

Empowering the All Electric Society 



100 years of passion for
technology and innovation

Welcome

Functional Safety overview 2023

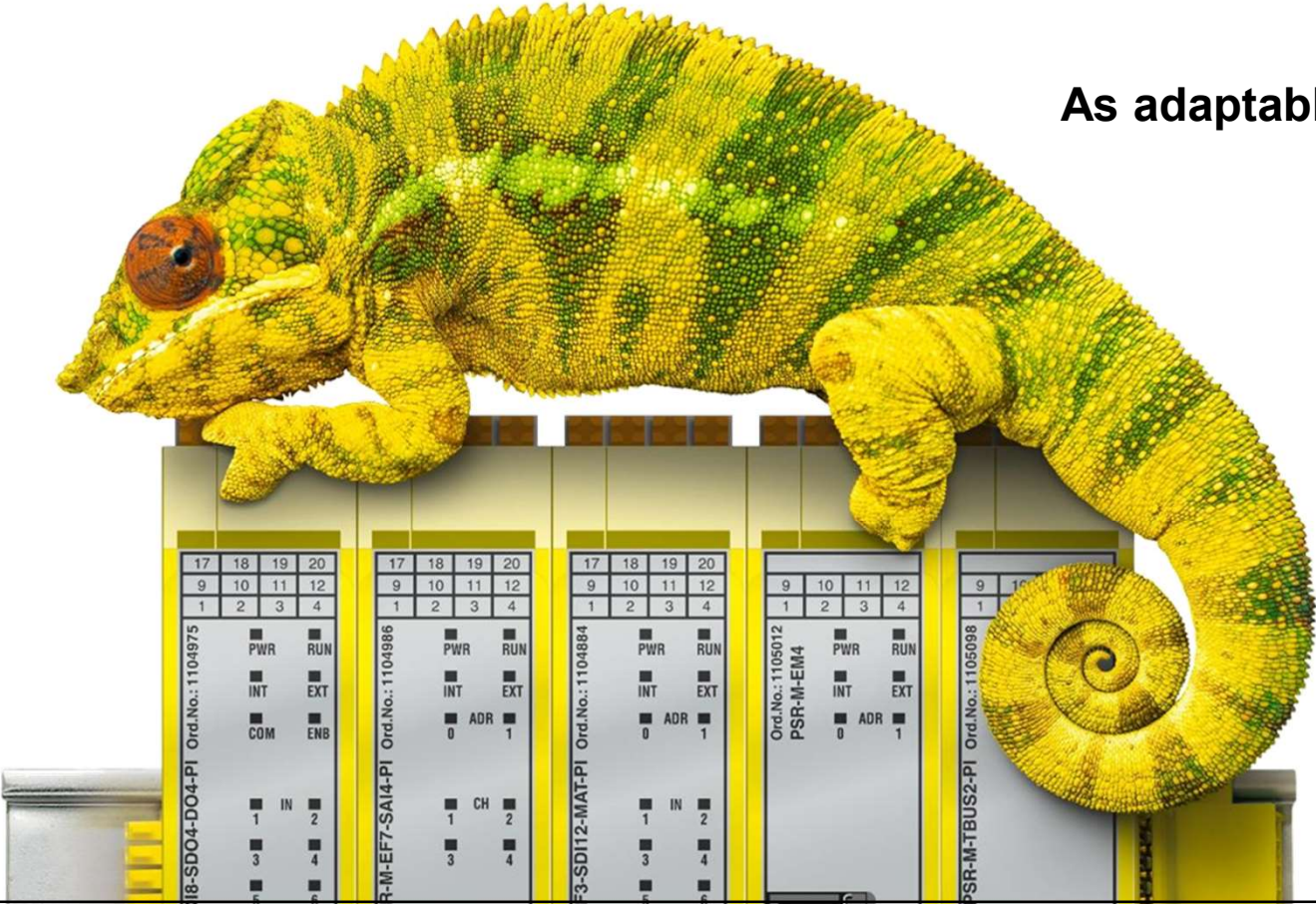
Andy Maskell – Product Manager – Safety (IMA)



Configurable Safety

PSRmodular

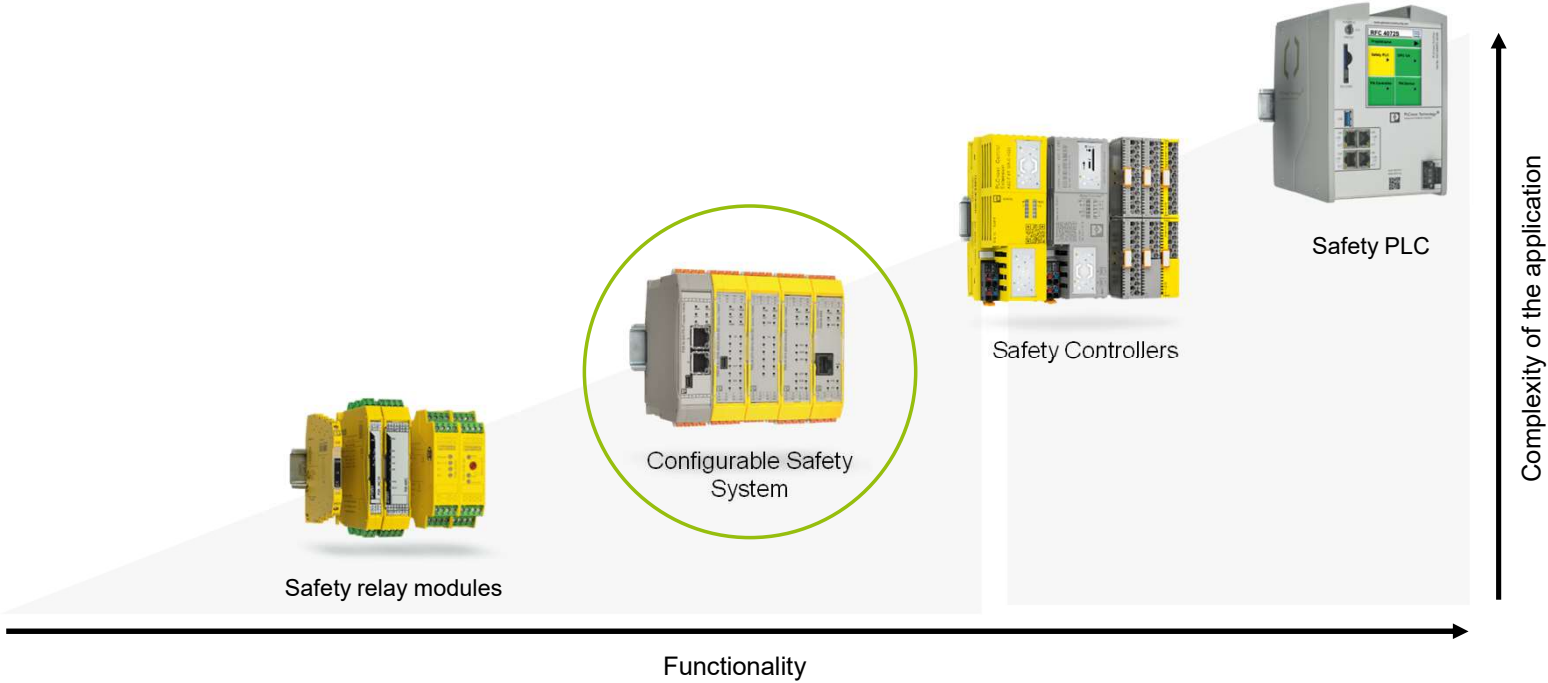
As adaptable as a chameleon !



Configurable Safety PSRmodular

Extensive functionality with easy handling

As a configurable safety system, PSRmodular performs more functions than a safety relay and is easier to handle than a programmable controller:

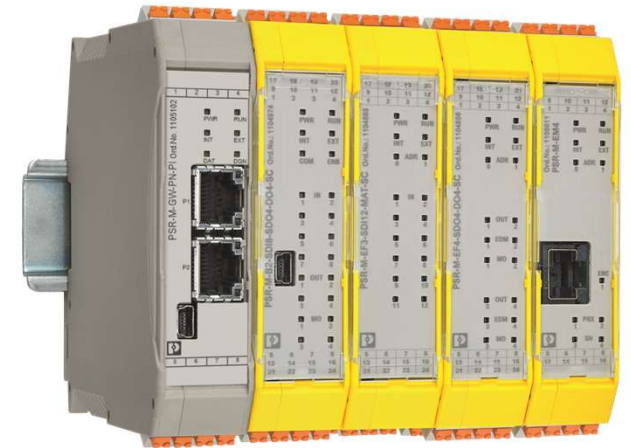


Configurable Safety PSRmodular

Functional safety up to PLe or SIL 3

Economic monitoring of numerous safety functions up to
PL e or SIL 3:

- ✓ **Classic functions:** Emergency stop signals, safety gate interlocks, light curtains and safety mats
- ✓ **Motion monitoring:** speed, standstill or direction of rotation
- ✓ **Safe analog value monitoring**



Configurable Safety PSRmodular

Diagnostic options

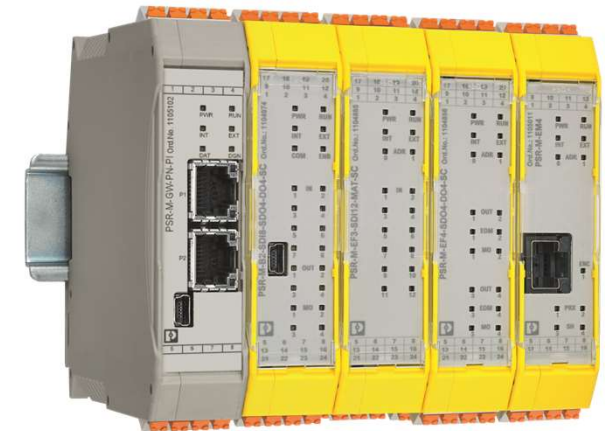
Diagnostics on HMI:

- Information about the device
- Status information on the safety function
- Continuously available in all common automation networks

Diagnostics on the device:

- LED status information
- Channel Information
- Module status

Bidirectional communication for machine control functions

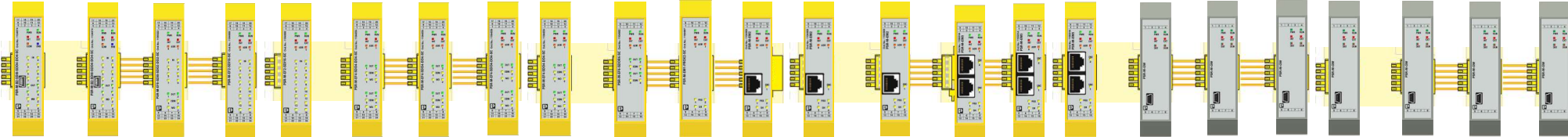


Configurable Safety PSRmodular

Portfolio overview



PSR-M-B3



PSR-M-B1 PSR-M-B2 PSR-M-EF1 PSR-M-EF2 PSR-M-EF3 PSR-M-EF4 PSR-M-EF5 PSR-M-EF6 PSR-M-EF7 PSR-M-EF8 PSR-M-EM1 PSR-M-EM2 PSR-M-EM3 PSR-M-EM4 PSR-M-EM5 PSR-M-EM6 PSR-M-EM7 PSR-GW-PN PSR-GW-PB PSR-GW-ETH PSR-GW-ECAT PSR-GW-CAN PSR-GW-ModTCP PSR-GW-DNET PSR-GW-CCLINK

2 Base modules

8 expansion modules Fail safe

7 expansion modules safe motion

7 Gateways

~~~ 60 new articles in total ! \*~~

\* incl accessories !

# Configurable Safety PSRmodular

## Portfolio overview (excl. Safe Motion)

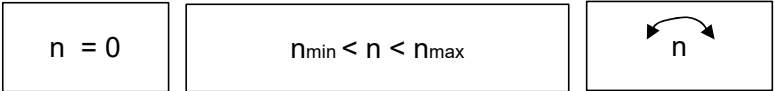
| Designation | Type                                                                                          | Input                                                                         | Output                 | Monitoring Out | Test pulses | EDM/reset input |
|-------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|------------------------|----------------|-------------|-----------------|
| PSR-M-B1    | Base module                                                                                   | 8 digital                                                                     | 2 (pair)               | 2              | 4           | 2               |
| PSR-M-B2    | Base module (extended memory for large applications)                                          | 8 digital                                                                     | 4 x single or 2 x pair | 4*             | 4           | 4*              |
| PSR-M-EF1   | Expansion Failsafe Digital Input/Output                                                       | 8 digital                                                                     | 4 x single or 2 x pair | 4*             | 4           | 4*              |
| PSR-M-EF2   | Expansion Failsafe Digital Input                                                              | 16 digital                                                                    | -                      | -              | 4           | -               |
| PSR-M-EF3   | Expansion Failsafe (Safety mats)                                                              | 12 digital                                                                    | -                      | -              | 8           | -               |
| PSR-M-EF4   | Expansion Failsafe Digital Output                                                             | -                                                                             | 4                      | 4              | -           | 4               |
| PSR-M-EF5   | Expansion Failsafe Digital Output                                                             | -                                                                             | 4 x DO (2A)            | 8              | -           | 4               |
| PSR-M-EF6   | Expansion Failsafe Relay                                                                      | -                                                                             | 4 x Relay              | -              | -           | 4               |
| PSR-M-EF7   | Expansion Failsafe Analog U/I (0..10V or 0(4)..20mA, treshold, range mathematical operations) | 4 analog                                                                      | -                      | -              | -           | -               |
| PSR-M-EF8   | Expansion Failsafe Digital Input/Output                                                       | 8                                                                             | 2 x pair               | 2              | 4           | 2               |
| PSR-M-E1/E2 | Expansion module (non-safe) Digital Output                                                    | -                                                                             | 8 / 16                 | -              | -           | -               |
| PSR-M-GW... | Gateway                                                                                       | PROFIBUS, PROFINET, EtherCAT, MODBUS TCP, ETHERNET/IP, CCLINK, CAN, DeviceNet |                        |                |             |                 |

\* configurable, EDM = external device monitoring

# Configurable Safety PSRmodular

## Portfolio overview (Safe Motion)

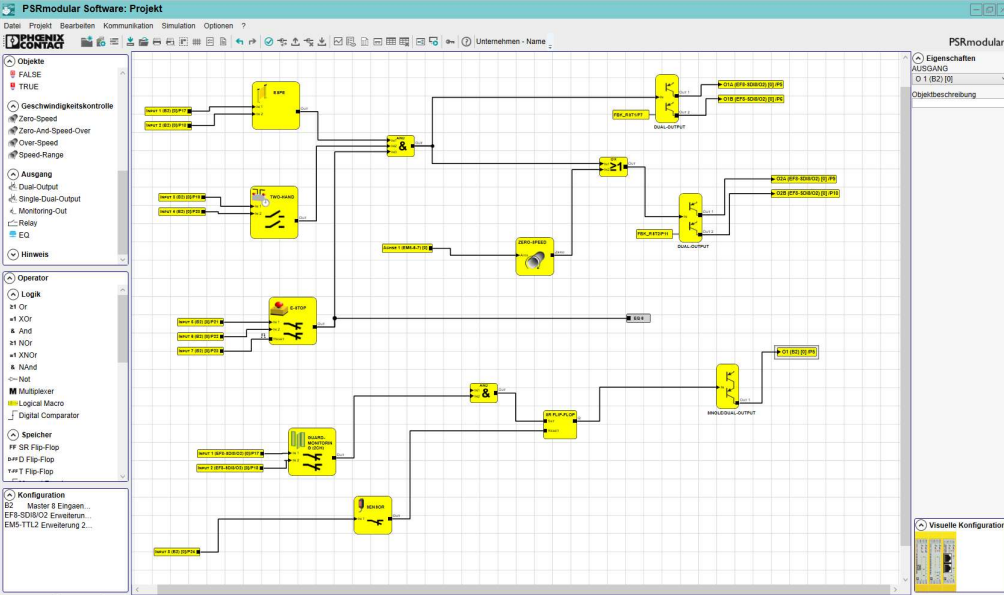
| Designation | Type                 | Safety Function in acc to EN 618000-5-2 |                           |                      |                         | Sensor type        |     |     |         | # Encoder |
|-------------|----------------------|-----------------------------------------|---------------------------|----------------------|-------------------------|--------------------|-----|-----|---------|-----------|
|             |                      | SOS<br>(Zero Speed)                     | SLS / SSM<br>(Over Speed) | SSR<br>(Speed Range) | SDI<br>(Safe Direction) | Proximity switches | TTL | HTL | SIN/COS |           |
| PSR-M-EM1   | Motion<br>monitoring | X                                       | X                         | X                    | -                       | X                  | -   | -   | -       | -         |
| PSR-M-EM2   |                      | X                                       | X                         | X                    | X                       | X                  | X   |     |         | 1         |
| PSR-M-EM3   |                      | X                                       | X                         | X                    | X                       | X                  |     | X   |         | 1         |
| PSR-M-EM4   |                      | X                                       | X                         | X                    | X                       | X                  |     |     | X       | 1         |
| PSR-M-EM5   |                      | X                                       | X                         | X                    | X                       | X                  | X   |     |         | 2         |
| PSR-M-EM6   |                      | X                                       | X                         | X                    | X                       | X                  |     | X   |         | 2         |
| PSR-M-EM7   |                      | X                                       | X                         | X                    | X                       | X                  | X   |     | X       | 2         |





# Configurable Safety PSRmodular

## TÜV-certified Software function blocks



PSRmodular Configuration-Software

- Intuitive graphical configuration
- Various safety function blocks
- Boolean operators
- Counter, timer, flip-flop...
- Reaction time calculator



# Configurable Safety PSRmodular

## PSR-M-B3

### PSRmodular - one base module for many networks

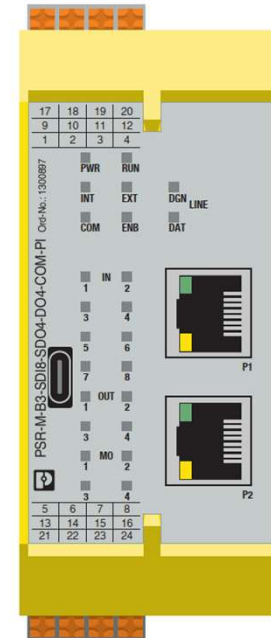
#### Features

- 2x RJ45 network connection with integrated multiprotocol chip
- Project download via Ethernet or USB
- More Software Safety Functions

↓ [PSRmodular 1.9.0.1.exe \(109 MB\)](#)

#### Benefits

- ✓ High flexibility by integrated network communication (ModBusTCP, EthernetIP; PROFINET, EtherCAT)
- ✓ Can be combined with additional ext. gateway
- ✓ Reduced down times by process monitoring of motion signals via gateway
- ✓ Usable in applications up to the highest safety level SIL 3 /PL e
- ✓ Easy to use



# Configurable Safety PSRmodular

## PSR-M-B3 Extended Environmental Specifications for Programmable Safety

### Features

- Extended temperature range up to 70°C
- Extended approvals (maritime approval, Heat Treatment\*, ATEX Zone 2\*, Cl1Zone2\*, G3)
- Coated PCB

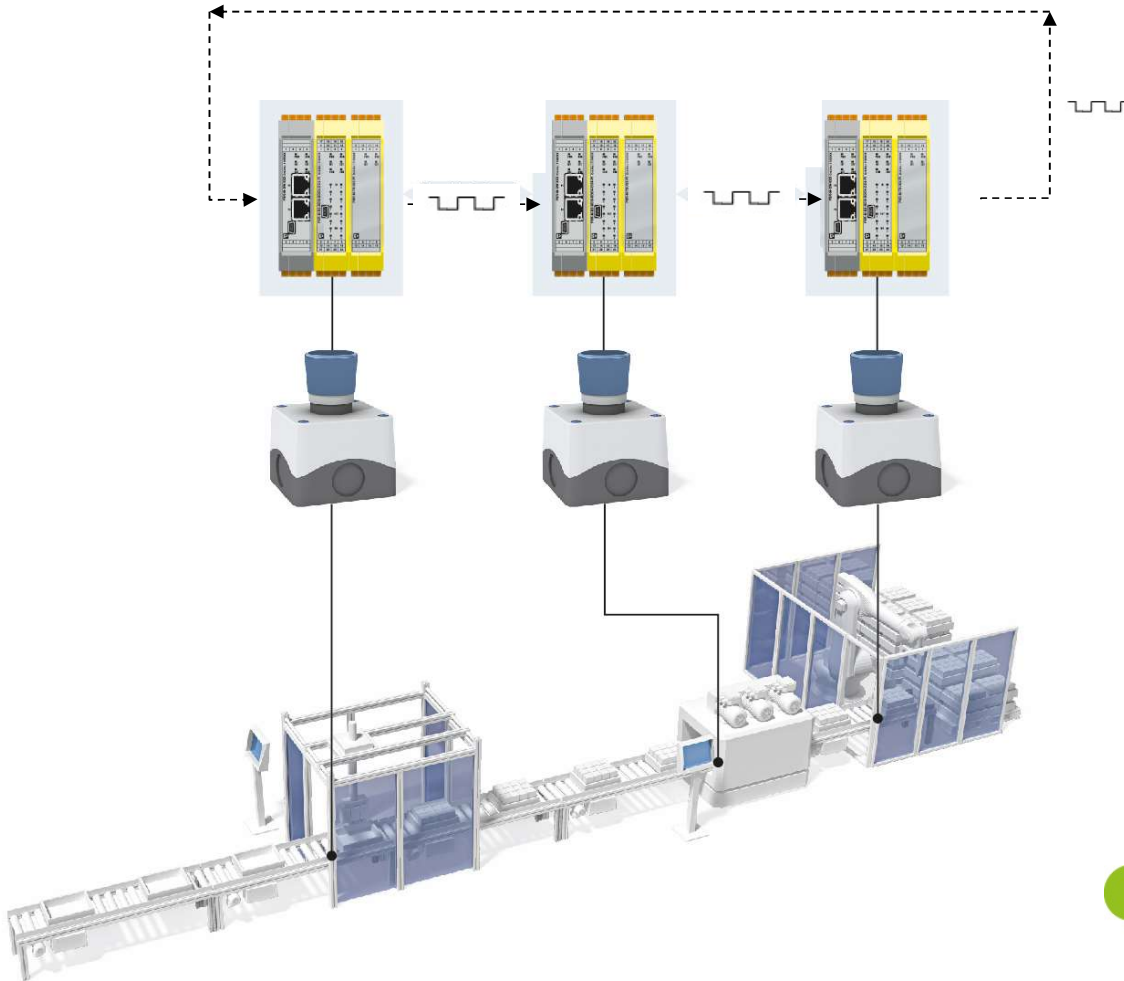
### Benefits

- ✓ Special reliability even in extreme temperature ranges up to 70°C
- ✓ Corrosion protection by protective coating of the printed circuit board
- ✓ Use in potentially explosive atmospheres as well as maritime applications
- ✓ Can be used in applications with the highest safety requirements according to SIL 3/PL e



# Configurable Safety PSRmodular

## Line E-Stop: Daisy-Chain-principle



# Configurable Safety PSRmodular

## Expansion Modules – TBUS expansion

| Features                 | PSR-M-TBUS1 | PSR-M-TBUS2 |
|--------------------------|-------------|-------------|
| Connection channel       | 1           | 2           |
| Max # of TBUS-Expansions | 6           |             |

