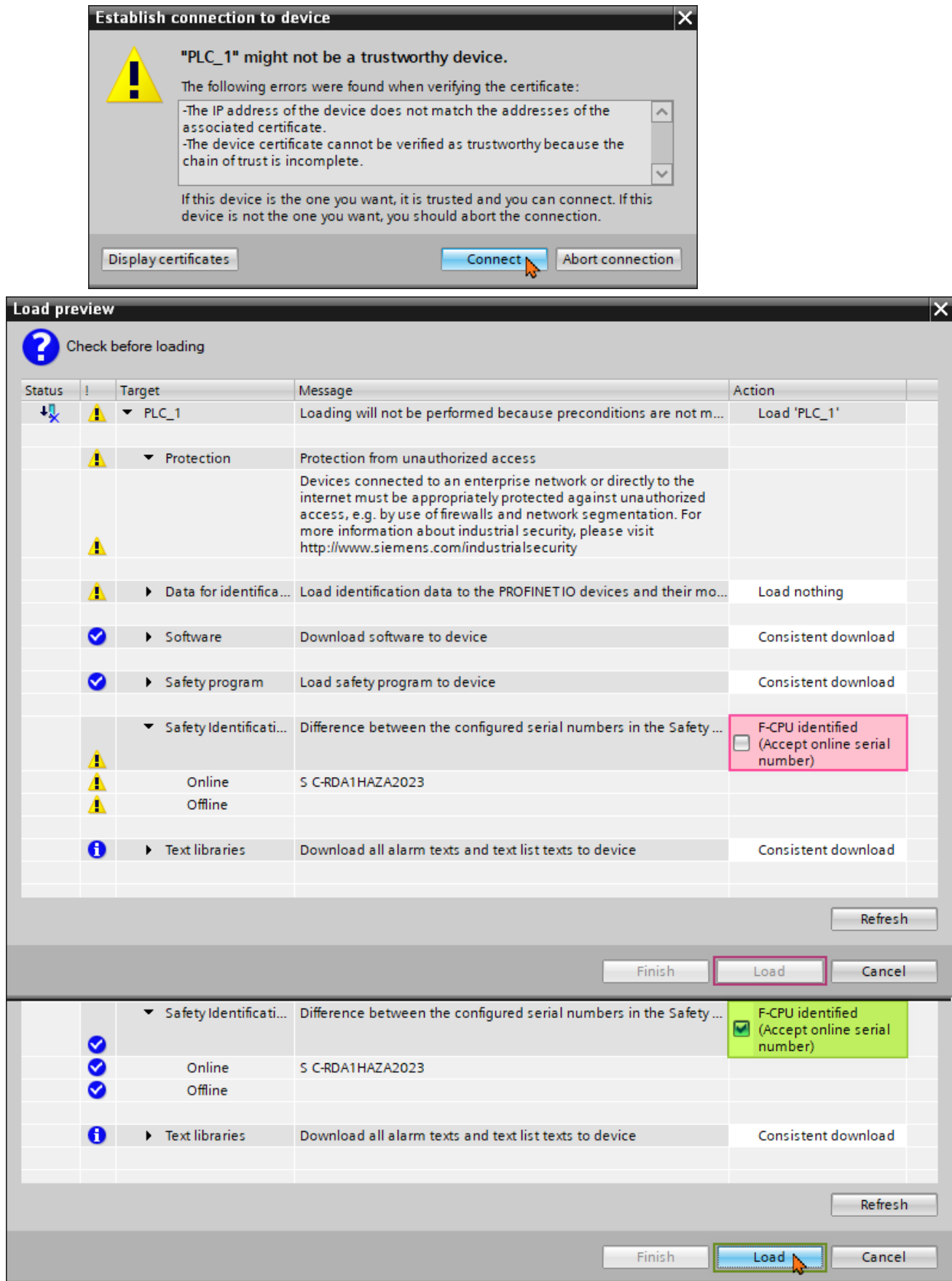


Figure 120: TIA Portal – Security » Identification of the F-CPU

11.2 Notes on IOLS ports

11.2.1 Set IOLS ports to default settings (back-to-box)

The following procedure describes how to reset the IO-Link safety devices to their default settings. This process is also known as '**BACK-TO-BOX**'.



INFO

- ▶ It is recommended to set the IO-Link safety devices to **Back-to-box** before performing a **factory reset** on the PDP67 device!
 - see [Chapter 11.7.2 Device exchange using MicroSD card and Reset button](#) [82].

11.2.2 Resetting the IOLS command and signalling device Pilz PITgatebox

- ▶ Select 'Port 1' and the value '**TECHPARCRC = 0**' so that the Pilz PITgatebox can be set to 'Commissioning mode' with the new download:

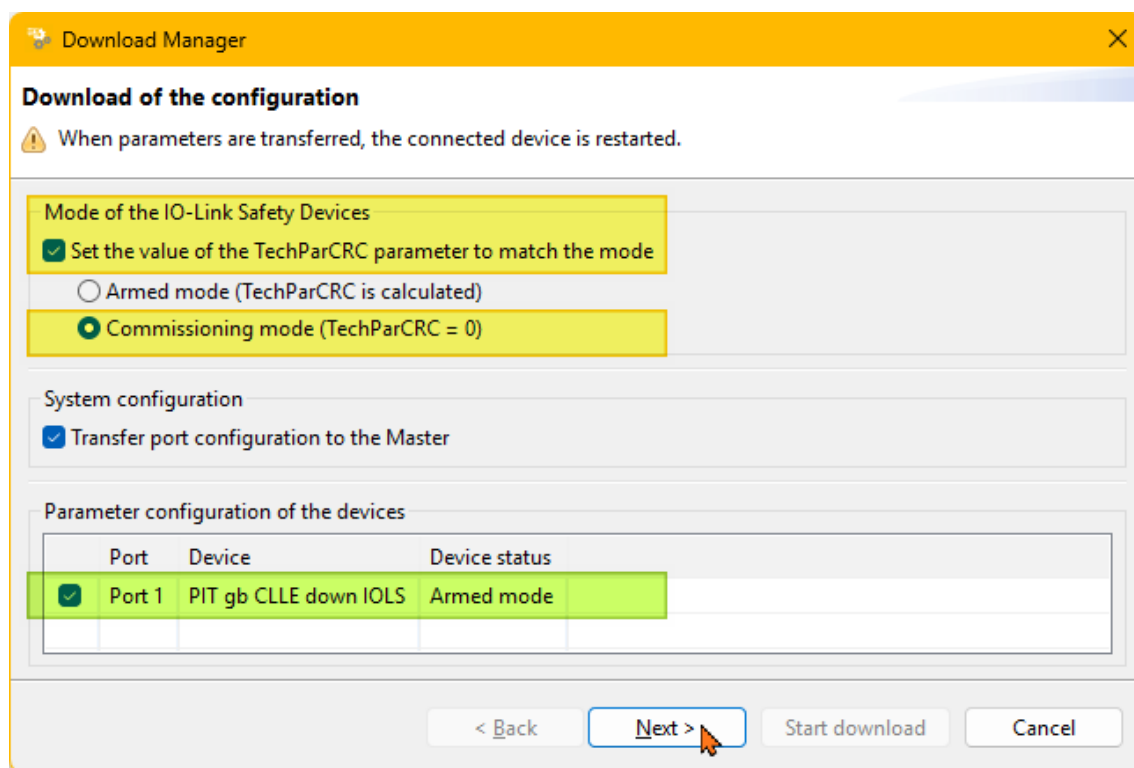


Figure 121: IO-Link configurator – Download manager » Set PITgb to 'Commissioning mode'

- ▶ Check whether the device is in 'Commissioning mode':

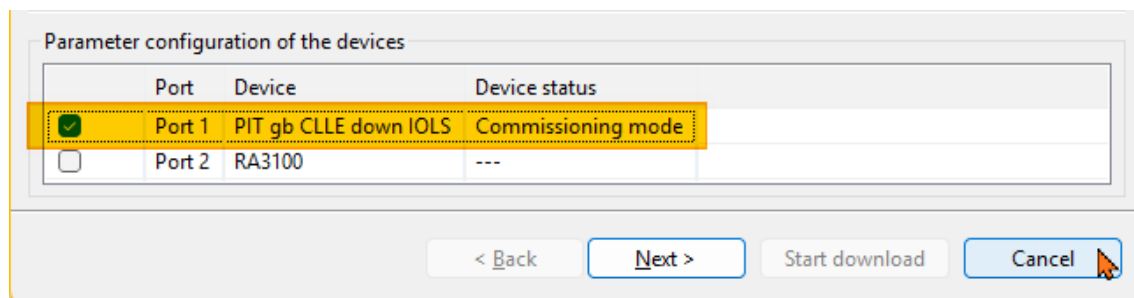


Figure 122: IO-Link Configurator – Download Manager » PITgb is in 'Commissioning Mode'

- ▶ Close the download manager with **[Cancel]**.

- ▶ Double-click on the device PITgatebox, port 1 (X05) to open the device data.
- ▶ Establish an online connection to the device.



- ▶ Switch to the “Diagnostics” area and open the “Service Functions” section.
- ▶ Start the System Command **[Back-to-box]**:

Back to configuration

IODD parameters
1 : PDP67 PN 8FDIO 4IOLS Port 1

PIT gb CLLE down IOLS

Show IODD details

Process data

Identification

Observation

Parameter

Diagnostics

Name	R/W	Dynamic	Value on device	Value in project
Device Status Information				
Device Status	ro	✓	Device is OK	
Detailed Device Status	ro	✓		
2	ro	✓		
20	ro	✓		
Service Functions				
System Command	wo			Back-to-box

Generic

Figure 123: IO-Link configurator – Display diagnostics » Start [Back-to-box] command

PDP67

Are you sure you want to run the system command [Back-to-box]?

Yes No

Diagnostics

Name	R/W	Dynamic	Value on device	Value in project	State
Device Status Information					
Device Status	ro	✓	Device is OK		Default value
Detailed Device Status	ro	✓			
2	ro	✓			Default value
20	ro	✓			Default value
Service Functions					
System Command	wo			Back-to-box	

Current operation Writing parameters... Cancel

Current operation Port status

Source	Action	Result	Details
1 : PDP67 PN 8FDIO 4IOLS		Port connected	
Port 1	Port connection	Port connected	
System Command	Download	Download was successful.	The value was successfully written to the device.

Current operation Online

Figure 124: IO-Link Configurator – Display diagnostics » Execute [Back-to-box] command

- ▶ Do not forget to disconnect the online connection afterwards!



11.3 Notes on establishing the online connection to the PDP67

A network connection is required for detailed configuration and online connection between the PASconfig PC and the PDP67 device:

→ see [Figure 12: Application – Wiring of Ethernet connections \(schematic\)](#) [18].

- ▶ This allows you to perform various online actions, for example:
 - firmware updates,
 - downloading FS/ST configuration data,
 - uploading device data, and
 - displaying the error stack

The *PASconfig PC* must have an IP address from the same subnetwork as the IP address of the PDP67 device; the port number is required for the connection to the configuration PC.

- ▶ Three parameters are required for this communication connection to the device:

1. the IP address (default setting: 0.0.0.0 » 192.168.0.2),
2. the port number (default setting: 18080 » 18080) and
3. the F address (default setting: 1 » 5).

If the IP address 0.0.0.0 is still present on the device, the following response is received as no online connection can be established between the *PASconfig PC* and the PDP67 device:

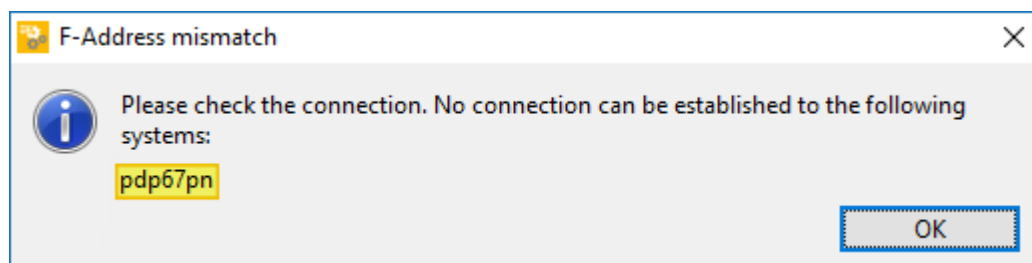


Figure 125: PASconfig – Error message ‘No connection established’

Therefore, the PDP67 device must be assigned an IP address first, so that *PASconfig* can establish an online connection to this decentralised fieldbus device.

- ▶ One option is to save, translate and transfer the *TIA project* to the F-CPU.
 - see [Chapter 8.3 TIA Portal – Transferring the configuration to the S7 F-CPU](#) [32 f].
- ▶ After restarting, the configured IP addresses are set in the PROFINET network:
 - see [Figure 31: TIA Portal – Properties of PDP67-PROFINET interface \[X1\] » General](#) [26].

Notes:

- ▶ Please note that the IP address of the *PASconfig PC* must be in the same subnetwork as the IP address of the PDP67 device.
 - For PROFINET networks, the free Siemens tool *PRONETA Basic* can be used to perform many analysis and configuration tasks, see [Subchapter 11.3.1 Determining the IP address and port number \(PROFINET\)](#) [75].
- ▶ In addition to the IP address, the **F address** configured for the PROFI-safe group in the *TIA Portal* tool must also be set in the **connection manager**.
 - Important: Please note the information in the [Subchapter 11.3.2 Determination and temporary assignment of the F-address \(PROFI-safe\)](#) [76 f].

11.3.1 Determining the IP address and port number (PROFINET)

The following tools can be used to determine existing PROFINET devices in a network:

- ▶ First of all, you should use the online functions of the PLC programming tool used, here especially for **TIA Portal** in the Online menu the function “Accessible devices...”.
 - see [Chapter 7.4 Setting up the Ethernet adapter](#) [18], [Figure 13](#) & [Figure 14](#).
- ▶ For PROFINET networks, the free Siemens tool **PRONETA Basic** can be used to perform many analysis and configuration tasks for these devices, such as displaying and setting the IP address and the PROFINET device name.

11.3.2 Determination and temporary assignment of the F-address (PROFIsafe)

The FS container used in Slot 11 has an F-address:

→ see Info under [Chapter 6.2.1.1 Failsafe and standard I/O process image](#) [13 f]

▶ This has two functions:

1. software F-address of the device for PROFIsafe communication in the PROFINET network
- and**
2. necessary (third) parameter for establishing the connection to the configuration PC.

Without the F-address, no connection to the PDP67 device can be established.

If you no longer know the F-address of a fieldbus device that has already been configured or used, you can read it out from the device using the *PASconfig* tool and use it temporarily for communication between the configuration PC and the Pilz device.

▶ Prerequisites:

- The configuration PC is connected to the PDP67 device and
- you know the IP address and the port number of the device (see [Chapter 11.3.1](#))

▶ Procedure:

- The configuration of a PDP67 device with an unknown F address is imported either via an existing PLC project or it must be newly created in *PASconfig*.
- Then start the »**Connection manager**« in the Tools menu, activate the line with the correct connection in its table and should first »Test« whether this is “error-free”.

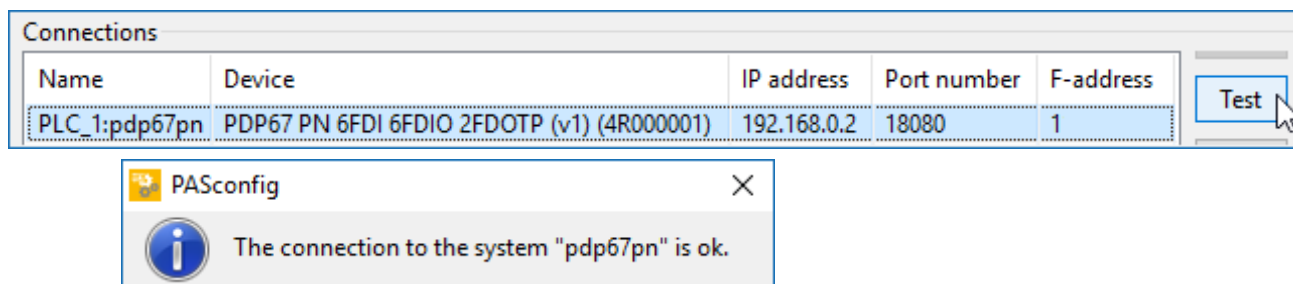


Figure 126: PASconfig – Connection manager » Manage connections to systems

– Now click on the button »Edit«, a window like in [Figure 127](#) opens:

- There you click on the button »Retrieve F-address for the Ethernet connection.« **(1)**.
- Now you are asked to enter the 'FS password' (default: "pssu") **(2)** **(3)**, to execute the function:
 - » The F-address for the Ethernet connection is now read out of the device.
 - » This F-address is then displayed **(4)** and
 - » temporarily assigned for the selected PDP67 device with »Finish« **(5)**.

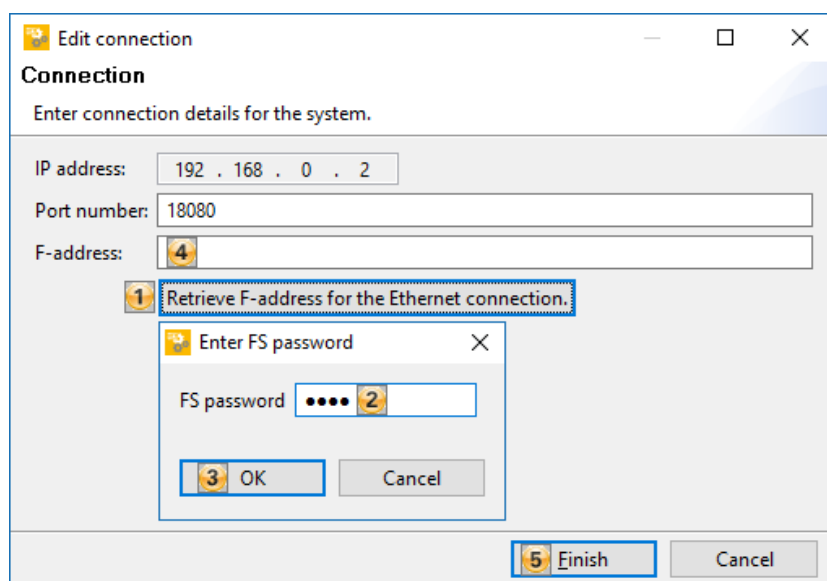


Figure 127: PASconfig – Connection » Read out the F-address for the Ethernet connection

- Now you can perform two functions independently of each other and in any order:

1. download the actual I/O configuration on the device

- see [Chapter 8.4.3 Download the configuration to PDP67 device](#) [38 ff]

and

2. download the current F-address to the device.

To do this, start the option »Set F-address« in the System menu.

The »Download« **1** also replaces the (previously existing and temporarily assigned) Device F-address in the right column with the current Project F-address **2** **3**, Error-free communication with the PROFIsafe master should then be possible.

- see [Figure 58: F-CPU / PDP67 – LED displays with error-free configuration](#) [40].

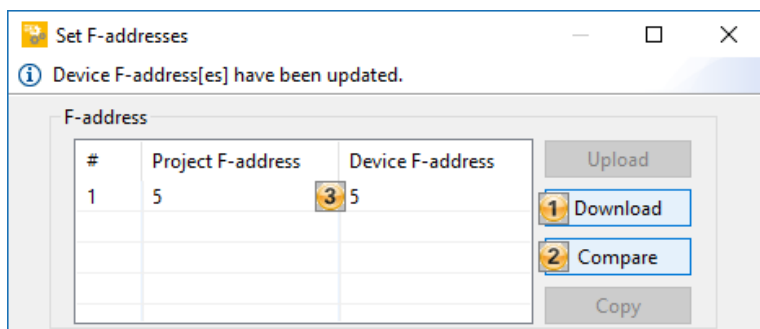


Figure 128: PASconfig – Enter F-address » Download and Compare

11.3.3 Manual assignment of F-addresses (IOLS)

Each of the four IO-Link ports X05 ... X08 has its own F-address, which must be entered with the same value in both TIA Portal and PASconfig:

1. In TIA, the F-address is defined in the hardware configuration of the respective second Subslot; in the example for Slot '5.2', the *F_Dest_Add* is '10':
 - see [Figure 79: TIA Portal – FS submodule IOLS_SP3 » Entering the PROFIsafe address "F_Dest_Add"](#) [50].
2. In PASconfig, the F-addresses of the project and on the device must be identical for the respective 'Slot.Subslot', in this case '5.2: 10':
 - see [Figure 80: PASconfig – Compare F addresses of the project and the device » Subslot 5.2](#) [51].

The following example uses the default F-addresses.

Default values that have not been changed are not automatically transferred in the PAS project and download to the PDP67 device. To do this, the following steps must be performed after starting the PASconfig tool:

- Start the 'System' function » 'Set F-address(es)'.
- »Compare« the F-addresses for the Subslots used:

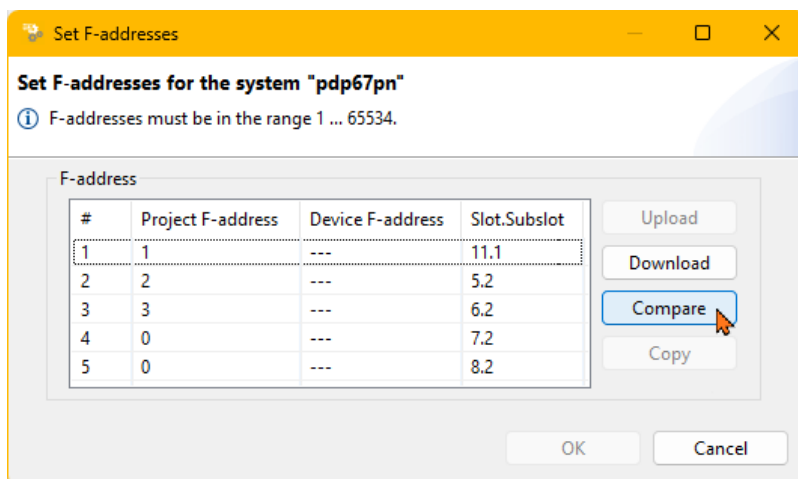


Figure 129: PASconfig – Set F-addresses » Compare project and device

- ▶ If the comparison shows any differences, these must be unified.
»Download« the (unequal) F-addresses of the project to the device.

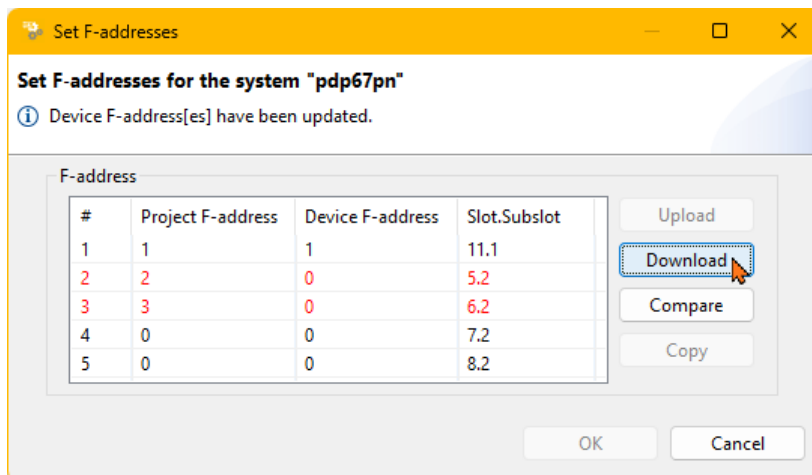


Figure 130: PASconfig – Set F-addresses » Download to device

- ▶ The F-addresses are changed on the device and it is restarted:

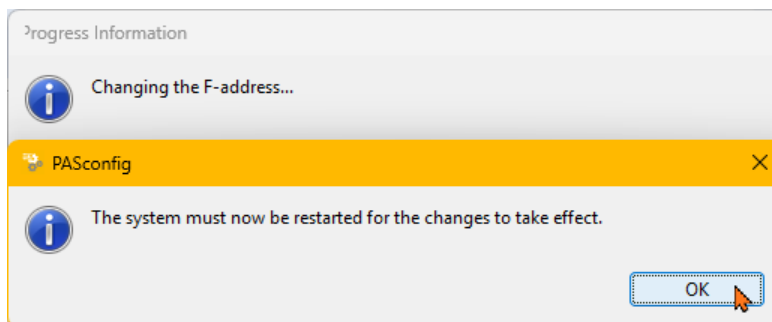


Figure 131: PASconfig – Set F-addresses » Restarting the device

- ▶ Then check again by »Compare« to see if the transfer has been performed correctly.

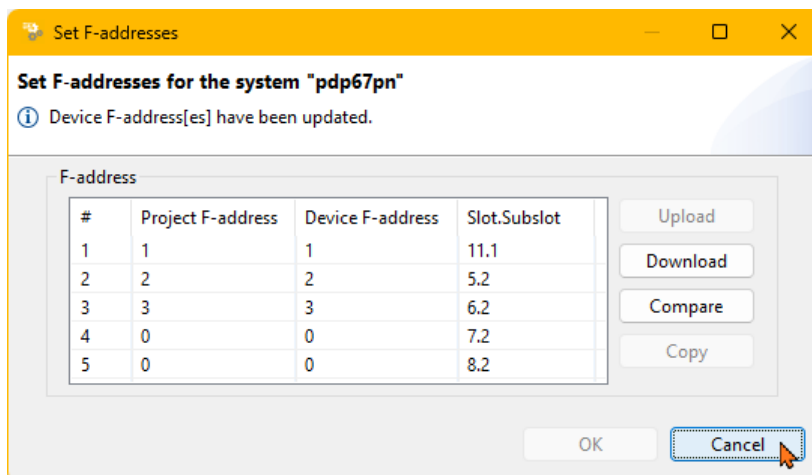


Figure 132: PASconfig – Set F-addresses » Check by comparing again

- ▶ Click **Cancel** to close the window.

11.4 Comparison of checksums of the failsafe configuration data

The FS checksum for the PDP67 device can be checked. If a project has been changed since the last download, this can be determined with this comparison. For this purpose, the device project in the offline project is compared with the one on the fieldbus device.

- ▶ The CRC can be checked in two places:
 1. still directly in the tool *PASconfig* in the menu 'system':

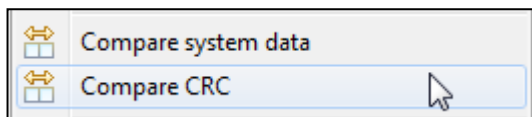


Figure 133: PASconfig – Function “Compare CRC”

or

2. in TIA Portal via »Start Device Tool...«, here now via the access point “Properties”:

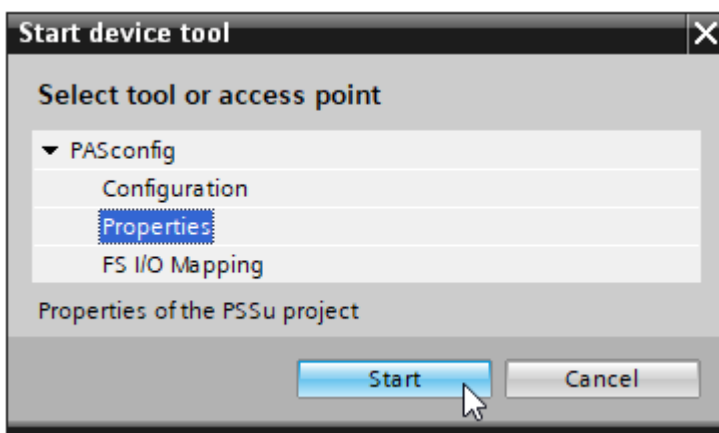


Figure 134: PASconfig – Function “Properties”

- ▶ Then the window with the offline configured *system properties* of the PDP67 device is displayed, here you can then start the comparison with the device data that are stored online:

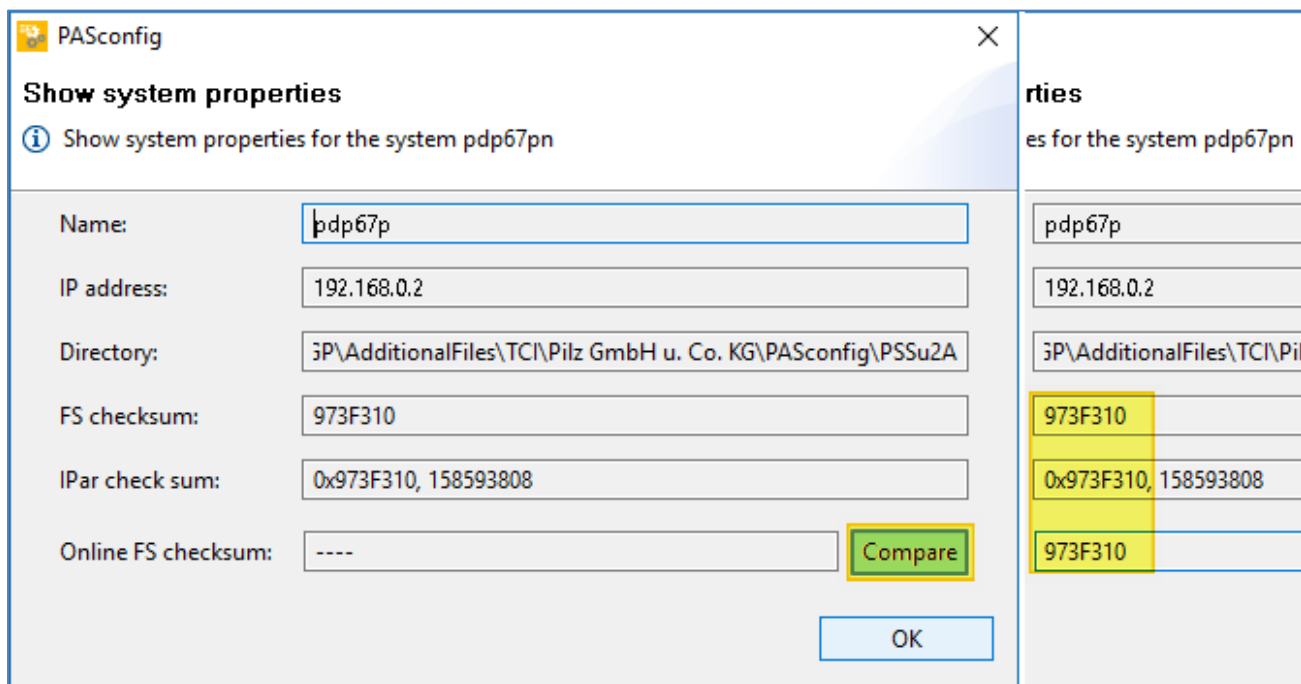


Figure 135: PDP67 – Display of the system properties with offline/online comparison (Example)

Note:

- ▶ The values of the checksums in the figures in this chapter are only examples.

11.5 Notes on the diagnostic display in TIA Portal and PASconfig

- ▶ The following example show diagnostic displays from the *TIA Portal* tool. These two online functions for diagnostics are accessible via the context menu of the F-CPU:

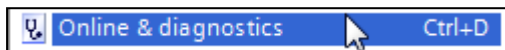
– »Go online«:

This will include the activation of the function in the project navigation, which shows the operating status or diagnostic status of the online-connected devices with icons.



– »Online & diagnostics«:

This opens a system related window with information on the diagnostics and other online functions. In the “Diagnostics” folder, you can select the group “Diagnostic buffer”, in which the “Events” are tabulated as a log file for the F-CPU and the modules assigned to it.



The following figure shows the online display of the *TIA project* with the diagnostic symbols and the “Diagnostic buffer” of the F-CPU:

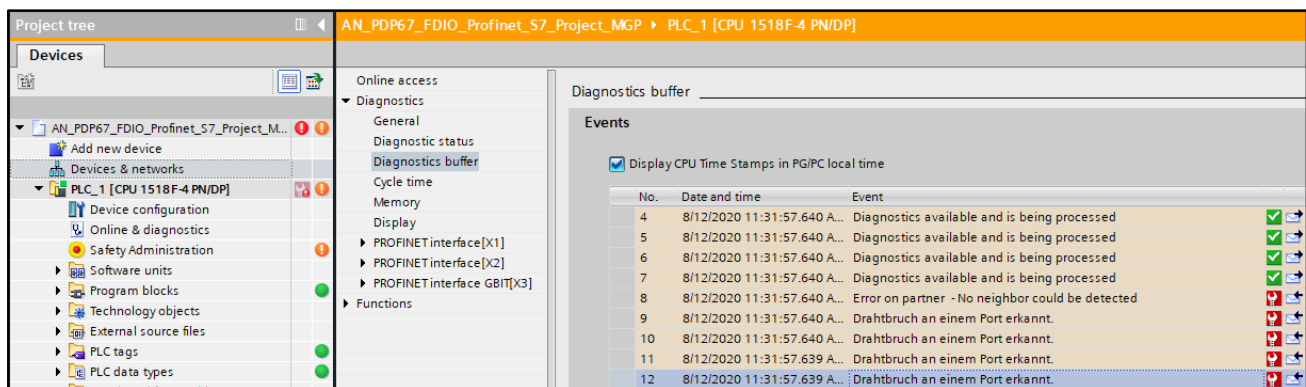


Figure 136: TIA Portal – F-program » Online diagnostic display and “Diagnostic buffer” of the F-CPU

- ▶ The more detailed error stack of the PDP67 device can be accessed in the *PASconfig* tool:

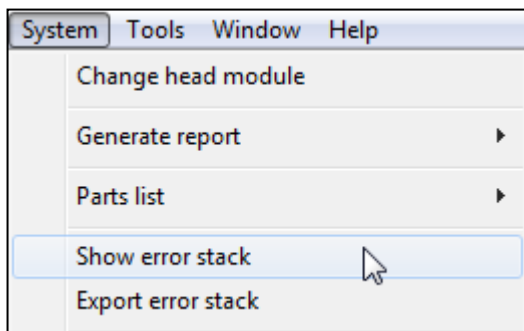


Figure 137: PASconfig – PDP67 » Display of Error stack

- ▶ The error stack with IO-Link event details can be accessed in the *IO-Link Configurator* tool:

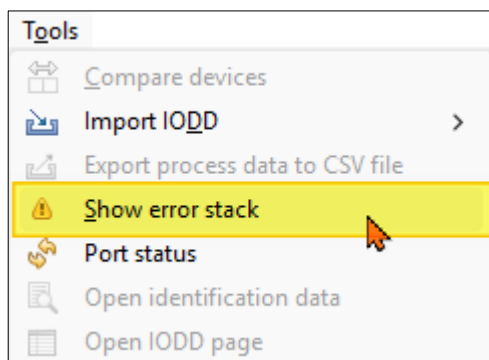


Figure 138: IO-Link Configurator – IOL ports » Display of the error stack

11.6 Web application on the Pilz device

A browser-based web application is integrated on the PDP67 device, enabling device functions to be executed without using the PASconfig software.

- ▶ Enter the IP address of the device in the form `https://<configured IP address>` in the address bar of your web browser.
- ▶ The first time you log in, use the following default data:
 - User name: “**admin**” (or “**guest**”)
 - Password: “**PDP67**”
- ▶ The start page will now open:

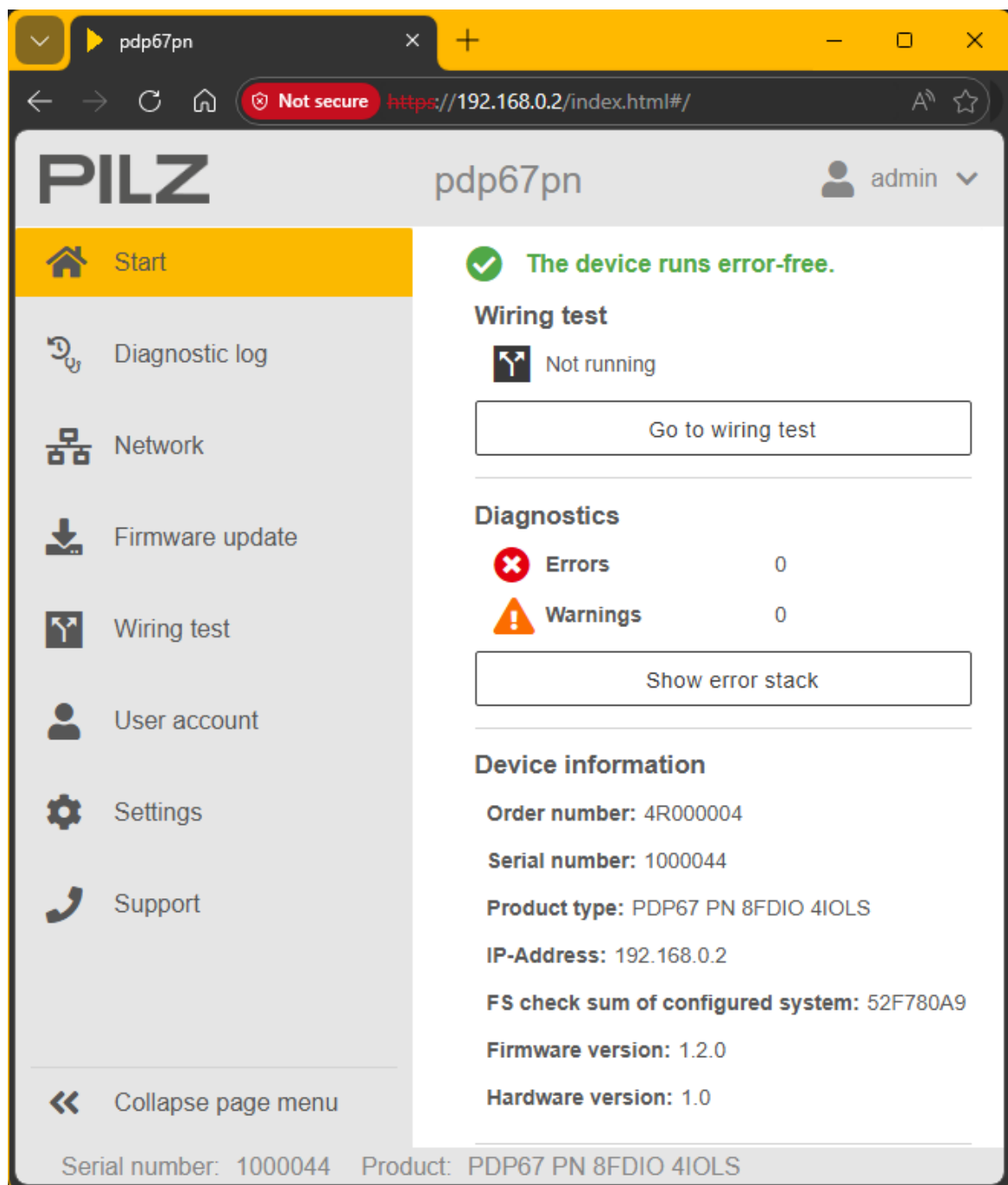


Figure 139: PDP67 – Web application » Start



INFO

- ▶ The individual functions are described in the chapter “Web application (web app)” of the PDP67 PN 8FDIO 4IOLS operating manual:
 - [Chapter 1.1 Documentation from Pilz GmbH & Co. KG](#) [6].

11.7 Notes on using the MircoSD card and Reset button

11.7.1 Carrying out of a restart (warm reset) by means of the Reset button

- ▶ Procedure:
 - Press the Reset button for **less than 5 seconds**.

After execution of a restart/reboot command, the current processing is aborted, and the device is re-initialized. After a restart, the inputs will keep their current input values and substitute values are used for the outputs until the connection to the controller has been re-established.

11.7.2 Device exchange using MicroSD card and Reset button

- ▶ A MircoSD card is available as an optional accessory for the PDP67 device.
 - see table in [Chapter 2.1 Pilz products \[7\]](#)

In the event of a device failure during operation, all relevant configuration data can be transferred very quickly to a second device using the removable data medium, without the need for software or an online connection (**Device exchange scenario**).

- ▶ Prerequisites:
 - On the first PDP67 device, a MicroSD card must have been plugged in before commissioning.
 - The removable data medium must not be empty or defective.
 - After commissioning, you can use *PASconfig* to check the FS checksum of the device on the microSD card; this must match the FS checksum of the configured device.
 - » see [Chapter 11.4 Comparison of checksums of the failsafe configuration data \[79\]](#)
 - Important: To ensure that final data is stored on the disk, do not remove the microSD card until the check is complete.
 - The device project on the removable data medium must match the product type.
- ▶ Procedure:
 - Press the Reset button for **more than 5 seconds**. The LED SD flashes yellow.
 - Release the Reset button and press and release it again within **10 seconds**.
 - The device project is transferred from the removable storage card to the device.

If the required files are not available on the removable storage card, the device exchange scenario is not performed, and an entry is written to the error stack.



NOTICE

If the previously described procedure is executed with the Reset button and no removable storage card is plugged in, an **Original Reset** is performed.

- ▶ Effects of the Original Reset:
 - ST and FS configuration data is deleted.
 - Profinet Factory Reset is executed
 - Error stack is not deleted
 - The fieldbus device is automatically restarted.

12 Appendix

12.1 Electrical port assignment of PDP67 device

- Graphical overview of electrical port assignment without those for Reset button and Removable storage media:

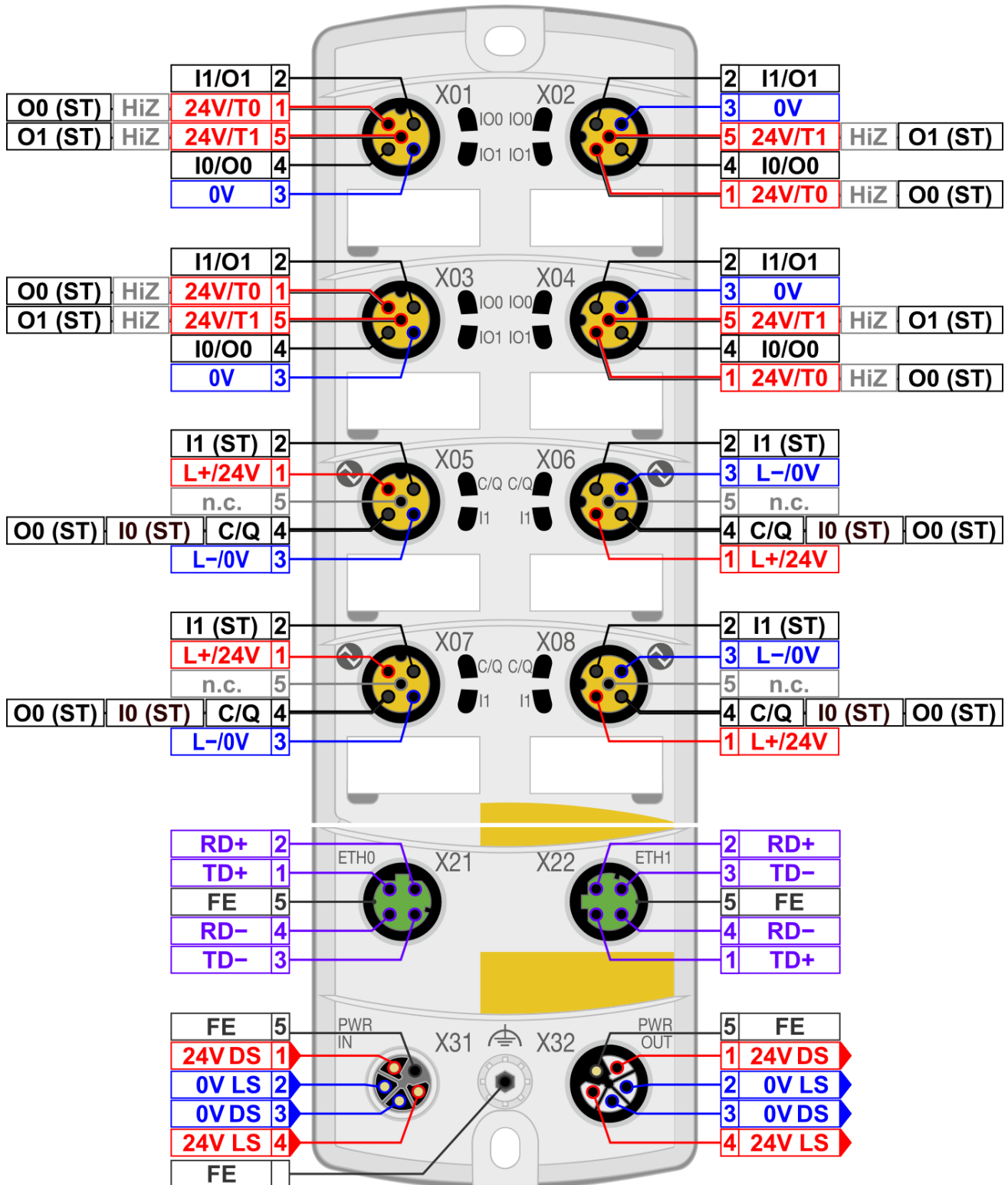


Figure 140: PDP67 – Wiring » Graphical overview of electrical port assignment

Now the electrical pin assignment for each port type is shown in detail:

► Pin assignment of the Input and output ports X01..X08 (**Failsafe** and **Standard**)

Pin	Assignment	
	2FDIO X01 – X04	IO-Link Safety X05 – X08
1	24V/T0 /HiZ/ O0 (ST)	L+ (Device Supply)
2	I1 O1	I1 (ST)
3	0V 0V	L- (Device Supply)
4	I0 O0	C/Q oder I0/O0 (ST)
5	24V/T1 /HiZ/ O1 (ST)	n.c.

Notes to the port function "FS input" at X01..X04:
 On a 2FDIO port without activated test clock outputs (option: "ST output"),
 2 FS inputs [Pin 2&4] and 2 controllable single-pole ST outputs [1&5] can be used
 simultaneously; you can even mix the listed options channel by channel!
 However, the failsafe function is then limited (no test pulses available).
 With the "24V" option, you have a permanent power supply in each case [1&5].

Figure 141: PDP67 – Wiring » Pin assignment X01..X08 (M12, female, A coded)

► Pin assignment of the Ethernet ports X21, X22

Pin	Assignment
1	TD+
2	RD+
3	TD-
4	RD-
5	FE

Figure 142: PDP67 – Wiring » Pin assignment X21, X22 (M12, female, D coded)

► Pin assignment of the Power supply ports X31, X32

– Note here the direction of the wiring:

- X31: Interface **from** the 24 V power supply or **from previous** decentralised device
- X32: Interface **to the next** decentralised device

Pin	Assignment
1	+24 VDC Device Supply
2	0 VDC Load Supply
3	0 VDC Device Supply
4	+24 VDC Load Supply
5	FE

Figure 143: PDP67 – Wiring » Pin assignment X31, X32 (M12, male & female, L coded)



CAUTION!

To ensure IP67 protection, unused ports should be covered with protective caps.

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