myPNOZ:
Signal forwarding to another myPNOZ

PILZ
THE SPIRIT OF SAFETY

Product

Type:	Modular safety relay
Name:	myPNOZ
Manufacturer:	Pilz GmbH & Co. KG, Safe Automation

Document

Release Number:	02
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Document Revision History

Release	Date	Changes	Chapter
01	2021-04-29	Creation	all
02	2021-05-17	Adjustments for publication language	3.2

Validity of Application Note

This present Application Note is valid until a new version of the document is published.
This and other Application Notes can be downloaded in the latest version and for free from www.pilz.com. For a simple search, use our content document (1002400) or the direct search function in the download area.

The Pilz newsletter is free of charge and keeps you up-to-date on all the latest issues and trends in safe automation.

Exclusion of Liability

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We are grateful for any feedback on the contents.

May 2021

Industrial Security

To secure plants, systems, machines and networks against cyberthreats it is necessary to implement (and continuously maintain) an overall Industrial Security concept that is state of the art.
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	www.pilz.com > AN content (1002400)
PNOZ	Pilz E-STOP positive-guided (DE: **P**ilz **NO**T-AUS-**Z**wangsgeführt)	www.pilz.com > PNOZ
NC	**N**ormally **C**losed	
NO	**N**ormally **O**pen	
OSSD	**O**utput **S**witching **S**ignal **D**evice	
FU	**F**unctional **U**nit	
ES	**E**mergency **St**op	
SG	**S**afety **G**ate	
AL	**A**ssembly **L**ine	

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.

Contents

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
2	myPNOZ System Description	myPNOZ System Description-1005377-EN-xx.pdf
3	myPNOZ Getting started	myPNOZ Getting started-1005615-EN-xx.pdf
4	Operating Manual PSEN cs3.1n	Operating Manual PSEN cs3.1n_22172-EN-xx
5	Operating Manual PIT gb CLLE y	Operating Manual PIT gb_1004627-EN-xx

1.2 Documentation from other sources of information

No.	Description	Item No. / Download
1		
2		
3		
4		

2 Used hardware and software

2.1 Pilz products

No.	Descriptions	Order number	Version	Number
1	PNOZ yh1	2A000002	01	3
2	PNOZ yio2	2A000015	01	6
3	PNOZ yo1	2A000012	01	3
4	PSEN cs3.1n switch	541053	1.2	3
5	PSEN cs3.1 actuator	541080	1.0	3
6	PIT gb CLLE y	G1000002	1	3

2.2 Third-party products

No.	Descriptions	Order number	Version	Number
1	-			
2				
3				
4				

3 Application description

3.1 Description

Monitoring the functional safety of a multi-part production line with separate functional units (FU).

Each of the functional unit is safeguarded by an individual myPNOZ.
The individual functional units are designed identically based on the safety assessment.

CAUTION!

The safety functions are shown based on the switching-off of hazardous machine movements of functional unit 2, by way of example. The further hazards (functional units, lines) in the work area are not shown and examined further in this example. In a real application this part must be included in the safety assessment.

The functional units can be developed as separate modules, whereby an exchange of individual functional units can be performed, the standardised interface for the connection then has to be adapted to the relevant possible module requirements.

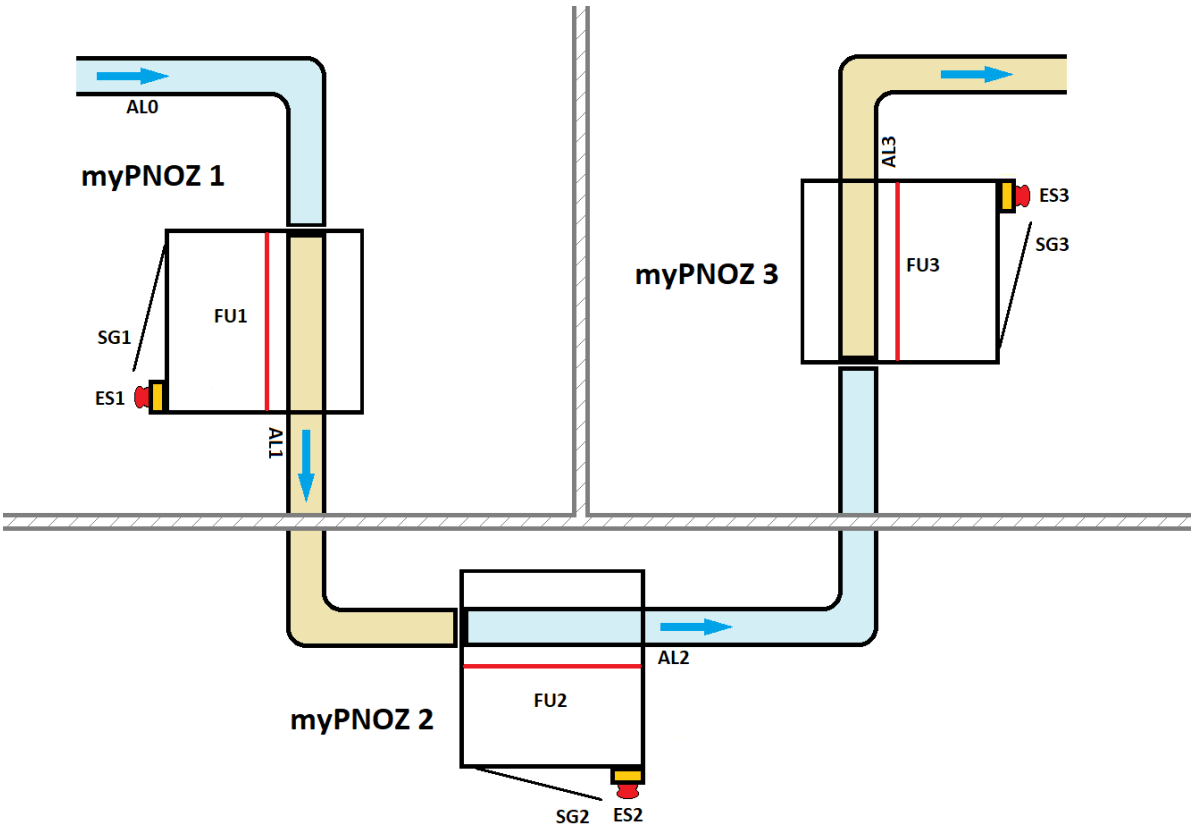


Figure 1: Overview of application

The functional units in this example are designed physically separate, therefore there is not direct visual contact to the other control panels and danger areas.

Safety gate
The safety gate switch (SG) of each functional unit is to stop the relevant functional unit.
The stop of an individual functional unit must not compromise the other functional units.

Example: A stop of the functional unit FU2 does not cause a change of processing in the functional units FU1 or FU3. Executions started in FU1 and FU3 can be completed, available raw materials can be processed and completed parts can be taken away.

The assembly line AL2 is not switched off by safety gate SG2, it is outside the area of intervention of safety gate SG2.

Emergency stop
The E-STOP (in the example ES2) of the individual functional unit is to stop the relevant functional unit and the related assembly line (in the example AL2).

E-STOP continuation, to stop the feeding assembly line (signal forwarding to another myPNOZ)
The driving of all the assembly lines running through the work area of the functional units must be stopped in case of an E-STOP operation (in the example AL1 and AL2). The feeding transport line AL1 of the previous functional unit FU1 is stopped for this. The feeding functional unit (FU1 in this case) can complete your current execution, but a continuing of the process is no longer possible because of the stopped assembly line (AL1 in this case).
The stop of the feeding line (AL1 in this case) is performed by forwarding the stop signal from the initiating unit (FU2/ES2) to the upstream unit (FU1), which will then stop the corresponding line (AL1).

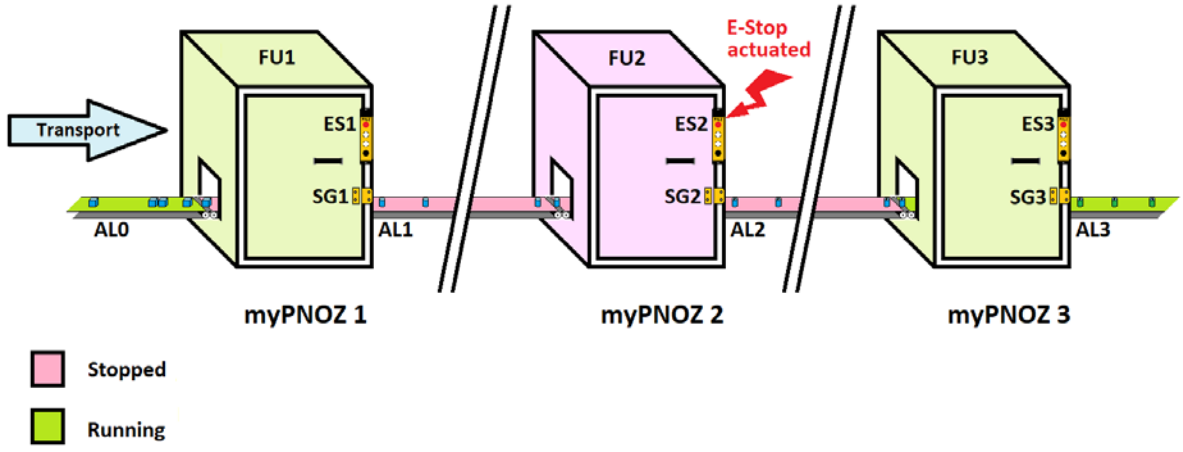


Figure 2: E-STOP continuation

CAUTION!

The cascading of several myPNOZ causes an extension of the reaction time in relation to the number of the connected myPNOZ systems.

3.2 Zone separation

To achieve an independent processing of individual monitoring zones you can create separate zones in myPNOZ.

Separating the inputs and outputs for the relevant zones is implemented by the plug-in sequence of the individual modules.
Upstream inputs have a direct effect on downstream outputs. A new zone is created when an output is added after an input. The global input function on the head module has an effect on the outputs of all the zones.

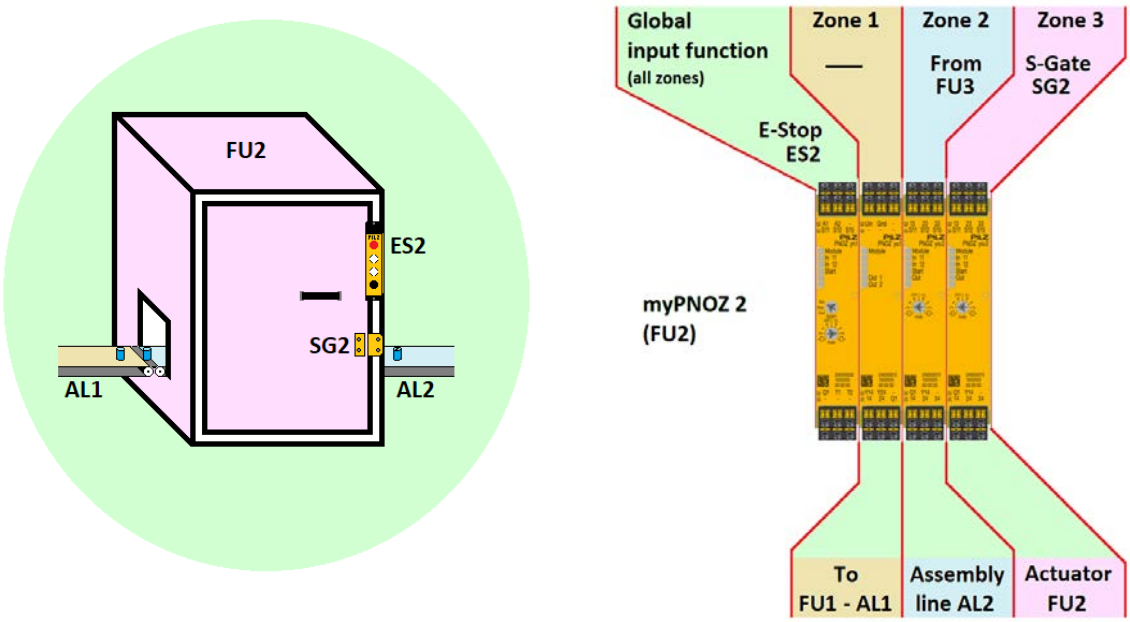


Figure 3: Zone separation

Zone 1
The assembly line AL1 of the functional unit FU1 that feeds the functional unit FU2 is stopped by zone 1 of the functional unit FU2 when:
- The E-STOP ES2 of the functional unit FU2 was triggered via the global safety input on the head module PNOZ yh1 (-A2) and thereby zone 1 of FU2 via their safety outputs triggers the input function of zone 2 of FU1.
  or
- The E-STOP ES1 of the functional unit FU1 was triggered via the global safety input on the head module PNOZ yh1 (-A1).

Zone 2
The assembly line AL2 of functional unit FU2 is stopped when:
- The E-STOP ES2 of functional unit FU2 was triggered via the global safety input on the head module PNOZ yh1 (-A2),
  or
- The E-STOP ES3 of the functional unit FU3 was triggered via the global safety input on the head module PNOZ yh1 (-A3) and thereby zone 1 of FU3 via their safety outputs triggers the input function of zone 2 of FU2.

Zone 3
The functional unit 2 is stopped when:
- The E-STOP ES2 of functional unit FU2 was triggered via the global safety input on the head module PNOZ yh1 (-A2),
  or
- The safety gate SG2 was triggered via the safety input of zone 3 on FU2 on the module PNOZ yio2 (-A2.3).

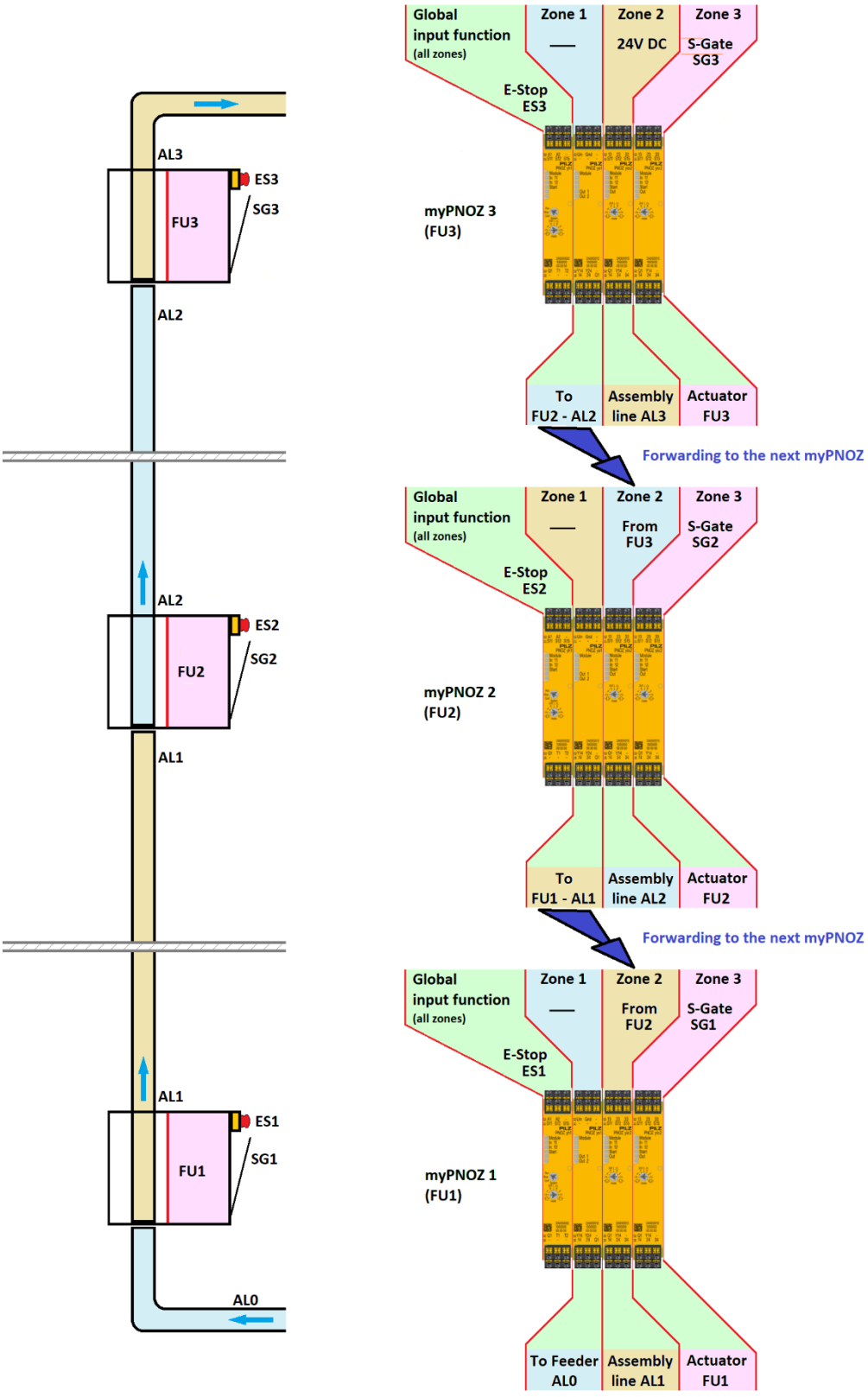


Figure 4: E-STOP continuation

INFORMATION

Further information on myPNOZ application logic and zones is available in the myPNOZ system description.

3.2.1 Safety gate monitoring

If the safety gate switch (SG2) is operated or if an error occurs, the outputs of the corresponding zone (zone 3) of myPNOZ is immediately reset. The enable output is also reset during STOP of myPNOZ.

The reset of the error depends on the start type set on the myPNOZ.
In this application example, parameters for the safety input are set in such a way that:
- During cold start (myPNOZ switched from off/on),
- During warm start (STOP-RUN transition of myPNOZ) or
- after closing the safety gate

A reset with a rising and falling edge (-A5-S2) must be performed on the input module so that the output is set again.

CAUTION!

Even if the safety gate is configured to reset itself, a myPNOZ cold start or closing of the safety gate may not directly enable a machine to start up without further conditions being met.

Input circuit safety gate safety assessment
- A short circuit between the OSSD outputs within a multicore cable is detected as an error by the PSEN cs.
- A short circuit between 24 V DC and an OSSD output is detected as an error by the PSEN cs.
- If the shutdown occurs via partial operation, switching on again the input function is possible only after both safety inputs have been operated simultaneously (partial operation lock).
- The time to the stop of the hazardous movement must be less than the access time to the danger zone.
- 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.

3.2.2 Monitoring E-STOP

When the E-STOP (ES2) is operated or an error occurs, the outputs of all the zones of myPNOZ are immediately reset. The enable outputs are also reset during the STOP of myPNOZ.

CAUTION!

The operated E-STOP only has an effect here on the relevant functional unit and the feeding assembly line. It must be ensured that the further operation of the upstream/downstream devices (functional units and/or assembly lines) does not present a hazard.

The reset of the error depends on the start type set on the myPNOZ.
In this application example, parameters for the safety input are set in such a way that:
- During cold start (myPNOZ switched from off/on),
- During warm start (STOP-RUN transition of myPNOZ) or
- After reactivation of the E-STOP pushbutton

A reset with a rising and falling edge (-A5-S2) must be performed at the input module so that the output is set again.

Safety assessment input circuit E-STOP
- Using the test pulse evaluation, myPNOZ detects a short circuit between the switching contacts within a multicore cable as an error.
- Using the test pulse evaluation, myPNOZ detects a short circuit between 24 V DC and a switching contact as an error.
- If the shutdown occurs via partial operation, reactivation of the input function is only possible after both safety inputs were operated simultaneously (partial operation lock).
- The highest safety category can only be achieved when the contacts of the E-STOP pushbuttons are supplied with test pulses and wired dual-channel.

Continued E-STOP to stop the feeding assembly line (signal forwarding to another myPNOZ)
Using FU2 as an example:
When the E-STOP (ES2) of the functional unit FU2 is operated or if an error occurs on myPNOZ 2, the outputs of zone 1 of myPNOZ 2 are reset immediately. The enable output is also reset during STOP of myPNOZ 2. This triggers the input of zone 2 of FU1 and the corresponding output of zone 2 of the FU1 switches off the assembly line AL1.

In this case, the functional unit (zone 3) of FU1 can end its execution, however, processing is functionally stopped afterwards by the lacking removal of material of the stopped transport line AL1.

The reset of the error depends on the start type set on the myPNOZ.
The safety input parameters for the continuing E-STOP are set so that:
- During cold start (myPNOZ switched from off/on),
- During warm start (STOP-RUN transition of myPNOZ) or
- After reactivation of the E-STOP pushbutton

a reset with a rising and falling edge (-A5-S2) must be performed at the input module so that the output is set again.

Safety assessment input circuit continued E-STOP

- Using the evaluation of switch-off tests, myPNOZ detects a short circuit between the semiconductor outputs within a multicore cable as an error.
- Using the evaluation of switch-off tests, myPNOZ detects a short circuit between 24 VDC and a semiconductor output as an error.

INFORMATION

For the last functional unit in the manufacturing process (in the example FU3) it is necessary to connect both terminals of the input for the E-STOP continuation (zone 2) to 24VDC.

3.2.3 Feedback loop monitoring

To monitor the contactors that are connected to the non-delayed and delayed outputs of a module, feedback loop contacts (N/C contacts) of these external contactors (KM21-KM24) can be connected to the myPNOZ feedback loop contacts.

The feedback loop input belonging to an output is on the relevant output module.
On semiconductor outputs the determination of whether output and feedback loop belong together is made through the identical numbering with a preceding "Y".

On relay outputs the corresponding feedback loop is marked with the terminal designation of the first switching contact and a preceding "Y".

The N/C contacts incorporated into the feedback loop must be closed before starting. If the N/C contact is open, the myPNOZ and therefore the connected plant or machine cannot be restarted.

Safety assessment feedback loop monitoring

- The feedback loop contacts must be installed in a common mounting area (control cabinet).
- To achieve a higher level of safety, 2 actuators must be used.
- The N/C contacts incorporated into the feedback loop must be closed before starting.
- A short circuit between 24 V DC and a safety output will be detected as an error by the safety controller. The load can be switched off via the second shutdown route.

CAUTION!

If feedback loop monitoring is not required, the feedback loop inputs must be connected to 24 V DC.

3.2.4 Diagnostics

The signal output Q1 of the relevant output and the head module can be connected to a controller, for example, for evaluation or used for the not safety-related control of a fast shutdown of a controlled drive combined with a delay at the safe outputs.

3.2.5 Safety assessment

- The circuit of myPNOZ is designed to be redundant with self-monitoring.
- The safety device remains effective also in case of a component failure.
- The relay contacts meet the requirements for protective separation by increased insulation compared with all other circuits in the safety system.
- Test pulse outputs must be used exclusively to test the inputs. They must not be used to drive loads.
- The safety outputs of the semiconductor modules are tested periodically using an off-test.
- Do not route the test pulse cables together with actuator cables within an unprotected multicore cable.
- To prevent EMC interferences (particularly common-mode interferences) the measures described in EN 60204-1 must be executed. This includes the separate routing of cables of the control circuits

(input, start and feedback loop) from other cables for energy transmission or the shielding of cables, for example.

- The safety relay myPNOZ and the controlled contactors KM must be installed in a common mounting area (control cabinet) to exclude a short across contacts at the output.
- When the relay outputs are switched on, the mechanical contact of the myPNOZ on the internal relay cannot be tested automatically. Depending on the operational environment, measures to detect the non-opening of switching elements may be required under some circumstances. When the product is used in accordance with the European Machinery Directive, a check must be carried out to ensure that the myPNOZ-internal safety contacts on the relay outputs open correctly. Start the device again or open the safety contacts (switch off output), so that the internal diagnostics can check the correct opening of the safety contacts
  - for SIL CL 3/PL e at least 1x per month
  - for SIL CL 2/PL d at least 1x per year

3.3 Functional safety

The safety functions are shown as an example using the functional unit 2.

3.3.1 Safety-related characteristics in accordance with EN ISO 13849-1

No.	Safety function	Performance Level	Safety-related parts of the control system
1	Switching off of a machine (FU2) when a safety gate (SG2) is open.	PL e	Sensor (PSEN cs3.1n -S2) Input (PNOZ yio2 -A2.3) Logic (PNOZ yh1 -A2) Output (PNOZ yio2 -A2.3) Actuator (contactors KM23, KM24}
2	Switching off a machine (FU2) using E-STOP (ES2).	PL e	Sensor (PIT gb – A5:S4) Input (PNOZ yh1 -A2) Logic (PNOZ yh1 -A2) Output (PNOZ yio2 -A2.3) Actuator (contactors KM23, KM24}
3	Switching off the assembly line (AL2) using E-STOP (ES2).	PL e	Sensor (PIT gb - A5:S4) Input (PNOZ yh1 -A2) Logic (PNOZ yh1 -A2) Output (PNOZ yio2 -A2.2) Actuator (contactors KM21, KM22}
4	Switching off the assembly line (AL1) using E-STOP (ES2).	PL e	Sensor (PIT gb - A5:S4) Input (PNOZ yh1 -A2) Logic (PNOZ yh1 -A2) Output (PNOZ yo1 -A2.1) Input (PNOZ yio2 -A1.2) Logic (PNOZ yh1 -A1) Output (PNOZ yio2 -A1.2) Actuator (contactors KM11, KM12}

No.	Description		Identification
1	Common cause failure (CCF):		The requirements are met (to be checked when implemented)
2	Mission time:		20 years
3	Operating interval (electromechanical components):	Sensor ES2	one operation per week
		Actuator KM21/22	22 operations per week
		Actuator KM23/24	one operation per week
		Actuator KM11/12	3 operations per week
4	Characteristic values of contactors KM21/KM22:	B10d	1,300,000
5	Characteristic values of contactors KM23/KM24:		
6:	Characteristic values of contactors KM11/KM12:		

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

3.3.2 Safety-related characteristics in accordance with EN 62061

No.	Safety-related control function (SRCF):	Safety Integrity Level	Subsystems
1	Switching off a machine (FU2) when a safety gate (SG2) is open.	SIL 3	Sensor (PSEN cs3.1n -S2) Input (PNOZ yio2 -A2.3) Logic (PNOZ yh1 -A2) Output (PNOZ yio2 -A2.3) Actuator (contactors KM23, KM24}
2	Switching off a machine (FU2) using E-STOP (ES2).	SIL 3	Sensor (PIT gb – A5:S4) Input (PNOZ yh1 -A2) Logic (PNOZ yh1 -A2) Output (PNOZ yio2 -A2.3) Actuator (contactors KM23, KM24}
3	Switching off the assembly line (AL2) using E-STOP (ES2).	SIL 3	Sensor (PIT gb - A5:S4) Input (PNOZ yh1 -A2) Logic (PNOZ yh1 -A2) Output (PNOZ yio2 -A2.2) Actuator (contactors KM21, KM22}
4	Switching off the assembly line (AL1) using E-STOP (ES2).	SIL 3	Sensor (PIT gb - A5:S4) Input (PNOZ yh1 -A2) Logic (PNOZ yh1 -A2) Output (PNOZ yo1 -A2.1) Input (PNOZ yio2 -A1.2) Logic (PNOZ yh1 -A1) Output (PNOZ yio2 -A1.2) Actuator (contactors KM11, KM12}

No.	Description		Identification
1	Common cause failure (CCF):		ß = 2 % (must be tested on implementation)
2	Proof test interval:		20 years
3	Operating interval (electromechanical components):	Sensor ES2 - EStop	one operation per week
		Actuator KM21/22	22 operations per week
		Actuator KM23/24	one operation per week
		Actuator KM11/12	3 operations per week
4	Characteristic values of contactors KM21/KM22:	B10d	1,300,000
5	Characteristic values of contactors KM23/KM24:		
6	Characteristic values of contactors KM11/KM12:		

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

4 Hardware configuration

4.1 Employed hardware

In the example the individual functional units have an identical structure. myPNOZ can adapt flexibly through its modular design so that the individual functional units can also be expanded with additional input functions in each zone or with further zones.

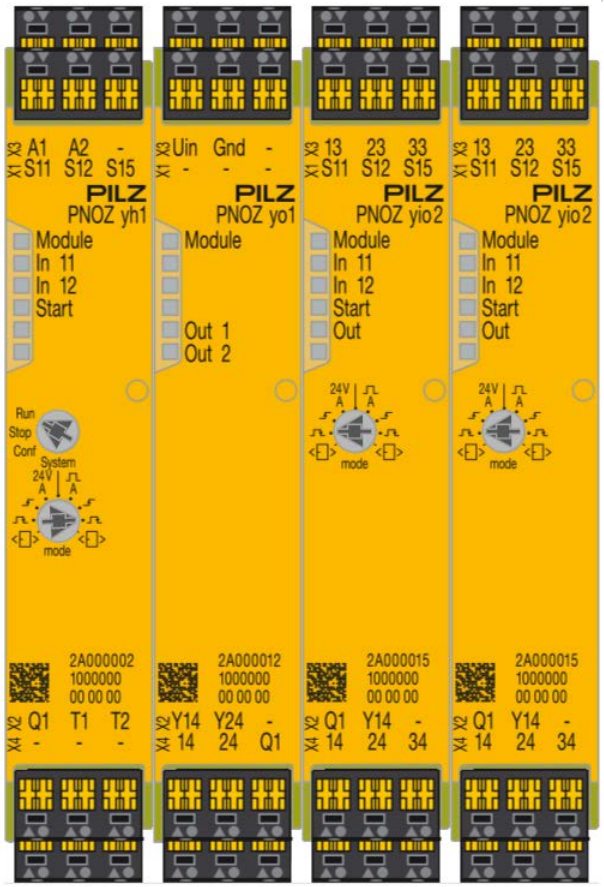


Figure 5: myPNOZ system design

INFORMATION

For further information on myPNOZ Hardware configuration and saving the configuration please refer to the myPNOZ system description.

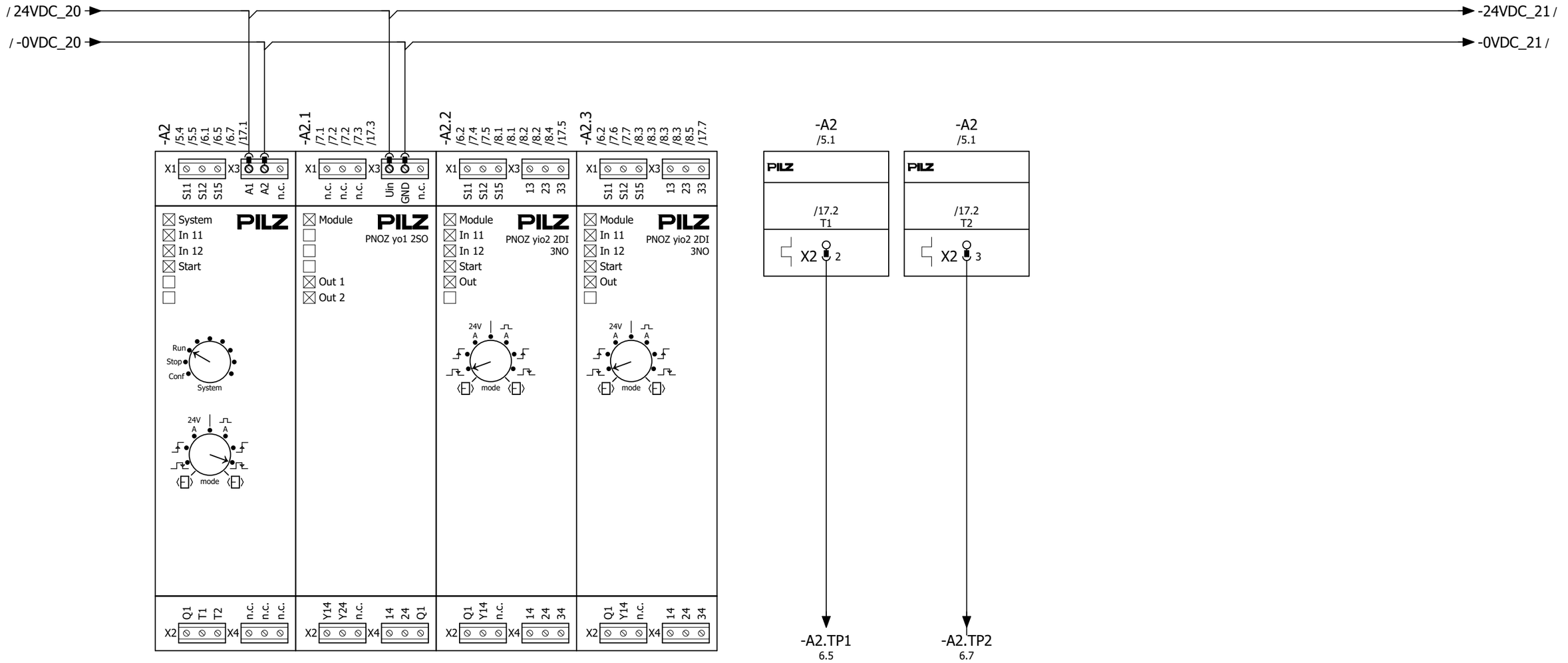
5 Configure myPNOZ using myPNOZ Creator

The web application myPNOZ Creator enables the configuration to be carried out based on a logic plan or through the combination of the individual modules. Based on this system configuration, the web application automatically assembles an individual myPNOZ.
It selects the required modules, defines the sequence and defines the position of the rotary switches. The result is a pre-configured myPNOZ, which can be ordered directly.

This document does not analyse in detail the description of myPNOZ Creator.

You can display the configuration of a functional unit from this example in myPNOZ Creator using the following configuration link.

myPNOZ Creator – configuration link
https://www.pilz.com/mypnoz-creator?product=8Z000002&typeKey=myPNOZ.28.CKA380AB000XD200XD200&documentID=J3R4NOXzRzaC65XsD7xJgA



Testpulse 1 Testpulse 2

Revision	29.03.2021	Date	02.03.2021	EN ISO 13849-1	PL e	myPNOZ 2	Mounting place + AN_MYPNOZ_01
Name	Pilz	Name	Pilz				
				EN 62061	SIL 3		Page: 5 / 15
		Dep.	CS				

Pilz GmbH & Co. KG
Felix-Wankel-Strasse 2
D-73760 Ostfildern

/ 24VDC_22 ▶
/ -0VDC_22 ▶
▶ -24VDC_23 /
▶ -0VDC_23 /

-A5
PILZ
PIT gb CLLE y

X1 6
10
2 0V

S2 Drucktaster 1
H2
S3 Drucktaster 2
H3
S4.1 Not-Halt
S4.2
S4.3

X1 +24V 1
n.c. 11
4
8
7
3
5
9
12

-START_M2
-A2.TP1 5.5
-A2.TP2 5.6

X1 3 | S15 /17.2 | PILZ | -A2 /5.1 | Start ES2
X1 3 | S15 /17.6 | PILZ PNOZ yio2 2DI 3NO | -A2.2 /5.2 | Start Fwd
X1 3 | S15 /17.8 | PILZ PNOZ yio2 2DI 3NO | -A2.3 /5.3 | Start SG2
Start Machine 2
X1 1 | S11 /17.2 | PILZ | -A2 /5.1 | Test Pulse 1 | ES2 Input1
X1 2 | S12 /17.2 | PILZ | -A2 /5.1 | Test Pulse 2 | ES2 Input2

Revision	29.03.2021	Date	02.03.2021	EN ISO 13849-1 PL e	Pilz GmbH & Co. KG Felix-Wankel-Strasse 2 D-73760 Ostfildern	Emergency Stop 2	Mounting place + AN_MYPNOZ_01
Name	Pilz	Name	Pilz				
				EN 62061 SIL 3			Page: 6 / 15
		Dep.	CS				

/ 24VDC_21 ➔
/ -0VDC_21 ➔
➔ -24VDC_22 /
➔ -0VDC_22 /

-A2.1
/5.2

PILZ PNOZ yo1 2SO
/17.4
14
X4 1

-A2.1
/5.2

PILZ PNOZ yo1 2SO
/17.4
24
X4 2

-X21 1 2 3

/ 0V21_TO_0V11
/ ES2_TO_AL1_1
/ ES2_TO_AL1_2

Interface previous unit (FU1)

Interface following unit (FU3)

11.1 0V31_TO_0V21
11.1 ES3_TO_AL2_1
11.2 ES3_TO_AL2_2

-X23 1 2 3

TRANSPONDER

-S2
1 A1
5 n.c.
Power/Fault
Safety Gate
Input
PSENcs 3.1n
1 switch 1 Uni
t
12 2
22 4
A2 3

X2 1
Y14
/17.4
PILZ PNOZ yo1 2SO
-A2.1
/5.2

X2 2
Y24
/17.4
PILZ PNOZ yo1 2SO
-A2.1
/5.2

X1 1
S11
/17.6
PILZ PNOZ yio2 2DI 3NO
-A2.2
/5.2

X1 2
S12
/17.6
PILZ PNOZ yio2 2DI 3NO
-A2.2
/5.2

X1 1
S11
/17.8
PILZ PNOZ yio2 2DI 3NO
-A2.3
/5.3

X1 2
S12
/17.8
PILZ PNOZ yio2 2DI 3NO
-A2.3
/5.3

Fwd to FU1 Output 1
Fwd to FU1 Output 2
FBL Fwd to FU1 - not used -
FBL Fwd to FU1 - not used -
Fwd from FU3 Input 1
Fwd from FU3 Input 2
SG2 Input1
SG2 Input2

Revision	29.03.2021	Date	02.03.2021	EN ISO 13849-1	PL e	Pilz GmbH & Co. KG Felix-Wankel-Strasse 2 D-73760 Ostfildern	Safety Gate 2	Mounting place + AN_MYPNOZ_01
Name	Pilz	Name	Pilz					
				EN 62061	SIL 3			Page: 7 / 15
		Dep.	CS					

/ -L1_2
/ -L2_2
/ -L3_2
/ -PE_2
/ -N_2
/ -24VDC_23
/ -0VDC_23

-L1_23 /
-L2_23 /
-L3_23 /
-PE_23 /
-N_23 /
-24VDC_23 /
-0VDC_23 /

-F21 6A
-F22 6A
-F23 6A
-F24 6A

X3 1 — 13 /17.6 — PILZ PNOZ yio2 2DI 3NO — -A2.2 /5.2
X3 2 — 23 /17.6 — PILZ PNOZ yio2 2DI 3NO — -A2.2 /5.2
X3 1 — 13 /17.8 — PILZ PNOZ yio2 2DI 3NO — -A2.3 /5.3
X3 2 — 23 /17.8 — PILZ PNOZ yio2 2DI 3NO — -A2.3 /5.3

-A2.2 /5.2 — PILZ PNOZ yio2 2DI 3NO — /17.6 14 — X4 1
-A2.2 /5.2 — PILZ PNOZ yio2 2DI 3NO — /17.6 24 — X4 2
-A2.3 /5.3 — PILZ PNOZ yio2 2DI 3NO — /17.8 14 — X4 1
-A2.3 /5.3 — PILZ PNOZ yio2 2DI 3NO — /17.8 24 — X4 2

-KM21 A1 A2
-KM22 A1 A2
-KM23 A1 A2
-KM24 A1 A2

-KM21 /8.1 — 11 / 12
-KM22 /8.2 — 11 / 12
-KM23 /8.3 — 11 / 12
-KM24 /8.4 — 11 / 12

X2 2 — Y14 /17.6 — PILZ PNOZ yio2 2DI 3NO — -A2.2 /5.2
X2 2 — Y14 /17.8 — PILZ PNOZ yio2 2DI 3NO — -A2.3 /5.3

-Q3 — 1 3 5 / I> I> I> / 2 4 6
-Q4 — 1 3 5 / I> I> I> / 2 4 6

-KM21 /8.1 — 1 3 5 / 2 4 6
-KM22 /8.2 — 1 3 5 / 2 4 6
-KM23 /8.3 — 1 3 5 / 2 4 6
-KM24 /8.4 — 1 3 5 / 2 4 6

-Q9 — 1 3 5 / 2 4 6 — U1 V1 W1 — -M3 M 3~ — PE
-Q10 — 1 3 5 / 2 4 6 — U1 V1 W1 — -M4 M 3~ — PE

1 2 /8.6
3 4 /8.7
5 6 /8.7
11 12 /8.5
AL2

1 2 /8.6
3 4 /8.7
5 6 /8.7
11 12 /8.5
AL2

1 2 /8.8
3 4 /8.8
5 6 /8.8
11 12 /8.6
FU2

1 2 /8.8
3 4 /8.8
5 6 /8.8
11 12 /8.6
FU2

FBL AL2

FBL FU2

AL2

FU2

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				EN 62061	SIL 3		Page: 8 / 15
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