

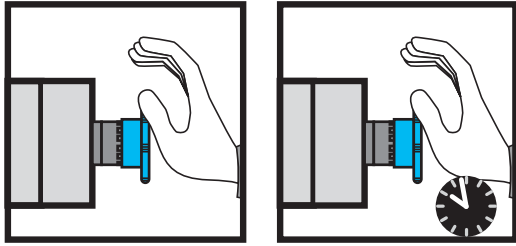
Safety functions

Emergency stop function

and Principal protective functions

Guards without guard locking device

Guards with guard locking device



Stop category 0
Emergency stop function

Stop category 1

Emergency stop function

International standard EN/ISO 13850 (which replaces standard EN 418) specifies the functional requirements and design principles of emergency stop devices. It applies to all machines, whatever type of energy is used to control this function.

When the emergency stop instruction ceases, the effect must be maintained until it is reset. Manual resetting must only be possible in the location where the instruction was given. Resetting must not start the machine, but simply enable the starting cycle. Restarting of the machine must not be possible until the emergency stop has been reset.

The standard allows two types of stop:

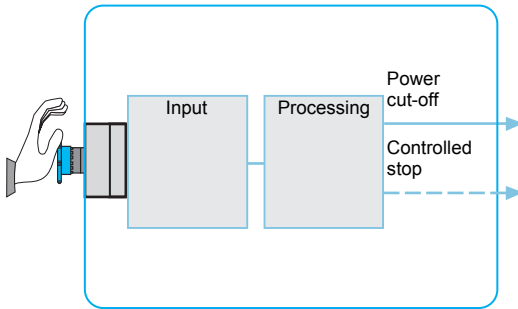
- category 0 : stopping by immediate cutting-off of power or mechanical disconnection between the dangerous components,
- category 1 stop: controlled stopping with power maintained to the actuator to achieve stopping (braking for example), then cut-off of power when standstill is reached.

The choice between these two stopping methods is determined by an evaluation of the machine-related risks.

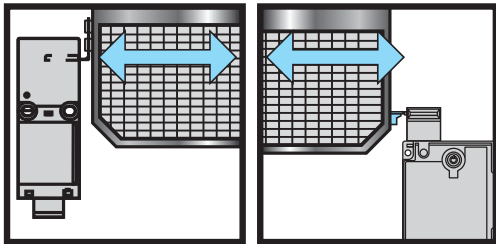
This function includes several sub-functions but is generally represented by the drawings opposite.

The operator interface may be:

- a pushbutton equipped with a mushroom head,
- a cable actuated switch,
- a foot switch.



Sub-elements of the emergency stop function



Guard without guard locking device Guard with guard locking device

Guards without guard locking device

On a large number of potentially dangerous machines, the operator must be kept at a distance during operation, but needs to take action when the machine is stopped to position a part, remove a product or adjust a tool.

An effective means of protection is to install a guard which, according to the type of installation, will cut-off the power to the motor if an attempt is made to open it during the machine operating phase.

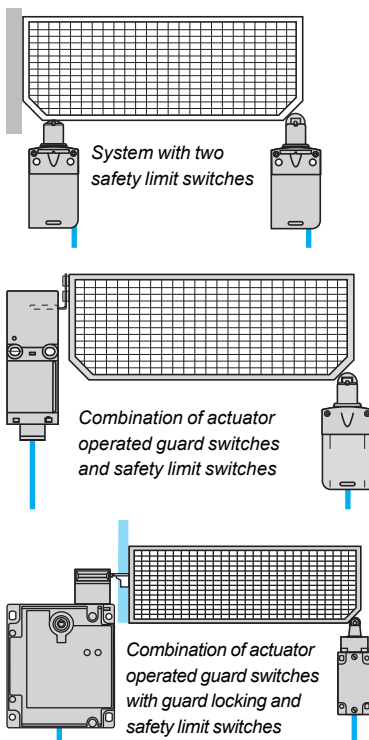
In all cases, it must not be possible to restart the machine until the guard is closed.

Depending on the level of protection required, the system will comprise two conventional limit switches or a combination of protected, actuator operated guard switches to prevent tampering.

Guards with guard locking device

This type of guard is necessary for potentially dangerous machines with high inertia (long rundown time).

The guard is interlocked (by a solenoid for example); it cannot be opened until the machine has come to a complete standstill.

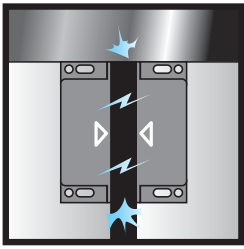


Safety functions

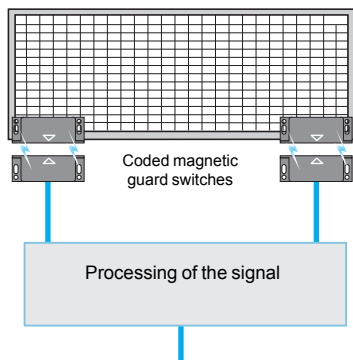
Principal protective functions (continued)

Coded magnetic guard switch and system

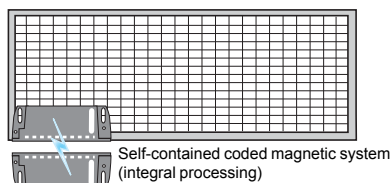
Safety light curtains



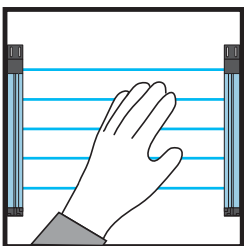
Coded magnetic guard switch



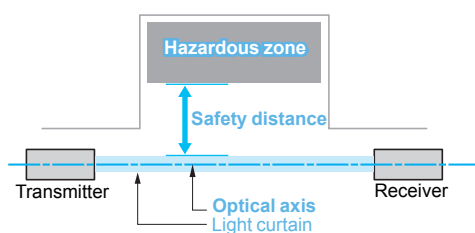
Functions of coded magnetic guard switches



Functions of a coded magnetic guard switch system



Safety light curtain



Coded magnetic guard switch and system

A non-contact solution is often used on industrial machines fitted with a door or guards with imprecise guiding. It is particularly suitable for machines subjected to frequent washing or splashing of liquids as well as small machines with a single guard for self-contained systems.

Depending on the models used, the sensing distance will be between 5 and 10 mm.

The reed contacts used for the coded magnetic switches cannot withstand short-circuits and the switches always incorporate a resistor in series. Their operation can therefore only be guaranteed with the associated processing module.

The Hall-effect self-contained systems with integral processing do not require any further processing of the signal.

The illustrations opposite show the functions of coded magnetic guard switches and of a system.

Safety light curtains

Safety light curtains are electro-sensitive systems (Electro-Sensitive Protective Equipment) designed to protect persons working in the vicinity of machinery, by stopping dangerous movements when a light beam is broken.

The absence of a door or guard reduces loading, inspection or tool changing times.

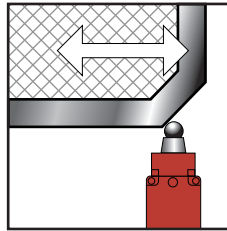
This type of system, defined by standards EN/IEC 61496-1 and EN/IEC 61496-2, is frequently used with machines such as:

- presses,
- machine tools,
- assembly lines, etc.

The machine must be designed so that it is impossible to gain access to dangerous movements without breaking one or more of the light beams. In addition, the movement must be stopped whatever the entry speed of the operator into the hazardous zone.

The diagram opposite illustrates the operation of a light curtain.

Applications



Modules

For Emergency stop and switch monitoring



Maximum achievable safety level

PL e/Category 4 conforming to EN/ISO 13849-1, SILCL 3 conforming to EN/IEC 62061

Conformity to standards

EN/IEC 60204-1, EN 1088/ISO 14119, EN/ISO 13850, EN/IEC 60947-1, EN/IEC 60947-5-1

Product certifications

UL, CSA, TÜV	UL, CSA, BG	UL, CSA, TÜV
--------------	-------------	--------------

Number of circuits

Safety	3		
Additional	1 solid-state output for signalling to PLC	1 relay output for signalling to PLC	–

3		
1 solid-state output for signalling to PLC	1 relay output for signalling to PLC	–

Display

2 LEDs	3 LEDs	
--------	--------	--

Supply voltage

~ and 24 V $\overline{\text{---}}$ 48 V ~ 115 V ~ 230 V ~	~ and 24 V $\overline{\text{---}}$	
--	------------------------------------	--

Synchronisation time between inputs

Unlimited

Input channel voltage

24 V/48 V version	~ and 24 V $\overline{\text{---}}$ /48 V ~		
24 V/48 V or 110 V/120 V/230 V version	–	24 V $\overline{\text{---}}$	24 V $\overline{\text{---}}$ /–
	115 V ~/230 V	–	–
	–	–	–

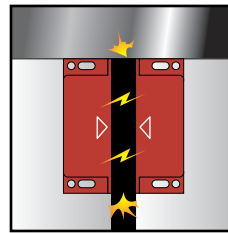
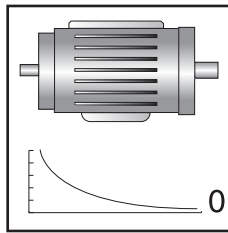
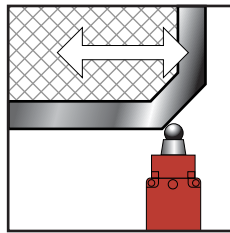
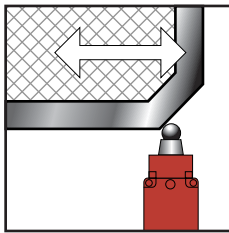
~ and 24 V $\overline{\text{---}}$ /48 V ~	24 V $\overline{\text{---}}$	24 V $\overline{\text{---}}$ /–
–	–	–
115 V ~/230 V	–	–
–	–	–

Module type

XPSAC	XPSAXE	XPSAF
--------------	---------------	--------------

Pages

91	93	
----	----	--



For Emergency stop, switch, sensing mat/edges or solid-state output safety light curtain monitoring

For Emergency stop, switch or solid-state output safety light curtain monitoring

For zero speed detection of AC or DC motors which produce a remanent voltage in their windings due to residual magnetism

For coded magnetic switch monitoring
For 2 max. | **For 6 max.**



PL e/Category 4 conforming to EN/ISO 13849-1, SILCL 3 conforming to EN/IEC 62061

PL d/Category 3 conforming to EN/ISO 13849-1, SILCL 2 conforming to EN/IEC 62061

PL e/Category 4 conforming to EN/ISO 13849-1 SILCL 3 conforming to EN/IEC 62061

EN/IEC 60204-1, EN 1088/ISO 14119, EN/ISO 13850, EN/IEC 60947-1, EN/IEC 60947-5-1

EN/IEC 60204-1, EN/IEC 60947-1, EN/IEC 60947-5-1

EN/IEC 60204-1, EN 1088/ISO 14119, EN/IEC 60947-1, EN/IEC 60947-5-1, EN/IEC 60947-5-3

UL, CSA, TÜV

3	7	2		
1 relay + 4 solid-state outputs for signalling to PLC	2 relay + 4 solid-state outputs for signalling to PLC	2 solid-state outputs for signalling to PLC		
4 LEDs			3 LEDs	15 LEDs
~ and 24 V $\overline{\text{---}}$ 48 V ~ 110 V ~ and 24 V $\overline{\text{---}}$ 120 V ~ and 24 V $\overline{\text{---}}$ 230 V ~ and 24 V $\overline{\text{---}}$	~ and 24 V $\overline{\text{---}}$ 115 V ~ and 24 V $\overline{\text{---}}$ 230 V ~ and 24 V $\overline{\text{---}}$	24 V $\overline{\text{---}}$ 115 V ~ 230 V ~	24 V $\overline{\text{---}}$	
Unlimited or 2 s, 4 s (depending on wiring)	Unlimited	-		
24 V $\overline{\text{---}}$ /-		-		
-	24 V ~/24 V	-		
24 V $\overline{\text{---}}$ /24 V/24 V	-	-		
XPSAK	XPSAR	XPSVNE	XPSDMB	XPSDME
95	97	99	101	

Operating principle

Safety modules XPSAC and XPSAXE are used for monitoring Emergency stop circuits conforming to standards EN/ISO 13850 and EN/IEC 60204-1 and also meet the safety requirements for the electrical monitoring of switches in protection devices conforming to standard EN 1088/ISO 14119. They provide protection for both the machine operator and the machine by immediately stopping the dangerous movement on receipt of a stop instruction from the operator, or on detection of a fault in the safety circuit itself.

To aid diagnostics, the modules have LEDs which provide information on the monitoring circuit status.





The XPSAC module has 3 safety outputs and a solid-state output for signalling to the PLC.
The XPSAXE module has 3 safety outputs and a relay output for signalling to the PLC.

Characteristics

Module type		XPSAC, XPSAC●●●●P	XPSAXE●●●●P, XPSAXE●●●●C
Maximum achievable safety level		PL e/Category 4 conforming to EN/ISO 13849-1, SILCL 3 conforming to EN/IEC 62061	PL e/Category 4 conforming to EN/ISO 13849-1, SILCL 3 conforming to EN/IEC 62061
Reliability data	Mean Time To dangerous Failure (MTTF _d)	Years 210.4	457
	Diagnostic Coverage (DC)	% > 99	> 99
	Probability of dangerous Failure per Hour (PFH _d)	1/h 3.56 x 10 ⁻⁹	3 x 10 ⁻⁸
Conformity to standards		EN/IEC 60204-1, EN 1088/ISO 14119, EN/ISO 13850, EN/IEC 60947-1, EN/IEC 60947-5-1	EN/IEC 60204-1, EN 1088/ISO 14119, EN/ISO 13850, EN/IEC 60947-1, EN/IEC 60947-5-1
Product certifications		UL, CSA, TÜV	UL, CSA, BG
Supply	Voltage	V ~ and 24 ---, 48 ~, 115 ~, 230 ~	~ and 24 ---
	Voltage limits	- 20...+ 10 % (24 V ~) - 20...+ 20 % (24 V ---) - 15...+ 10 % (48 V ~) - 15...+ 15 % (115 V) - 15...+ 10 % (230 V)	- 15...+ 10 %
	Frequency	Hz 50/60	50/60
Consumption		W < 1.2 (24 V ---)	-
		VA < 2.5 (24 V ~) < 6 (48 V ~) < 7 (115 V ~) < 6 (230 V ~)	< 4
Start button monitoring		No	No
Control unit voltage (at nominal supply voltage)		Identical to supply voltage	
	24 V version	V 24 ~ (approx. 90 mA), 24 --- (approx. 40 mA)	24 ---
	48 V version	V 48 ~ (approx. 100 mA)	-
	115 V version	V 115 ~ (approx. 60 mA)	-
	230 V version	V 230 ~ (approx. 25 mA)	-
Outputs	Voltage reference	Volt-free	Volt-free
	Number and type of safety circuits	3 NO (13-14, 23-24, 33-34)	3 NO (13-14, 23-24, 33-34)
	Number and type of additional circuits	1 solid-state	1 NC relay (41-42)
	Breaking capacity in AC-15	VA C300: inrush 1800, maintained 180	B300
	Breaking capacity in DC-13	24 V/2 A L/R = 50 ms	24 V/1.5 A L/R = 50 ms
	Max. thermal current (I _{the})	A 6	8
	Max. total thermal current	A 10.5	-
	Output fuse protection, using fuses conforming to IEC/EN 60947-5-1, DIN VDE 0660 part 200	A 4 gG (gl) or 6 fast acting	6 gG
	Minimum current	mA 10	10
Minimum voltage	V 17	17	
Electrical durability		Please refer to our catalogue "Safety functions and solutions using Preventa".	
Response time on input opening		ms < 100	< 80
Rated insulation voltage (U_i)		V 300 (degree of pollution 2 conforming to IEC/EN 60947-5-1, DIN VDE 0110 parts 1 & 2)	
Rated impulse withstand voltage (U_{imp})		kV 3 (overvoltage category III, conforming to IEC/EN 60947-5-1, DIN VDE 0110 parts 1 & 2)	4 (overvoltage category III, conforming to IEC/EN 60947-5-1, DIN VDE 0110 parts 1 & 2)
LED display		2	2
Operating temperature		°C - 10...+ 55	- 25...+ 55
Storage temperature		°C - 25...+ 85	- 25...+ 75
Degree of protection conforming to IEC/EN 60529	Terminals	IP 20	IP 20
	Enclosure	IP 40	IP 40

Characteristics						
Module type			XPSAC	XPSAC●●●●P	XPSAXE●●●●P	XPSAXE●●●●C
Connection	Type	Terminals	Captive screw clamp terminals	Captive screw clamp terminals	Captive screw clamp terminals	Spring terminals
		Terminal block	Integrated in module	Removable from module	Removable from module	Removable from module
1-wire connection	Without cable end		Solid or flexible cable: 0.14...2.5 mm ²			
	With cable end		Without bezel, flexible cable: 0.25...2.5 mm ²			
2-wire connection	Without cable end		With bezel, flexible cable: 0.25...1.5 mm ²	With bezel, flexible cable: 0.25...2.5 mm ²	With bezel, flexible cable: 0.25...1.5 mm ²	With bezel, flexible cable: 0.25...2.5 mm ²
			Solid or flexible cable: 0.14...0.75 mm ²	Solid cable: 0.2...1 mm ² , flexible cable: 0.2...1.5 mm ²	Solid or flexible cable: 0.2...1 mm ²	—
	With cable end		Without bezel, flexible cable: 0.25...1 mm ²			
			Double, with bezel, flexible cable: 0.5...1.5 mm ²			

References

	Description	Connection	Number of instantaneous opening safety circuits	Additional out	Supply	Reference	Weight kg
 XPSAC●●●●	Safety modules for Emergency stop and switch monitoring	Captive screw clamp terminals Terminal block integrated in module	3	1 solid-state	~ and 24 V $\overline{\text{DC}}$	XPSAC5121	0.160
					48 V ~	XPSAC1321	0.210
					115 V ~	XPSAC3421	0.210
 XPSAC●●●●P		Captive screw clamp terminals Terminal block removable from module	3	1 solid-state	~ and 24 V $\overline{\text{DC}}$	XPSAC5121P	0.160
					48 V ~	XPSAC1321P	0.210
					115 V ~	XPSAC3421P	0.210
 XPSAXE5120P					230 V ~	XPSAC3721P	0.210
					1 relay	~ and 24 V $\overline{\text{DC}}$	XPSAXE5120P
 XPSAXE5120C		Spring terminals Terminal block removable from module	3	1 relay	~ and 24 V $\overline{\text{DC}}$	XPSAXE5120C	0.229

Operating principle

Safety modules XPSAF meet the requirements of Performance Level PL e/Category 4 conforming to standard EN/ISO 13849-1.

They are used for:

- Monitoring Emergency stop circuits conforming to standards EN/ISO 13850 and EN/IEC 60204-1.
- Electrical monitoring of switches activated by protection devices conforming to standard EN 1088.

Housed in a compact enclosure, the modules have 3 safety outputs.

Preventa safety modules XPSAF●●●●P incorporate removable terminal blocks, thus optimising machine maintenance.

To aid diagnostics, the modules have 3 LEDs on the front face which provide information on the monitoring circuit status.

The Start button monitoring function is configurable depending on the wiring.

Characteristics

Module type		XPSAF5130	XPSAF5130P		
Maximum achievable safety level		PL e/Category 4 conforming to EN/ISO 13849-1, SILCL 3 conforming to EN/IEC 62061			
Reliability data	Mean Time To dangerous Failure (MTTF _d)	Years	243		
	Diagnostic Coverage (DC)	%	> 99		
	Probability of dangerous Failure per Hour (PFH _d)	1/h	4.62 x 10 ⁻⁹		
Conformity to standards		EN/IEC 60204-1, EN 1088/ISO 14119, EN/IEC 60947-5-1, EN/IEC 60947-1, EN/ISO 13850			
Product certifications		UL, CSA, TÜV			
Supply	Voltage	V	~ and 24 $\overline{\text{---}}$		
	Voltage limits		- 15...+ 10 %		
	Frequency	Hz	50/60		
Consumption		VA	≤ 5		
Module inputs fuse protection		Internal, electronic			
Start button monitoring		Yes/No (configurable by terminal connections)			
Control unit voltage and current		24 V $\overline{\text{---}}$ /30 mA approx. (at nominal supply voltage)			
Maximum wiring resistance RL		Ω	90		
Synchronisation time between inputs A and B		Unlimited			
Outputs	Voltage reference	Volt-free			
	Number and type of safety circuits	3 NO (13-14, 23-24, 33-34)			
	Breaking capacity in AC-15	VA	C300: inrush 1800, maintained 180		
	Breaking capacity in DC-13	24 V/1.5 A - L/R = 50 ms			
	Max. thermal current (I _{the})	A	6		
	Max. total thermal current	A	18		
	Output fuse protection	A	4 gG or 6 fast acting, conforming to IEC/EN 60947-5-1, DIN VDE 0660 part 200		
	Minimum current	mA	10		
	Minimum voltage	V	17		
Electrical durability		Please refer to our catalogue "Safety functions and solutions using Preventa".			
Response time on input opening		ms	≤ 40		
Rated insulation voltage (U_i)		V	300 (degree of pollution 2 conforming to IEC/EN 60947-5-1, DIN VDE 0110 parts 1 & 2)		
Rated impulse withstand voltage (U_{imp})		kV	4 (overvoltage category III, conforming to IEC/EN 60947-5-1, DIN VDE 0110 parts 1 & 2)		
LED display		3			
Operating temperature		°C	- 10...+ 55		
Storage temperature		°C	- 25...+ 85		
Degree of protection conforming to IEC/EN 60529	Terminals	IP 20			
	Enclosure	IP 40			
Connections	Type	Terminals	Captive screw clamp terminals	Captive screw clamp terminals	
		Terminal block	Integrated in module		
	1-wire connection	Without cable end	Solid or flexible cable: 0.14...2.5 mm ²		Solid or flexible cable: 0.2...2.5 mm ²
		With cable end	Without bezel, flexible cable: 0.25...2.5 mm ²		
	2-wire connection	With cable end	With bezel, flexible cable: 0.25...1.5 mm ²		With bezel, flexible cable: 0.25...2.5 mm ²
		Without cable end	Solid or flexible cable: 0.14...0.75 mm ²		Solid cable: 0.2...1 mm ² , flexible cable: 0.2...1.5 mm ²
		With cable end	Without bezel, flexible cable: 0.25...1 mm ²		
		With cable end	Double, with bezel, flexible cable: 0.5...1.5 mm ²		Double, with bezel, flexible cable: 0.5...1.5 mm ²

References



XPSAF5130

Description	Type of terminal block connection	Number of safety circuits	Supply	Reference	Weight kg
Safety modules for Emergency stop and switch monitoring	Integrated in module	3	~ and 24 V $\overline{\text{DC}}$	XPSAF5130	0.250
	Removable from module	3	~ and 24 V $\overline{\text{DC}}$	XPSAF5130P	0.250

Operating principle

Safety modules XPSAK meet the requirements of Performance Level PL e/Category 4 conforming to standard EN/ISO 13849-1.

They are used for:

- Monitoring Emergency stop circuits conforming to standards EN/ISO 13850 and EN 60204-1.
- Electrical monitoring of switches activated by protection devices, with optional selection of synchronisation time between signals.
- Monitoring 4-wire sensing mats or edges.
- Monitoring type 4 light curtains conforming to EN/IEC 61496-1 which have solid-state safety outputs with test function (light curtains XUSL).

Housed in a compact enclosure, the modules have 3 safety outputs, a relay signalling output and 4 solid-state signalling outputs for signalling to the process PLC.

Preventa safety modules XPSAK●●●●P incorporate removable terminal blocks, thus optimising machine maintenance.


To aid diagnostics, the modules have 4 LEDs on the front face which provide information on the monitoring circuit status.

The Start button monitoring function is configurable depending on the wiring.

Characteristics

Module type		XPSAK3●1144	XPSAK3●1144P
Maximum achievable safety level		PL e/Category 4 conforming to EN/ISO 13849-1, SILCL 3 conforming to EN/IEC 62061	
Reliability data	Mean Time To dangerous Failure (MTTF _d)	Years	154.5
	Diagnostic Coverage (DC)	%	> 99
	Probability of dangerous Failure per Hour (PFH _d)	1/h	7.39 x 10 ⁻⁹
Conformity to standards		EN/IEC 60204-1, EN 1088/ISO 14119, EN/ISO 13850, EN/IEC 60947-1, EN/IEC 60947-5-1	
Product certifications		UL, CSA, TÜV	
Supply	Voltage	V	~ and 24 ---, 48 ~, 110 ~ and 24 ---, 120 ~ and 24 ---, 230 ~ and 24 ---
	Voltage limits		- 15...+ 10 %
	Frequency	Hz	50/60
Consumption	24 V version	VA	≤ 5
	110/120/230 V versions		≤ 6
Module inputs fuse protection		Internal, electronic	
Start button monitoring		Yes/No (configurable by terminal connections)	
Control unit voltage and current between terminals S21-S22, S31-S32		24 V ---/30 mA approx. (at nominal supply voltage)	
Maximum wiring resistance RL between terminals S21-S22, S31-S32		Ω	28
Synchronisation time between inputs A and B (terminals S21-S22, S31-S32)		s	Automatic start: 2 or 4 depending on wiring Manual start (start button between S33 and S34): unlimited
Outputs	Voltage reference		Volt-free
	Number and type of safety circuits		3 NO (13-14, 23-24, 33-34)
	Number and type of additional circuits		1 NC (41-42) + 4 solid-state
	Breaking capacity in AC-15	VA	C300: inrush 1800, maintained 180
	Breaking capacity in DC-13		24 V/1.5 A - L/R = 50 ms
	Breaking capacity of solid-state outputs		24 V/20 mA, 48 V/10 mA
	Max. thermal current (I _{the})	A	6
	Max. total thermal current	A	18
	Output fuse protection	A	4 gG or 6 fast acting, conforming to IEC/EN 60947-5-1, DIN VDE 0660 part 200
	Minimum current	mA	10
	Minimum voltage	V	17
Electrical durability		Please refer to our catalogue "Safety functions and solutions using Preventa".	
Response time on input opening		ms	≤ 40
Rated insulation voltage (Ui)		V	300 (degree of pollution 2 conforming to IEC/EN 60947-5-1, DIN VDE 0110 parts 1 & 2)
Rated impulse withstand voltage (U_{imp})		kV	4 (overvoltage category III, conforming to IEC/EN 60947-5-1, DIN VDE 0110 parts 1 & 2)
LED display			4
Operating temperature		°C	- 10...+ 55
Storage temperature		°C	- 25...+ 85
Degree of protection	Conforming to IEC 60529	Terminals	IP 20
		Enclosure	IP 40

Characteristics (continued)				
Module type			XPSAK3●1144	XPSAK3●1144P
Connections	Type	Terminals	Captive screw clamp terminals	Captive screw clamp terminals
		Terminal block	Integrated in module	Removable from module
	1-wire connection	Without cable end	Solid or flexible cable: 0.14...2.5 mm ²	Solid or flexible cable: 0.2...2.5 mm ²
		With cable end	Without bezel, flexible cable: 0.25...2.5 mm ²	
	2-wire connection	With cable end	With bezel, flexible cable: 0.25...1.5 mm ²	With bezel, flexible cable: 0.25...2.5 mm ²
		Without cable end	Solid or flexible cable: 0.14...0.75 mm ²	Solid cable: 0.2...1 mm ² , flexible cable: 0.2...1.5 mm ²
		With cable end	Without bezel, flexible cable: 0.25...1 mm ²	
		With cable end	Double, with bezel, flexible cable: 0.5...1.5 mm ²	

References								
	Description	Type of terminal block connection	Number of safety circuits	Outputs: Additional / Solid-state for PLC	Supply	Reference	Weight kg	
	Safety modules for Emergency stop, switch, sensing mat/edges or safety light curtain monitoring	Integrated in module	3	1 / 4	24 V ~ 24 V ☰	XPSAK311144	0.300	
					110 V ~ 24 V ☰	XPSAK361144	0.400	
					120 V ~ 24 V ☰	XPSAK351144	0.400	
					230 V ~ 24 V ☰	XPSAK371144	0.400	
			Removable from module	3	1 / 4	24 V ~ 24 V ☰	XPSAK311144P	0.300
						48 V ~	XPSAK331144P	0.300
						110 V ~ 24 V ☰	XPSAK361144P	0.400
						120 V ~ 24 V ☰	XPSAK351144P	0.400
						230 V ~ 24 V ☰	XPSAK371144P	0.400

XPSAK3●1144

Operating principle

Safety modules XPSAR meet the requirements of Performance Level PL e/ Category 4 conforming to standard EN/ISO 13849-1 and are designed for the following safety applications:

- Monitoring Emergency stop circuits conforming to EN/ISO 13850 and EN/IEC 60204-1.
 - Electrical monitoring of switches activated by protection devices conforming to standard EN 1088/ISO 14119.
 - Monitoring type 4 light curtains conforming to EN/IEC 61496-1 that have solid-state safety outputs with test function (light curtains XUSL).
- In addition to 7 safety outputs, modules XPSAR incorporate 2 relay signalling outputs and 4 solid-state signalling outputs for signalling to the process PLC.

Safety modules XPSAR●●●●●●P incorporate removable terminal blocks, thus optimising machine maintenance.

To aid diagnostics, the modules have 4 LEDs on the front face which provide information on the monitoring circuit status.

The Start button monitoring function is configurable depending on the wiring.

Characteristics

Module type		XPSAR3●1144	XPSAR3●1144P	
Maximum achievable safety level		PL e/Category 4 conforming to EN/ISO 13849-1, SILCL 3 conforming to EN/IEC 62061		
Reliability data	Mean Time To dangerous Failure (MTTF _d)	Years	277.8	
	Diagnostic Coverage (DC)	%	> 99	
	Probability of dangerous Failure per Hour (PFH _d)	1/h	2.22 x 10 ⁻⁹	
Conformity to standards		EN/IEC 60204-1, EN 1088/ISO 14119, EN/ISO 13850, EN/IEC 60947-1, EN/IEC 60947-5-1		
Product certifications		UL, CSA, TÜV		
Supply	Voltage	V	~ and 24 ---, 115 ~, 230 ~	
	Voltage limits	24 V ---	%	- 15...+ 10
		24 V ~	%	- 15...+ 10
		115 V ~	%	- 15...+ 15
		230 V ~	%	- 15...+ 10
Frequency	Hz	50/60		
Consumption		24 V --- version: < 4 W, 24 V ~ version: < 7 VA, 115/230 V version: < 9 VA		
Module inputs fuse protection		Internal, electronic		
Start button monitoring		Yes/No (configurable by terminal connections)		
Control unit voltage and current (between terminals S11-S52 and S21-S22). 24 V, 115 V and 230 V version		V	24 --- (20 mA approx.) (at nominal supply voltage)	
Maximum wiring resistance RL (between terminals S11-S52 and S21-S22)		Ω	50	
Synchronisation time between inputs A and B Automatic start, terminals S33, S34 linked		ms	100	
Safety outputs	Voltage reference		Volt-free	
	Number and type of safety circuits		7 NO (13-14/23-24/33-34/43-44/53-54/63-64/73-74)	
	Number and type of additional outputs		4 solid-state (Y31-Y32, Y31-Y64, Y31-Y74, Y31-Y35)	
	Number and type of auxiliary contacts		2 NC (81-82/91-92)	
	Breaking capacity in AC-15	VA	B300 (inrush: 3600, maintained: 360)	
	Breaking capacity in DC-13		24 V/2 A, L/R = 50 ms	
	Breaking capacity of solid-state outputs		24 V/20mA	
	Max. thermal current (I _{the})	A	10	
	Max. total thermal current	A	40	
	Output fuse protection	A	6 gG or 10 fast acting, conforming to EN/IEC 60947-5-1, DIN VDE0660 part 200	
	Minimum current	mA	170	
Minimum voltage	V	17		
Electrical durability		Please refer to our catalogue "Safety functions and solutions using Preventa".		
Response time on input opening		ms	< 20	
Rated insulation voltage (U_i)		V	300 (degree of pollution 2 conforming to IEC/EN 60947-5-1, DIN VDE 0110 parts 1 & 2)	
Rated impulse withstand voltage (U_{imp})		kV	4 (overvoltage category III, conforming to IEC/EN 60947-5-1, DIN VDE 0110 parts 1 & 2)	
LED display			4	
Operating temperature		°C	- 10...+ 55	
Storage temperature		°C	- 25...+ 85	
Degree of protection conforming to IEC 60529			Terminals: IP 20, enclosure: IP 40	

Characteristics (continued)

Module type			XPSAR3●1144	XPSAR3●1144P
Connection	Type	Terminals	Captive screw clamp terminals	Captive screw clamp terminals
		Terminal block	Integrated in module	Removable from module
1-wire connection	Without cable end		Solid or flexible cable: 0.14...2.5 mm ²	Solid or flexible cable: 0.2...2.5 mm ²
	With cable end		Without bezel, flexible cable: 0.25...2.5 mm ²	
	With cable end		With bezel, flexible cable: 0.25...1.5 mm ²	With bezel, flexible cable: 0.25...2.5 mm ²
2-wire connection	Without cable end		Solid or flexible cable: 0.14...0.75 mm ²	Solid cable: 0.2...1 mm ² , flexible cable: 0.2...1.5 mm ²
	With cable end		Without bezel, flexible cable: 0.25...1 mm ²	
	With cable end		Double, with bezel, flexible cable: 0.5...1.5 mm ²	

References

Description	Type of terminal block connection	Number of safety circuits	Additional outputs/ solid-state outputs to PLC	Supply	Reference	Weight	
Safety modules for Emergency stop, switch or safety light curtain monitoring	Integrated in module	7	2 / 4	V	XPSAR311144	0.300	
				24 ~			
				24 ---			
	Removable from module	7	2 / 4	24 ~	115 ~	XPSAR351144	0.400
					24 ---		
					230 ~	XPSAR371144	0.400
Removable from module	7	2 / 4	24 ~	24 ---	XPSAR311144P	0.300	
				115 ~	XPSAR351144P	0.400	
				24 ---			
Removable from module	7	2 / 4	24 ~	230 ~	XPSAR371144P	0.400	
				24 ---			



XPSAR3●1144

Operating principle

Preventa safety modules XPSVNE for zero speed detection are used to detect the stop condition of electric motors. Their most common applications include: providing the unlock signal for electrically interlocked sliding or removable machine guards, controlling rotation direction signals for reversing motors and engaging locking brakes after a motor has come to a standstill.

As electric motors run down, a remanent voltage is produced in the windings of the motor due to residual magnetism. This voltage is proportional to the speed of the motor and, therefore, decreases as the motor comes to a standstill. This remanent voltage is measured in a redundant manner so as to detect the stop condition of the motor. The cabling between the motor windings and the inputs of the XPSVNE module is also monitored to prevent a cabling breakage or fault being seen as a stopped motor.

A transformer should not be used to connect the motor to terminals Z1, Z2 and Z3 since there is no monitoring of the connection with the motor winding via the resistance monitoring.

Modules XPSVNE are suitable for detecting the stop condition of all types of AC or DC motor driven machines which, when the motor runs down, produce a remanent voltage in the windings due to residual magnetism. These machines can be controlled by electronic devices, such as variable speed drives or DC injection brakes. The input filters for standard XPSVNE modules are designed for a frequency of up to 60 Hz.

For motors operating at a frequency higher than 60 Hz, which therefore produce a high frequency remanent voltage, special modules XPSVNE●●●●HS should be used.

Modules XPSVNE have 2 potentiometers mounted on the front face of the module which allow independent adjustment of the switching threshold for each input circuit. This allows adjustment for different types of motors and application requirements.

To aid diagnostics, modules XPSVNE have 4 LEDs and 2 solid-state outputs to provide information on the status of the zero speed detection circuit.

Characteristics

Module type		XPSVNE	
Maximum achievable safety level			PL d/Category 3 conforming to EN/ISO 13849-1, SILCL 2 conforming to EN/IEC 62061
Reliability data	Mean Time To dangerous Failure (MTTF _d)	Years	124.1
	Diagnostic Coverage (DC)	%	> 99
	Probability of dangerous Failure per Hour (PFH _d)	1/h	9.26 x 10 ⁻⁹
Conformity to standards			EN/IEC 60204-1, EN/IEC 60947-1, EN/IEC 60947-5-1
Product certifications			UL, CSA, TÜV
Supply	Voltage	V	24 $\overline{\text{---}}$ 115 \sim 230 \sim
	Voltage limits		- 15...+ 10 % (24 V $\overline{\text{---}}$) - 15...+ 15 % (115 V \sim) - 15...+ 10 % (230 V \sim)
	Frequency	Hz	50/60 (115 V, 230 V)
Consumption		W	≤ 3.5 (24 V $\overline{\text{---}}$)
		VA	≤ 7.5 (115 V \sim), ≤ 7 (230 V \sim)
Frequency of motor power supply		Hz	≤ 60 Hz (XPSVNE●●42), > 60 Hz (XPSVNE●●42HS)
Inputs	Maximum voltage between terminals Z1 - Z2 - Z3	V	500 rms
	Detection threshold	V	0.01 - 0.1 (adjustable)

Characteristics (continued)				
Module type		XPSVNE		
Outputs	Voltage reference	Volt-free		
	Number and type of safety circuits	1 NO (13-14), 1 NC (21-22)		
	Number and type of additional circuits	2 solid-state		
	Breaking capacity in AC-15	C300 (inrush: 1800 VA/maintained: 180 VA)		
	Breaking capacity in DC-13	24 V/1.5 A - L/R = 50 ms (contact 13-14) 24 V/1.2 A - L/R = 50 ms (contact 21-22)		
	Breaking capacity of solid-state outputs	24 V/20 mA, 48 V/10 mA		
	Max. thermal current (I _{the})	A 2.5		
	Output fuse protection	A 4 gG, conforming to IEC/EN 60947-5-1, DIN VDE 0660 part 200		
	Minimum current (volt-free contact)	mA 10 (1)		
Minimum voltage (volt-free contact)	V 17 (1)			
Electrical durability	Please refer to our catalogue "Safety functions and solutions using Preventa".			
Rated insulation voltage (U_i)	V	300 (degree of pollution 2 conforming to IEC/EN 60947-5-1, DIN VDE 0110 parts 1 & 2)		
Rated impulse withstand voltage (U_{imp})	kV	4 (overvoltage category III, conforming to IEC/EN 60947-5-1, DIN VDE 0110 parts 1 & 2)		
LED display		4		
Operating temperature	°C	- 10...+ 55		
Storage temperature	°C	- 25...+ 85		
Degree of protection Conforming to EN/IEC 60529	Terminals	IP 20		
	Enclosure	IP 40		
Connection	Type	Terminals	Captive screw clamp	
		Terminal block	Removable from module	
	1-wire connection	Without cable end	Solid or flexible cable: 0.2...2.5 mm ²	
		With cable end	Without bezel, solid or flexible cable: 0.25...2.5 mm ² With bezel, solid or flexible cable: 0.25...2.5 mm ²	
	2-wire connection	Without cable end	Solid cable: 0.2...1 mm ² , flexible cable: 0.2...1.5 mm ²	
		With cable end	Without bezel, flexible cable: 0.25...1 mm ² With bezel, flexible cable: 0.5...1.5 mm ²	

(1) The module is also capable of switching low power loads (17 V/10 mA) provided that the contact has not been used for switching high power loads (possible contamination or wear of the gold layer on the contact tips).

References



XPSVNE●●●●●●

Description	Number of safety circuits	Solid-state outputs for PLC	Supply	Frequency of motor power supply	Reference	Weight kg
Safety modules for zero speed detection	2	2	24 V $\overline{\text{---}}$	≤ 60 Hz	XPSVNE1142P	0.500
				> 60 Hz	XPSVNE1142HSP	0.500
	115 V \sim	≤ 60 Hz	XPSVNE3442P	0.600		
		> 60 Hz	XPSVNE3442HSP	0.600		
	230 V \sim	≤ 60 Hz	XPSVNE3742P	0.600		
		> 60 Hz	XPSVNE3742HSP	0.600		

Operating principle

Safety modules XPSDMB and XPSDME are specifically designed for monitoring coded magnetic safety switches. They incorporate two safety outputs and two solid-state outputs for signalling to the process PLC. Conforming to Performance Level PL e/Category 4 conforming to EN/ISO 13849-1, modules XPSDMB can monitor two independent sensors and modules XPSDME can monitor up to six independent sensors.

To monitor a higher number of magnetic switches using these safety modules, the magnetic switches can be connected in series parallel, while meeting the requirements of Performance Level PL d/Category 3 conforming to standard EN/ISO 13849-1.

Safety modules XPSDME●●●●●P incorporate removable terminal blocks, thus optimising machine maintenance.

To aid diagnostics, the modules have LEDs on the front face which provide information on the monitoring circuit status.

Characteristics

Module type		XPSDMB1132	XPSDMB1132P	XPSDME1132	XPSDME1132P		
Maximum achievable safety level		PL e/Category 4 conforming to EN/ISO 13849-1, SILCL 3 conforming to EN/IEC 62061					
Reliability data	Mean Time To dangerous Failure (MTTF _d)	Years	83.1	82.4			
	Diagnostic Coverage (DC)	%	> 99				
	Probability of dangerous Failure per Hour (PFH _d)	1/h	3.92 x 10 ⁻⁹	3.97 x 10 ⁻⁹			
Conformity to standards		EN/IEC 60204-1, EN 1088/ISO 14119, EN/IEC 60947-1, EN/IEC 60947-5-1, EN/IEC 60947-5-3					
Product certifications		UL, CSA, TÜV					
Supply (U_e) conforming to IEC 60038	Voltage	V	24 V $\overline{\text{---}}$				
	Voltage limits		- 20...+ 20 %				
Consumption		W	< 2.5	< 3.5			
Module inputs fuse protection		Internal, electronic					
Maximum wiring resistance R_L between the module and the coded magnetic switches		Ω	100				
Control unit voltage and current		28 V/8 mA					
Synchronisation time between magnetic switch inputs		s	< 0.5				
Safety outputs	Voltage reference	Volt-free					
	Number and type of safety circuits	2 NO					
	Number and type of solid-state outputs	2					
	Breaking capacity in AC-15	VA	C300: inrush 1800, maintained: 180				
	Breaking capacity in DC-13	24 V/1.5 A, L/R = 50 ms					
	Max. thermal current (I _{the})	A	6				
	Max. total thermal current	A	12				
	Output fuse protection	A	4 gG or 6 fast acting				
	Minimum current	mA	10				
	Minimum voltage	V	17				
Electrical durability		Please refer to our catalogue "Safety functions and solutions using Preventa".					
Response time on input opening		ms	< 20				
Rated insulation voltage (U_i)		V	300 (degree of pollution 2 conforming to IEC/EN 60947-5-1, DIN VDE 0110 parts 1 & 2)				
Rated impulse withstand voltage (U_{imp})		kV	4 (overvoltage category III, conforming to IEC/EN 60947-5-1, DIN VDE 0110 parts 1 & 2)				
LED display			3	15			
Ambient air temperature	For operation	°C	- 10...+ 55				
	For storage	°C	- 25...+ 85				
Degree of protection conforming to EN/IEC 60529		Terminals: IP 20, enclosure: IP 40					
Connection	Type	Terminals	Captive screw clamp terminals				
		Terminal block	Integrated in module	Removable from module	Integrated in module	Removable from module	
	1-wire connection	Without cable end		Solid or flexible cable: 0.14...2.5 mm ²	Solid or flexible cable: 0.2...2.5 mm ²	Solid or flexible cable: 0.14...2.5 mm ²	Solid or flexible cable: 0.14...2.5 mm ²
			With cable end	Without bezel, flexible cable: 0.25...2.5 mm ²			
		With cable end		With bezel, flexible cable: 0.25...1.5 mm ²	With bezel, flexible cable: 0.25...2.5 mm ²	With bezel, flexible cable: 0.25...1.5 mm ²	With bezel, flexible cable: 0.25...2.5 mm ²
				Solid or flexible cable: 0.14...0.75 mm ²	Solid cable: 0.2...1 mm ² , flexible cable: 0.2...1.5 mm ²	Solid or flexible cable: 0.14...0.75 mm ²	Solid cable: 0.2...1 mm ² , flexible cable: 0.2...1.5 mm ²
	2-wire connection	Without cable end		Solid or flexible cable: 0.14...0.75 mm ²	Solid cable: 0.2...1 mm ² , flexible cable: 0.2...1.5 mm ²	Solid or flexible cable: 0.14...0.75 mm ²	Solid cable: 0.2...1 mm ² , flexible cable: 0.2...1.5 mm ²
			With cable end	Without bezel, flexible cable: 0.25...1 mm ²			
		With cable end		With bezel, flexible cable: 0.5...1.5 mm ²			
				With bezel, flexible cable: 0.5...1.5 mm ²			

Safety automation solutions

Preventa safety modules types XPSDME, XPSDME

For coded magnetic switch monitoring



XPSDME1132



XPSDME1132P

References						
Description	Type of terminal block connection	Number of safety circuits	Solid-state outputs for PLC	Supply	Reference	Weight
				V		kg
Safety module for monitoring 2 coded magnetic switches	Integrated in module	2 NO	2	24 V	XPSDME1132	0.250
Safety module for monitoring 6 coded magnetic switches	Integrated in module	2 NO	2	24 V	XPSDME1132	0.300
Safety module for monitoring 2 coded magnetic switches	Removable from module	2 NO	2	24 V	XPSDME1132P	0.250
Safety module for monitoring 6 coded magnetic switches	Removable from module	2 NO	2	24 V	XPSDME1132P	0.300