Decentralised periphery PNOZmulti: PNOZ ml2p with PDP67 F 8DI ION HP

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the spirit of safety

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January 2013

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Abbreviations

PSEN	**P**ilz **Sen**sor
PNOZ	Pilz E-STOP Positive-guided (DE: **P**ilz **NO**T-AUS-**Z**wangsgeführt)
OSSD	**O**utput **S**ignal **S**witching **D**evice
PDP	**P**roduct Range **D**ecentralised **P**eriphery
STO	Stop Category 0 - **S**afe **T**orque **O**ff
SS2	Stop Category 2 - **S**afe **S**top **2**

1. Useful documentation

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

1.1. Documentation from Pilz GmbH & Co. KG

No.	Description	Item No.
1	Pilz international homepage, download section	www.pilz.com
2	Operating manual PDP67 F 8DI ION HP	1002 225-EN-xx
3	Operating manual PNOZ m3p	1001 352-EN-xx
4	Operating Manual PNOZ ml2p	1001 642-EN-xx
5	Operating manual PSEN op4F/H-s-…/1	1001 422-EN-xx
6	Operating manual PSEN op67-69K	1002 401-2EN-xx
7	Operating instructions PSEN adapt PSS67/PDP67 4p	21 913-3FR-xx
8	Operating manual PMCprotego D.01…D.24	21 934-EN-xx
9	Operating manual PMCprotego S2	1001 432-EN-xx
10	Operating manual PMCtendo AC	21 706-EN-xx
11	User manual Motion Control Tools	21 468-EN-xx

1.2. Documentation from other sources of information

No.	Description	Item No.
1		
2		

2. Hardware configuration

2.1. Pilz products

No.	Description	Order number	Version	Number
1	PNOZ m3p	773 125	v2.1	1
2	PNOZ ml2p	773 602	v1.0	1
3	PDP67 F 8DI ION HP	773 601	v1.0	3
4	PSEN op4F-s-14-090/1	630 745	-	1
5	PSEN op67-69K-090/1 (protective housing for light grids)	630 935	-	2
6	PSEN op4F/H Receiver adapter	380 326	-	1
7	PSEN opt M12 Transmitter adapter	380 304	-	1
8	PNOZmulti Configurator	-	v8.1.1 Build 2	1
9	*Motion**	-	-	-

*** Note**
Structure, control and evaluation of the safe servo amplifier are not shown in this example. The detailed description of this functionality can be taken from the Application Note "AN_PMCprotegoDS_PSENcs_1002085-DE-xx".

2.2. Hardware configuration

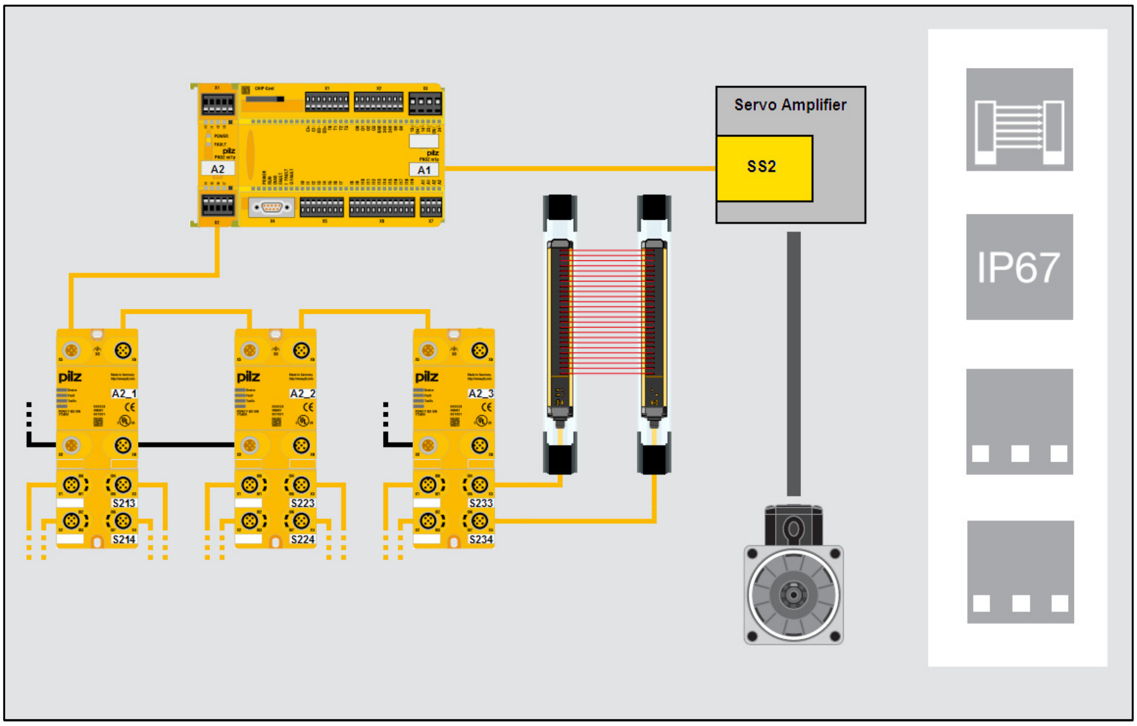


Fig. 1: Hardware configuration

3. Application Task

3.1. Description

The example shows the realisation of a light curtain application at a decentralised input module PDP67 F 8DI ION HP (A2_3).

A machine moves inside a protective housing. The Access to the danger area is monitored by a light curtain (AS233/AS234). To secure the light curtain against wetness and dust, PSEN op67-69K protective housing for light grids is used.
The decentralised input modules PDP67 F 8DI ION HP (A2_1, A2_2, A2_3) monitors the output signals of the connected sensors.
The signals are transmitted to the link module PNOZ ml2p via a safe data link and are monitored by the PNOZ m3p (A1).
The safe control and evaluation of the signals is performed by the Pilz function block “Light Curtain” from the element selection (function elements) of the PNOZmulti Configurator.
When the light curtain is interrupted, the drive (M1) is shut down according to the function safe stop 2 (SS2) and kept in position control.

Caution
The safety functions are exemplified by the shutdown of one dangerous machine movement (M1). Other hazards (machinery) in the operating area, are not shown and considered in this example. In real applications, this part must be included in the safety review.

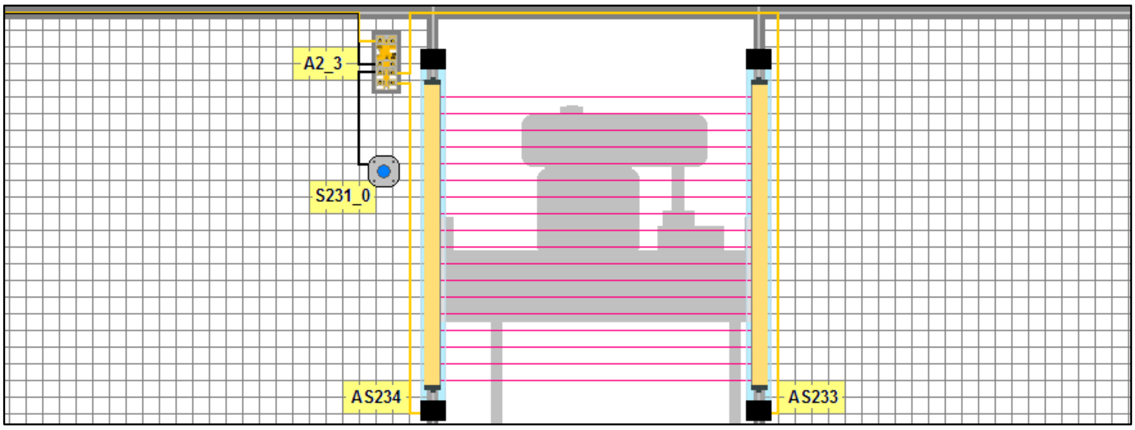


Fig. 2: Application light curtain monitoring

The process is divided into the following functions:
- Monitoring Light Curtain

3.1.1. Monitoring light curtain

The light curtain (AS234) is monitored by the controller PNOZm3p (A1) via the user program. A FS function block “Light Curtain” is assigned to the light curtain. This FS-FB detects whether the assigned light curtain has been interrupted, as well as detecting invalid input signals and whether the contact synchronisation time has been exceeded, etc.

If the light curtain is interrupted or an error occurs, the enable output of the FS-FB will immediately be reset. The enable output is also reset when the PNOZmulti is stopped and when the PNOZmulti is switched on.
The signal of the enable output activates the SS2 function of the safety card by means of a falling edge at the SS2 input of the PMCprotego S2 safety card. If the configured limit values of the SS2 function are violated, the drive changes to STO.
Please note that no more holding torque exists with STO and relevant additional measures must be employed to ensure that this behaviour does not lead to a hazardous situation (e.g. with suspended loads).

The way in which the error is reset will depend on the operating mode set on FS-FB.
In this application example, parameters for FS-FB have been set in such a way that:

- when cold started (PNOZ switched from off to on),
- when warm started (PNOZ transferring from STOP to RUN) or
- after releasing the light curtain

it is necessary to reset (S231_0) at the FS-FB in order to reset the output parameter.

Caution
Although the light curtain functions are configured to reset themselves, a PNOZ cold start or releasing the light curtain must not directly enable a machine to start up without further conditions being met.

Settings at PSENopt
The EDM function is switched by applying +24V to the “EDM selection” and 0V to the “EDM” set override.
The light curtain is switched by applying OSSD1 to the input “manual/automatic restart” to automatic restart mode. The light curtain also acts as the normal operation automatically resume as soon as the beams of the light curtain are free.

Note
If an operator completely (or even maybe partly) is able to access the dangerous area, a risk analysis should clarify whether an additional, separate “manual reset function” is required.

3.1.2. Series connection PSEN with PDP67 F 8DI ION HP

The decentralised input modules (PDP67 F 8DI ION HP) can connect by an interface to the evaluation device or to an upstream module or a downstream module.
The series connection of the modules does not represent a sensor referred series connection. The connected sensors are detected by the inputs of the modules. Communication with the control system is via a safe data link. Data is exchanged cyclically.

INFO
The decentralised input modules PDP67 F 8DI ION HP (A2_1, A2_2 and A2_3) are approved in accordance with IP67.
When connecting IP67 capable sensors (e.g. PSENcode, PSENini, etc.) and using suitable connecting cables, the entire sensor part can be composed as IP67.
In the present case a protective housing for light grids (PSEN op67-69K-…) is used, in order to achieve IP67 with the light curtain (AS233/AS234).

IP67

Note
The usable operating range (reduction factor) is reduced by 10% per unit, when the protective housing for light grids is used.

In the following some characteristics about handling the PSEN series connection at PDP67 F 8DI ION HP is explained in more detail.

3.1.2.1. Voltage drop of supply voltage over the input lead

For considering the fall of voltage, several factors are important:

- The power supply device (PNOZ ml2p) for the sensors must be able to provide the necessary power to supply the connected devices.
- Length, diameter and material of the used connection conductor.

General Technical Data for the calculation of the example

Condition: Interface cable PSS SB BUSCABLE LC,
Sensor cable 0.25mm^2,
Supply cable 0.5mm^2

From "Technical Data" PNOZ ml2p: $U_{B:}$ 24V,
Max. output current decentralised module supply 4A,
Maximum cable run unscreened 30 m,
Maximum cable run screened 100 m

From "Technical Data" PDP67 F 8DI ION HP: $U_{B:}$ 24V,
Power consumption at $U_{B:}$ 1.2W,
Voltage tolerance -30%/+25%,
Max. output current at semiconductor output 0.50 A,
Input current 3.0 mA,
Max. internal voltage drop 200 mV
($U_{fall\_A2\_1/A2\_2/A2\_3\_max}$)

From "Technical Data" PSEN op4F.../1 (AS233/AS234): $U_{B:}$ 24V,
Power consumption (TX): 2.5W max,
Power consumption (RX): 3.5W max (without load),
Voltage tolerance -20%/+20%

General calculations

Current consumption at PDP67 F 8DI ION HP = 1.2W / 24V = 0.05A ~ 50mA (I_{PDP})

Current consumption at PSEN S233 = 2.5W / 24V = 0.10416A ~ 104mA (I_{S233})

Current consumption at PSEN S234 = 3.5W / 24V = 0.14583A ~ 146mA (I_{S234})

Max. voltage drop ($U_{fall\_max\_PDP}$) up to the PDP = -30% (24V) = 24V * 0.3 = 7.2V = Tolerable negative voltage tolerance at module (A2_1, A2_2, A2_3).

Max. voltage drop ($U_{fall\_max\_Sen}$) up to the sensor = -20% (24V) = 24V * 0.2 = 4.8V = Tolerable negative voltage tolerance at sensor (AS233/AS234).

Guidelines for calculating the voltage drop on various cable types:

Cable type	Voltage drop per 10 m (Cable up-and-down included) and per 100mA
PSS SB BUSCABLE LC	0.1V
Sensorkabel 0.25 mm²	0.15V
Sensorkabel 0.34 mm²	0.11V
Sensorkabel 0.5 mm²	0.07V

Calculation of voltage drop at conductor

- Length of the sensor lines is assumed as 5m each.
- Length of the connection lines W12 and W23 is assumed as 10m.
- Length of the connection line W01 is assumed as 20m.
- Length of the supply lines 2W01 and 3W03 is assumed as 5m.
- Length of the supply line 2W12 is assumed as 10m.

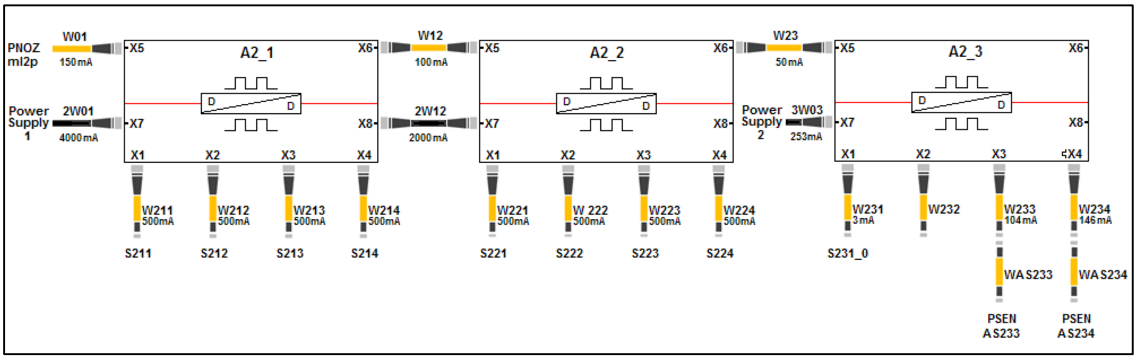


Fig. 3: Calculation of voltage drop

W231

For the current calculation of mechanical wearing contacts, the input current of the used input is inserted = 3mA = $I_{A2\_3\text{-}I0}$ = I_{W231}.

W233 with WAS233

The current in the conductor W233 and the adapter WAS233 is the same as the current of the sensor S233 (I_{S233}). It is therefore 104mA (I_{W233}).

Factor for the voltage drop	=	**0.15V**		(per 10m and 100mA)
Factor of the cable length (W/WAS233)	=	**0.51**	= (5m+0.1m) / 10m	
Factor from the current	=	**1.04**	= 104mA / 100mA	

Voltage drop over the conductor resistance (U_{W233}) = Factor from the current * Factor of the cable length * Factor voltage drop

U_{W233} = 1.04 * 0.51 * 0.15V = 0.07956V ~ 0.08V

W234 with WAS234

The current in the conductor W234 and the adapter WAS234 is the same as the current of the sensor S233 (I_{S234}). It is therefore 146mA (I_{W234}).

Factor for the voltage drop	=	**0.15V**		(per 10m and 100mA)
Factor of the cable length (W/WAS234)	=	**0.51**	= (5m+0.1m) / 10m	
Factor from the current	=	**1.46**	= 146mA / 100mA	

Voltage drop over the conductor resistance (U_{W234}) = Factor from the current * Factor of the cable length * Factor voltage drop

U_{W234} = 1.46 * 0.51 * 0.15V = 0.11169V ~ 0.11V

3W03

The summation of the currents I_{W231}, I_{W233} and I_{W234} results in current of line 3W03 = 253mA.

Factor for the voltage drop	=	**0.07V**	
Factor of the cable length (3W03)	=	**0.5**	= 5m / 10m
Factor from the current	=	**2.53**	= 253mA / 100mA

Voltage drop over the conductor resistance (U_{3W03}) = Factor from the current * Factor of the cable length * Factor voltage drop

U_{3W03} = 2.53 * 0.5 * 0.07V = 0.08855V ~ 0.09V

Note

In order to obtain realistic calculation values for the example, for the modules A2_1 and A2_2 the maximum values of the outputs (500mA) for each connection slot and a complete allocation is assumed.

W221, W222, W223, W224

$I_{W221} = I_{W222} = I_{W223} = I_{W224}$ = 500mA.

Factor for the voltage drop	=	**0.15V**	
Factor of the cable length (W22x)	=	**0.5**	= 5m / 10m
Factor from the current	=	**5.00**	= 500mA / 100mA

Voltage drop over the conductor resistance (U_{W22x}) = Factor from the current * Factor of the cable length * Factor voltage drop

U_{W22x} = 5.00 * 0.5 * 0.15V = 0.375V ~ 0.38V

2W12

The summation of the currents I_{W221}, I_{W222}, I_{W223} and I_{W224} results in current of line 2W12 = 2A.

Factor for the voltage drop	=	**0.07V**	
Factor of the cable length (2W12)	=	**1**	= 10m / 10m
Factor from the current	=	**20.00**	= 2000mA / 100mA

Voltage drop over the conductor resistance (U_{2W12}) = Factor from the current * Factor of the cable length * Factor voltage drop

U_{2W12} = 20.00 * 1 * 0.07V = 1.40V ~ 1.40V

W211, W212, W213, W214

$I_{W211} = I_{W212} = I_{W213} = I_{W214}$ = 500mA.

Factor for the voltage drop	=	**0.15V**	
Factor of the cable length (W21x)	=	**0.5**	= 5m / 10m
Factor from the current	=	**5.00**	= 500mA / 100mA

Voltage drop over the conductor resistance (U_{W21x}) = Factor from the current * Factor of the cable length * Factor voltage drop

U_{W21x} = 5.00 * 0.5 * 0.15V = 0.375V ~ 0.38V

2W01

The summation of the currents I_{W211}, I_{W212}, I_{W213}, I_{W214} and I_{2W12} results in current of line 2W01 = 4A.

Factor for the voltage drop	=	**0.07V**	
Factor of the cable length (2W01)	=	**0.5**	= 5m / 10m
Factor from the current	=	**40.00**	= 4000mA / 100mA

Voltage drop over the conductor resistance (U_{2W01}) = Factor from the current * Factor of the cable length * Factor voltage drop

U_{2W01} = 40.00 * 0.5 * 0.07V = 1.40V ~ 1.40V

The HP variant of the PDP67 modules are energised by a separate current supply line, thus only the current of the PDPs can be used to compute the current of the data lines

W23

$I_{W23} = I_{PDP\_A2\_3}$, therefore results in current of line W23 = 50mA.

Factor for the voltage drop	=	**0.1V**	
Factor of the cable length (W23)	=	**1**	= 10m / 10m
Factor from the current	=	**0.5**	= 50mA / 100mA

Voltage drop over the conductor resistance (U_{W23}) = Factor from the current * Factor of the cable length * Factor voltage drop

U_{W23} = 0.5 * 1 * 0.1V = 0.05V ~ 0.05V

W12

$I_{W12} = I_{PDP\_A2\_2} + I_{W23}$, therefore results in current of line W12 = 100mA.

Factor for the voltage drop	=	**0.1V**	
Factor of the cable length (W12)	=	**1**	= 10m / 10m
Factor from the current	=	**1**	= 100mA / 100mA

Voltage drop over the conductor resistance (U_{W12}) = Factor from the current * Factor of the cable length * Factor voltage drop

U_{W12} = 1 * 1 * 0.1V = 0.10V ~ 0.10V

W01

$I_{W01} = I_{PDP\_A2\_1} + I_{W12}$, therefore results in current of line W01 = 150mA.

Factor for the voltage drop	=	**0.1V**	
Factor of the cable length (W01)	=	**2**	= 20m / 10m
Factor from the current	=	**1.5**	= 150mA / 100mA

Voltage drop over the conductor resistance (U_{W01}) = Factor from the current * Factor of the cable length * Factor voltage drop

U_{W01} = 1.5 * 2 * 0.1V = 0.30V ~ 0.30V

Total voltage drop

The summation of the voltage for the highest total voltage drop at module ($U_{fall\_tot\_PDP}$) applies to the farthest connected module A2_3.

$U_{fall\_tot\_PDP}$	$= U_{W01}$	$+ U_{fall\_A2\_1\_max}$	$+ U_{W12}$	$+ U_{fall\_A2\_2\_max}$	$+ U_{W23}$
0.85V	= 0.30V	+ 0.2V	+ 0.10V	+ 0.2V	+ 0.05V

$U_{fall\_tot\_PDP} < U_{fall\_max\_PDP}$

The summation of the voltage for the highest total voltage drop at sensor ($U_{fall\_tot\_Sen}$) in the available example is partitioned into the 2 used power supplies:

Power Supply 1:

The sensors S221 till S224 have the same tolerable voltage tolerance and the same voltage drop on the line (acceptance example), thus it is insignificantly which individual sensor for the computation are used.

$U_{fall\_tot\_Sen\ (Supply\ 1)}$	$= U_{2W01}$	$+ U_{2W12}$	$+ U_{W22x}$
3.18V	= 1.40V	+ 1.40V	+ 0.38V

Note
The largest voltage drop (sensor) needs not to occur at the farthest connected module. By appropriate cable length and sensor performance, this also can occur at other modules.

Power Supply 2:

The sensors AS233 and AS234 have the same tolerable voltage tolerance, thus the sensor with the largest voltage drop on the line is used for the computation.

$U_{fall\_tot\_Sen\ (Supply\ 2)}$	$= U_{3W03}$	$+ U_{W234}$
0.2V	= 0.09V	+ 0.11V

$U_{fall\_tot\_Sen} < U_{fall\_max\_Sen}$

Note
At sensors with different tolerable voltage tolerance, the computation of the total voltage drop must be made for each individual sensor.

Result:

The voltage drop to the module A2_3 in the example (0.85V) is smaller than the maximum admissible voltage drop up to the module (A2_3) PDP67 F 8DI ION HP of 7.2V.
The voltage drop to the sensor S234 in the example (0.2V) is smaller than the maximum admissible voltage drop up to the sensor (S234) PSEN op4F…/1 of 4.8V.

3.1.2.2. Calculation of off-delay time

In series connection of multiple devices, the off-delay time is added by the number of intermediary devices.

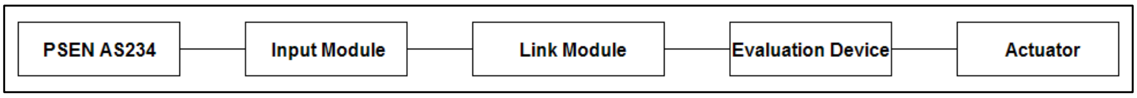


Fig. 4: Off-delay times

The calculation values can be taken from the respective Pilz operating manuals.

In the following example maximum values are used for the calculation of off-delay time.

Example: Actuation AS234

Sensor	**Off-delay time$_{(max)}$**	**Activator**	**Selection of time**	**Time accumulated**
PSEN op4F…/1 (AS234)	**29ms**	Input	**29ms**	29ms
PDP67 F 8DI ION HP (A2_3)	**1ms**	Input	**1ms**	30ms
PNOZ ml2p (A2)	**15ms**	Maximum input delay	**15ms**	45ms
PNOZ ml2p (A2)	**35ms**	Switch-off delay	**35ms**	80ms
PNOZ m3p (A1)	**-**	Program cycle time	**-**	-
PNOZ m3p (A1)	**30ms**	Semiconductor output	**30ms**	110ms
PMCprotego S2 (A3_1)	**2ms**	Input	**2ms**	112ms

Entire off-delay time$_{(max)}$ at actuation of sensor AS234 = 112ms + PNOZmulti Program cycle time

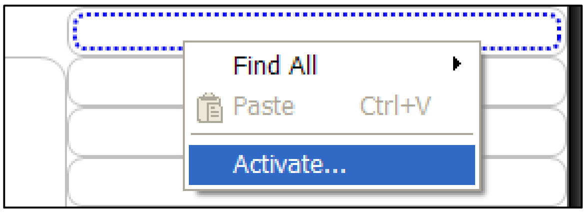
INFO
The processing time of 1.00 ms for decentralized input module PDP67 F 8DI ION applies when a signal changes from “1” to “0”.

3.1.2.3. Configuration of outputs in the PNOZmulti Configurator

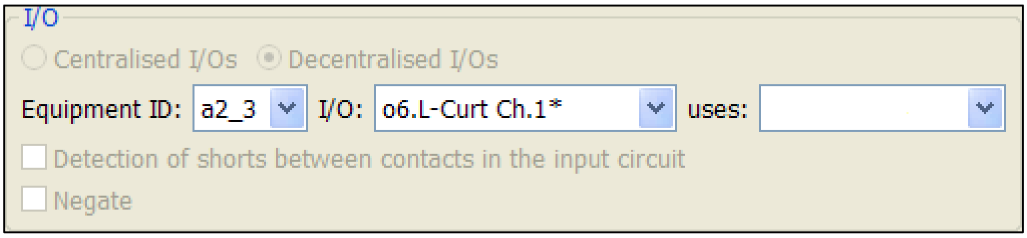
To connect sensors with OSSD outputs, the test pulse on the input circuit must be switched off. The voltage of the outputs is thereby also switched off.
To use the outputs for the supply voltage of the sensors anyway they can be configured as standard outputs or 24 VDC outputs in the system software's configurator.

Activation of 24V outputs in the Configurator

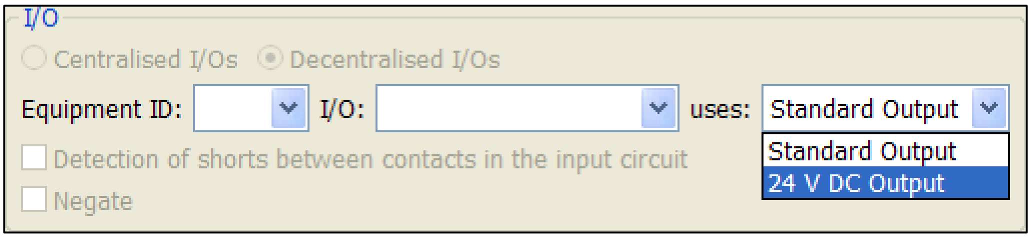
- Right click in the workspace “outputs” and choice “Activate …”.



- Choice of the (desired) output.



- Choice as a standard output or as a 24 VDC output.



Each output that is not reserved as test pulse output and which shall be used anyway, must be defined this way.

3.1.3. Safety assessment

- The circuit of PNOZ m3p (A1) is redundant with built-in self-monitoring.
- The safety function A1 remains effective in the case of a component failure.
- A fault on the PNOZmulti or the PMCprotego D and PMCprotego S2 combination does not lead to the loss of the safety function.
- The circuit of PNOZ ml2p (A2) is redundant with built-in self-monitoring.
- The safety function A2 remains effective in the case of a component failure.
- Communication of PDP67 F 8DI ION HP (A2_3) with the control system is via a safe data link. Data is exchanged cyclically.
- As the test pulses are permanently assigned to the inputs, all short circuits will be detected, with the exception of short circuits that short out the input device.

- The safety system (A1) should be installed in a control cabinet with a protection type of at least IP54.
- The PNOZmulti Mini and the PMCprotego D and PMCprotego S2 combination must be installed in the same mounting area in order to exclude a short circuit between 24 VDC and a safety input of the card.
- The safety system A2 should be installed in a control cabinet with a protection type of at least IP54.
- The expansion module PNOZ ml2p (A2) may only be connected to a base unit from the PNOZmulti modular safety system.
- A maximum of 4 link modules (PNOZ ml2p) can be connected to a PNOZmulti base unit.
- Do not connect terminators to the last expansion module (A2).
- A maximum of 4 decentralised modules (PDP67 F 8DI IOP or PDP67 F 8DI IOP HP) can be connected to a link module PNOZ ml2p.
- In order to guarantee protection type IP67, unused connectors at A2_3 (A2_1, A2_2) should be sealed using the blind plugs supplied.
- The safety light curtain PSEN op4F.../1 must be securely placed in a particular position so that access to the dangerous zone is not possible without the interruption of the beams
- If an operator completely (or even maybe partly) is able to access the dangerous area, a risk analysis should clarify whether an additional, separate “manual reset function” is required.

Caution
Structure, control and evaluation of the safe servo amplifier are not shown in this example. The detailed description of this functionality can be taken from the Application Note "AN_PMCprotegoDS_PSENcs_1002085-DE-xx".

3.2. Functional safety

The safety functions are exemplified by the shutdown of one dangerous machine movement (M1). Other hazards (machinery) in the operating area are not shown and considered in this example. In real applications, this part must be included in the safety review

3.2.1. Safety-related characteristics in accordance with EN ISO 13849-1

No.	Safety function	Achieved Performance Level	Safety-related parts of the control system
1	Machine shut down when the safety light curtain is interrupted.	PL d	Sensor (PSEN op4F…/1 AS233/AS234) Input (PDP67 F 8DI ION HP A2_3) Logic (PNOZ ml2p A2) Logic (PNOZ m3p A1) Output (PNOZ m3p A1) Actuator (PMCprotego S2 A3_1) {SS2}

Prerequisites:

No.	Description	Identification
1	Common cause failure (CCF):	Requirements are considered to be met (must be tested on implementation)
2	Mission time:	20 years

Please note the further requirements of EN ISO 13849-1, e.g. requirements for avoiding systematic faults.

3.2.2. Safety-related characteristics in accordance with EN 62061

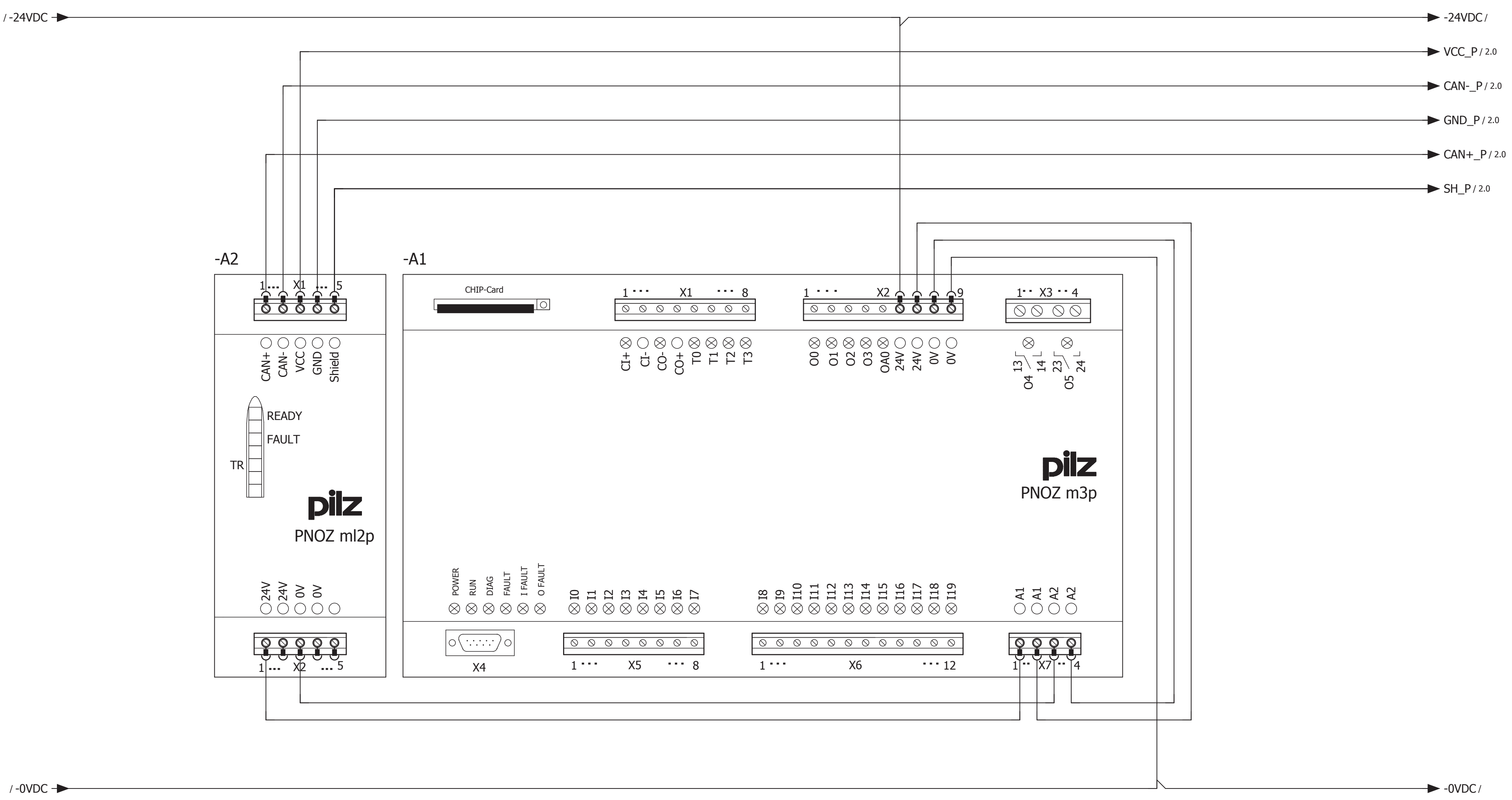
No.	Safety-related control function (SRCF):	Achieved Safety Integrity Level	Subsystems
1	Machine shut down when the safety light curtain is interrupted.	SIL 2	Sensor (PSEN op4F…/1 AS233/AS234) Input (PDP67 F 8DI ION HP A2_3) Logic (PNOZ ml2p A2) Logic (PNOZ m3p A1) Output (PNOZ m3p A1) Actuator (PMCprotego S2 A3_1) {SS2}

Prerequisites:

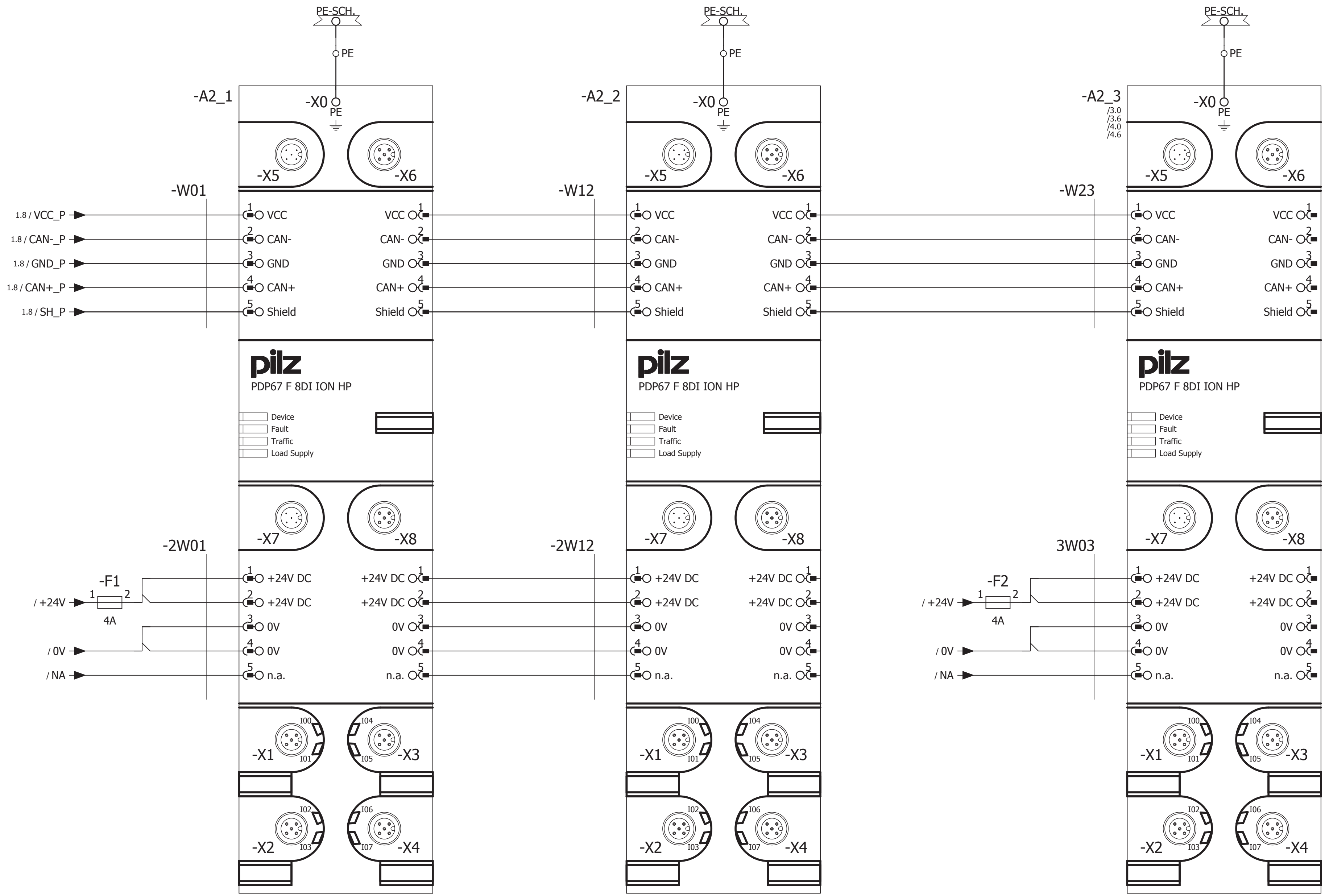
No.	Description	Identification
1	Common cause failure (CCF):	ß = 2 % (must be tested on implementation)
2	Proof test interval:	20 years

Please note the further requirements of EN 62061, e.g. requirements for systematic safety integrity.

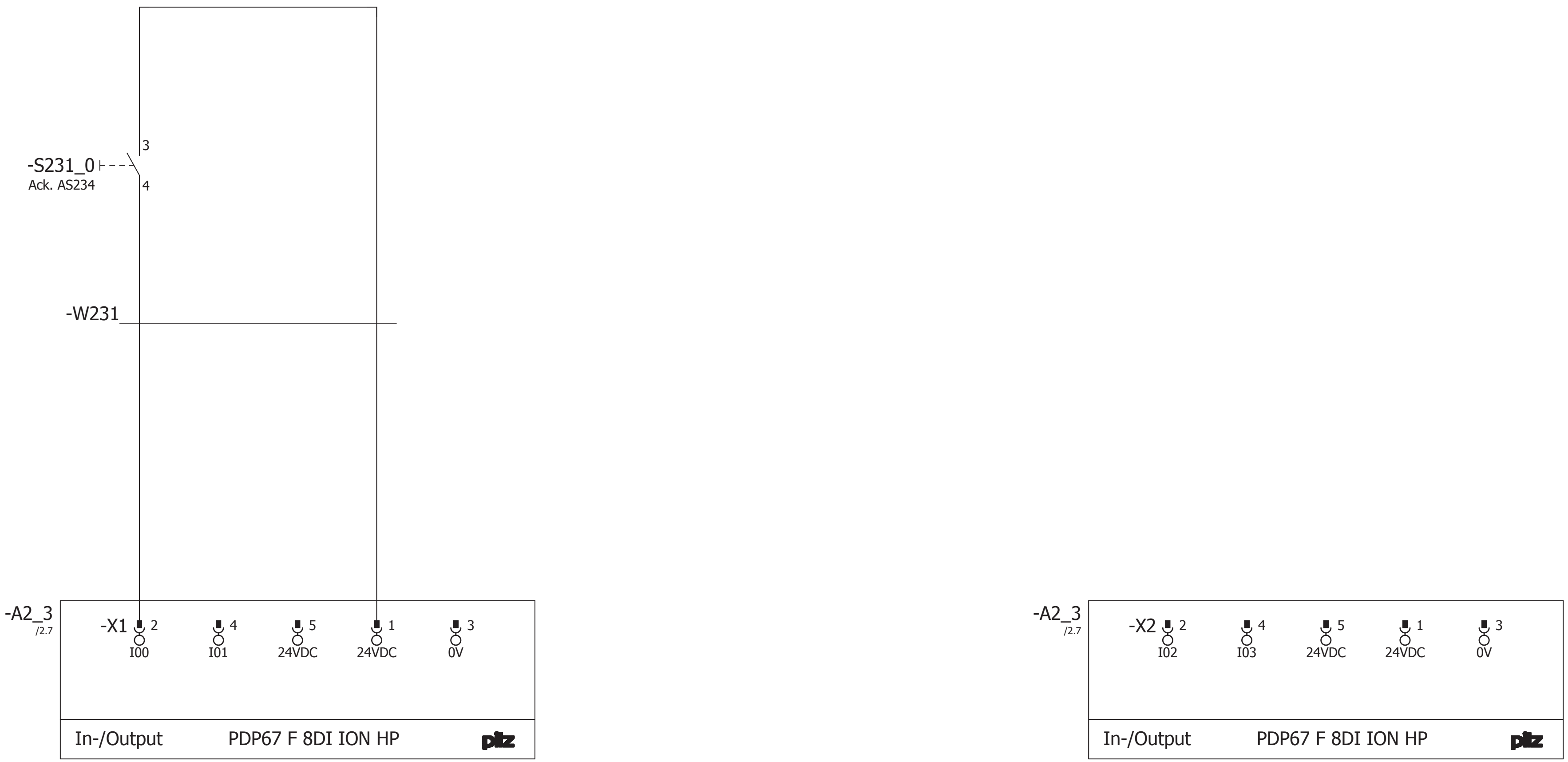
0	1	2	3	4	5	6	7	8	9



Revision	17.01.2013	Date	26.03.2012	EN ISO 13849-1:2006	PL d	Pilz GmbH & Co.KG Felix-Wankel-Str.2 73760 Ostfildern	PDP67 F 8DI ION HP	Mounting place + AN_1002541_01
Name	RDS	Name	RDS	EN 62061:2005	SIL 2		Control	Page: 1 / 5
		Dep.	CS					



Revision	17.01.2013	Date	26.03.2012	EN ISO 13849-1:2006	PL d	Pilz GmbH & Co.KG Felix-Wankel-Str.2 73760 Ostfildern	PDP67 F 8DI ION HP	Mounting place + AN_1002541_01
Name	RDS	Name	RDS					
				EN 62061:2005	SIL 2		Series Connection PDP67 F 8DI ION HP	Page: 2 / 5
		Dep.	CS					

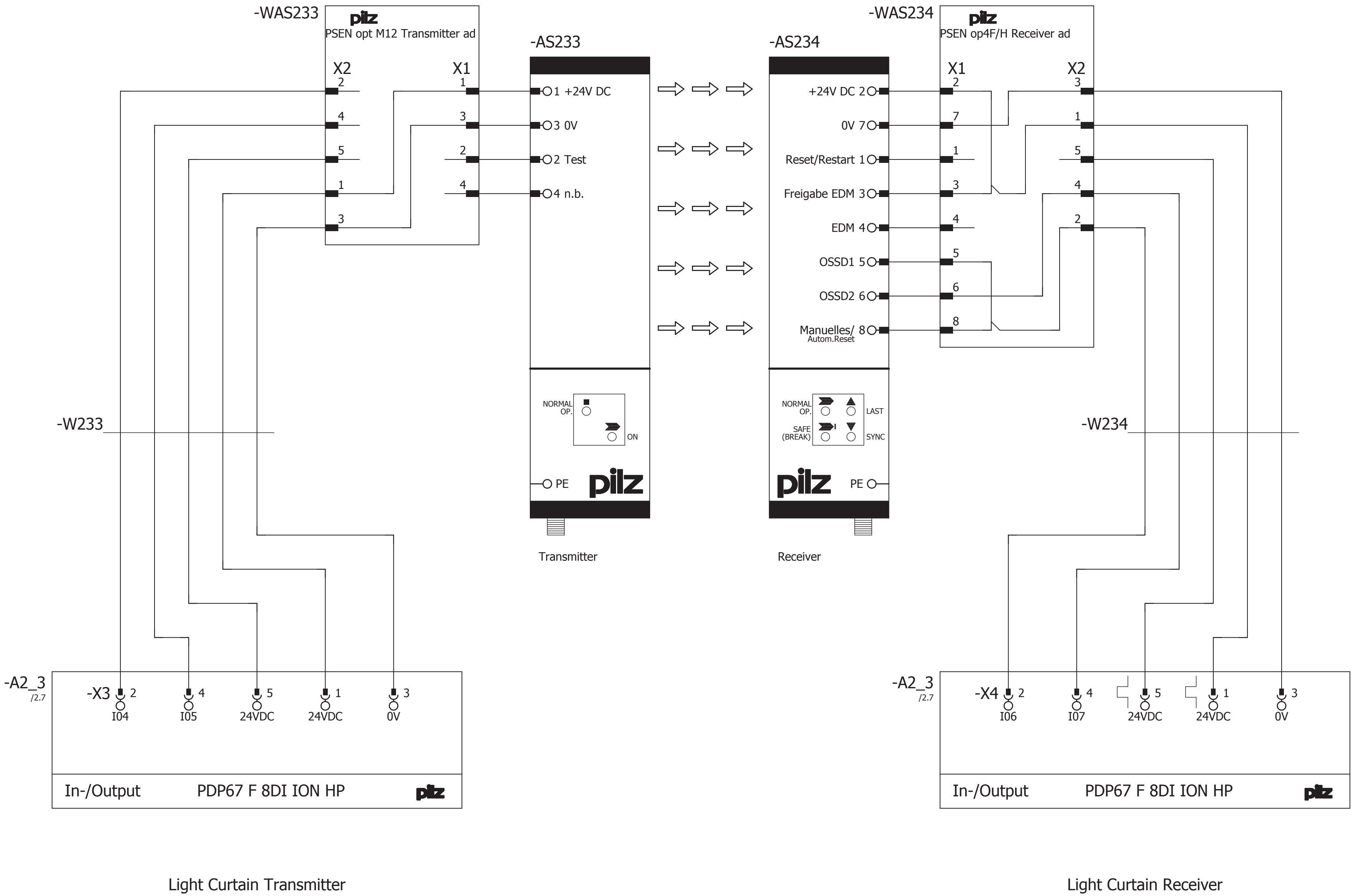


Acknowledge Light Curtain

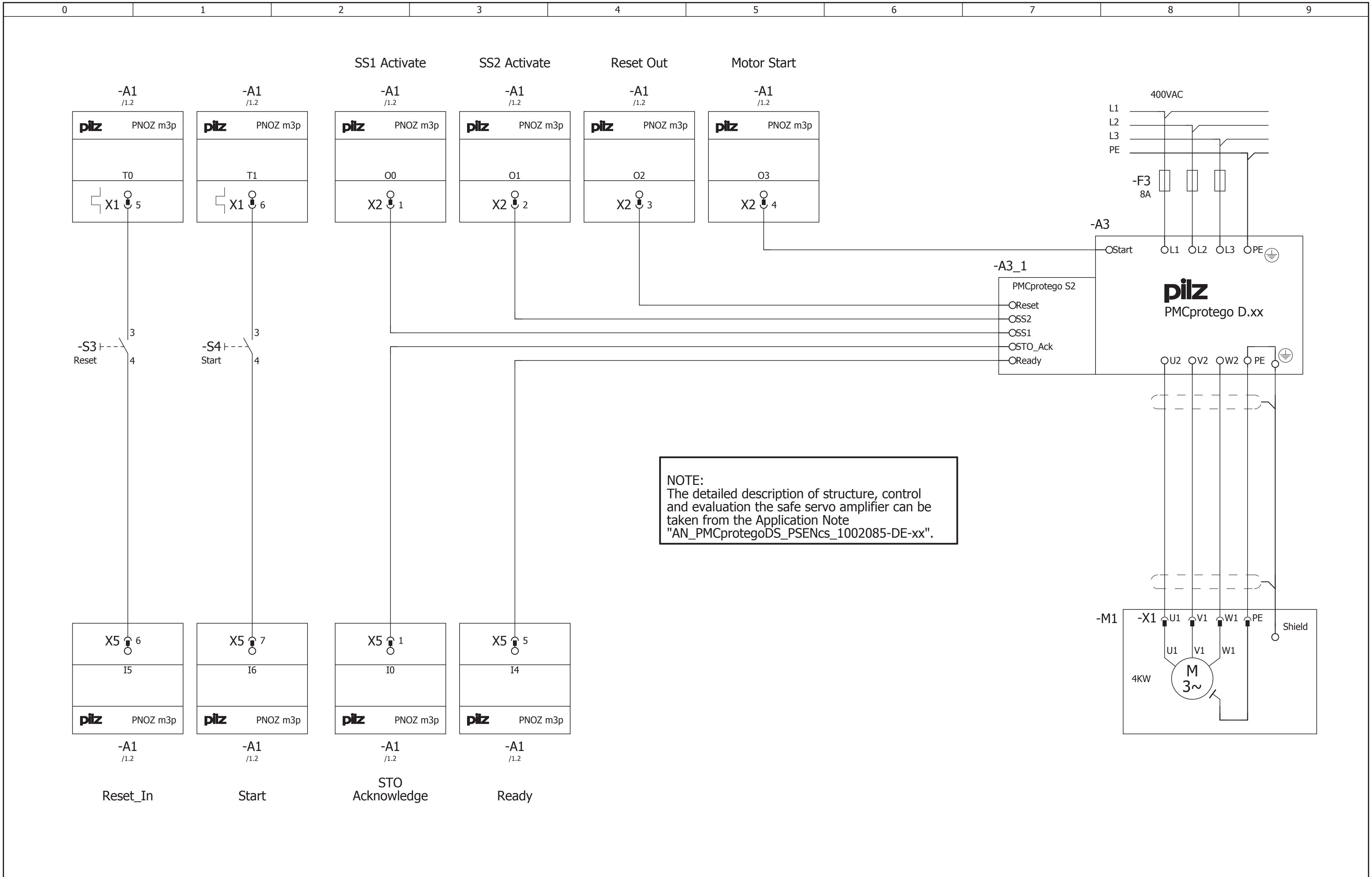
Spare

Revision	17.01.2013	Date	26.03.2012	EN ISO 13849-1:2006	PL d	Pilz GmbH & Co.KG Felix-Wankel-Str.2 73760 Ostfildern	PDP67 F 8DI ION HP	Mounting place + AN_1002541_01
Name	RDS	Name	RDS					
				EN 62061:2005	SIL 2		Input	Page: 3 / 5
		Dep.	CS					

0 1 2 3 4 5 6 7 8 9



Revision	17.01.2013	Date	26.03.2012	EN ISO 13849-1:2006 PL d	pilz	Pilz GmbH & Co.KG Felix-Wankel-Str.2 73760 Ostfildern	PDP67 F 8DI ION HP	Mounting place + AN_1002541_01
Name	RDS	Name	RDS	EN 62061:2005 SIL 2			Input - Single Adapter	Page: 4 / 5
		Dep.	CS					

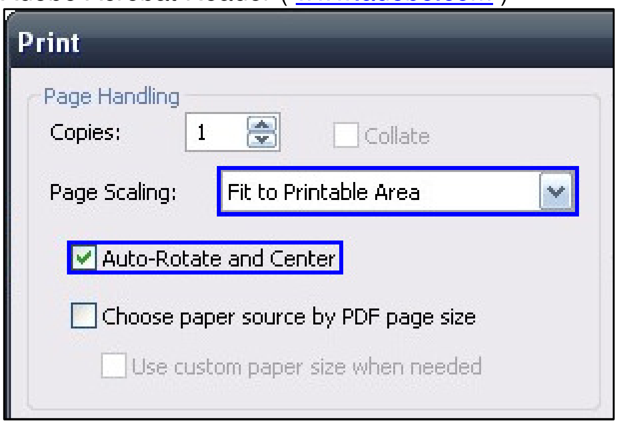


Revision	17.01.2013	Date	26.03.2012	EN ISO 13849-1:2006	PL d	Pilz GmbH & Co.KG Felix-Wankel-Str.2 73760 Ostfildern	PDP67 F 8DI ION HP	Mounting place + AN_1002541_01
Name	RDS	Name	RDS	EN 62061:2005	SIL 2		Drive Control	Page: 5 / 5
		Dep.	CS					

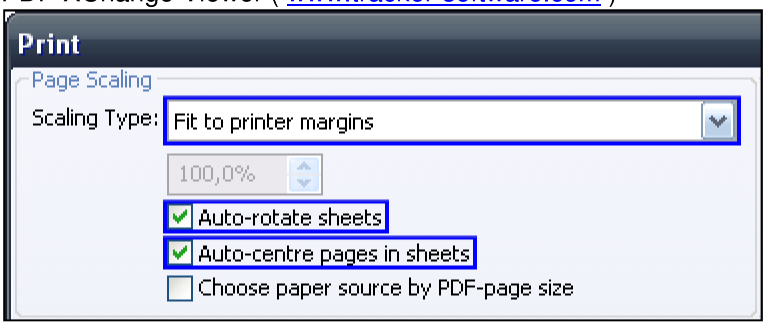
4. Table of figures

Recommended printer settings

Adobe Acrobat Reader (www.adobe.com)



PDF-XChange Viewer (www.tracker-software.com)



▸ ...

In many countries we are represented by our subsidiaries and sales partners.

Please refer to our homepage for further details or contact our headquarters.

▸ Technical support

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