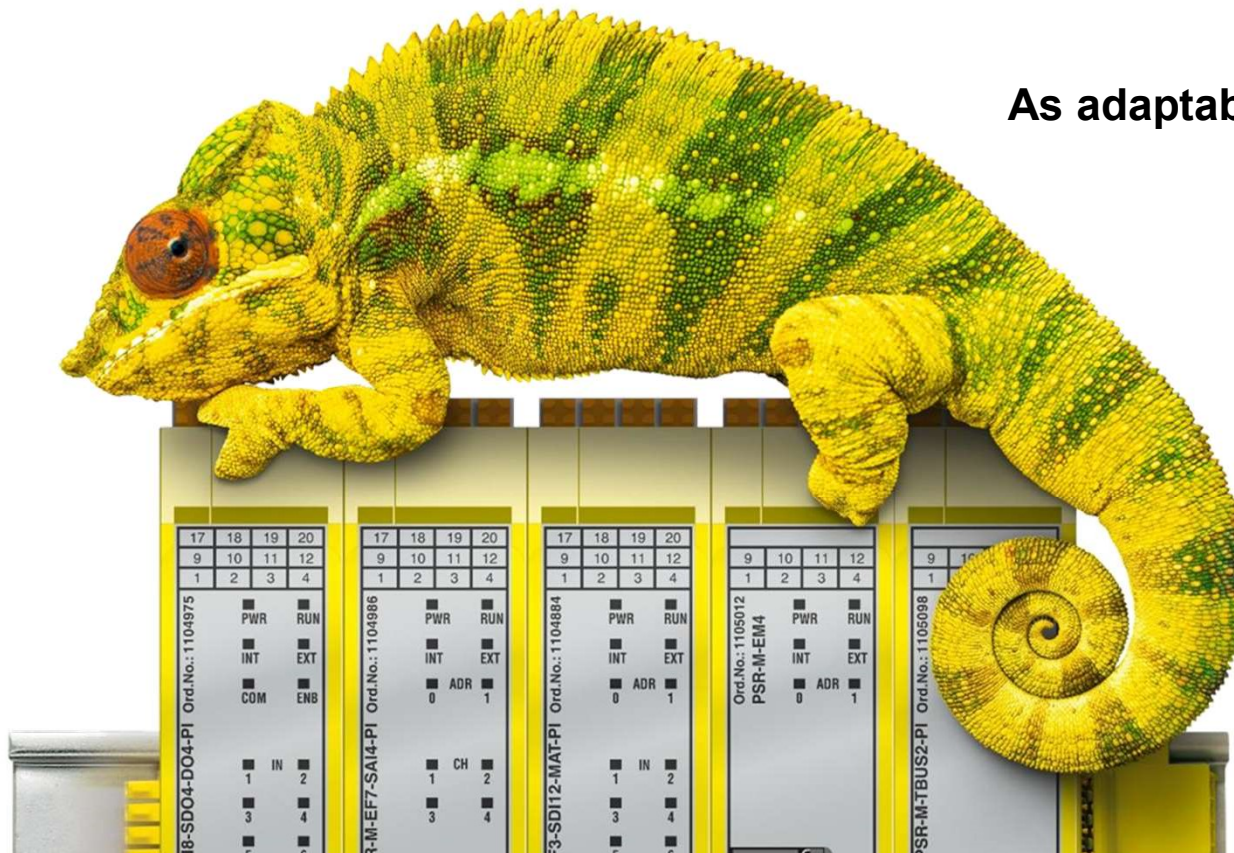


Configurable Safety System PSRmodular

Individual design of safety solutions

As adaptable as a chameleon !



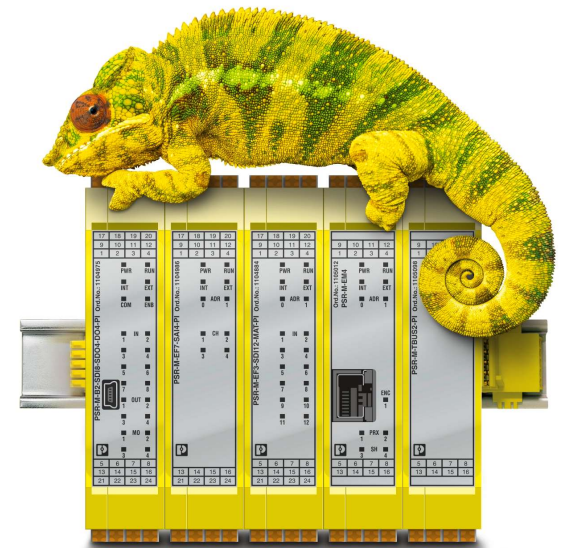
Antonio Gordillo
PM IMA

Octubre 2020

Configurable Safety System PSRmodular

Individual design of safety solutions

- Description
- Advantages
- Industries and use cases
- Product portfolio overview
- Module fact sheet
- Contact information

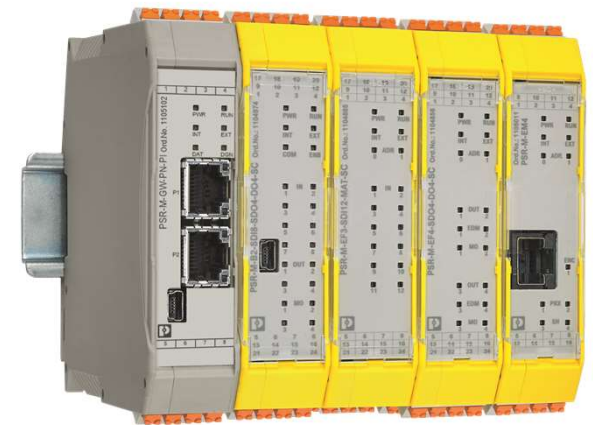


Configurable Safety System PSRmodular

Functional safety up to PLe or SIL 3

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

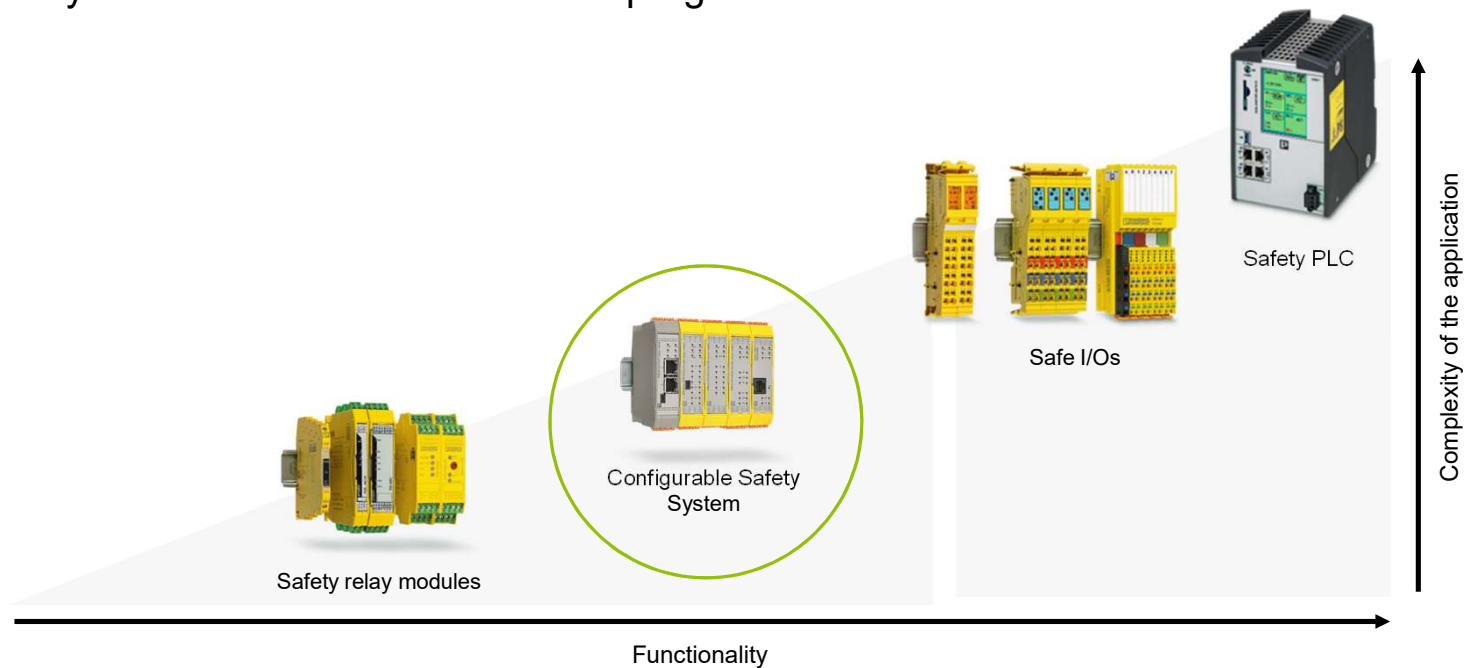
- ✓ **Classic functions:** Emergency stop signals, safety gate interlocks, light curtains and safety mats
- ✓ **Motion monitoring:** speed, standstill or direction of rotation
- ✓ **Safe analog value monitoring**



Configurable Safety System PSRmodular

Extensive functionality with easy handling

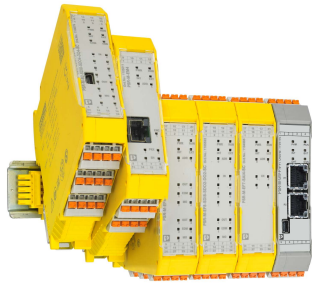
As a configurable safety system, PSRmodular performs more functions than a safety relay and is easier to handle than a programmable controller:



Configurable Safety System PSRmodular

Advantages at a glance

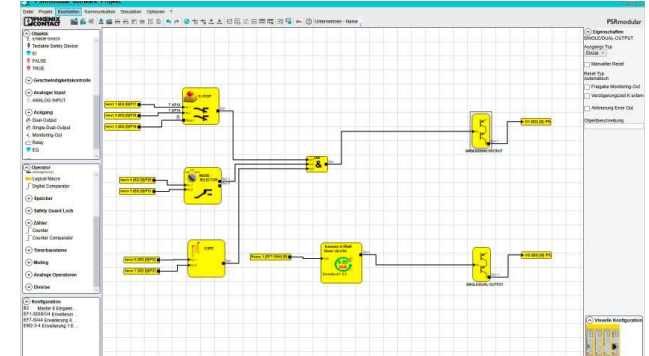
High scalability



Easy handling



Detailed diagnosis



Economic safety solution thanks to
high adaptability to individual
needs

Fast commissioning thanks to
simple configuration of hardware
and software

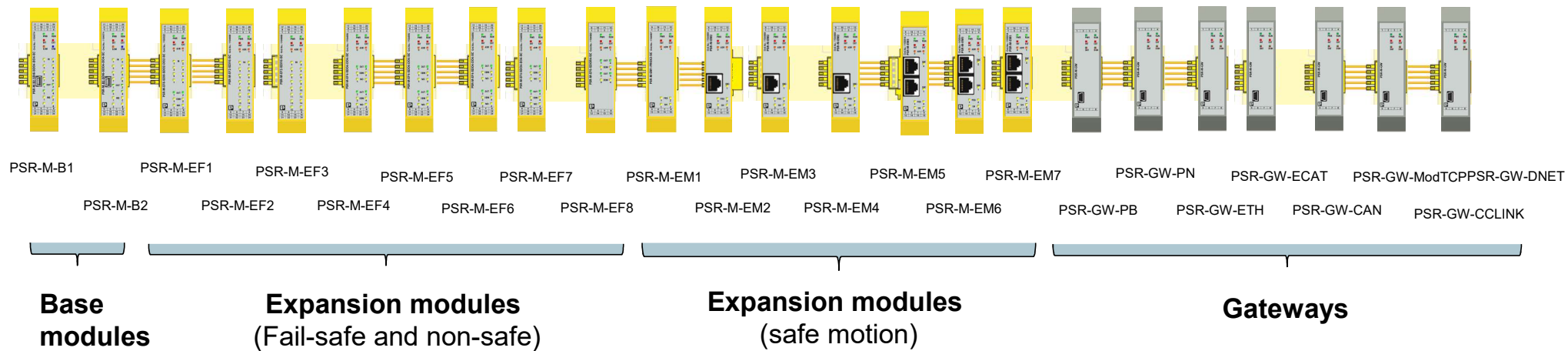
Minimized machine downtimes
through comprehensive and easily
understandable diagnostics

Individually scalable for your application

- **Powerful base modules** as stand-alone solution for applications with up to 3 safety functions
- **Numerous expansion modules** for analog value and motion monitoring; the application can be expanded to up to 160 I/Os
- **Gateways** for bidirectional communication, compatible with all common bus protocols

Configurable Safety System PSRmodular

Comprehensive product portfolio



Configurable Safety System PSRmodular

Tool-free and time-saving installation



Push-in Technology[®]
Designed by PHOENIX CONTACT

All function modules are designed for tool-free and time-saving installation:

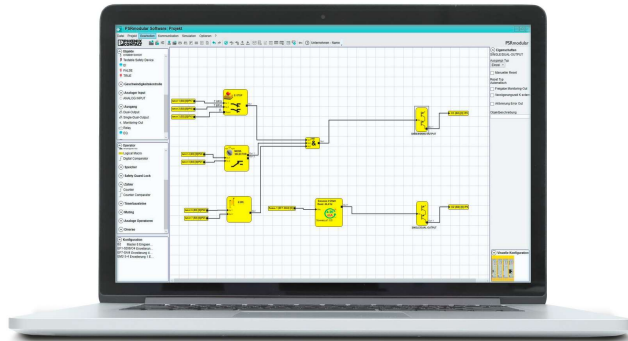
- **Push-In Technology** for convenient conductor connection

Simple and error-free connection of modules on the DIN-rail:

- Space-saving **22.5 mm** wide **ME-MAX housings** in combination with the proven **TBUS** device connector ensure a future-proof and innovative device system

Configurable Safety System PSRmodular

Extensive diagnostic functions easily configurable



Simple configuration without programming knowledge, through free **configuration software**:

- Preconfigured and **TÜV-certified software modules** allow you to assemble your safety system simply by drag & drop
- **Detailed simulation & reporting** function for validation

Diagnostic options

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

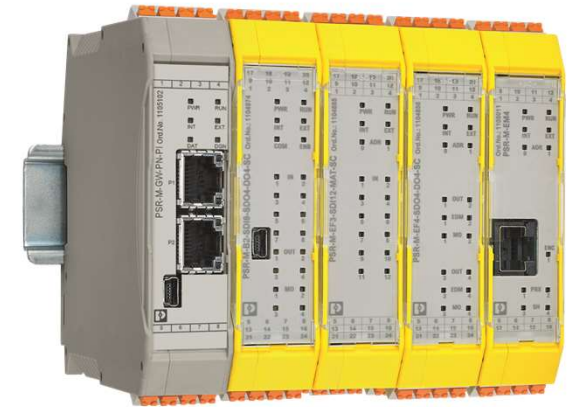
- LED status information
- Channel Information
- Module status





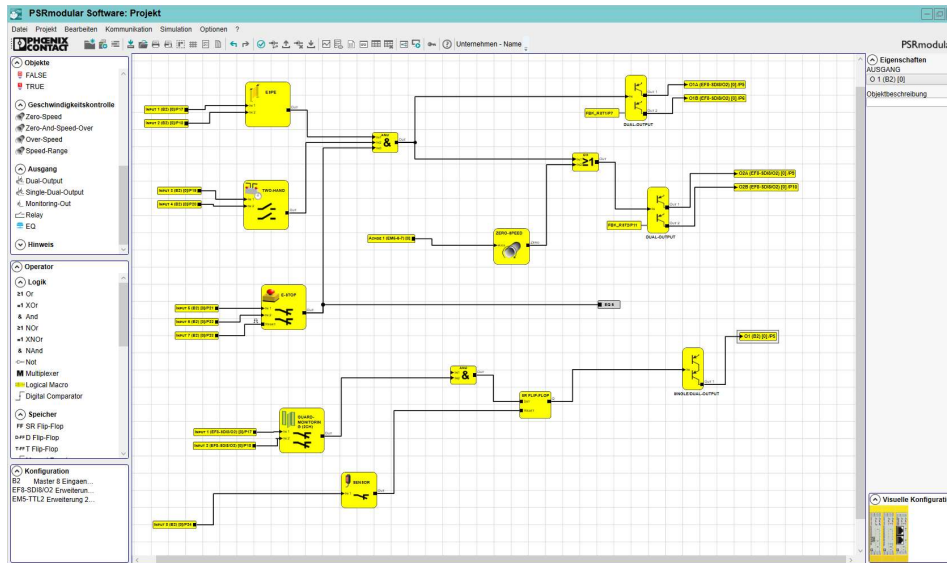




Configurable Safety System PSRmodular

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 System PSRmodular

Part 2: PSRmodular Software



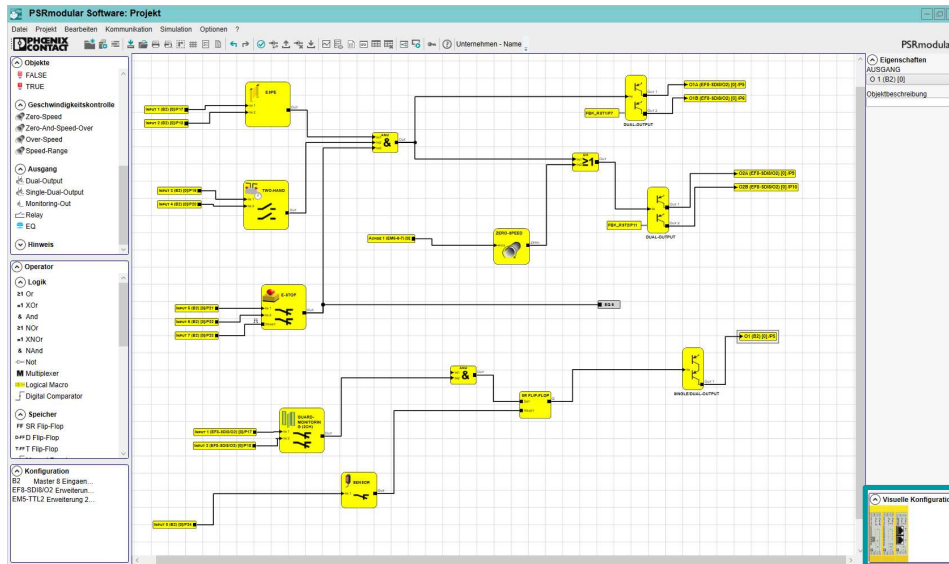
As adaptable as a chameleon !



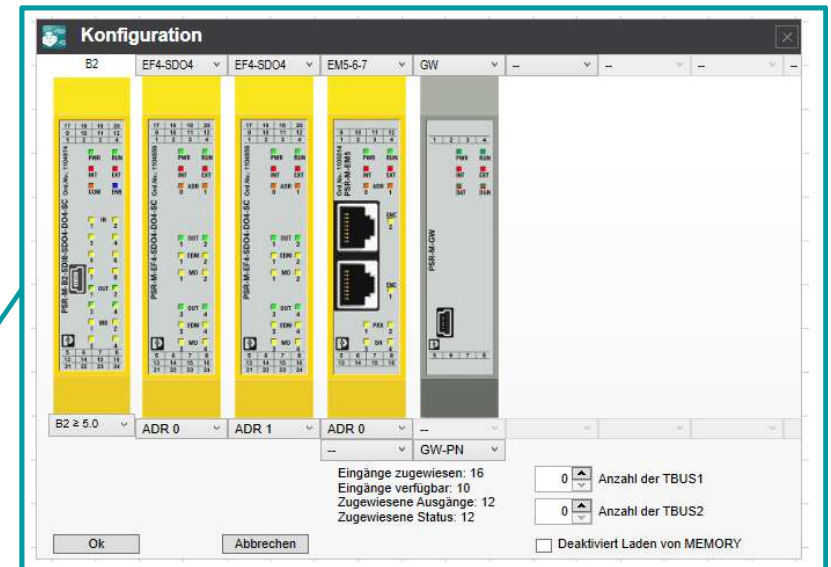
PSRmodular Software Video

Configurable Safety System PSRmodular

TÜV-certified Software function blocks



PSRmodular Konfigurations-Software



Configurable Safety System PSRmodular

PSRmodular in use



Machine building



Packaging industry



Food & beverage



Lift applications



Process industry



Wind turbines

Configurable Safety System PSRmodular

Machine tools

Safe monitoring of

- Emergency stop
- Monitoring of the guard locking function in combination with standstill monitoring
- Manually monitored reset
- Hold-to-run control in combination with overspeed monitoring
- Locking the sliding door
- Safe Torque Off (STO)
- Operating mode selector switch for manual and automatic operation



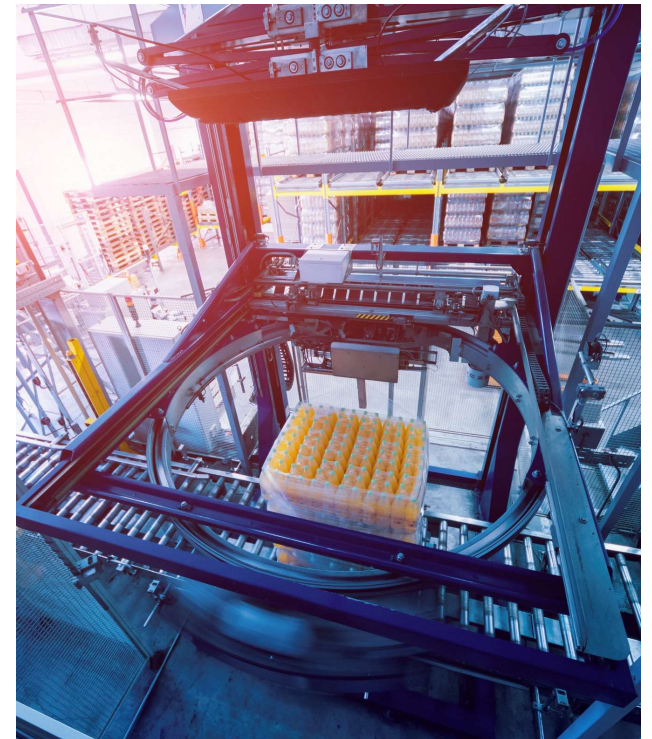
PSRmodular is suitable for safe monitoring of machine tools.

Configurable Safety System PSRmodular

Packaging industry

Safety monitoring of

- Emergency stop
- Safety gate interlocks
- Manually monitored reset
- Operating mode selector switch for manual/automatic operation



Configurable Safety System PSRmodular

Process industry

Safety monitoring of analog values:

- Limit value monitoring for:
 - Limit value monitoring for:
 - filling level measurement
 - Flow measurement
 - Pressure measurement
 - Temperature measurement



Configurable Safety System PSRmodular

Wind turbines

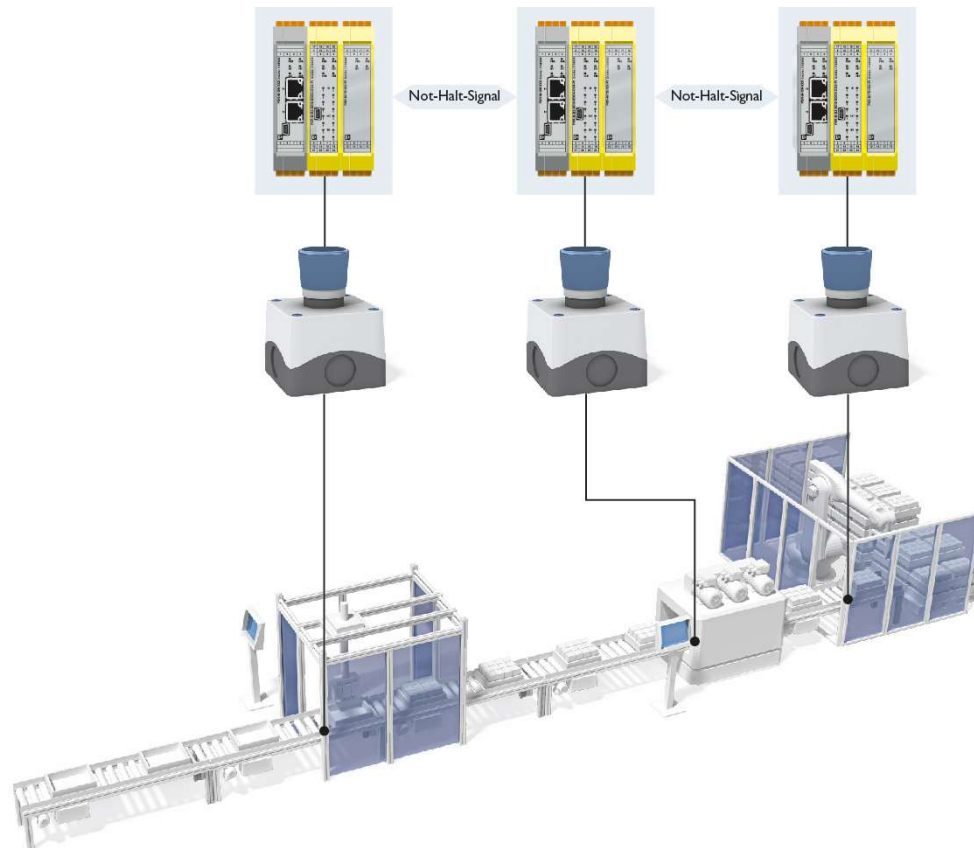
Safety monitoring of:

- Overspeed of the rotor and generator shaft
- Rotor blade adjustment (pitch) and wind direction tracking
- Monitoring for broken shearpins
- Monitoring of the oil temperature etc.
- Emergency stop



Configurable Safety System PSRmodular

Line E-Stop: machine assembly

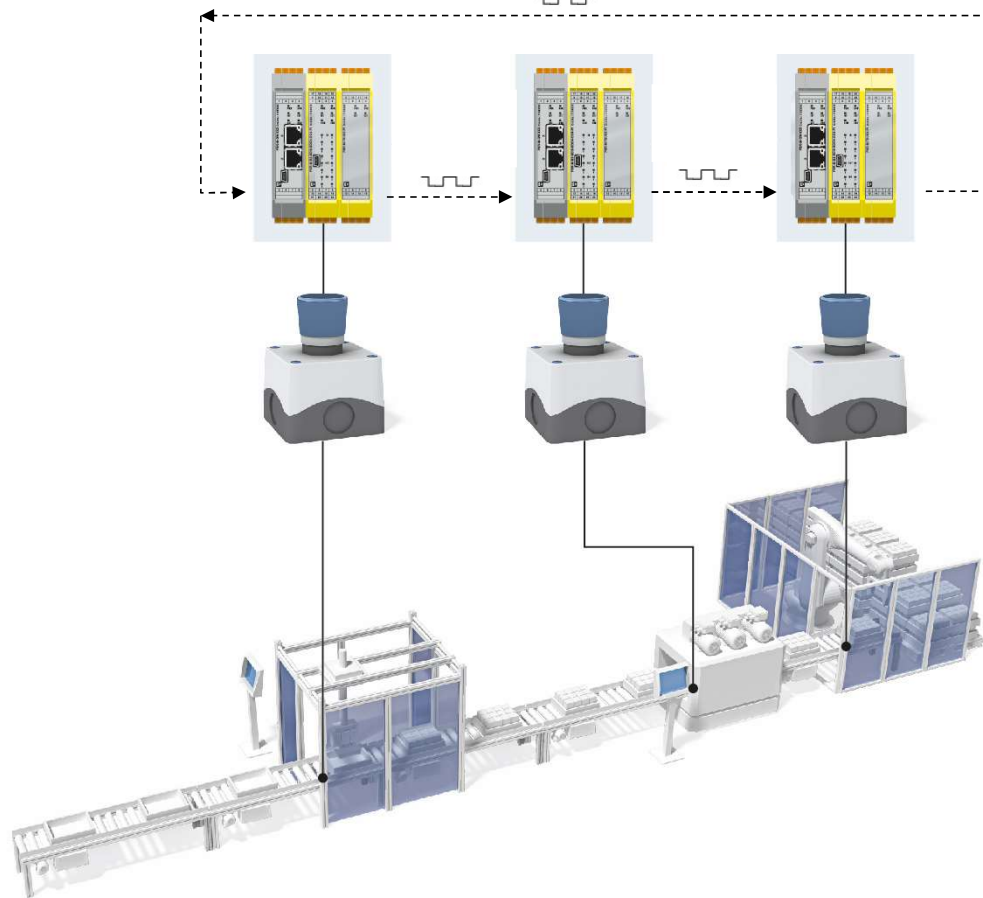


"Whenever possible, an emergency stop command should cause the entire production system to stop "

ISO 11161

Configurable Safety System PSRmodular

Line E-Stop: Daisy-Chain-principle



Configurable Safety System 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 System PSRmodular

Portfolio overview (Safe Motion)

		Safety Function in acc to EN 618000-5-2				Sensor type				
Designation	Type	SOS (Zero Speed)	SLS / SSM (Over Speed)	SSR (Speed Range)	SDI (Safe Direction)	Proximity switches	TTL	HTL	SIN/COS	# Encoder
PSR-M-EM1	Motion 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	2

$n = 0$

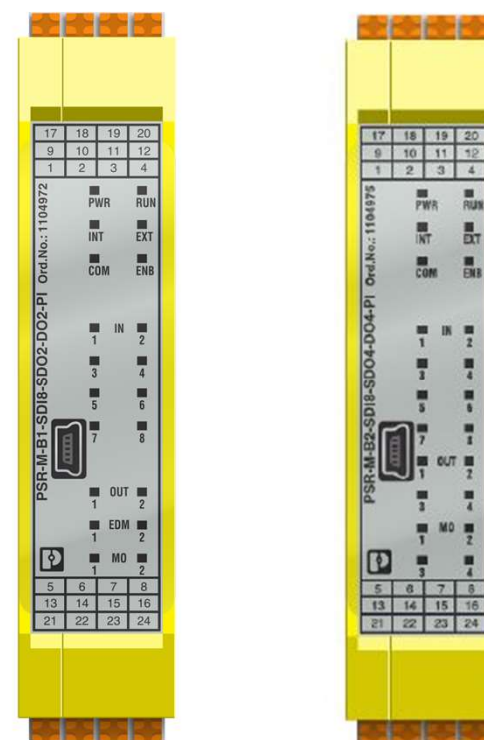
$n_{min} < n < n_{max}$

$\nleftrightarrow$
 n

Configurable Safety System PSRmodular

Base Modules

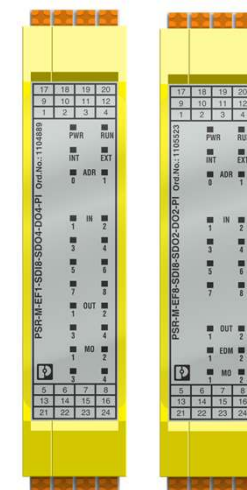
Features	PSR-M-B1-SDI8-SDO2-DO2	PSR-M-B2-SDI8-SDO4-DO4
Digital local safety inputs	8	8
EDM/Restart-inputs	2	4
Digital local safety outputs	2 x pair	4 x single or 2 x pair
Max No. safe I/Os per system	128 / 16	128 / 32
Testpulses	4	4
Local monitoring Out	2	4
Max No. Monitoring out per system	32	48
Max No of operators	64	128
Max No of Timer/Muting/guard lock	32 / 4 / 4	48 / 8 / 8
Virtual I/O's for non-safe communication	8 / 16	32 / 32
Supports analog monitoring	-	yes



Configurable Safety System PSRmodular

Expansion Modules – Failsafe – digital I/O

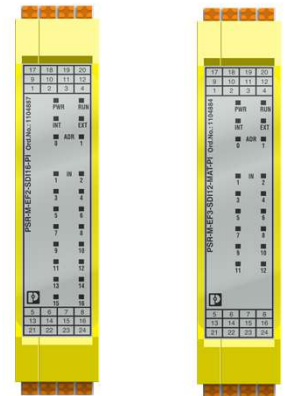
Features	PSR-M-EF1-SDI8- SDO4-DO4	PSR-M-EF8-SDI8- SDO2-DO2
Digital inputs	8	8
EDM/Restart-inputs	4	2
Digital outputs (400mA)	4 x single or 2 x pair	2 x pair
Testpulses	4	4
Monitoring out (100mA)	4	2



Configurable Safety System PSRmodular

Expansion Modules – Failsafe – digital Inputs

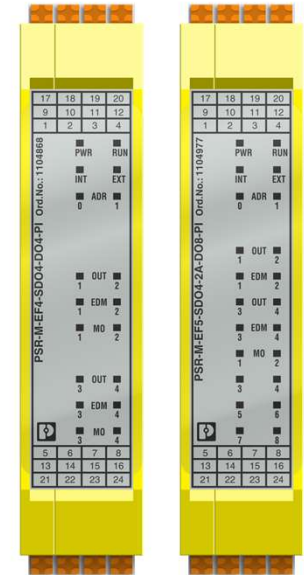
Features	PSR-M-EF2-SDI16	PSR-M-EF3-SDI12-MAT
Digital inputs	16	12
Testpulses	4	8
Safety mats / edges (4-wire)	--	up to 4



Configurable Safety System PSRmodular

Expansion Modules – Failsafe – digital outputs

Features	PSR-M-EF4-SDO4-DO4	PSR-M-EF5-SDO4-2A-DO8
Maximum current	2 x 4 x 0.4 A	4 x 2 A
EDM/Restart-inputs	4	4
Number of digital outputs	4 x pair	4 x single or 2 x pair
Monitoring out (100mA)	4	8



Configurable Safety System PSRmodular

Expansion Modules – Failsafe – relay outputs

Features	PSR-M-EF6-SDOR4
Maximum current	Up to 6A per NO
EDM/Restart-inputs	4
Number of NO	2 x pair or 4 x single



Configurable Safety System PSRmodular

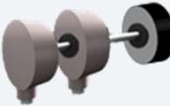
Expansion Modules – Failsafe – analog inputs

Features	PSR-M-EF7-SAI4
Analog inputs	2 x pairs or 4 single
0 – 10V	Yes
0(4) – 20 mA	Yes
Treshold value monitoring	Yes
Range monitoring	Yes
Mathematical operations	Yes
Plausibility	Yes



Configurable Safety System PSRmodular

Motion monitoring – use cases

Encoder		Proximity		Motion Module		Safety Level *
	1 Sin/Cos Safety Encoder		+		PSR-M-EM2...4	SIL 3 – PL e
	1 Sin/Cos or 1 TTL or 1 HTL Encoder	+	1 Proximity		PSR-M-EM2..4	Cat. 3 - DCavg 90% up to SIL 3 – PL e
			2 Proximity		PSR-M-EM1	Cat. 3 - DCavg 90% up to SIL 3 – PL e
	2 Sin/Cos or 2 TTL or 2 HTL Encoder		+		PSR-M-EM5...7	Cat. 3 - DCavg 90% up to SIL 3 – PL e
	1 Sin/Cos or 1 TTL or 1 HTL Encoder		+		PSR-M-EM2..4	Cat. B - PL b (Cat. 1 - SIL 1 – PL c under conditions)
			1 Proximity		PSR-M-EM1	Cat. B - PL b (Cat. 1 - SIL 1 – PL c under conditions)

Expansion Modules – non safe

Features	PSR-M-E1-DO8	PSR-M-E2-DO16
Digital outputs	8	16
Max current	100 mA per output	



Configurable Safety System PSRmodular

Expansion modules (Gateways)

- Bidirectional non-safe communication
- Up to Bit 32 In / 32 Out
- All relevant networks

Supported communication protocols

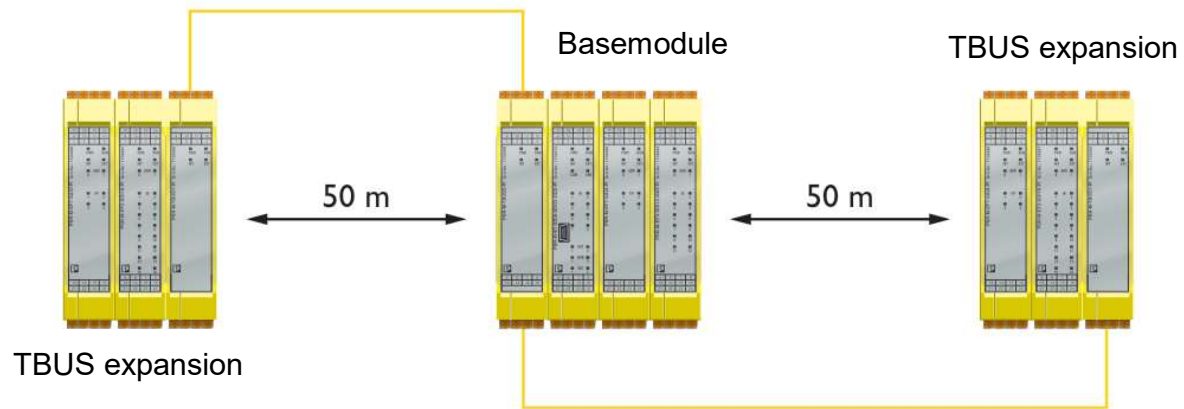
CANopen
EtherCAT
PROFINET
PROFIBUS
CC-Link
DeviceNet
Modbus TCP
EtherNet/IP



Configurable Safety System PSRmodular

Expansion modules for TBUS-“extension“

Extension up to 250m:



Configurable Safety System PSRmodular

Contact



Für weitere Informationen stehen wir Ihnen gerne persönlich zur Verfügung !

Pour plus d'informations, nous serons à votre disposition en personne !

Per maggiori informazioni siamo a vostra disposizione personalmente !

Para más información estamos a su disposición personalmente !

Marketing Antonio Gordillo
Cel 55 3233 6518
agordillo@phoenixcontact.com.mx

