Preventa safety modules
for emergency stop, limit switch, two-hand control, safety mat and edge monitoring

Operating principle, characteristics

Operating principle (see page 1/12)

Characteristics

Type		XPS-ASF	XPS-AMF	XPS-APF
Product designed for use in safety related parts of control systems (conforming to EN 954-1)		Category 4		
Supply				
- voltage	V	∿ and ⎓ 24 or 48, ∿ 115, ∿ 230		
- voltage limits		∿ - 20...+ 10 % (24 V, 48 V) ⎓ - 20...+ 20 % (24 V, 48 V) ∿ - 15...+ 15 % (115 V) ∿ - 15...+ 10 % (230 V)		
- frequency	Hz	50/60		
Maximum consumption connected to safety mat or edge				
24 V	VA	< 9		
48 V	VA	< 12		
115 V/230 V	VA	< 10		
Module fuse protection		Internal, electronic		
Control unit voltage between S11-S12, S21-S22 or S11-B1	V	24 (24 V version), 48 (48 V, 115 V, 230 V versions)		
Minimum voltage and current between terminals S11-S12, S21-S22 or S11-B1 (inputs A and B)				
U min./I min. - 24 V (20 °C) version		16 V/70 mA	16 V/60 mA	16 V/100 mA
U min./I min. - 48 V (20 °C) version		35 V/25 mA	35 V/25 mA	35 V/45 mA
U min./I min. - 115 V/230 V (20 °C) vers.		41 V/25 mA	41 V/25 mA	41 V/45 mA
Calculation of wiring resistance RL between terminals S11-S12, S21-S22 or S11-B1 as a function of the internal supply voltage U int (terminals S11-S21)	Ω	RL max. = $\frac{\text{U int - U min.}}{\text{I min.}}$ Ue = true voltage applied to terminals A1-A2 U int = supply voltage Ue - 3 V (24 V, 48 V version) U int between 42 V and 45 V, with typical value = 45 V (115 V, 230 V version) RL max. must not exceed 50 Ω		
Maximum resistance of safety mat and edge between terminals S31-S32, S41-S42	Ω	50		
Synchronisation time between inputs A and B automatic start, linked terminals S33-S34 and Y3-Y4	ms	Approx. 300		
Outputs				
- voltage reference		Volt-free		
- number and type of safety circuits		2 N/O (13-14, 23-24)	3 N/O (13-14, 23-24, 33-34)	6 N/O (13-14, 23-24, 33-34, 43-44, 53-54, 63-64)
- number and type of additional circuits		2 solid state	1 N/C (41-42) + 2 solid state	1 N/C (71-72) + 2 solid state
- breaking capacity in AC-15	VA	C300 : inrush 1800, maintained 180	B300 : inrush 3600, maintained 360	
- 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 (Ithe)	A	5	6	
- output fuse protection conforming to IEC 947-5-1, DIN VDE 0660 part 200	A	6 fast acting, 4 gl	6 gl	
- minimum current (volt-free contact)	mA	10		
- minimum voltage (volt-free contact)	V	17		
- max. total thermal current	A	10	15	30
Electrical life		See page 1/10		
Response time on input opening	ms	< 40		
Rated insulation voltage (Ui)	V	300 (degree of pollution 2 conforming to IEC 947-5-1, DIN VDE 0110 parts 1 and 2)		
Rated impulse withstand voltage (Uimp)	kV	4 (overvoltage category III, conforming to IEC 947-1, DIN VDE 0110 parts 1 and 2)		
LED display		4		
Operating temperature	°C	- 10…+ 55		
Storage temperature	°C	- 25…+ 85		
Degree of protection Terminals		IP 20		
conforming to IEC 529 Enclosure		IP 40		
Connection Type		Captive screw clamp terminals : without cable end 1 x 4 mm², with cable end 2 x 2.5 mm²		

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References

References

Description	Number of safety circuits	Additional outputs	Solid state outputs for PLC	Supply	Reference	Weight kg
 XPS-ASF **Safety modules for emergency stop, limit switch, two-hand control, safety mat and edge monitoring**	2	–	2	∿ and ⎓ 24 V	**XPS-ASF5142**	0.350
				∿ and ⎓ 48 V	**XPS-ASF5342**	0.350
				∿ 115 V	**XPS-ASF3442**	0.450
				∿ 230 V	**XPS-ASF3742**	0.450
 XPS-AMF	3	1	2	∿ and ⎓ 24 V	**XPS-AMF5142**	0.600
				∿ and ⎓ 48 V	**XPS-AMF5342**	0.600
				∿ 115 V	**XPS-AMF3442**	0.700
				∿ 230 V	**XPS-AMF3742**	0.700
 XPS-APF	6	1	2	∿ and ⎓ 24 V	**XPS-APF5142**	0.600
				∿ and ⎓ 48 V	**XPS-APF5342**	0.600
				∿ 115 V	**XPS-APF3442**	0.700
				∿ 230 V	**XPS-APF3742**	0.700

Preventa safety modules
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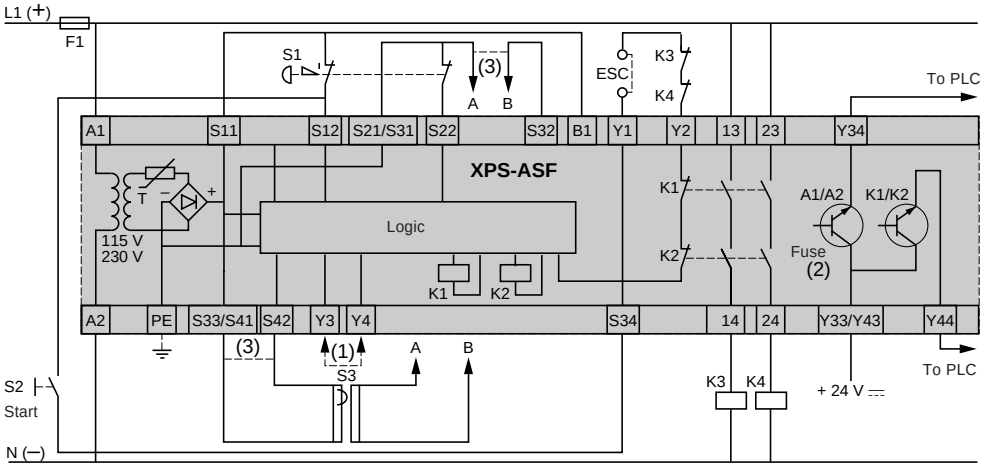
Connections, functional diagram

XPS-ASF

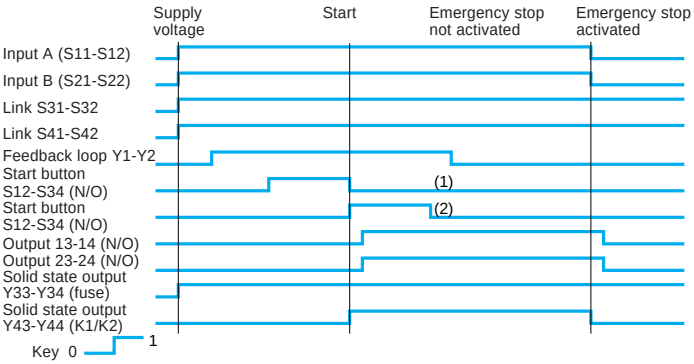
Module XPS-ASF associated with an emergency stop button with 2 N/C contacts



(1) Without start button monitoring (Y3-Y4 linked)
(2) Internal electronic fuse operating status
(3) If no safety mats or edges are connected, terminals S33/41-S42 and S21/31-S32 must be linked

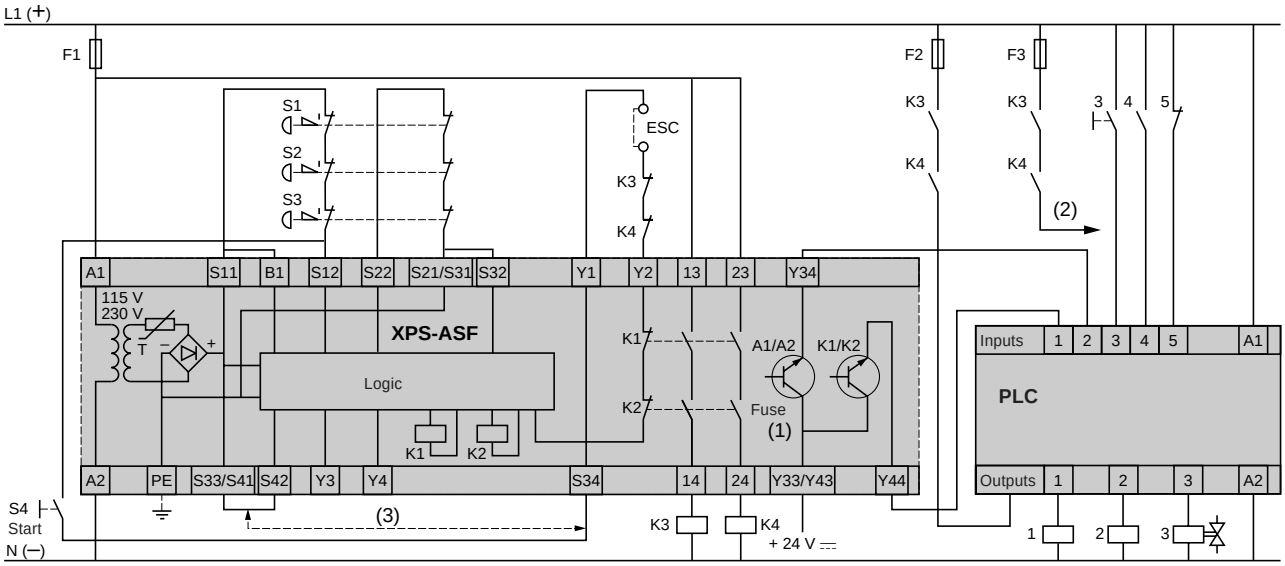
ESC : External start conditions
Y1-Y2 : Feedback loop
S3 : Safety mat or edge

Functional diagram for XPS-ASF
Emergency stop function



(1) With start button monitoring (Y3-Y4 open)
(2) Without start button monitoring (Y3-Y4 linked)

Module XPS-ASF connected to multiple emergency stop buttons and PLC



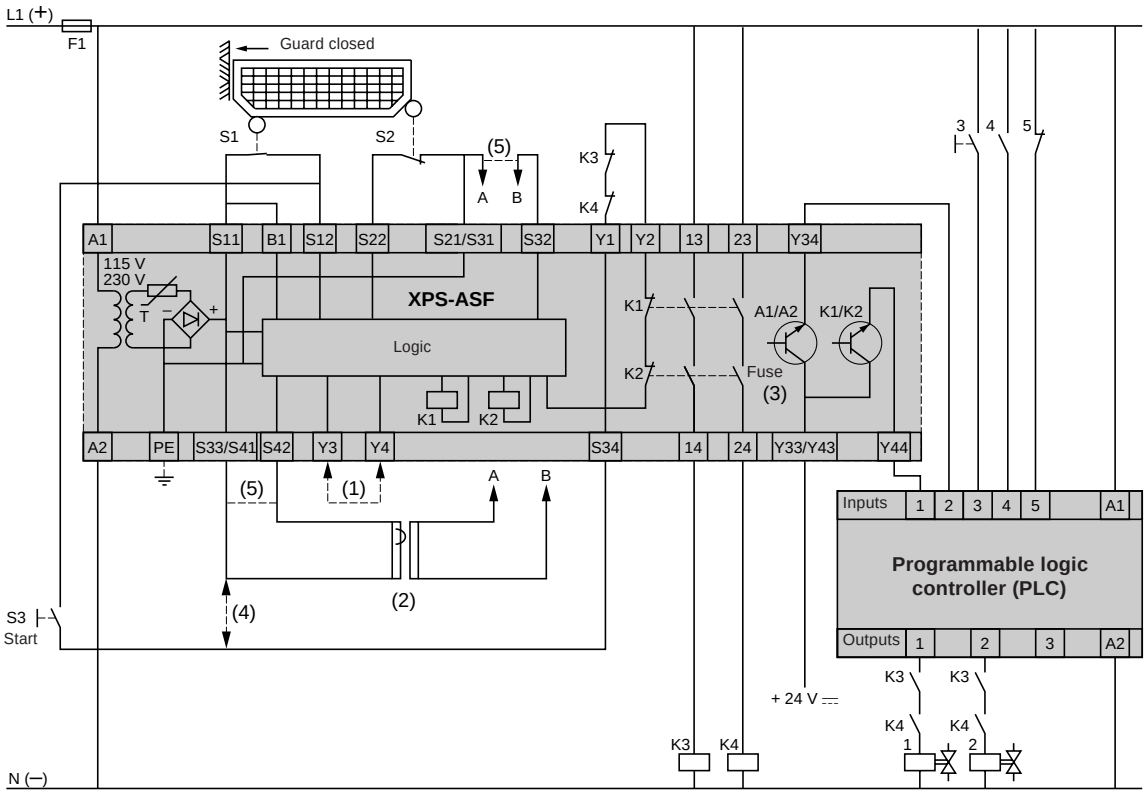
(1) Internal electronic fuse operating status
(2) Other circuits controlled by the XPS-ASF module
(3) Automatic start

ESC : External start conditions
Y1-Y2 : Feedback loop
The PLC outputs are controlled by the XPS-ASF safety module

Preventa safety modules
for emergency stop, limit switch, two-hand control, safety mat and edge monitoring

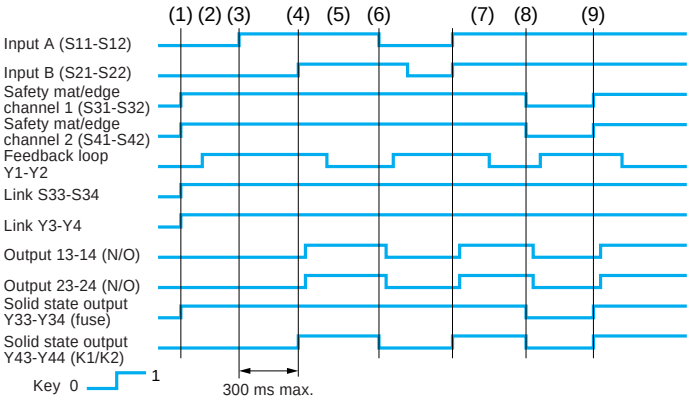
Connections, functional diagrams

XPS-ASF
Example of the safety circuit module XPS-ASF combining limit switches and/or safety mat and PLC monitoring functions



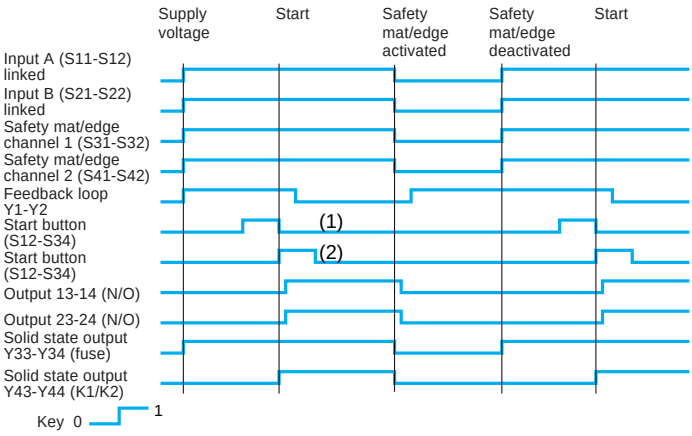
(1) Without start button monitoring (Y3-Y4 linked)
(2) Safety mat or edge
(3) Internal electronic fuse operating status
(4) Automatic start
(5) If no safety mats or edges are connected, terminals S33/41-S42 and S21/31-S32 must be linked

Functional diagrams of XPS-ASF module
Guard function with automatic start and safety mats



(1) Supply voltage
(2) Guard open
(3) 1st switch
(4) 2nd switch
(5) Guard closed
(6) Guard opens
(7) Guard closed
(8) Walk on mat
(9) Deactivate mat

Safety mat or edge function



(1) With start button monitoring (Y3-Y4 open)
(2) Without start button monitoring (Y3-Y4 linked)

Preventa safety modules
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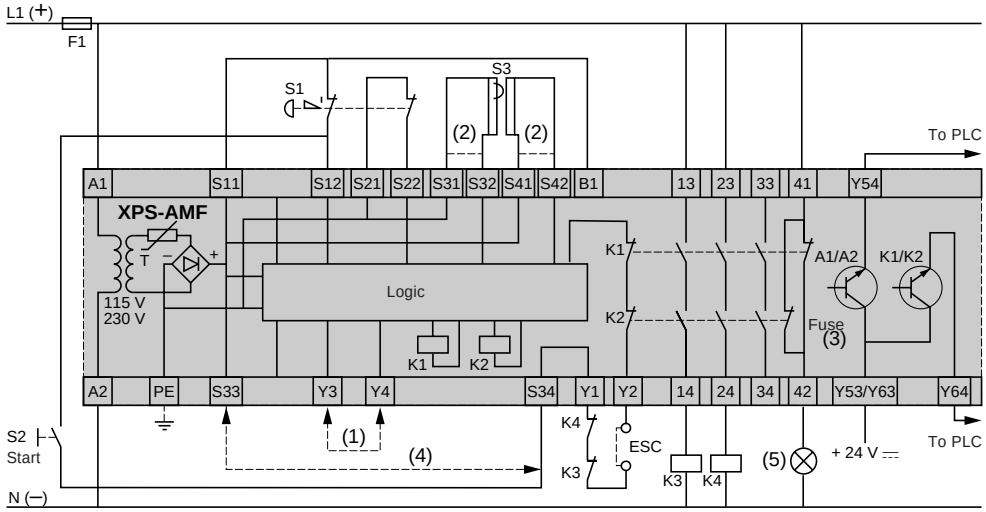
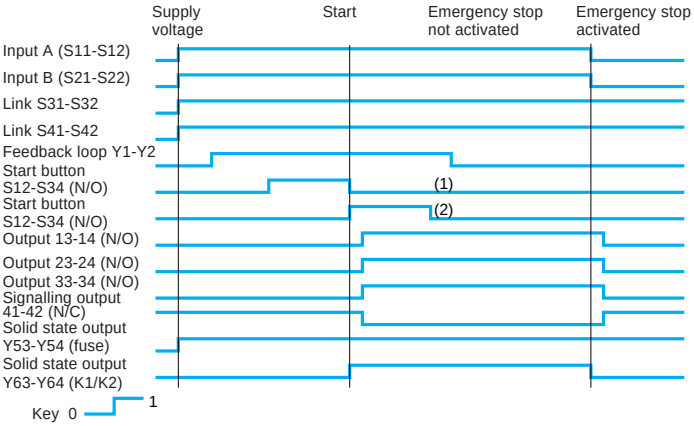
Connections, functional diagrams

XPS-AMF
Module XPS-AMF for emergency stop and/or safety mat monitoring function



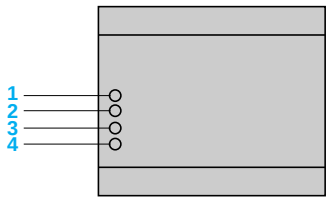
(1) Without start button monitoring (Y3-Y4 linked)
(2) If no safety mats or edges are connected, terminals S31-S32 and S41-S42 must be linked
(3) Internal electronic fuse operating status
(4) Automatic start
(5) "Emergency stop" signalling
S3 : Safety mat or edge
ESC : External start conditions

Functional diagram
Emergency stop function



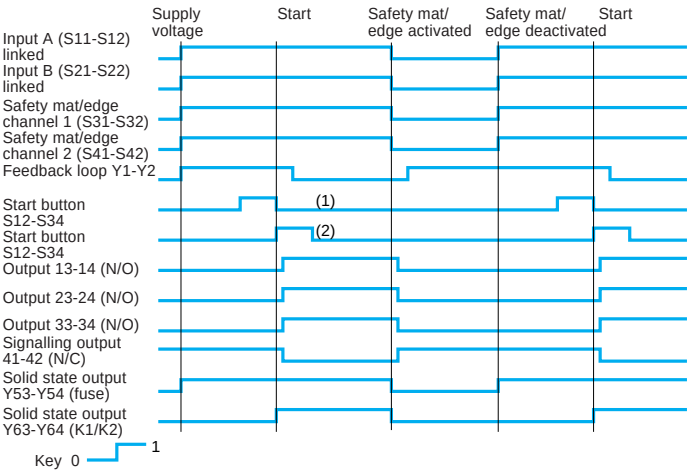
(1) With start button monitoring (Y3-Y4 open)
(2) Without start button monitoring (Y3-Y4 linked)

Key to LEDs



1 A1-A2 supply voltage. Fuse status
Safety mat/edge not activated
2 S12 input status (A)
3 S22 input status (B)
4 K1/K2 status (N/O safety outputs closed)

Functional diagram
Safety mat or edge function



(1) With start button monitoring (Y3-Y4 open)
(2) Without start button monitoring (Y3-Y4 linked)

Preventa safety modules
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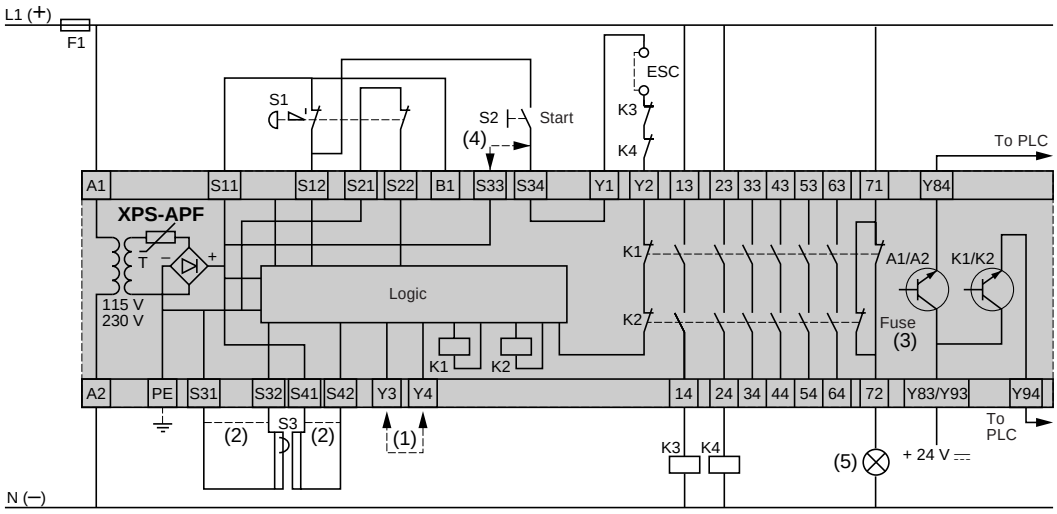
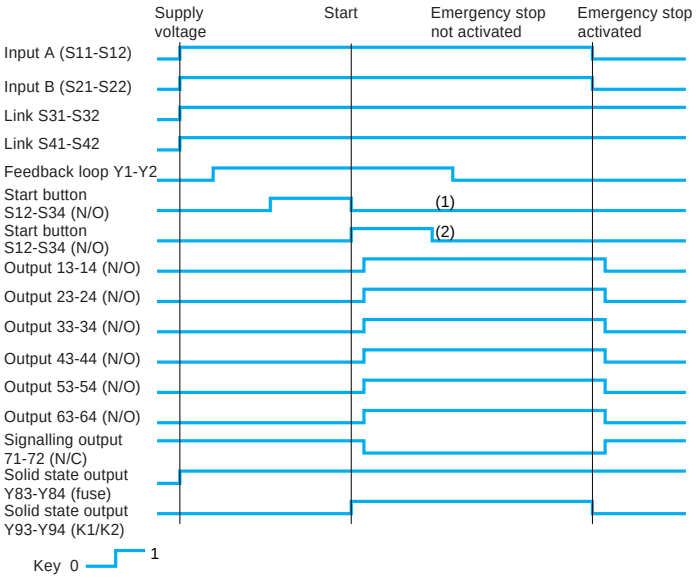
Connections, functional diagrams

XPS-APF
Module XPS-APF for emergency stop and/or safety mat monitoring function



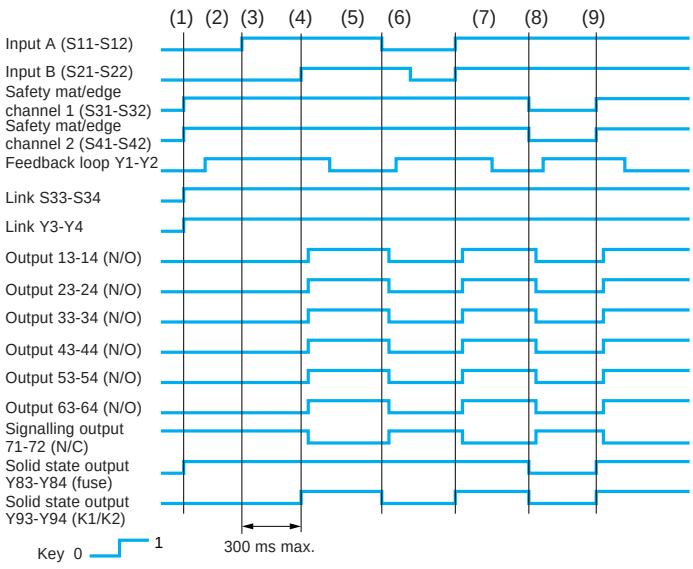
(1) Without start button monitoring (Y3-Y4 linked)
(2) If no safety mats or edges are connected, terminals S31-S32 and S41-S42 must be linked
(3) Internal electronic fuse operating status
(4) Automatic start
(5) “Emergency stop” signalling
ESC : External start conditions
Y1-Y2 : Feedback loop
S3 : Safety mat or edge

Functional diagrams
Emergency stop function



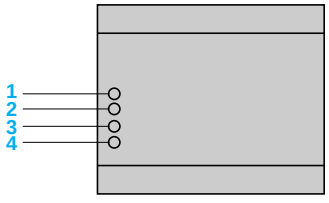
(1) With start button monitoring (Y3-Y4 open)
(2) Without start button monitoring (Y3-Y4 linked)

Guard function with automatic start and safety mat



(1) Supply voltage
(2) Guard open
(3) 1st switch
(4) 2nd switch
(5) Guard closed
(6) Guard opens
(7) Guard closed
(8) Walk on mat
(9) Deactivate mat

Key to LEDs

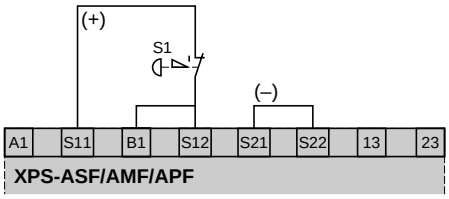


1 A1-A2 supply voltage. Fuse status. Safety mat or edge deactivated
2 S12 input status (A)
3 S22 input status (B)
4 K1/K2 status (N/O safety contacts closed)

Connections

XPS-ASF/AMF/APF
Configuration for emergency stop monitoring

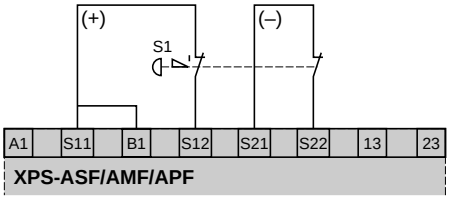
Single-channel wiring



Emergency stop button with single N/C contact.

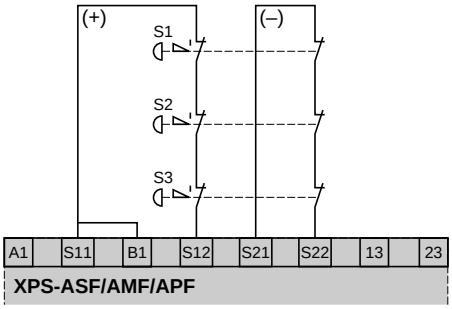
Not all faults are detected : a short-circuit on the emergency stop pushbutton is not detected.

2-channel wiring



Emergency stop button with 2 N/C contacts (recommended application).

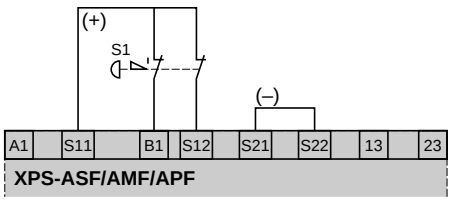
The two input channels are supplied with different polarities.
A short-circuit between the two inputs is detected.



Connection of several emergency stop buttons with 2 N/C contacts (recommended application).

The two input channels are supplied with different polarities. A short-circuit between the two inputs is detected.

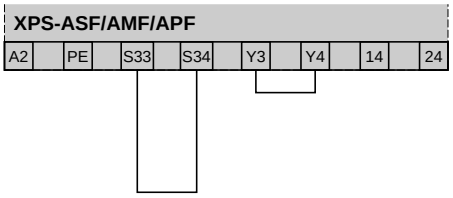
NOTE : A high resistance short between channels may not be detected.



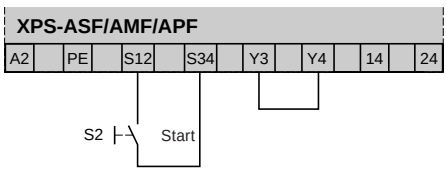
Emergency stop button with 2 N/C contacts.

Both input channels are supplied with the same polarity.
A short-circuit between the two inputs is not detected.

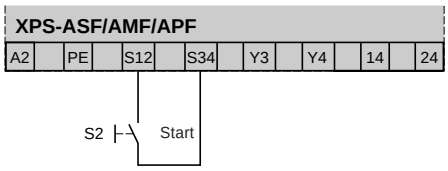
XPS-ASF/AMF/APF
Configuration with automatic and manual reset



Automatic start



Without start button monitoring, manual reset



Push-release function :
With start button monitoring and manual reset

Preventa safety modules
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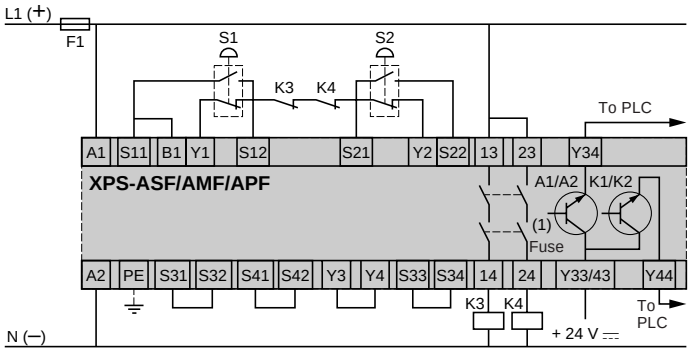
Connections, functional diagram

XPS-ASF/AMF/APF
Type III A two-hand control monitoring conforming to EN 574



S1 and S2 : pushbuttons
Must not be used for applications (presses) which require a type III C module (XPS-BC) conforming to EN 574.
See page 1/41.
(1) Internal electronic fuse operating status.

Functional diagram of module XPS-ASF
Two-hand control function