

Operating principle

Safety modules XPS AV and XPS ATE 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.

In addition to the stop category 0 instantaneous opening safety outputs (3 for XPS AV and 2 for XPS ATE), the modules incorporate stop category 1 time delay outputs (3 for XPS AV and 3 for XPS ATE) which allow for controlled deceleration of the motor components until a complete stop is achieved (for example, motor braking by variable speed drive).

At the end of the preset delay, the supply is disconnected by opening the time delay output circuits.

For module XPS AV, the time delay of the 3 output circuits is adjustable, in 15 preset values, between 0 and 300 seconds using selector buttons.

For module XPS ATE, the time delay of the 3 output circuits is adjustable between 0 and 30 seconds using a 12-position selector switch.

Module XPS AV also incorporates 3 solid-state signalling outputs for signalling to the process PLC. Module XPS ATE incorporates 4 solid-state signalling outputs for signalling to the process PLC.

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

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

Characteristics

Module type		XPS AV11113 and AV11113P	XPS ATE●●●● and ATE●●●●P
Product designed for max. use in safety related parts of control systems (conforming to EN 954-1/EN/ISO 13849-1)		Category 4 max.	Category 4 max. (instantaneous safety outputs) Category 3 max. (time delay safety outputs)
Conformity to standards		EN/IEC 60204-1, DIN V VDE 801 + A1, EN/ISO 13850, EN 1088/ISO 14119, EN/IEC 60947-1 A11, EN/IEC 60947-5-1	EN/IEC 60204-1, EN/IEC 60947-5-1, EN/ISO 13850, EN 50082-2
Product certifications		UL, CSA, BIA	UL, CSA, BG
Supply	Voltage	V --- 24	~ and --- 24, ~ 115, ~ 230
	Voltage limits	- 20...+ 20%	- 20...+ 10% (24 V) - 15...+ 15% (115 V) - 15...+ 10% (230 V)
	Frequency	Hz –	50/60
Consumption		W < 5	< 8
Module inputs fuse protection		Internal, electronic	Internal, electronic
Adjustable time delay		s 0...300	0...30
Start button monitoring		Yes/No (configurable by terminal connections)	Yes/No (configurable by terminal connections)
Control unit voltage (at nominal supply voltage)		Between input terminals S21-S22, S31-S32 or S11-S12	Between input terminals S11-S12, S21-S22 or S11-B1
	24 V version	V 24	24
	115 V, 230 V version	V –	48
Calculation of wiring resistance RL between input terminals		Ω 100 max. Maximum cable length: 2000 m	$RL_{max.} = \frac{U_{int} - U_{min.}}{I_{min.}}$ Ue = true voltage applied to terminals A1-A2 U int (terminals S11-S21) = supply voltage Ue - 3 V (24 V version) U int between 42 V and 45 V, with typical value = 45 V (115 V, 230 V version) Calculated max. RL must be equal to or greater than the true value

Safety automation system solutions

Preventa safety modules types XPS AV, XPS ATE

For Emergency stop and switch monitoring

Characteristics (continued)			XPS AV11113	XPS AV1113P	XPS ATE●●●●	ATE●●●●P	
Module type			XPS AV11113	XPS AV1113P	XPS ATE●●●●	ATE●●●●P	
Synchronisation time between inputs		s	For guard: 1.5 For Emergency stop: unlimited		Approx. 0.075 For automatic start, terminals S33-Y2 and Y3-Y4 linked		
Outputs	Voltage reference		Volt-free		Volt-free		
	Number and type of instantaneous opening safety circuits		3 N/O (03-04, 13-14, 23-24)		2 N/O (13-14, 23-24, 33-34)		
	Number and type of time delay opening safety circuits		3 N/O (37-38, 47-48, 57-58)		3 N/O (57-58, 67-68, 77-78)		
	Number and type of additional circuits		3 solid-state		4 solid-state		
	Breaking capacity in AC-15	Instantaneous outputs	VA	C300: inrush 1800, maintained 180		C300: inrush 1800, maintained 180	
		Time delay outputs	VA	C300: inrush 1800, maintained 180		C300: inrush 1800, maintained 180	
	Breaking capacity in DC-13	Instantaneous outputs		24 V/1.25 A L/R = 50 ms		24 V/1.0 A L/R = 50 ms	
		Time delay outputs		24 V/1.25 A L/R = 50 ms		24 V/1.0 A L/R = 50 ms	
	Breaking capacity of solid-state outputs			24 V/20 mA		-	
	Max. thermal current (I _{the})	Instantaneous outputs	A	3.3 for all 3, or 6 for 1 and 2 for 2, or 4 for 2 and for 2 for 1		5	
		Time delay outputs	A	3.3 for all 3, or 6 for 1 and 2 for 2, or 4 for 2 and 2 for 1		2.5	
	Max. total thermal current		A	20		8	
	Output fuse protection, using fuses conforming to EN/IEC 60947-5-1, DIN VDE 0660 part 200	Instantaneous outputs	A	4 gG or 6 fast acting		6 gG	
		Time delay outputs	A	4 gG or 6 fast acting		4 gG	
	Minimum current		mA	10 (1)		10 (1)	
Minimum voltage		V	17 (1)		17 (1)		
Electrical durability			See page 38610-EN_Ver11.1/2				
Response time on instantaneous opening inputs		ms	< 30		< 20		
Rated insulation voltage (U_i)		V	300 (degree of pollution 2 conforming to EN/IEC 60947-5-1, DIN VDE 0110 parts 1 and 2)				
Rated impulse withstand voltage (U_{imp})		kV	4 (overvoltage category III, conforming to EN/IEC 60947-5-1, DIN VDE 0110 parts 1 and 2)				
LED display			11		4		
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		Captive screw clamp terminals	Captive screw clamp terminals, removable terminal block	Captive screw clamp terminals	Captive screw clamp terminals, removable terminal block	
	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: 0.25...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: 0.14...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				
Double, 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).

Safety automation system solutions

Preventa safety modules types XPS AV,
XPS ATE

For Emergency stop and switch monitoring

103244



XPS AV11113

103245



XPS AV11113P

106571

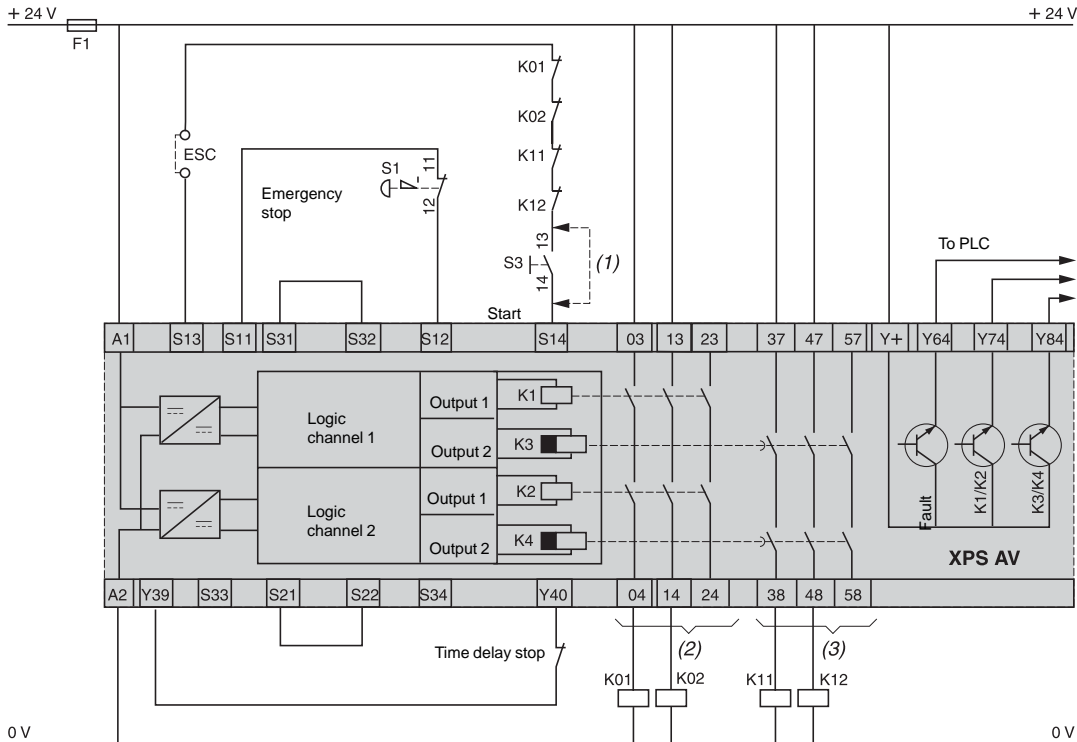


XPS AT●●●●

References						
Description	Number of safety circuits	Additional outputs	Supply	Type of terminal block connection	Reference	Weight kg
Safety modules for Emergency stop and switch monitoring	6 N/O (3 N/O time delay)	3 solid-state	= 24 V	Integrated in module	XPS AV11113	0.320
				Removable from module	XPS AV11113P	0.320
	5 N/O (3 N/O time delay)	4 solid-state	~/= 24 V	Integrated in module	XPS ATE5110	0.280
				Removable from module	XPS ATE5110P	0.280
				Integrated in module	XPS ATE3410	0.380
				Removable from module	XPS ATE3410P	0.380
				Integrated in module	XPS ATE3710	0.380
				Removable from module	XPS ATE3710P	0.380

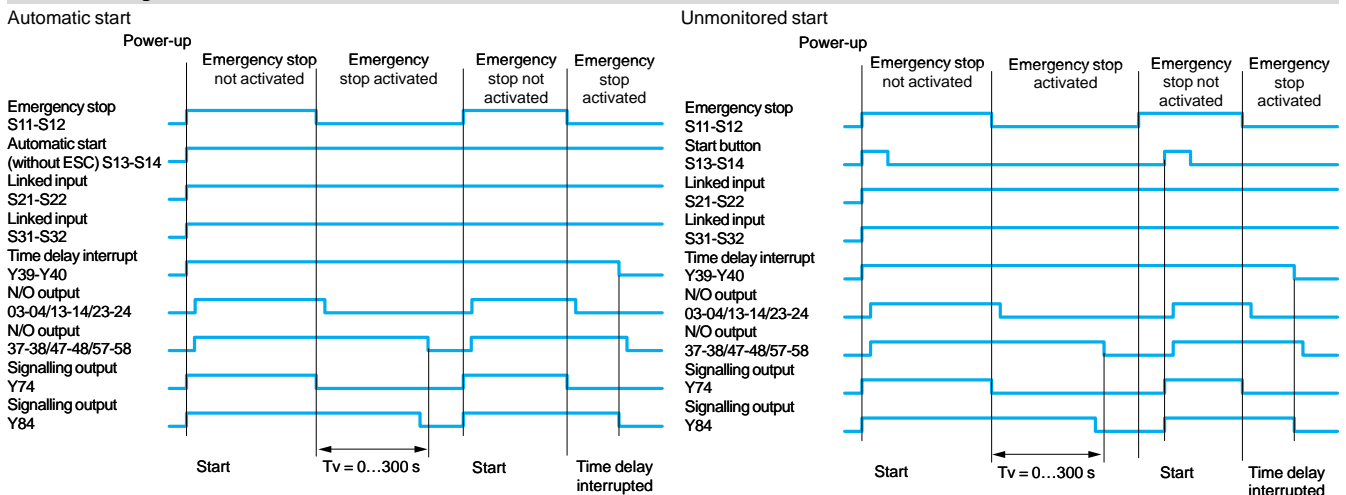
XPS AV

Module XPS AV associated with an Emergency stop button with 1 N/C contact, automatic start or unmonitored start



- (1) Link for automatic start.
 - (2) Instantaneous opening safety outputs (stop category 0).
 - (3) Time delay opening safety outputs (stop category 1).
- ESC = External start conditions.

Functional diagrams



Automatic start

There is no start contact or it is shunted.

Unmonitored start

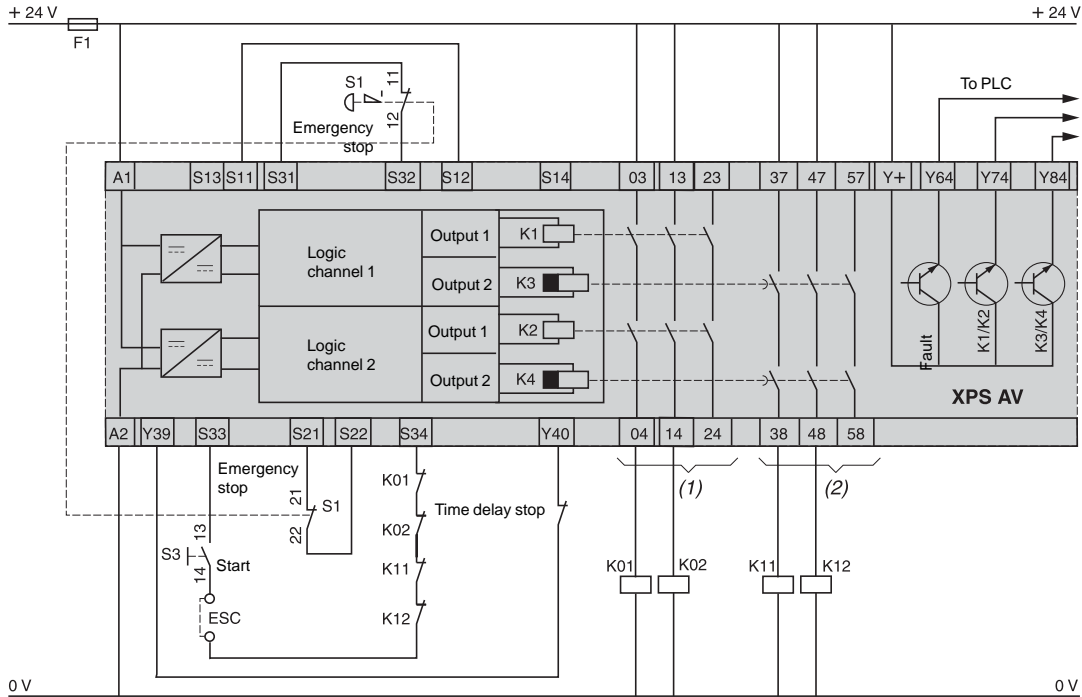
The output is activated on closing of the start contact.

Monitored start

The start input is monitored so that there is no start-up in the event of the start contact being shunted or the start circuit being closed for more than 10 seconds. Start-up is triggered following activation of the start button (push-release function) on opening of the contact.

XPS AV

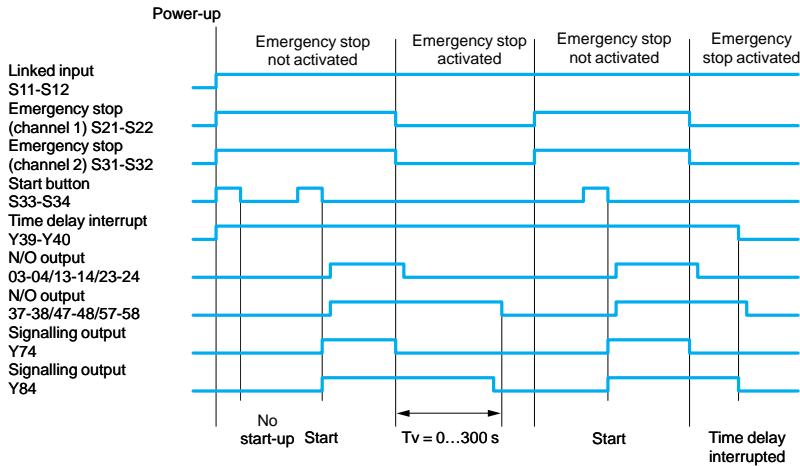
Module XPS AV associated with an Emergency stop button with 2 N/C contacts, monitored start



- (1) Instantaneous opening safety outputs (stop category 0).
 - (2) Time delay opening safety outputs (stop category 1).
- ESC = External start conditions.

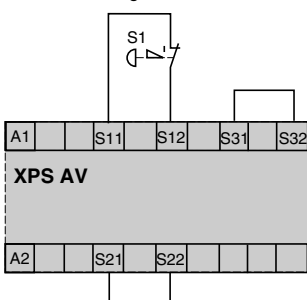
Functional diagram

Monitored start

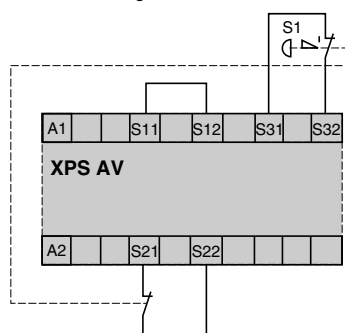


Emergency stop monitoring function configuration

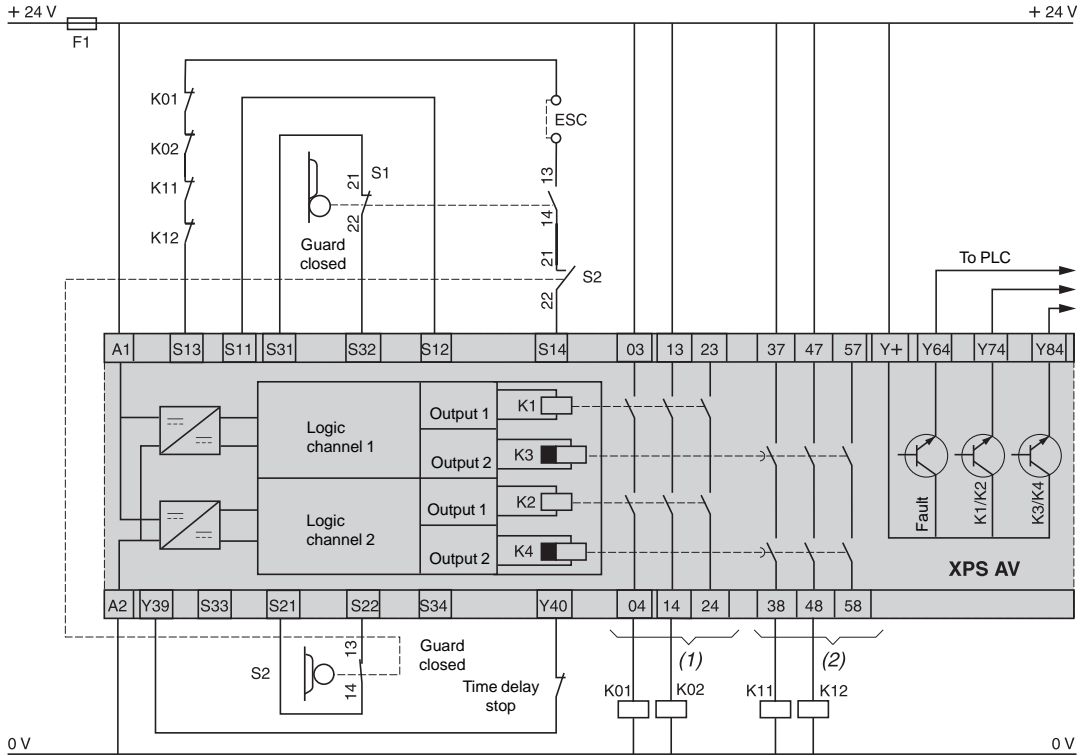
1-channel wiring



2-channel wiring, with short-circuit detection

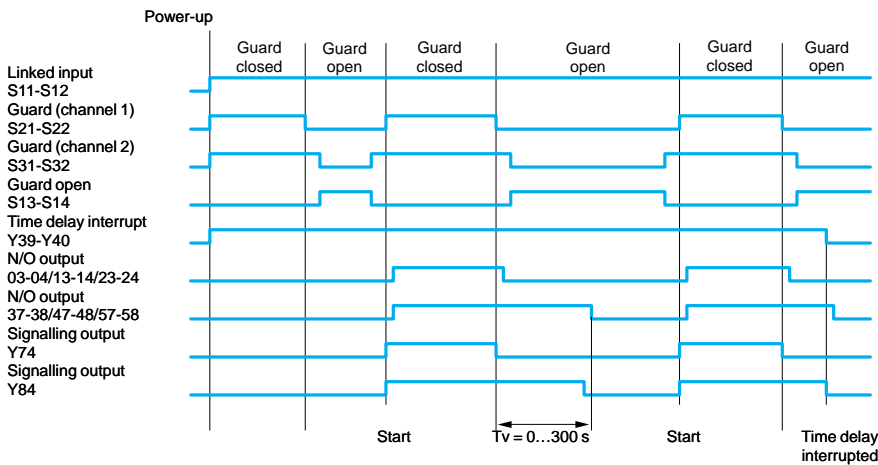


XPS AV
Monitoring of a movable guard associated with 2 switches
Automatic start (diagram shown for guard closed)

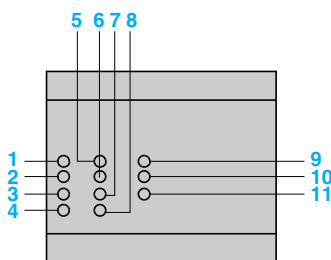


(1) Instantaneous opening safety outputs (stop category 0).
 (2) Time delay opening safety outputs (stop category 1).
 ESC = External start conditions.

Functional diagram



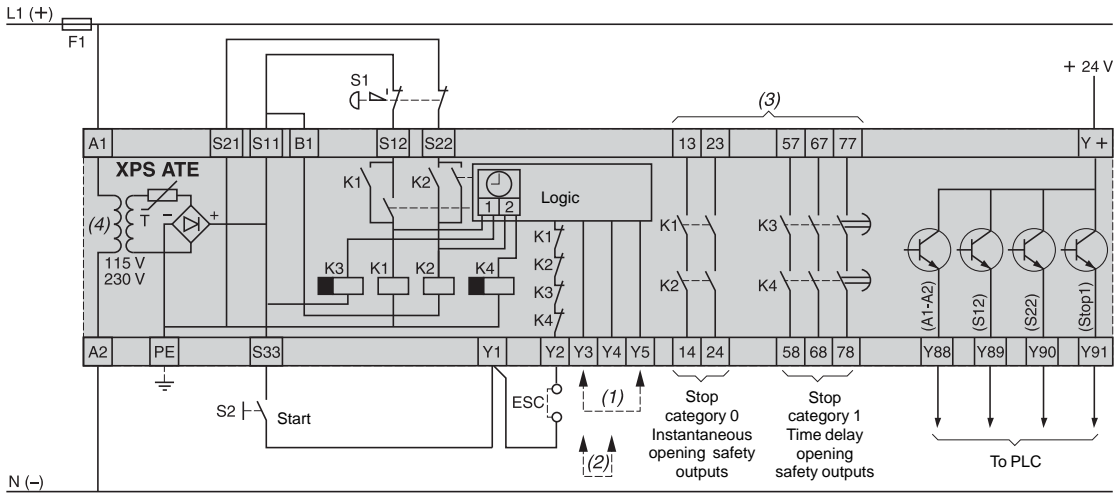
LED details



- 1 S12 input status.
- 2 S22 input status.
- 3 S32 input status.
- 4 S34 input status.
- 5 S14 input status.
- 6 Y40 input status (time delay stop).
- 7 K1/K2 status (N/O instantaneous opening safety outputs).
- 8 K3/K4 status (time delay opening safety outputs).
- 9 Supply voltage A1-A2.
- 10 Fault.
- 11 Configuration mode

XPS ATE

Module XPS ATE associated with an Emergency stop button



S1: Emergency stop button with 2 N/C contacts (recommended application).

S2: Start button.

ESC: External start conditions.

Y1 (S33) - Y2: Feedback loop.

F1: 4 A max.

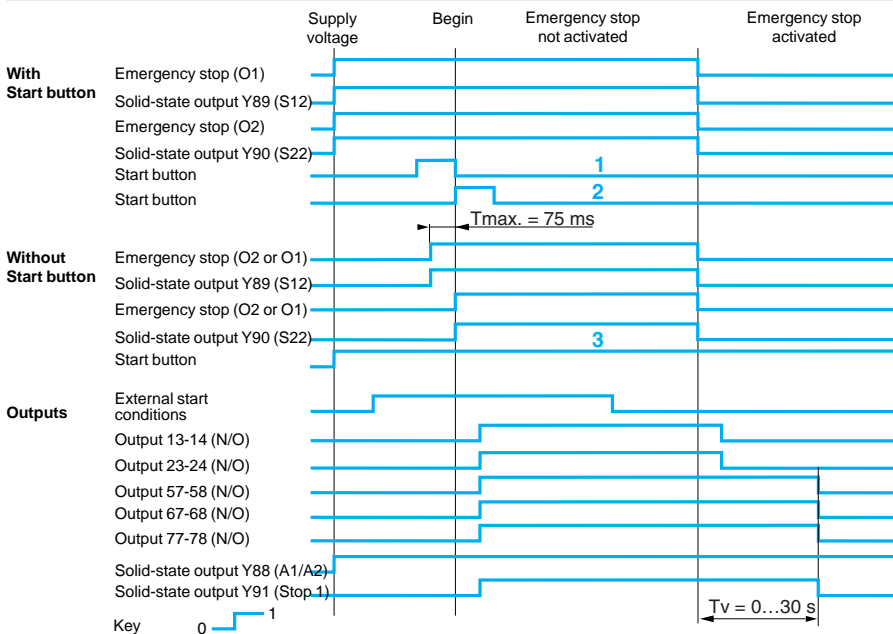
(1) With start button monitoring.

(2) Without start button monitoring.

(3) The outputs must be fuse protected. Technical characteristics for maximum rating of fuses, see page 38783-EN_Ver6.4/2.

(4) ~ 115/230 V only.

Functional diagram of module XPS ATE with Emergency stop button monitoring



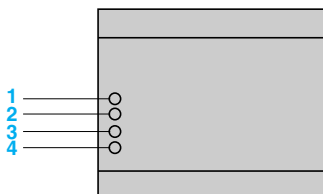
1 With start button monitoring (Y3-Y5 connection).

2 Without start button monitoring (Y3-Y4 connection).

3 Without start button (connection Y3-Y4 and S33-Y1).

T_v: adjustable time.

Description des DEL



1 Supply voltage A1-A2, internal electronic fuse status.

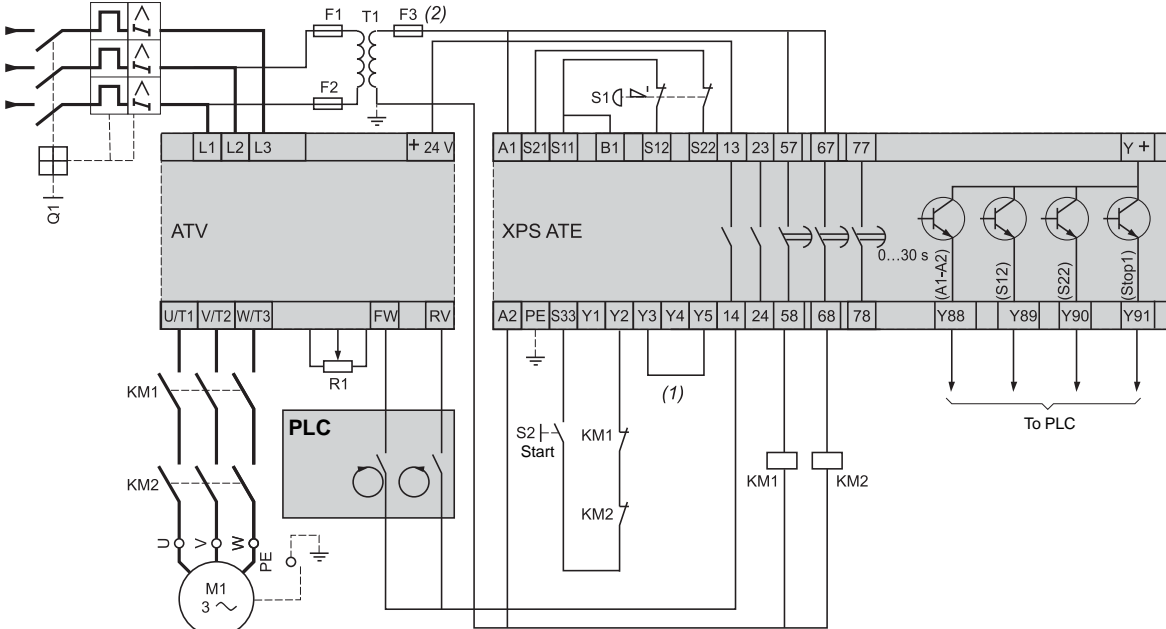
2 S12 (A) input status.

3 S22 (B) input status.

4 Stop category 1 outputs closed.

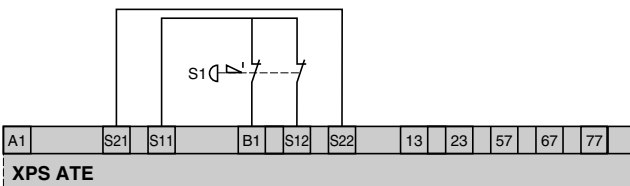
XPS ATE

Example of a safety circuit combining an Emergency stop module with a variable speed drive



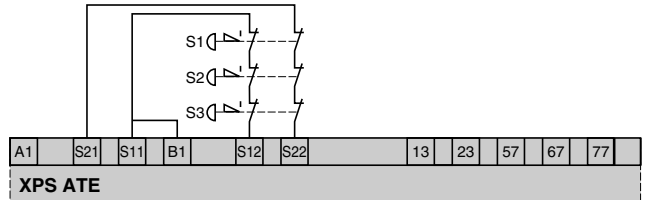
- S1: Emergency stop button with 2 N/C contacts (recommended application).
- S2: Start button
- (1) With start button monitoring.
- (2) Technical characteristics for maximum rating of fuses, see page 38783-EN_Ver6.4/2.

Connection with 1 Emergency stop button



Both input channels are supplied at the same potential.
S1: Emergency stop button with 2 N/C contacts.
A short-circuit between the 2 inputs is not detected.

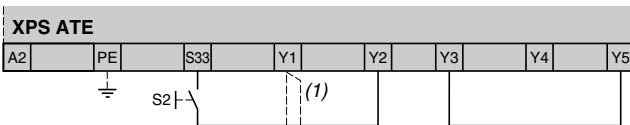
Connection with multiple Emergency stop buttons



The 2 input channels are supplied at different potentials.
A short-circuit between the 2 inputs is detected.

Configuration with start button monitoring

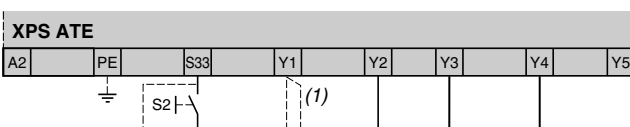
(functional diagram for Start button 1, see page 38783-EN_Ver6.4/5)



(1) Auxiliary terminal (to be used to separate the feedback loop from the wiring to the start button).

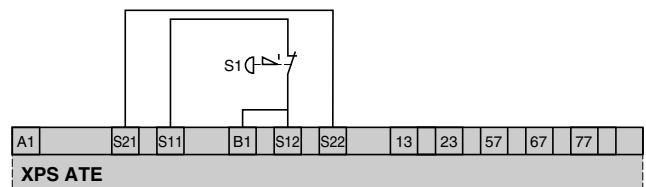
Configuration without start button monitoring

(functional diagram for Start button 2, see page 38783-EN_Ver6.4/5)



(1) Auxiliary terminal (to be used to separate the feedback loop from the wiring to the start button).

Monitoring an Emergency stop button with 1 N/C contact



S1: Emergency stop button with 1 N/C contact.
Not all faults are detected: a short-circuit on the Emergency stop button is not detected.