Modular safety relay myPNOZ

PILZ
THE SPIRIT OF SAFETY

Your new safety relay
Individual, tailor-made, easy

May 2021

myPNOZ®
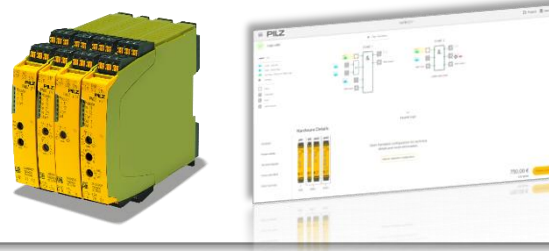create your safety

You create — Individual
We build — Tailor-made
You install — Easy

Overview of contents

Product overview

Details

Order process & benefits

You install — Easy
We build — Tailor-made
You create — Individual
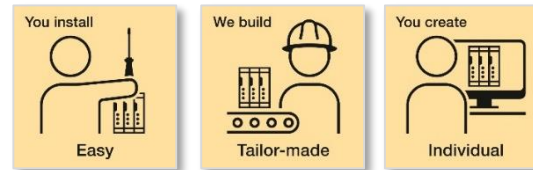
Details

Application examples
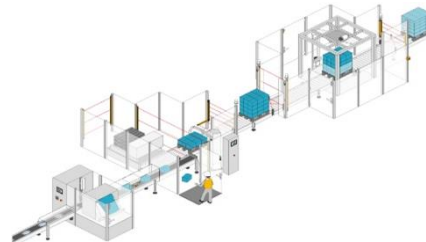
Details

Modules & accessories

Details

Complexity & $

Multiple, selectable safety functions and logic connections

Numerous configurable safety functions, logic connections and software function blocks

Single safety functions

PNOZmulti 2

myPNOZ

PNOZsigma

PNOZ X

PNOZcompact

Software diagnostics & fieldbus / Network connectivity

Simple LED diagnostics & digital output

Configurable small controller
Software configurable

Modular safety relay
Hardware configurable

1

Safety relays

16

96

Number of safety functions

▶ Product overview
At a glance

PILZ
THE SPIRIT OF SAFETY

### myPNOZ

myPNOZ Creator

Intended use:

▸ Monitoring of safety functions such as E-STOP, safety gates, light curtains, Type IIIA/C two-hand, enabling switches up to PL e (EN ISO 13849-1) and SIL CL 3 (IEC 62061)

▸ Small to medium-sized applications of low to medium complexity for monitoring from 2 to 16 safe input functions

Fundamentals:

▸ Easy-to-operate, flexible, modular safety relay with internal combinational logic

▸ Easy-to-operate myPNOZ Creator with logic editor, simulation and documentation

▸ 'Only pay for what you need': Modules can be assembled individually

▸ The customer receives a product that's assembled, set-up and tested individually, ready for commissioning

▸ No software necessary (programming or configuration)
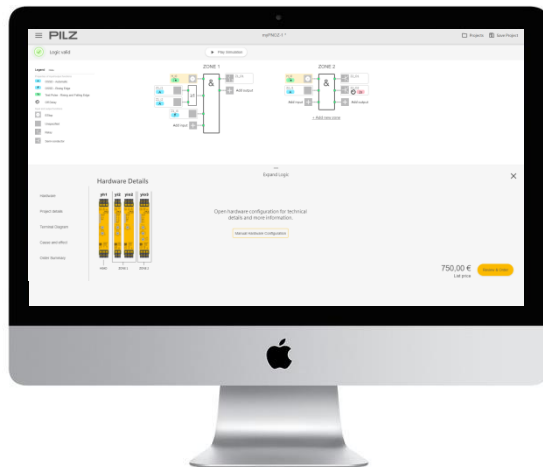
Features:

▸ Modular relay consisting of a head module and at least one but maximum eight expansion modules (any combination from 12 available expansion modules)

▸ The system logic is defined by the module type and plug-in sequence

▸ Modules are connected via a BUS connector – no wiring needed between modules

▸ It is possible to create independent safety circuits (zones) within a myPNOZ system

▸ Two safety inputs per input module, each 2-channel (1-channel use possible)

▸ Output modules either with safe relay or semiconductor outputs and with or without time delay

▸ Enables safety inputs to be AND / OR linked

▸ Diagnostics via LEDs per module and safety function

myPNOZ modules

Head module

yh1

Input/output modules

yio1 yio2 yio3 yio4

Input modules
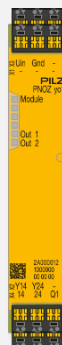

yi1 yi2 yi3 yi4

Output modules

yo1 yo2 yo3 yo4

▶ **Head module – 17.5mm**
  ▸ 24 VDC voltage supply to supply up to eight expansion modules
  ▸ Integrated higher-level safe input function (ie. E-STOP)

▶ **Input modules (4 module types) – 12.5mm**
  ▸ Monitoring of two AND/OR-linked safe input functions
  ▸ Monitoring of Type IIIA or IIIC two-hand control relays plus one AND-connected safe input function

▶ **Output modules (4 module types) – 17.5mm**
  ▸ Safe Relay or safe semiconductor outputs
  ▸ Versions with time delay available (on/off delay)

▶ **Input/output modules (4 module types) – 17.5mm**
  ▸ Monitoring of one safe input function
  ▸ Safe Relay or safe semiconductor outputs
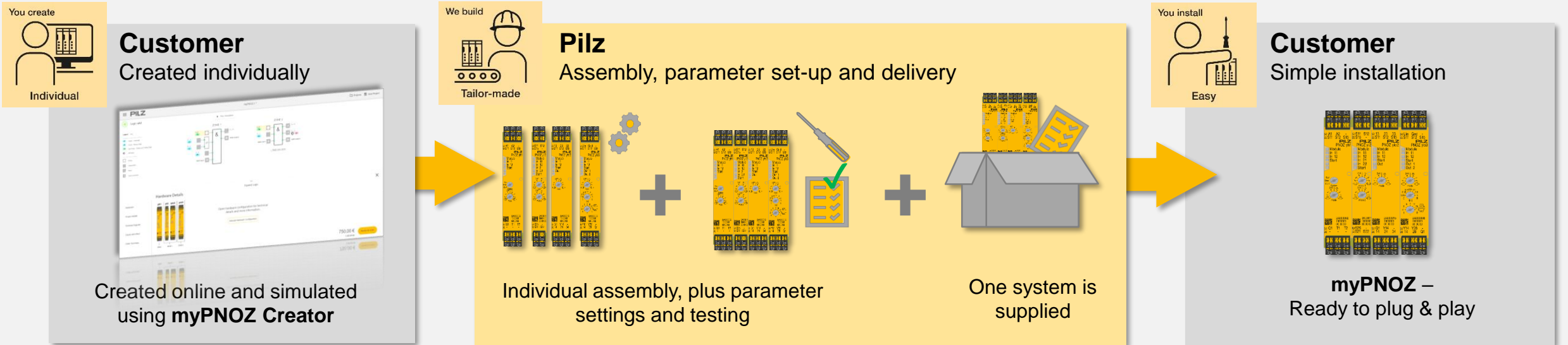 ▸ Versions with time delay available (on/off delay)

'Rules' for implementation and operation of myPNOZ

▶ Each myPNOZ consists of a head module and at least one additional expansion module. Up to eight expansion modules are possible; at least the last module must contain an output

▶ The head module contains the voltage supply as well as a global safety input function GSF

▶ All input modules are AND-connected to the global safety input function GSF; each input influences the next output module

▶ Each input module can monitor two safe input functions

▶ Outputs can be expanded using additional output modules

▶ If an input module follows an output module, a new zone is formed as a result

▶ The safety functions of an internal OR-connected input module are always AND-connected to other safe input functions in the zone

▶ The start type, test pulses and the output delay time are configured using the rotary switches on each device. No software is needed.

▶ The expansion modules are plugged into the right-hand side of the head module and are connected via a BUS connector.

▶ Individual modules can be exchanged without having to remove adjacent modules or the BUS connector.

Order process & benefits
Order process myPNOZ Creator

Ordering with the myPNOZ Creator

You create — Individual

Customer
Created individually

Created online and simulated
using **myPNOZ Creator**

We build — Tailor-made

Pilz
Assembly, parameter set-up and delivery

Individual assembly, plus parameter
settings and testing

One system is
supplied

You install — Easy

Customer
Simple installation

myPNOZ –
Ready to plug & play

▶ Order process & benefits
You create: Individually with the myPNOZ Creator (www.myPNOZ.com/Creator)

PILZ
THE SPIRIT OF SAFETY

Creation of logic & hardware

- Individual application easy to create via logic editor
- Hardware view of the created logic
- Connection diagram as wiring guide

Simulation & validation
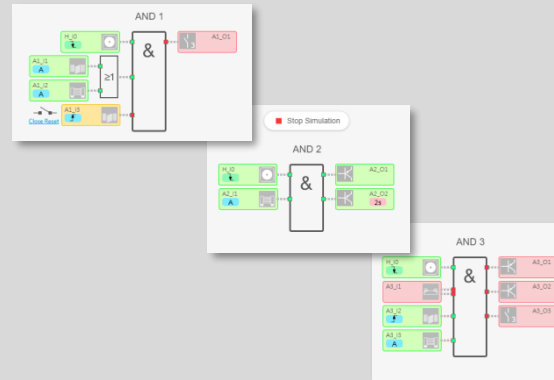
- Logic function is simulated
- Individual type code enables you to order and to retrieve the product
- Save and share created products
- Overview of modules and item numbers
- Shutdown matrix to verify the safety design

Basket & documentation
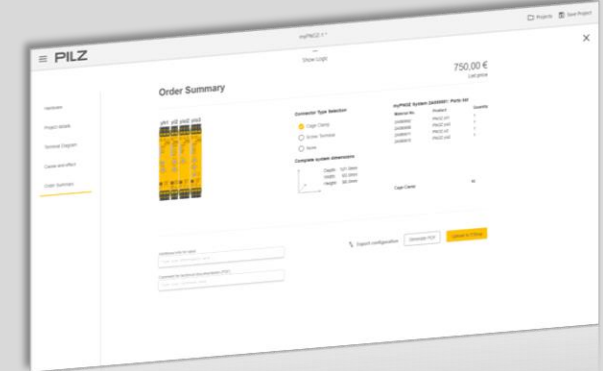
- Transfer to E-Shop and order in just a few clicks
- Order a product that's pre-assembled, set-up and tested
- Full documentation in a PDF file, incl. wiring, logic, hardware, summary etc.
- For safety inspection and documentation

Order process & benefits
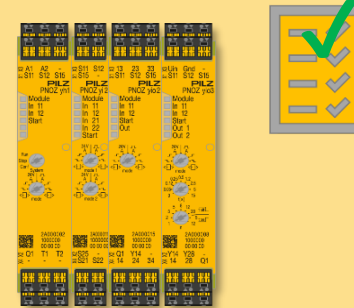## We build: Tailor-made by Pilz

Assembly
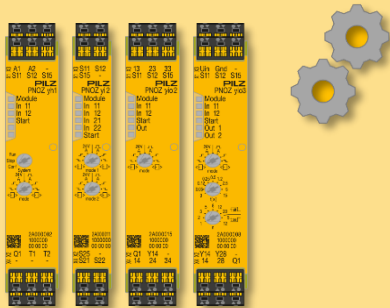
- myPNOZ is pre-assembled as an individual order
- You receive a product that's been tailor-made for you
- No "unnecessary" functions –only pay for what you need
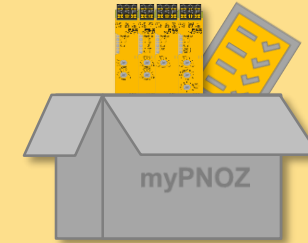
Parameter setting
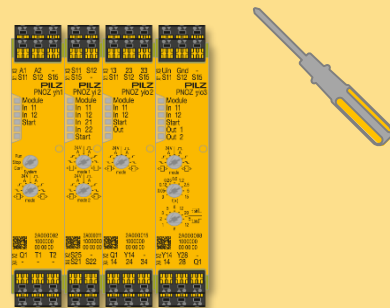
- Settings such as start type, test pulses or output delay time are pre-assigned in accordance with your specifications

Test

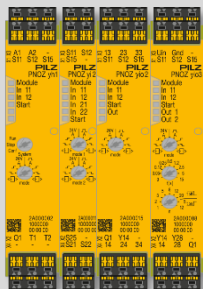- myPNOZ doesn't leave production until it has completed a final system test

Delivery

- What you get is a "ready for play" pre-assembled safety relay
- Extensive documentation for your myPNOZ
- Sustainable - saves on packaging waste
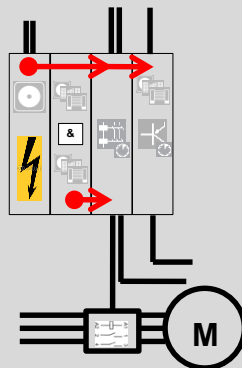
Order process & benefits
You install: Fast, simple installation

PILZ
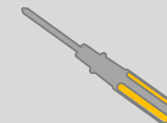THE SPIRIT OF SAFETY

Pre-assembled

- Doesn't need to be assembled by your staff
- One delivery package rather than individually packaged safety relays
- Immediately ready for commissioning

Little wiring

- Wiring work is greatly reduced as:
  - Voltage supplied via head module
  - Modules connected via BUS connector
- Simple to expand or exchange modules

No software

- No software for commissioning, no updates, no licence fees
- Settings can be changed simply using a screwdriver
- Low complexity means little expertise is required
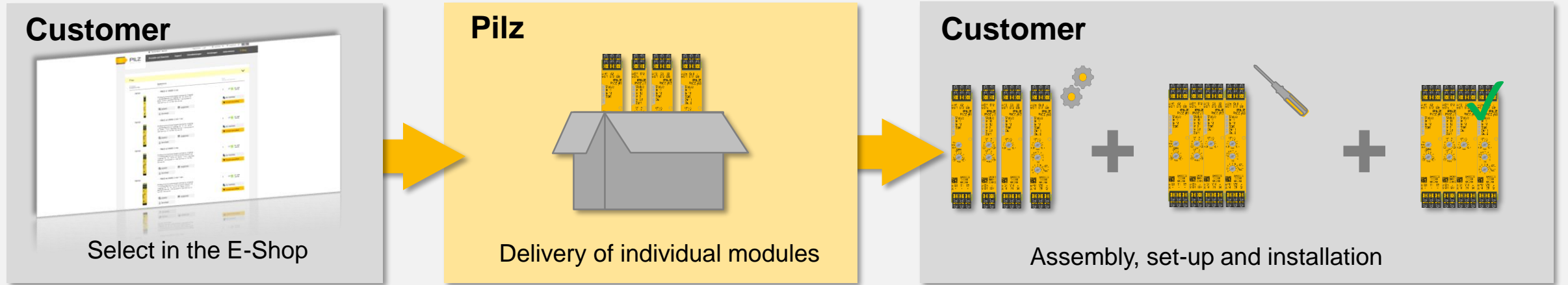
Reduced space requirement
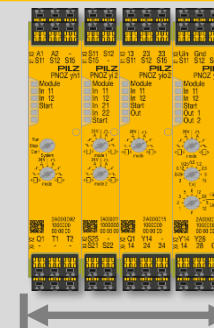
- Low number of modules needed:
  - 2 input functions per input module
  - 1 input function per I/O module
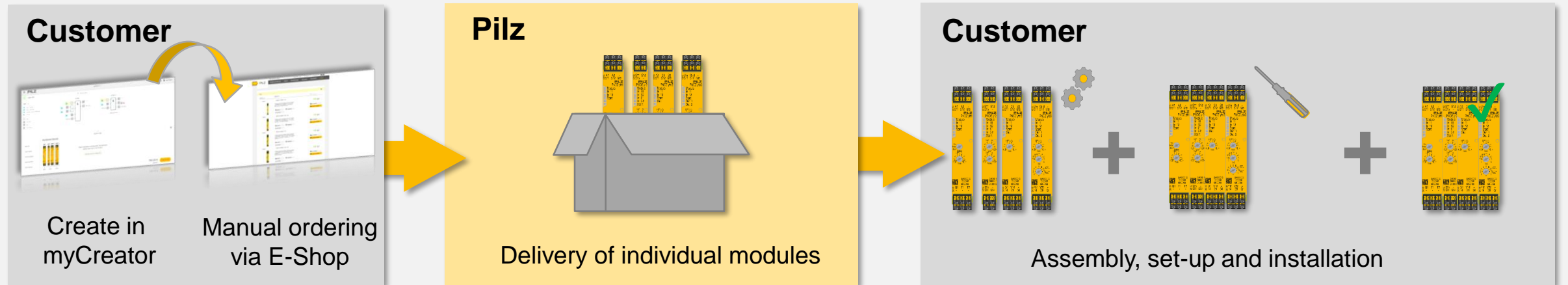- Narrow housing widths of 12.5 or 17.5mm

Order process & benefits
Alternative: Ordering individual myPNOZ modules

Ordering in the E-Shop without myPNOZ Creator

Customer	Pilz	Customer
Select in the E-Shop	Delivery of individual modules	Assembly, set-up and installation

Ordering in the E-Shop with myPNOZ Creator

Customer	Pilz	Customer
Create in myCreator — Manual ordering via E-Shop	Delivery of individual modules	Assembly, set-up and installation

▶ Benefits at a glance

PILZ
THE SPIRIT OF SAFETY

Innovative concept

- ▶ Can be assembled quickly and individually via myPNOZ Creator
    - ▶ Innovative procurement process with logic configuration and application simulation
    - ▶ myPNOZ is manufactured individually and, upon request, is delivered set-up and tested ready for commissioning
- ▶ Logic connections between safety functions through plug-in sequence, without additional wiring
- ▶ Formation of safety circuits (zones), to safeguard independent plant sections

Modular design

- ▶ Modularity in this form is unique on the market (only pay for what you need)
    - ▶ Large selection of input modules, output modules and input/output modules
    - ▶ Customized assembly for each application
- ▶ Expansion modules used for additional safety functions and to increase the number of contacts available
- ▶ Individual modules can be ordered for self-assembly.

Easy to handle

- ▶ No software tool required – all the engineering can be done via a screwdriver → as a result no license costs, updates or maintenance of the software
- ▶ Easy to change the settings, exchange and expand without software and without dismantling the whole system
- ▶ Advanced LED diagnostics (for each module / safety function)

Efficient to use

- ▶ Saves time and costs thanks to reduced wiring work
    - ▶ Head module provides the voltage supply to the whole system
    - ▶ Expansion modules are connected via BUS connector and are simply plugged in
- ▶ Simple to install in the control cabinet as myPNOZ is delivered pre-configured (assembled, set-up, tested) upon request
- ▶ Low space requirement in the control cabinet thanks to narrow widths and individually manufactured solutions
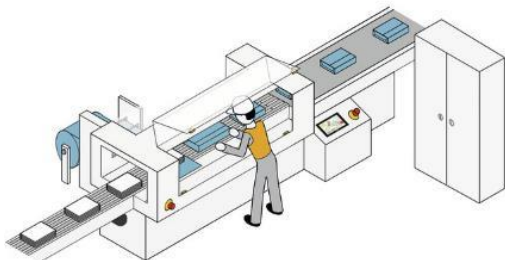
▶ Application examples
Small applications – Sealing / CNC / Packaging
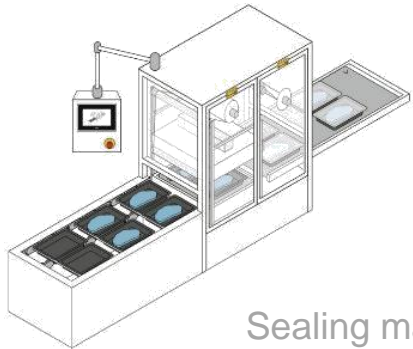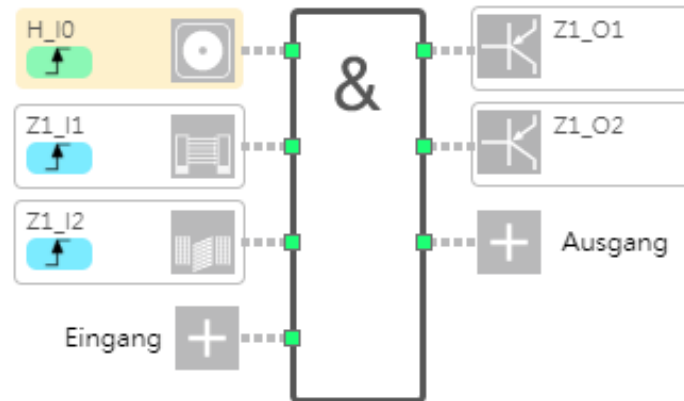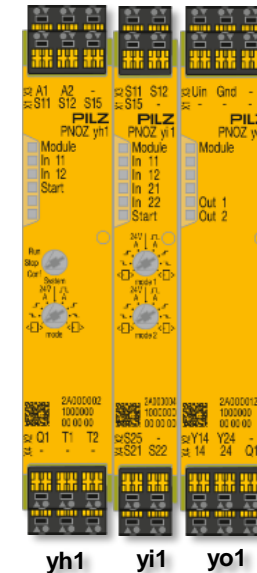
Sealing machine
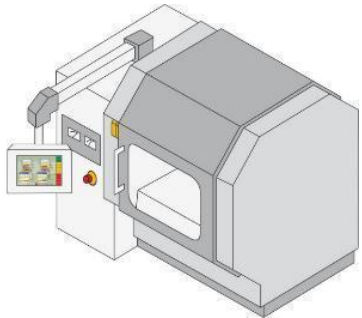
CNC machine

Packaging machine

Description:

- 1 to 4 x E-STOP in series connection
- 2 selectable safe input functions (e.g. light curtain, safety gates etc.)
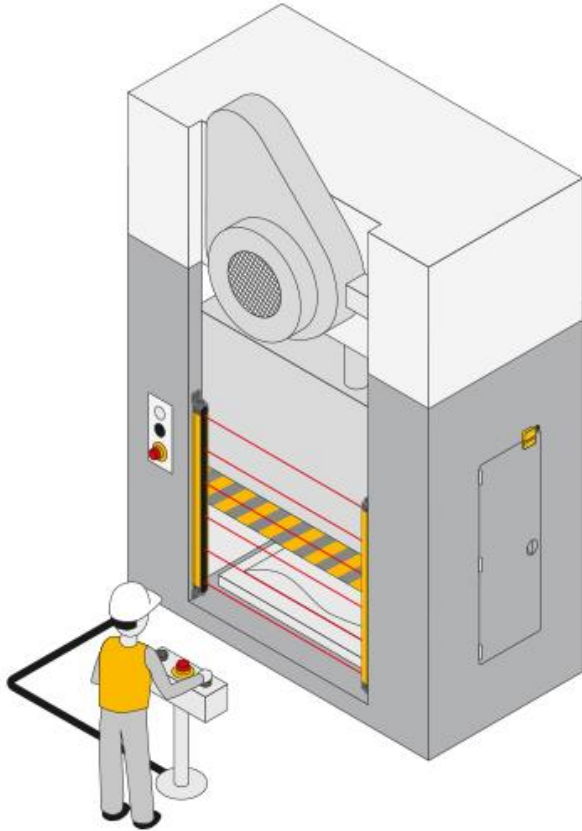- 2 x safe semiconductor output

Logic

Hardware

yh1   yi1   yo1

myPNOZ Creator Link
myPNOZ Creator type code: myPNOZ.27.CKA270EB330AB000
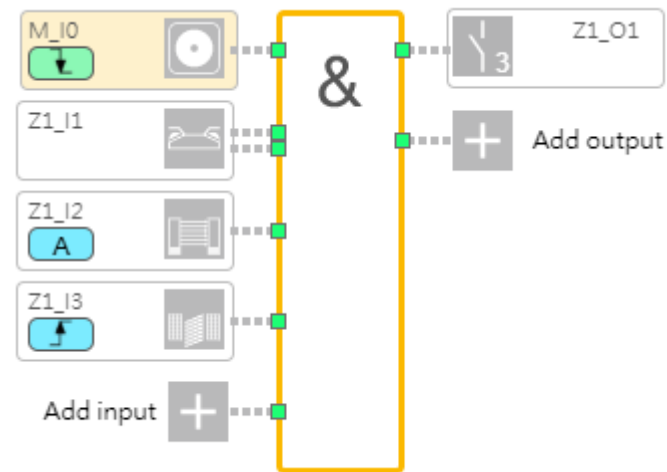
▶ Application examples
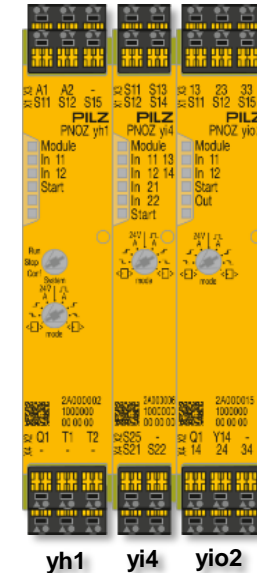## Small application – Semi-automatic press

Description:

- 2 x E-STOP in series connection
- Two-hand operation to execute the function
- Light curtain at manual feed
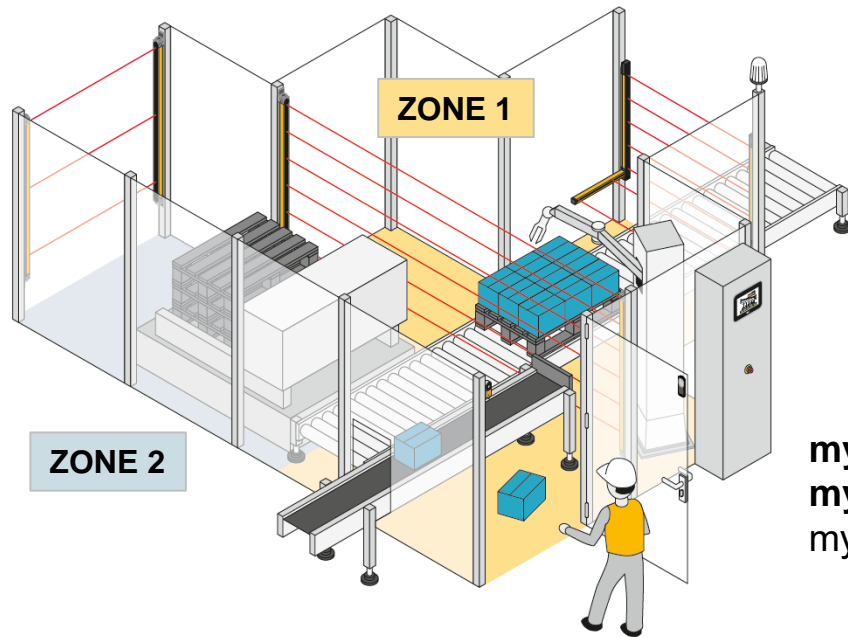- Safety gate monitoring for maintenance input

myPNOZ Creator Link
myPNOZ Creator type code: myPNOZ.50.CKA270EC400XD300

Application examples
Medium-sized application – Palletizing machine

ZONE 1

ZONE 2

Description:

Zone 1
- 4 x E-STOP in series connection
- Safety gate monitoring for maintenance input
- Light curtain inside to create a safe zone for the operator
- Light curtain with integrated muting on pallet outflow
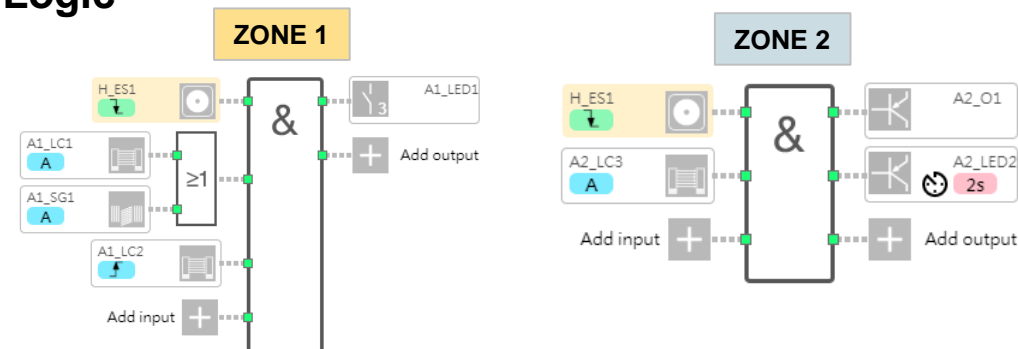
Zone 2
- Light curtain for pallet infeed

The "pallet infeed" light curtain only shuts down the pallet conveyor; it does not shut down the robot or package conveyor. So a forklift can load pallets without stopping the production process.
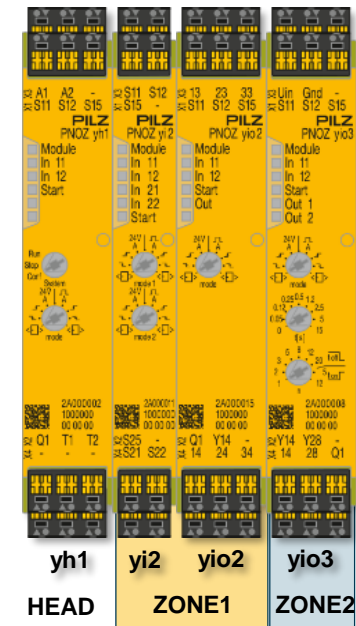
myPNOZ Creator Link
myPNOZ Creator type code:
myPNOZ.68.CKA280ED440XD300XA445

Hardware

Logic

ZONE 1

H_ES1

A1_LC1 A

A1_SG1 A

≥1

&

A1_LED1

Add output

A1_LC2

Add input

ZONE 2

H_ES1

A2_LC3 A

&

A2_O1

A2_LED2 2s

Add input

Add output

yh1   yi2   yio2   yio3
HEAD   ZONE1   ZONE2
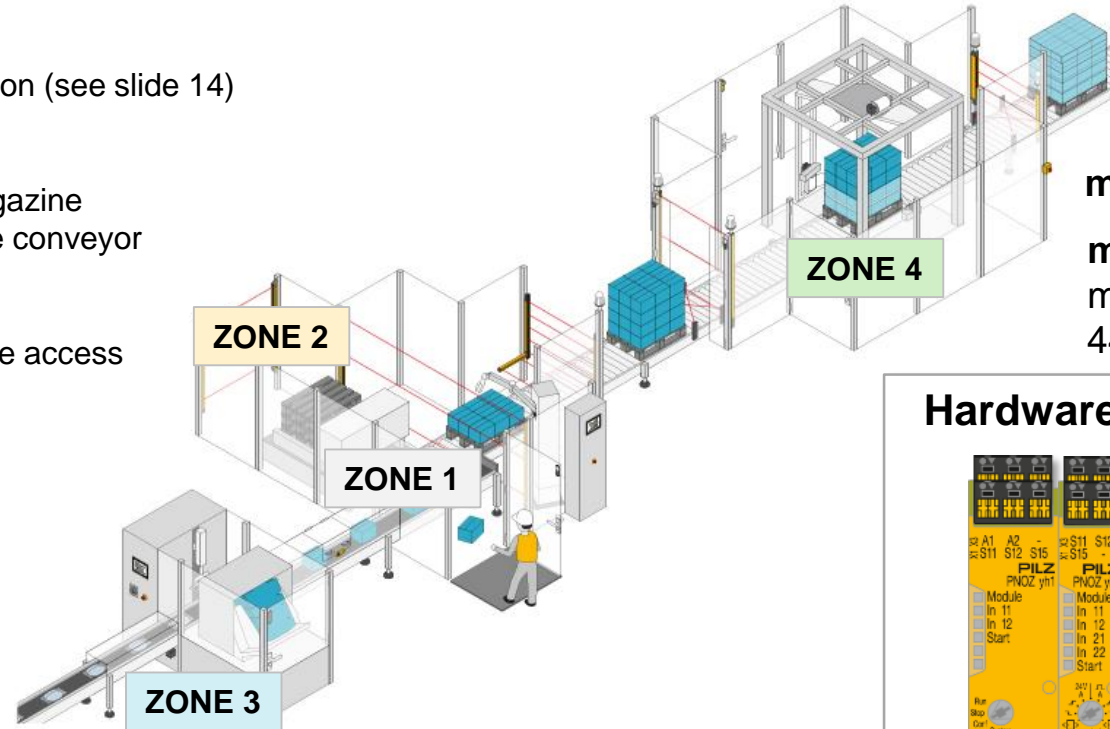
Description:

Zone 1 and **Zone 2** match the medium-sized application (see slide 14)

Zone 3
- E-STOP integrated within overall E-STOP
- Safety gate monitoring for access to the carton magazine
- Safety gate monitoring for the inspection flap on the conveyor

Zone 4
- E-STOP integrated within overall E-STOP,
- 2 x safety gate monitoring functions for maintenance access
- Light curtain with integrated muting on pallet inflow
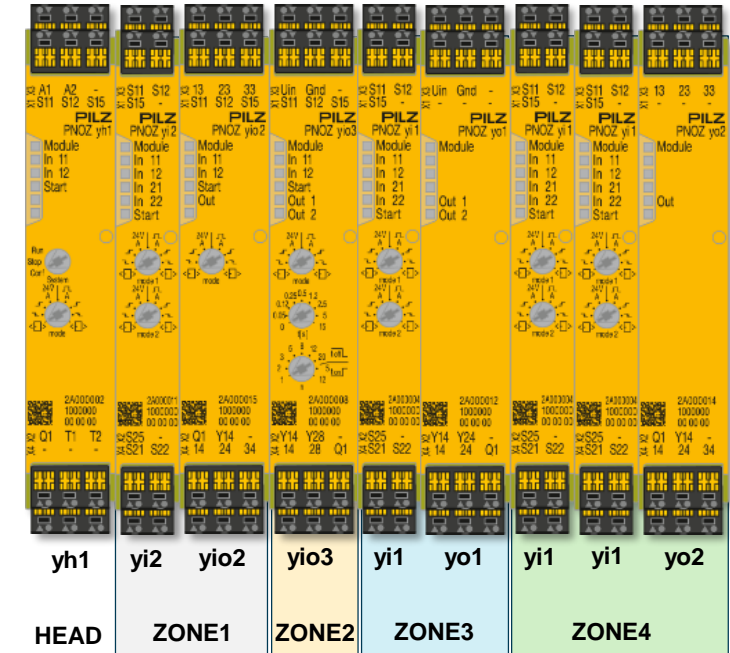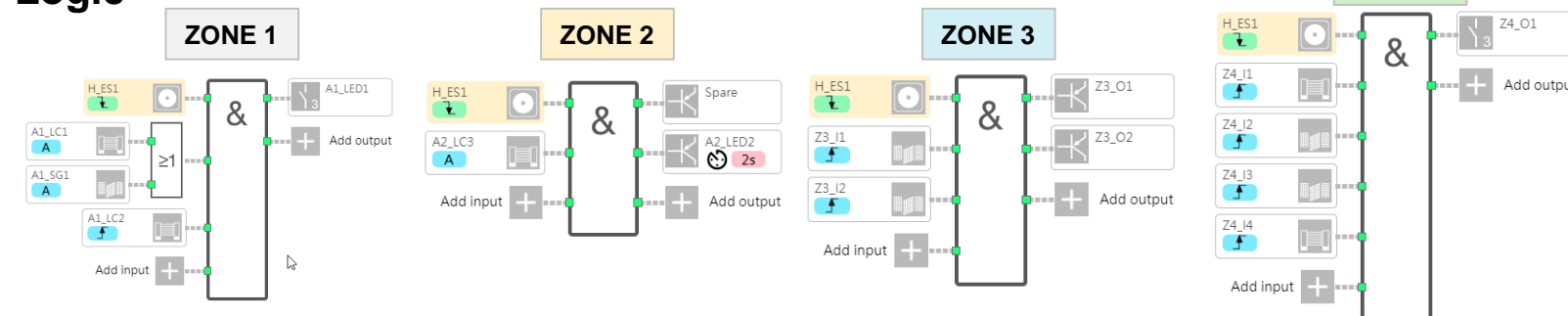- Light curtain with integrated muting on pallet inflow

ZONE 4
ZONE 2
ZONE 1
ZONE 3

myPNOZ Creator Link

myPNOZ Creator type code:
myPNOZ.34.CKA280ED440XD300XA
445EB330AB000EB330EB330AD000

Hardware

yh1 yi2 yio2 yio3 yi1 yo1 yi1 yi1 yo2

HEAD ZONE1 ZONE2 ZONE3 ZONE4

Logic

ZONE 1 · ZONE 2 · ZONE 3 · ZONE 4

Modules & accessories
Module overview

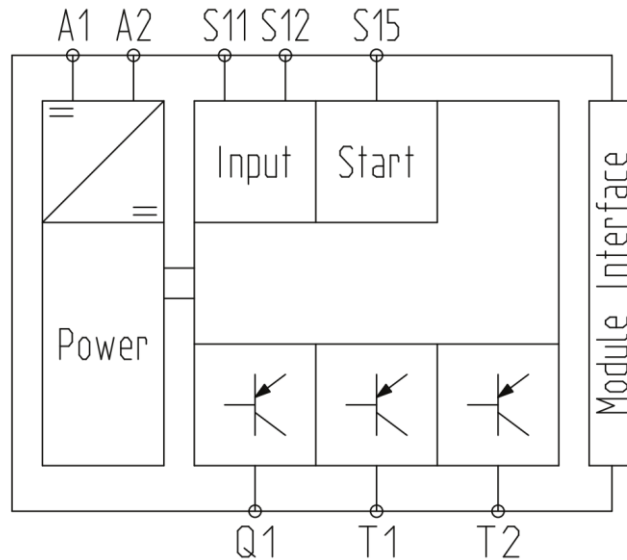| Description	Type	Features	Order number
myPNOZ yh1 2DI 24VDC	Head module	Inputs: 2 for monitoring 1 global safe input function, Outputs: 1 signal output using semiconductor technology, UB = 24VDC	2A000002
myPNOZ yi1 4DI	Input module	Inputs: 4 for monitoring up to 2 safe input functions, AND-linked	2A000004
myPNOZ yi2 4DI or	Input module	Inputs: 4 for monitoring 2 safe input functions, OR-linked	2A000011
myPNOZ yi3 2DI T3A	Input module	Inputs: 4 for monitoring Type IIIA 2-hand switches (in accordance with EN574) and one further safe input function AND-linked	2A000005
myPNOZ yi4 2DI T3C	Input module	Inputs: 6 for monitoring Type IIIC 2-hand monitoring (in accordance with EN574) and one further safe input function AND-linked	2A000006
myPNOZ yo1 2SO	Output module	Outputs: 2 safe instantaneous semiconductor outputs, 1 signal output using semiconductor technology	2A000012
myPNOZ yo2 3NO	Output module	Outputs: 3 NO safe instantaneous relay contacts, 1 signal output using semiconductor technology	2A000014
myPNOZ yo3 1SO 1SO t	Output module	Outputs: 1 direct, 1 selectable delayed safe semiconductor output (t=0-300s), 1 signal output using semiconductor technology	2A000007
myPNOZ yo4 3NO	Output module	Outputs: 3 NO safe, selectable delayed relay contacts (t=0-300s), 1 signal output using semiconductor technology	2A000009

Modules & accessories
Module overview

Description	Type	Features	Order number
myPNOZ yio1 2DI 2SO	Input/output module	Outputs: 2 safe instantaneous semiconductor outputs, 1 signal output using semiconductor technology Inputs: 2 for monitoring 1 safe input function	2A000013
myPNOZ yio2 2DI 3NO	Input/output module	Outputs: 3 NO safe instantaneous relay contacts, 1 signal output using semiconductor technology Inputs 2 for monitoring 1 safe input function	2A000015
myPNOZ yio3 2DI 1SO 1SO t	Input/output module	Outputs: 1 direct, 1 selectable delayed safe semiconductor output (t=0-300s), 1 signal output using semiconductor technology Inputs: 2 for monitoring 1 safe input function	2A000008
myPNOZ yio4 2DI 3 NO t	Input/output module	Outputs: 3 NO safe, selectable delayed relay contacts (t=0-300s), 1 signal output using semiconductor technology Inputs: 2 for monitoring 1 safe input function	2A000010
Spring terminals 17.5mm	Terminal	Set of spare plug-in terminals, 3-pin in spring force technology; SU = each 1 piece X1, X2, X3, X4	751003
Spring terminals 12.5mm	Terminal	Set of spare plug-in terminals, 2-pin in spring force technology; SU = each 1 piece X1, X2, X3, X4	751002
Screw terminals 17.5mm	Terminal	Set of spare plug-in terminals, 3-pin in screw technology; SU = each 1 piece X1, X2, X3, X4	750003
Screw terminals 12.5mm	Terminal	Set of spare plug-in terminals, 2-pin in screw technology; SU = each 1 piece X1, X2, X3, X4	750002
myPNOZ connector	BUS connector	Connector used to connect myPNOZ modules, SU=10 pieces	2A000016

▶ Modules & accessories
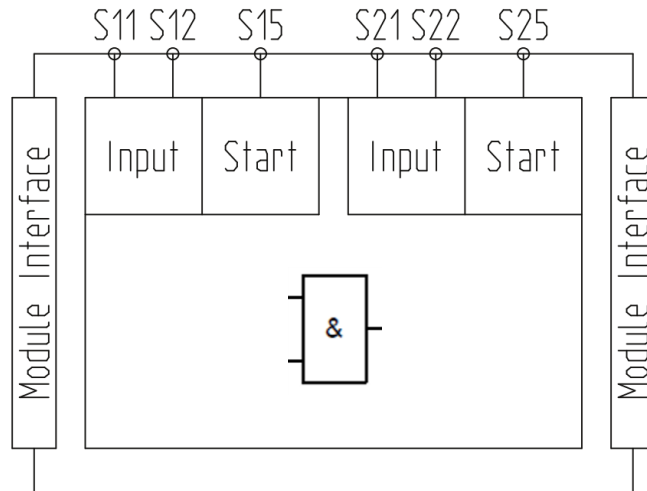## 2A000002 **Head module – PNOZ yh1**

Width: 17.5 mm

▶ 24V DC voltage supply for up to 8 expansion modules

▶ Integrated global safety function GSF (e.g. E-Stop) AND connected to all other safety input functions of the system

▶ Start input for global safety function

▶ Test pulse outputs for the complete system

▶ Rotary switches for operating modes and system function

▶ Diagnostic LEDs for each input and the entire system
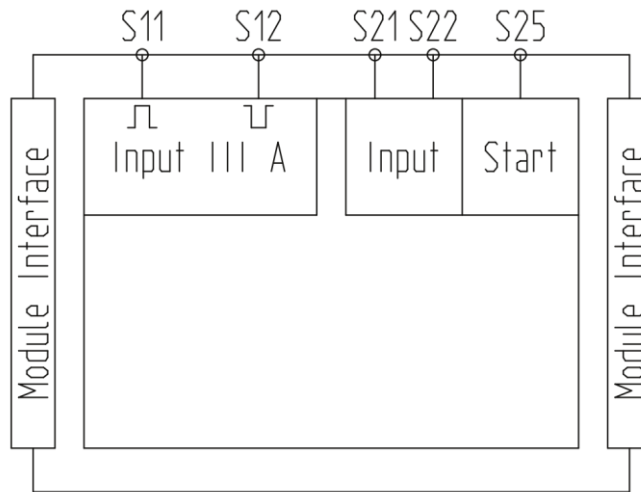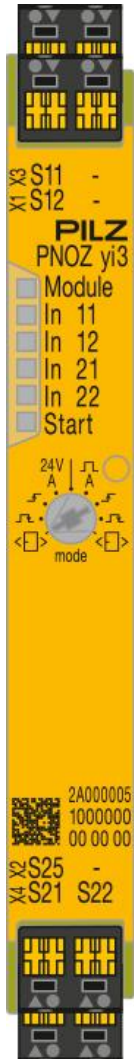
▶ 1 auxiliary output (non safety) for system status

▶ 4 digital inputs for two 2-channel safe input functions (1-channel use possible)

▶ Input functions AND-connected to each other, to the inputs of the same zone and to the global safety function GSF

▶ Start input for each input function

▶ Rotary switches for operating modes of the start-inputs for every safe input function

▶ Diagnostic LEDs for each input and the complete module

Width: 12.5 mm

▶ 4 digital inputs for two 2-channel safe input functions (1-channel use possible)

▶ Input functions OR-connected to each other and AND-connected to the inputs of the same zone and to the global safety function GSF

▶ Start input for each input function

▶ Rotary switches for operating modes of the start-inputs for every safe input function

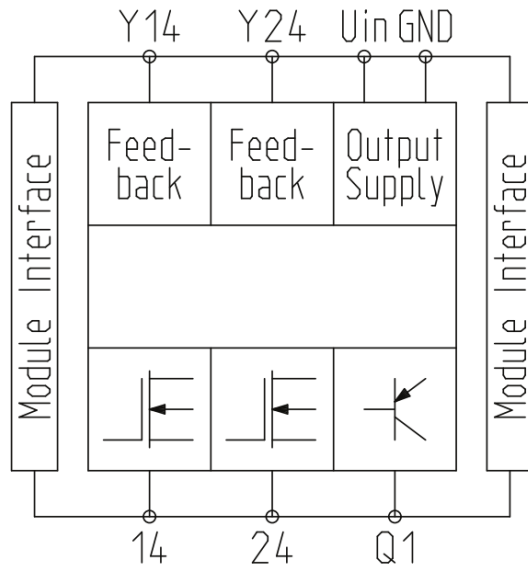▶ Diagnostic LEDs for each input and the complete module

Width: 12.5 mm

▶ 4 digital inputs for one 2-hand control Type IIIA (EN 574) plus one 2-channel safety input function (1-channel use possible)

▶ Input functions AND-connected to each other, to the inputs of the same zone and to the global safety function GSF

▶ Start input for the additional input function

▶ Rotary switches for operating modes of the start-inputs for every safe input function

▶ Diagnostic LEDs for each input and the complete module

Width: 12.5 mm

▶ 6 digital inputs for one 2-hand control Type IIIC (EN 574) plus one 2-channel safety input function (1-channel use possible)

▶ Input functions AND-connected to each other, to the inputs of the same zone and to the global safety function GSF

▶ Start input for the additional input function

▶ Rotary switches for operating modes of the start-inputs for every safe input function

▶ Diagnostic LEDs for each input and the complete module

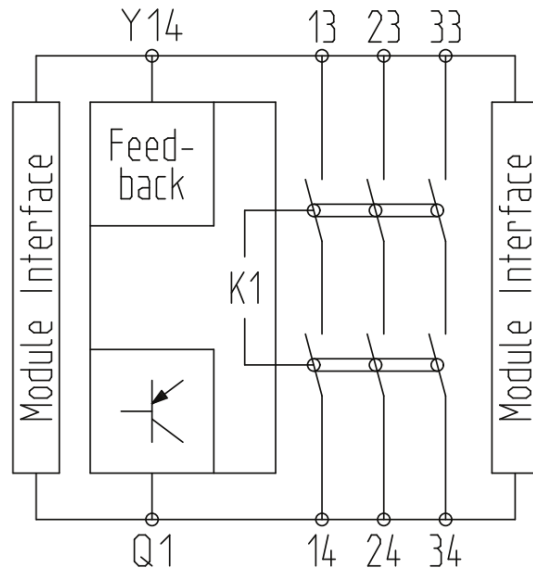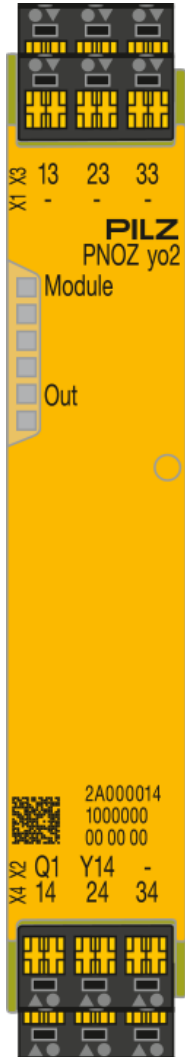Width: 12.5 mm

Width: 17.5 mm

- ▶ 2 safe semiconductor outputs direct switching (parallel), PL e, SIL CL 3
- ▶ Up to 6A output load per module
- ▶ Independent power supply for semiconductor outputs
- ▶ Feedback inputs for each single safety output
- ▶ Outputs can serve as contact expansion of previous output module
- ▶ 1 auxiliary output (non safety) for zone status
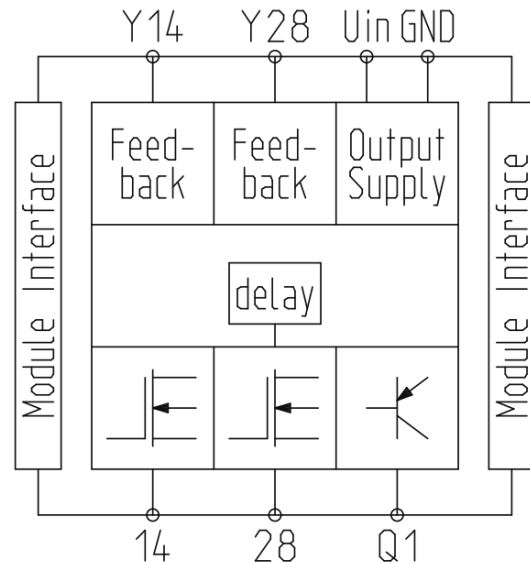- ▶ Diagnostic LEDs for each output and the complete module

▶ 1 safe relay output (3 contacts NO) direct switching, PL e, SIL CL 3

▶ Feedback input for safety output

▶ Outputs can serve as contact expansion of previous output module

▶ 1 auxiliary output (non safety) for zone status

▶ Diagnostic LEDs for the output and the complete module
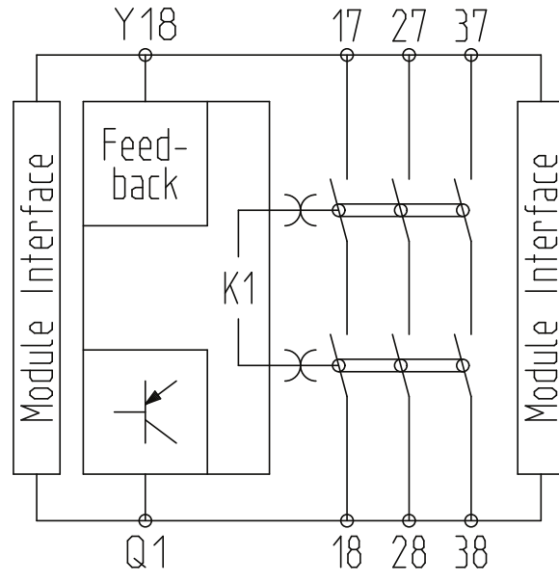
Width: 17.5 mm

Width: 17.5 mm

▸ 1 safe semiconductor output direct switching, PL e, SIL CL 3

▸ 1 safe semiconductor output delayed (ON/OFF delay selectable) PL e, SIL CL 3

▸ Independent power supply for semiconductor outputs (up to 6A load per module)

▸ Feedback inputs for each single safety output (undelayed and delayed)

▸ Outputs can serve as contact expansion of previous output module

▸ 1 auxiliary output (non safety) for zone status

▸ Rotary switches for delay settings

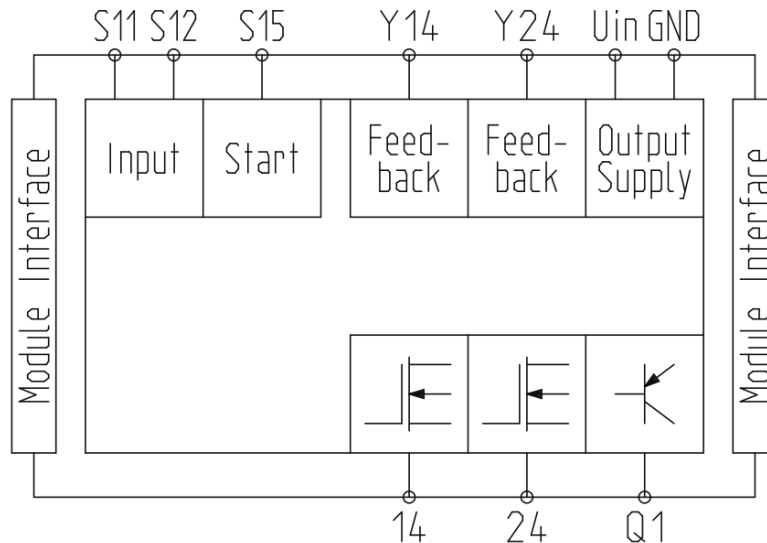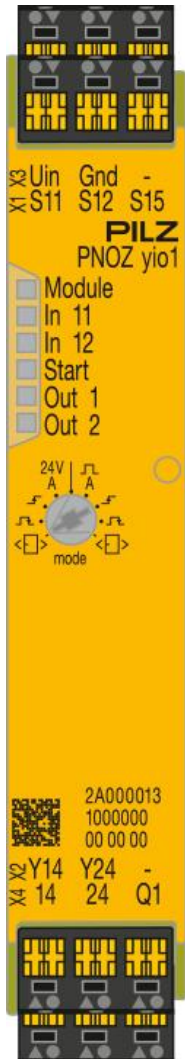▸ Diagnostic LEDs for each output and the complete module

▶ 1 safe relay output (3 contacts NO) delayed (ON/OFF delay selectable), PL e, SIL CL 3

▶ Feedback input for safety output

▶ Outputs can serve as contact expansion of previous output module

▶ 1 auxiliary output (non safety) for zone status

▶ Rotary switches for delay settings

▶ Diagnostic LEDs for the output and the complete module
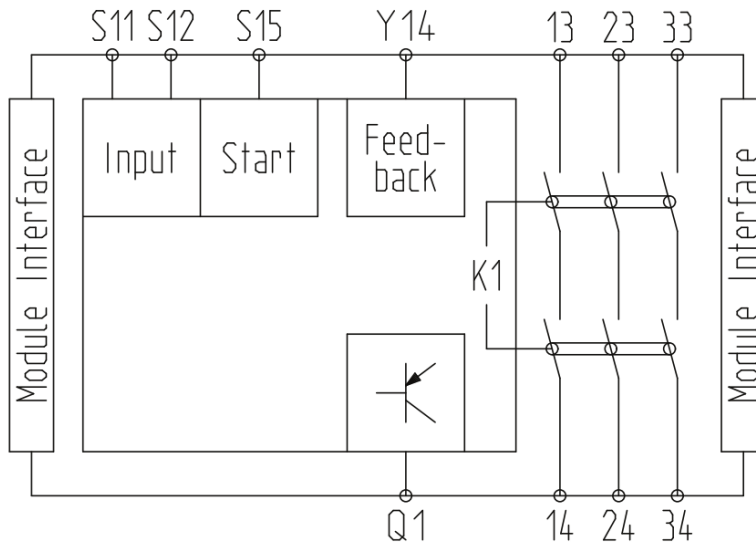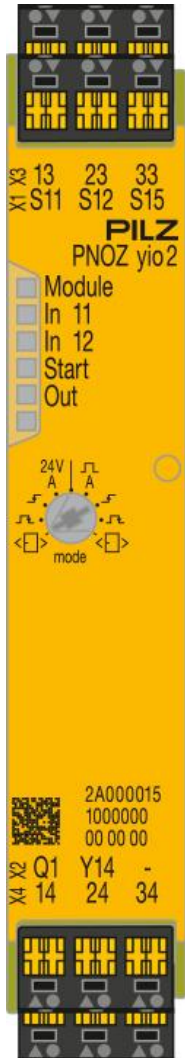
Width: 17.5 mm

Width: 17.5 mm

▶ 2 digital inputs for one 2-channel safe input function (1-channel use possible)

▶ Input function AND-connected to the inputs of the same zone and to the global safety function GSF

▶ 1 start input for input function

▶ 2 safe semiconductor outputs direct switching (parallel), PL e, SIL CL 3 (up to 6A output load per module)

▶ Independent power supply for semiconductor outputs

▶ Feedback inputs for each single safety output

▶ 1 auxiliary output (non safety) for zone status

▶ Rotary switch for operating mode of start-input

▶ Diagnostic LEDs for each input, output and the complete module

▶ 2 digital inputs for one 2-channel safety input function (1-channel use possible)

▶ Input function AND-connected to the inputs of the same zone and to the global safety function GSF

▶ Start-input for safe input function

▶ 1 safe relay output (3 contacts NO) direct switching, PL e, SIL CL 3

▶ Feedback input for safety output

▶ 1 auxiliary output (non safety) for zone status

▶ Rotary switch for operating mode of start-input

▶ Diagnostic LEDs for each input, output and the complete module

Width: 17.5 mm

Width: 17.5 mm

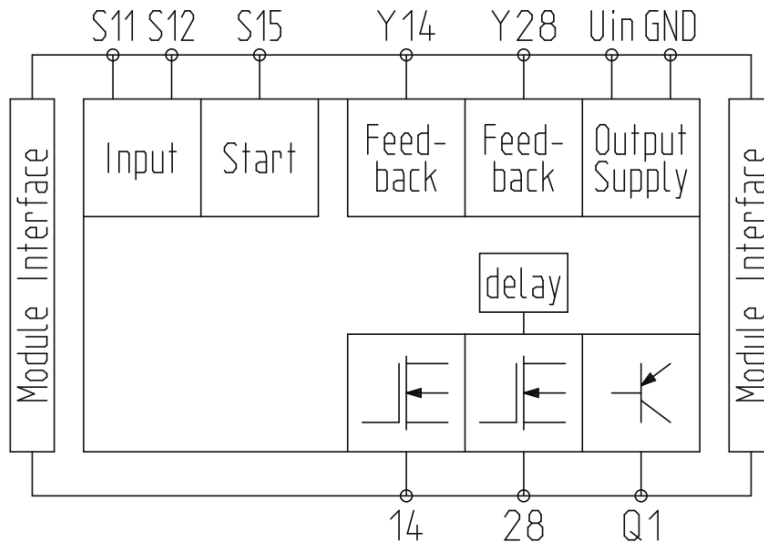▶ 2 digital inputs for one 2-channel safe input function (1-channel use possible)

▶ Input function AND-connected to the inputs of the same zone and to the global safety function GSF

▶ 1 start input for input function

▶ 2 safe semiconductor outputs delayed (ON/OFF delay selectable), PL e, SIL CL 3 (up to 6A output load per module)

▶ Independent power supply for semiconductor outputs

▶ Feedback inputs for each single safety output

▶ 1 auxiliary output (non safety) for zone status

▶ Rotary switch for operating mode of start-input

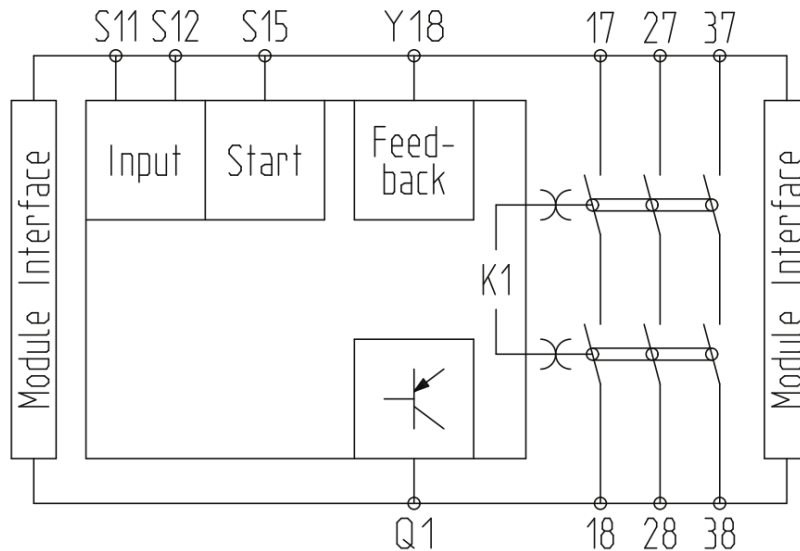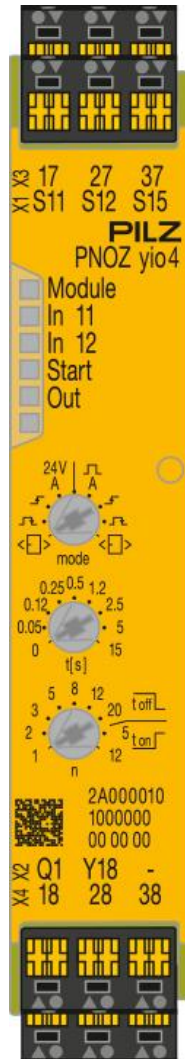▶ Diagnostic LEDs for each input, output and the complete module

▸ 2 digital inputs for one 2-channel safety input function (1-channel use possible)

▸ Input function AND-connected to the inputs of the same zone and to the global safety function GSF

▸ Start-input for safe input function

▸ 1 safe relay output (3 contacts NO) delayed (ON/OFF delay selectable), PL e, SIL CL 3

▸ Feedback input for safety output

▸ 1 auxiliary output (non safety) for zone status

▸ Rotary switch for delay settings and operating mode of start-input

▸ Diagnostic LEDs for each input, output and the complete module

Width: 17.5 mm

▸ **Run**   Sets the system into operation mode

▸ **Stop**   Stops the operation mode and switches the outputs to safe state

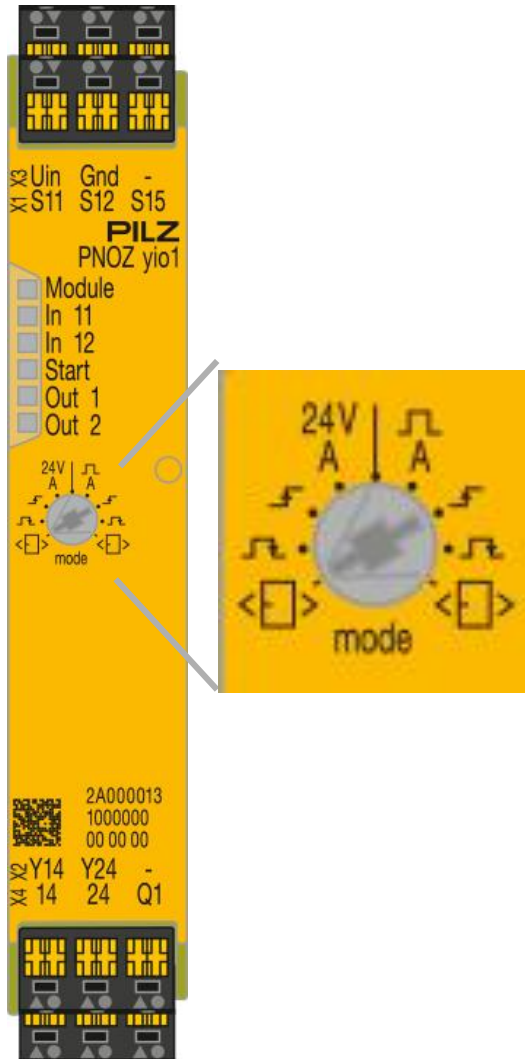▸ **Conf**   Sets the configuration mode (teach in):
In Conf position, the current system configuration is read in
and saved if no change is made for 5 seconds

▸ **Undefined**   Positions 4-9 of the system rotary switch are equivalent to Stop
For a valid system start, a transition from position "Stop" to "Run" is
required

Rotary switch *mode*	Automatic or manual start	Monitored start rising edge	Monitored start rising and falling edge	Automatic start with start-up test
Without detection of shorts across contacts / OSSDs				
With detection of shorts across contacts				

Automatic start: Unit is active once the input circuit has been closed and the start circuit is connected to 24V DC

Manual start: Unit is active once the input circuit and the start circuit are closed

Monitored start with rising edge: Unit is active once the input circuit is closed and once the start circuit is closed after the waiting period has elapsed

Monitored start with rising and falling edge: Unit is active once the input circuit is closed, and then the start circuit is closed and after 150 ms to max. 2 seconds opened again

Start with start-up test: The unit checks whether safety gates that are closed are opened and then closed again when supply voltage is applied
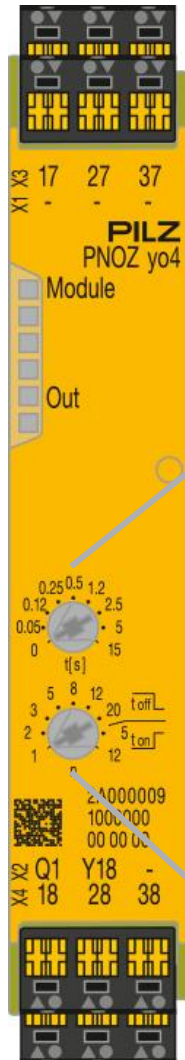
T_off
(OFF delay)

Factor n / Time t[s]	1	2	3	5	8	12	20
0	0	0	0	0	0	0	0
0,05	0,05	0,1	0,15	0,25	0,4	0,6	1
0,12	0,12	0,24	0,36	0,6	0,96	1,44	2,4
0,25	0,25	0,5	0,75	1,25	2	3	5
0,5	0,5	1	1,5	2,5	4	6	10
1,2	1,2	2,4	3,6	6	9,6	14,4	24
2,5	2,5	5	7,5	12,5	20	30	50
5	5	10	15	25	40	60	100
15	15	30	45	75	120	180	300

T_on
(ON delay)

| Factor n / Time t[s]	5	12
0	0	0
0,05	0,25	0,6
0,12	0,6	1,44
0,25	1,25	3
0,5	2,5	6
1,2	6	14,4
2,5	12,5	30
5	25	60
15	75	180

Mechanical connection of the modules:

▶ Remove the terminal connectors
▶ Slide the module down using the guiding rails on the side of the housing
▶ Move it to a common height to ensure correct electrical connection

Electrical connection via BUS connector:

The modules need to be electrically connected at their bottom with BUS connectors. Each bus connector is plugged onto two neighboring modules.
Once mechanically and electrically connected, the system can be mounted on the DIN rail and mechanically fixed by moving the retaining clamps.

retaining clamp
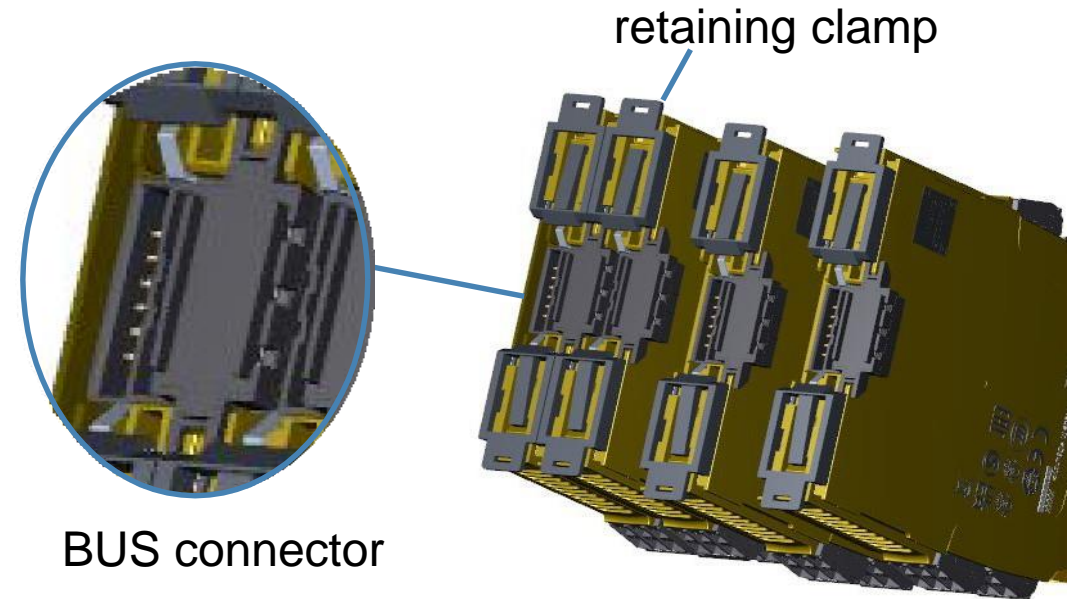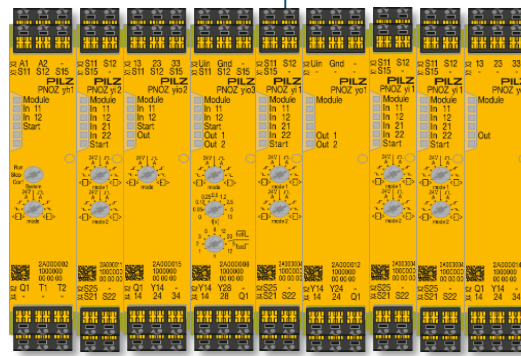
BUS connector

Replacing a module

A single module can easily be replaced at any position of the system also from a fixed compound mounted on a DIN rail
- Simply unplug the terminal connectors of the module to be replaced and the one placed on the left hand side of it, then unlock the module by loosening the retaining clamps
- Pull it upwards out of the system compound - the BUS connectors remain on the neighboring modules
- Insert the new module from above into the guiding rails of the neighboring modules and push it down onto the mounting rail; this automatically connects the module to the BUS connectors
- Lock the module closing the retaining clamps and plug in the terminal connectors - that's it!
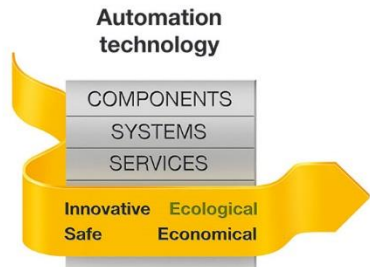
All these Pilz sensor products can be connected to myPNOZ

myPNOZ

Automation technology

COMPONENTS
SYSTEMS
SERVICES

Innovative   Ecological
Safe   Economical

Pilz Automation Safety, LP

7150 Commerce Blvd.
Canton, MI 48187
Tel.: +1 734 354-0272
Fax: +1 734 354-3355
info@pilzusa.com

pilz
the spirit of safety

Partner of:
The Best of German Engineering

WELTMARKT FÜHRER 2017
CHAMPIONS
Pilz GmbH & Co. KG
Elektronik & Elektrotechnik
Wirtschafts Woche

BLUeCOMPETENCE
Alliance Member
Partner der Nachhaltigkeitsinitiative des Maschinen- und Anlagenbaus

BRANDS OF THE CENTURY
pilz

DIN EN ISO 9001
REG. NR. 2462

Keep up-to-date on Pilz
www.pilz.us

PILZ
THE SPIRIT OF SAFETY