

Preventa™ XPSMC Safety Controllers

Catalog

File 9007

06

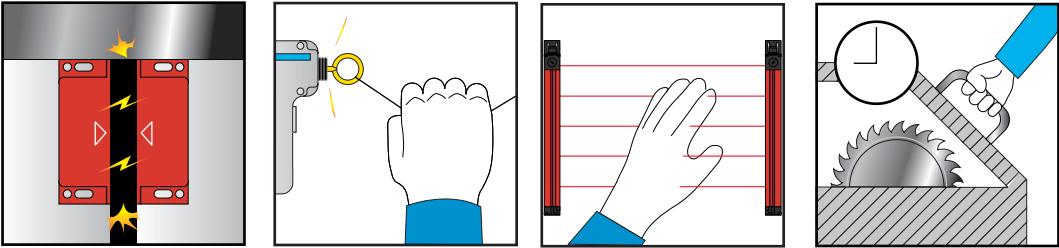



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Preventa™ XPSMC Safety Controllers Selection

Applications									
Modules	<p>Controllers for several independent safety functions, with selection of safety functions by configuration software running on Windows. 16 or 32 inputs and 8 independent safety outputs.</p> <p>Monitoring of emergency stops, limit switches, safety interlocks, two-hand controls, light curtains with or without "muting" function, enabling switches, non-contact safety interlocks, safety mats, solenoid valves on hydraulic presses, safety stop at top dead center on eccentric presses and zero speed detection.</p>								
									
Conformity to Standards	<p>EN 954-1 - category 4/ISO 13849-1, IEC 61508 - SIL 3, EN/IEC 60204-1, EN 1760-1/ISO 13856-1, EN/IEC 60947-5-1, EN/IEC 61496-1, EN 574/ISO 13851, EN 954-1/ISO 13849-1</p>								
Product Certifications	<p>UL, CSA, TÜV, CE</p>								
Number of Circuits									
<table border="1"> <tr> <td>Safety</td> <td>4 N.O. (2 N.O. per function) + 6 solid-state</td> </tr> <tr> <td>Additional</td> <td>1 "muting" signalling output</td> </tr> <tr> <td>Display</td> <td>LED display on front face</td> </tr> <tr> <td>Supply Voltage</td> <td>24 Vdc</td> </tr> </table>	Safety	4 N.O. (2 N.O. per function) + 6 solid-state	Additional	1 "muting" signalling output	Display	LED display on front face	Supply Voltage	24 Vdc	
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Communication									
<table border="1"> <tr> <td>CANopen Bus</td> <td>Via SUB-D 9-pin male connector, only on XPSMC16ZC and XPSMC32ZC</td> </tr> <tr> <td>Profibus Bus</td> <td>Via SUB-D 9-pin female connector, only on XPSMC16ZP and XPSMC32ZP</td> </tr> <tr> <td>Modbus Network</td> <td>Via RJ45 connector, on all controllers XPSMC●●Z●</td> </tr> </table>	CANopen Bus	Via SUB-D 9-pin male connector, only on XPSMC16ZC and XPSMC32ZC	Profibus Bus	Via SUB-D 9-pin female connector, only on XPSMC16ZP and XPSMC32ZP	Modbus Network	Via RJ45 connector, on all controllers XPSMC●●Z●			
CANopen Bus	Via SUB-D 9-pin male connector, only on XPSMC16ZC and XPSMC32ZC								
Profibus Bus	Via SUB-D 9-pin female connector, only on XPSMC16ZP and XPSMC32ZP								
Modbus Network	Via RJ45 connector, on all controllers XPSMC●●Z●								
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Product Type	<p>XPSMC</p>								

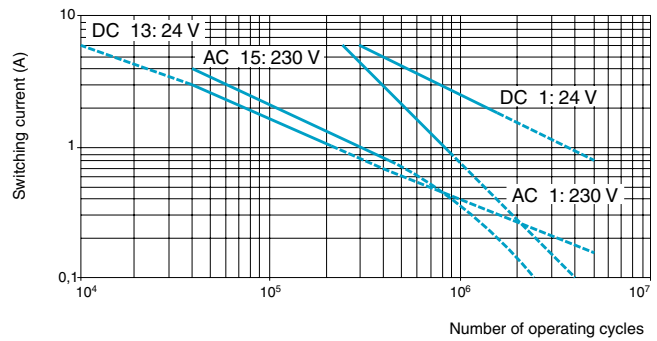
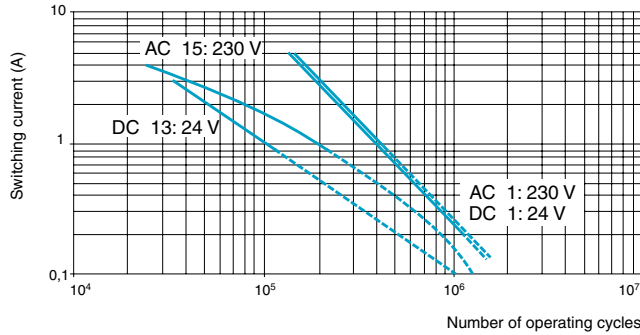
ELECTRICAL RATINGS

Lifetime Curve and Switching Capability with N.O. Contacts

Determined by EN 60947-5-1 Table C2

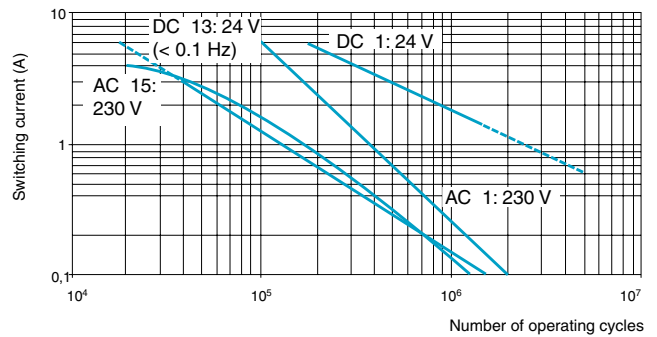
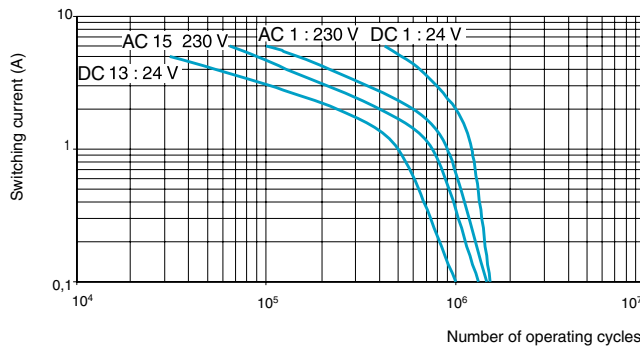
XPSAC, XPSAT (time delay contacts), XPSTSA, XPSTSW, XPSBA, XPSBC, XPSCM, XPSDA, XPSFB, XPSNS, XPSOT, XPSPVK, XPSPVT, XPSVN, GNKL

XPSAT (instantaneous contacts), XPSECM, XPSECP, GBS



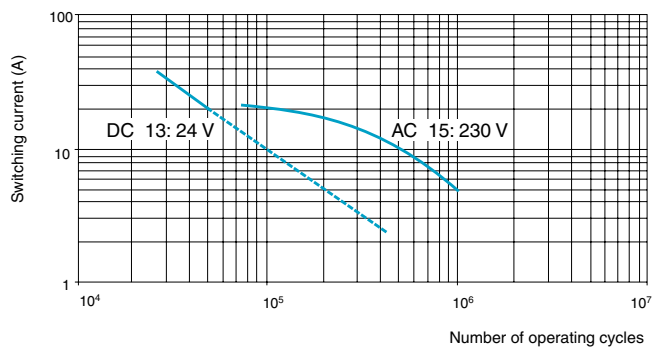
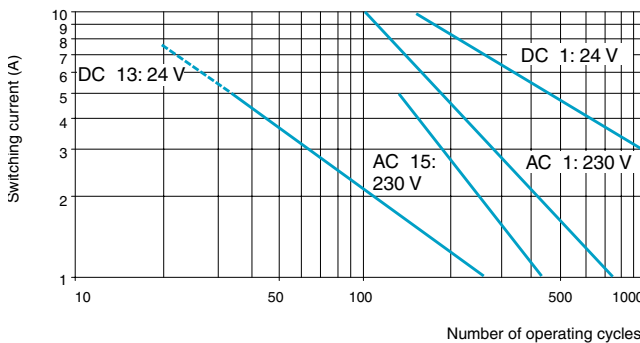
XPSAF, XPSAK, XPSAFL

XPSAV, XPSBF, XPSMP, XPSMC



XPSAR

XPSDMB/DME



The product life expressed above is based on average usage and normal operating conditions. Actual operating life will vary with conditions. The above statements are not intended to nor shall they create any express or implied warranties as to product operation or life. For information on the limited warranty offered on this product please refer to the Square D terms and conditions of sale found in the Square D Digest.

Preventa™ XPSMC Safety Controllers

Overview



XPSMC16ZC

Configurable safety controllers XPSMC●●Z● are designed to provide a solution for safety applications requiring conformity to category 4 of standard EN 954-1, ISO 13849-1, and SIL 3 requirements of standard IEC 61508.

The range of configurable safety controllers comprises 6 products, each with different technical characteristics.

Configurable controllers	Safety inputs	Safety outputs (1)	Bus and networks connection		
			CANopen bus	Profibus bus	Modbus network
XPSMC16Z	16	6 + 2 x 2	–	–	Yes, slave
XPSMC16ZC	16	6 + 2 x 2	Yes, slave	–	Yes, slave
XPSMC16ZP	16	6 + 2 x 2	–	Yes, slave	Yes, slave
XPSMC32Z	32	6 + 2 x 2	–	–	Yes, slave
XPSMC32ZC	32	6 + 2 x 2	Yes, slave	–	Yes, slave
XPSMC32ZP	32	6 + 2 x 2	–	Yes, slave	Yes, slave



XPSMC32ZC

Control Outputs

The safety inputs (16 or 32) into the safety controller are supplied with power from the safety controller terminals identified as control outputs (2), and these circuits are monitored for short-circuits between each input and ground or the presence of residual voltages.

The controller, assisted by the control outputs, continuously tests all the connected inputs. As soon as an error is detected on an input, all the outputs associated with this input are disconnected. Safety outputs associated with other inputs remain active.

Configuration

Safety controllers XPSMC●●Z● are configurable and addressable using XPSMCWIN software running on a PC. Connection accessories required: see page 11.

Connections

For connection of safety inputs and outputs, safety controllers XPSMC●●Z● can be fitted with a choice of:

- screw connectors type XPSMCTS●●, or
- spring clip connectors type XPSMCTC●●.

These connectors are to be ordered separately, see page 10.

(1) The safety outputs consist of six solid state outputs and two sets of relay outputs with two contacts each (for a total of four relay output contacts).

(2) Control outputs are available to power safety inputs, but they are not safety outputs.

Safety Functions

Configuration of the safety functions is carried out using XPSMCWIN software.

30 certified safety functions are available with this software and they are easily assignable to the safety outputs. The safety functions have multiple combination possibilities and various starting conditions.

The safety functions are:

- Certified in accordance with EN 954-1/ISO 13849-1 and IEC 61508,
- Configurable in controller XPSMC using XPSMCWIN software.

All 8 safety outputs are suitable for use in safety related parts of control systems conforming to category 4 of EN 954-1/ISO 13849-1, and SIL 3 requirements of standard IEC 61508. Each output can disconnect one of its safety circuits.

Main safety functions	Wiring Diagrams and functional diagrams, see pages
Emergency stop monitoring, with or without time delay, 1 or 2-channel wiring	12, 13
Two-hand control (type III-C conforming to EN 574/ISO 13851)	14
Guard monitoring with 1 or 2 limit switches or safety interlocks	15-19
Guard monitoring for injection presses and blowing machines	20, 21
Non-contact safety interlock switch monitoring	22, 23
Safety mat monitoring	24, 25
Light curtain (type 4 conforming to EN/IEC 61496, relay or solid-state output) monitoring	26-29
Zero speed detection	30
Dynamic monitoring of hydraulic valves on linear presses	31
Monitoring safety stop at top dead center on eccentric press	32-35
Safety time delays	36
"Muting" function of light curtains	37
Enabling switch monitoring, 2 or 3 contact	38, 39
Hydraulic press	40, 41
Eccentric press	42, 43
Foot switch monitoring	44
Chain shaft breakage monitoring	45
Position selector	46

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Communication

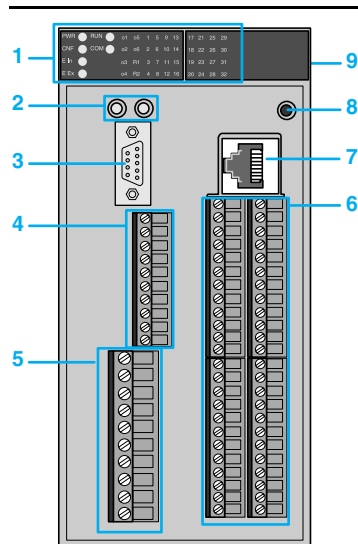
CANopen fieldbus	
<p>Premium automation platform</p> <p>Micro automation platform</p> <p>Advantys STB</p> <p>Configurable controllers XPSMC16Z, MC32ZC</p> <p>ATV 38 ATV58/58F</p> <p>TeSys Model U</p> <p>Tego Power</p> <p>FTB 1CN</p>	<p>XPSMC●●ZC</p> <p>Configurable safety controllers XPSMC●●ZC incorporate a SUB-D 9-pin male connector for direct connection on CANopen bus.</p> <p>CANopen bus is an open bus that ensures deterministic and reliable access to the real-time data of automation equipment. The bus uses a shielded dual twisted pair on which a maximum of 127 devices can be connected by chaining. The data rate varies between 10 Kbps and 1Mbps depending on the length of the bus (16404 to 65.6 ft (5000 m to 20 m)).</p>
Profibus bus	
<p>Premium automation platform</p> <p>Configurable controller XPSMC16ZP, MC32ZP</p> <p>Third-party products</p> <p>Repeater (3 max.)</p>	<p>XPSMC●●ZP</p> <p>Configurable safety controllers XPSMC●●ZP incorporate a SUB-D 9-pin female connector for connection on Profibus bus. Configurable safety controllers XPSMC●●ZP are slaves on the Profibus bus.</p> <p>Profibus bus is a fieldbus that meets industrial communication requirements. The topology of the Profibus bus is of the linear type with a centralized master/slave type access procedure. The physical link is a single shielded twisted pair.</p>
Modbus network	
<p>Premium automation platform</p> <p>Magelis graphic terminal</p> <p>Configurable controllers XPSMC16Z●/MC32Z●, slaves of the Modbus network</p>	<p>XPSMC●●Z</p> <p>Configurable safety controllers XPSMC●●Z incorporate a Modbus® communication interface (RJ45 socket) for configuration and diagnostics. This interface enables connection of the controllers to:</p> <ul style="list-style-type: none"> — a PC (configuration), — a PLC (diagnostics), or — an operator dialogue terminal (diagnostics). <p>The Modbus network comprises a master station (Premium automation platform) and slave stations (Configurable controllers XPSMC16/32Z●).</p> <p>Two exchange mechanisms are possible:</p> <ul style="list-style-type: none"> • Question/response, the questions from the master are addressed to a given slave. The response is expected by return from the interrogated slave. • Distribution, the master distributes a message to all the stations of the bus. The latter execute the order without transmitting a reply.

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Preventa™ XPSMC Safety Controllers Overview

Description

Configurable safety controllers XPSMC●●Z●



Configurable safety controller XPSMC●●Z●, with screw connectors

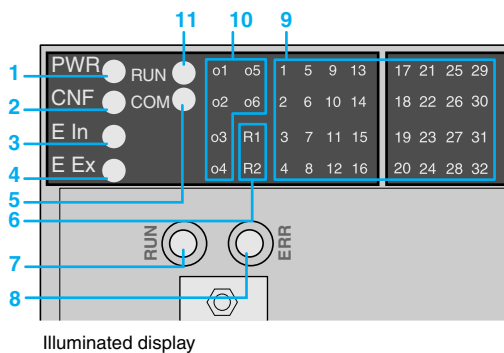
Front cover of controllers

1. LED display and system diagnostics.
2. Two LEDs for CANopen or Profibus (1) connection status.
3. SUB-D 9-pin male connector for connection on CANopen bus (XPSMC16ZC/MC32ZC) or SUB-D 9-pin female connector for connection on Profibus bus (XPSMC16ZP/MC32ZP).
4. Solid-state safety output and "muting" indicator light terminals.
5. Power supply (24 Vdc) and relay safety output terminals.
6. Control output terminals for power supply to safety inputs and safety input terminals.
7. RJ45 connector for connection on Modbus network.
8. RESET button (resetting of controller).

Back of controllers

9. Mounting plate for mounting on rail.

(1) Depending on controller model.



LED details

LED	Color	Status	Meaning
1. PWR	Green	On	Supply voltage present.
2. CNF	Yellow	On	In configuration mode.
		Flashing	Not configured, initial power-up.
3. E In	Red	On	Internal error: all safety outputs deactivated.
4. E Ex	Red	On	External error: all safety outputs associated with the defective circuit are deactivated.
5. COM	Green	On	Controller communicating via the TER (RJ45) connection.
6. R1, R2	Green	On	Relay outputs 13/14, 23/24, 33/34 and 43/44 activated.
		Flashing	Fault on these outputs.
7. RUN	Green	Off	Hardware OK for the Profibus bus or the CANopen bus.
		On	Communicating on Profibus bus or on CANopen bus. Normal status.
8. ERR	Red	On	Communication impossible, configuration error, damaged cabling or absence. Bus deactivated
		Off	Communicating on CANopen or Profibus bus. Normal status.
		Flashing (x 1)	Warning limit reach.
		Flashing (x 2)	Control event error on CANopen bus.
9. 1 to 16 1 to 32	Green	On	Input circuit closed.
		Flashing	Error detected on input relating to LED.
10. o1 to o6	Green	On	Solid-state output activated.
		Flashing	Short-circuit, fault on output.
11. RUN	Green	On	Run mode.
		Flashing	Changing from run mode to stop mode.

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Preventa™ XPSMC Safety Controllers

Technical Data

Configurable safety controller type		XPSMC16Z and MC32Z, XPSMC16ZC and MC32ZC, XPSMC16ZP and MC32ZP	
Conformity to standards		EN/IEC 60204-1, EN 1760-1/ISO 13856-1, EN/IEC 60947-5-1, EN/IEC 61496-1, EN 574/ISO 13851, EN 954-1/ISO 13849-1, IEC 61508	
Product certifications		UL, CSA, TÜV, CE	
Products designed for max. use in safety related parts of control systems (conforming to EN 954-1/ISO 13849-1 and IEC 61508)		Category 4 max. (EN 954-1/ISO 13849-1), SIL 3 max. (IEC 61508)	
Power supply		V 24 Vdc ± 20%	
Power consumption		W 12	
Fuse protection		A 16 gL max.	
Start button monitoring		Configurable	
Control circuit voltage (maximum)		28.8 V/13 mA (between input terminals C1-I1 to C8-I16, resp. I32)	
Calculation of wiring resistance RL		Ω 100 max, maximum cable length: 6500 ft. (2000 m) (Between input terminals)	
Synchronization time between inputs		s Depending on configuration selected	
Outputs	Relay	Output type	Relay hard contacts
		Safety circuit	2 N.O. per function (4 N.O. total) (13-14, 23-24, 33-34, 43-44)
		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
		Thermal current (Ithe) for each group of 2 outputs	A 6 for 1 output and 2 for the other, or 4 for both outputs.
		Current limit	A Ith ≤ 16 (with several relay output circuits simultaneously loaded)
		Output fuse protection	A 4 gL or 6 fast acting
		Minimum current	mA 10 (1)
	Minimum voltage	V 17 (1)	
	Solid-state	Breaking capacity	24 Vdc/2 A
Safety circuit		6 solid-state (O1, O2, O3, O4, O5, O6)	
Current limit		A Ith ≤ 6.5 (with several solid-state output circuits simultaneously loaded)	
Electrical life		See page 3	
Response time on input opening		ms Response time = 20 or 30, configurable using software XPSMCWIN — if controllers XPSMC●●Z● are set for 20 ms, response time for safety mats will be 30 ms — if controllers XPSMC●●Z● are set for 30 ms, response time for safety mats will be 45 ms	
Rated insulation voltage (Ui)		V 300 (degree of pollution 2 conforming to IEC 60647-5-1, DIN VDE 0110 part 1)	
Rated impulse withstand voltage (Uimp.)		kV 4 (overvoltage category III, conforming to IEC 60647-5-1, DIN VDE 0110 part 1)	
LED display		30 (XPS MC16Z), 46 (XPS MC32Z) 32 (XPS MC16ZC/MC16ZP, 48 (XPS MC32ZC/MC32ZP)	
Temperature	Operating	+14°F to + 130°F (-10°C to + 55°C)	
	Storage	-13°F to + 185°F (-25°C to + 85°C)	
Degree of protection		IP 20 conforming to IEC 60529 (connector and enclosure)	

(1) The controller is also capable of switching low power loads (17 V/10 mA minimum) 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).

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Communication

Modbus network		
Compatibility		XPSMC16Z, XPSMC32Z, XPSMC16ZC, XPSMC32ZC, XPSMC16ZP, XPSMC32ZP
Serial link ports	Number and type	1 x RJ45
	Status	Slave
Data exchange		14 words
Addressing		1 to 247
Speed (Baud)	bps	1200, 2400, 4800, 9600 or 19200
Parity		Even, odd, none
Fixed parameters		RTU (Remote Terminal Unit) mode 1 start bit / 8 data bits 1 stop bit stop with "even" or "odd" parity 2 stop bits without parity
Functions supported		01: 8-bit output data / 32-bit input data (0 = OFF, 1 = ON) 02: 32-bit input data / 8-bit output data (0 = OFF, 1 = ON) 03: information and errors

CANopen bus			
Compatibility		XPSMC16ZC, XPSMC32ZC	
Serial link ports	Number and type	1 x SUB-D 9-pin male	
	Status	Slave	
Data exchange		14 words By included dual port memory: only data addresses, diagnostics, but no baud rates	
Parameters (adjustable using software XPSMCWIN)	Speed (Baud)	Kbps	20, 50, 125, 250, 500, 800
		Mbps	1
	Address		1 to 127

Profibus bus			
Compatibility		XPSMC16ZP, XPSMC32ZP	
Serial link ports	Number and type	1 x SUB-D 9-pin female	
	Status	Slave	
Data exchange		14 words By included dual port memory: only data addresses	
Parameters	Speed (Baud)	Mbps	12
	Address		1 to 125

Connections

Type	Separate plug-in screw connector XPSMCTS●● (1)		Separate plug-in spring clip connector XPSMCTS●● (1)	
Power supply and relay output terminals				
1 conductor	Without cable end	Solid or stranded cable: 24-12 AWG (0.2-2.5 mm ²)		
	With cable end	Without bezel, stranded cable: 22-14 AWG (0.25-2.5 mm ²) With bezel, stranded cable: 22-14 AWG (0.25-2.5 mm ²)		
2 conductors	Without cable end	Solid or stranded cable: 24-16 AWG (0.2-1.5 mm ²)		–
	With cable end	Without bezel, stranded cable: 22-16 AWG (0.25-1.5 mm ²) Double, with bezel, stranded cable: 20-16 AWG (0.5-1.5 mm ²)		– Double, with bezel, stranded cable: 20-18 AWG (0.5-1.0 mm ²)
Tightening torque of screw terminals		4.2-5.3 lb-in (0.5-0.6 Nm)		–
Wire stripping length		0.39 in (10 mm)		–
Other terminals				
1 conductor	Without cable end	Solid or stranded cable: 28-16 AWG (0.14-1.5 mm ²)		
	With cable end	Without bezel, stranded cable: 22-16 AWG (0.25-1.5 mm ²) With bezel, stranded cable: 22-20 AWG (0.25-0.5 mm ²)		
2 conductors	Without cable end	Solid cable: 28-20 AWG (0.14-0.5 mm ²) Stranded cable: 28-20 AWG (0.14-0.5 mm ²)		–
	With cable end	Without bezel, stranded cable: 22 AWG (0.25-0.34 mm ²) Double, with bezel, stranded cable: 20 AWG (0.5 mm ²)		– –
Enclosure mounting (conforming to DIN EN 50022)		Metal adaptor for mounting on 35 mm metal rail		

(1) To be ordered separately.

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Preventa™ XPSMC Safety Controllers

Ordering Information

Configurable safety controllers (connectors not included)

Number of inputs	Number of outputs (1)		Communication (Network and bus)	Catalog Number	Weight oz (kg)
	Relay	Solid-state			
16	4 (2 x 2)	6	Modbus	XPSMC16Z	28.92 (0.820)
			Modbus, CANopen	XPSMC16ZC	28.92 (0.820)
			Modbus, Profibus	XPSMC16ZP	28.92 (0.820)
32	4 (2 x 2)	6	Modbus	XPSMC32Z	29.63 (0.840)
			Modbus, CANopen	XPSMC32ZC	29.63 (0.840)
			Modbus, Profibus	XPSMC32ZP	29.63 (0.840)

Plug-in connectors for configurable safety controllers (2)

Description	For use with	Catalog Number	Weight oz (kg)
Screw connectors	XPSMC16Z, MC16ZC, MC16ZP	XPSMCTS16	2.82 (0.080)
	XPSMC32Z, MC32ZC, MC32ZP	XPSMCTS32	3.88 (0.110)
Spring clip connectors	XPSMC16Z, MC16ZC, MC16ZP	XPSMCTC16	2.82 (0.080)
	XPSMC32Z, MC32ZC, MC32ZP	XPSMCTC32	3.88 (0.110)

Configuration software

Description	Characteristics	Catalog Number	Weight oz (kg)
Configuration software for controllers XPSMC●●Z●	CD-ROM + user manual Operating system: Windows NT®, 2000 or XP	XPSMCWIN	18.32 (0.520)

(1) The safety outputs consist of six solid state outputs and two sets of relay outputs with two contacts each (for a total of four relay output contacts).

(2) To be ordered separately from the controllers.



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Preventa™ XPSMC Safety Controllers Ordering Information and Dimensions

Connecting cables (1)

XPSMCCPC

TSXPCX1031

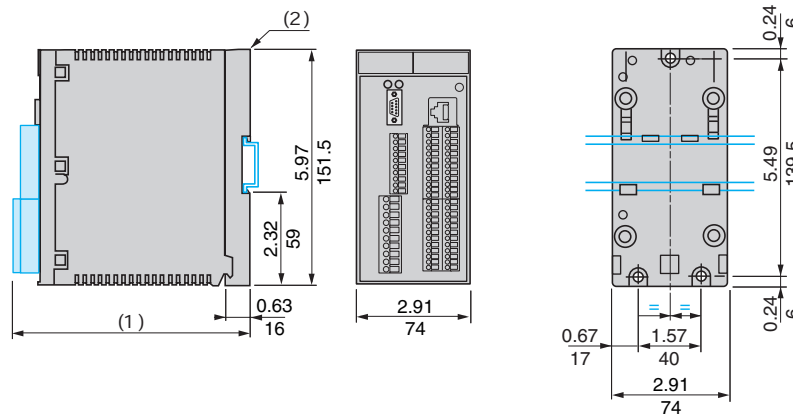
TSXCANTDM4

Function	Description	Length ft (m)	Catalog number	Weight oz (kg)
Diagnostics using Magelis® operator dialog terminal type XBTG (using adapter XPSMCCPC)				
Configuration	1 Adapter: RJ45 socket/PC connection cables	–	XPSMCCPC	0.39 (0.011)
	2 Cable to PC serial port	8.20 (2.5)	TSXPCX1031	6.00 (0.170)
	2 Cable to PC USB port	8.20 (2.5)	TSXPCX3030	6.00 (0.170)
Modbus network access				
Premium automation platform TSX SCY 21601				
CANopen bus access	1 CANopen connection cables (fitted with: 1 SUB-D 9-pin female connector at each end)	0.98 (0.3)	TSXCANCADD03	–
		3.28 (1.0)	TSXCANCADD1	–
		9.84 (3.0)	TSXCANCADD3	–
		16.40 (5.0)	TSXCANCADD5	–
	2 CANopen tap-off box	–	TSXCANTDM4	–
		164.04 (50.0)	TSXCANCB50	–
3 Standard CANopen cables	328.08 (100.0)	TSXCANCB100	–	
	984.25 (300.0)	TSXCANCB300	–	
	328.08 (100.0)	TSXPBSCA100	–	
Profibus bus access				
1312.34 (400.0)				
Accessories				
Regulated power supply, single-phase	Output voltage: 24 Vdc Nominal current: 10 A Nominal power: 240 W		ABL7RP2410	77.00 (2.200)

(1) To be ordered separately

Dimensions

XPSMC●●Z●

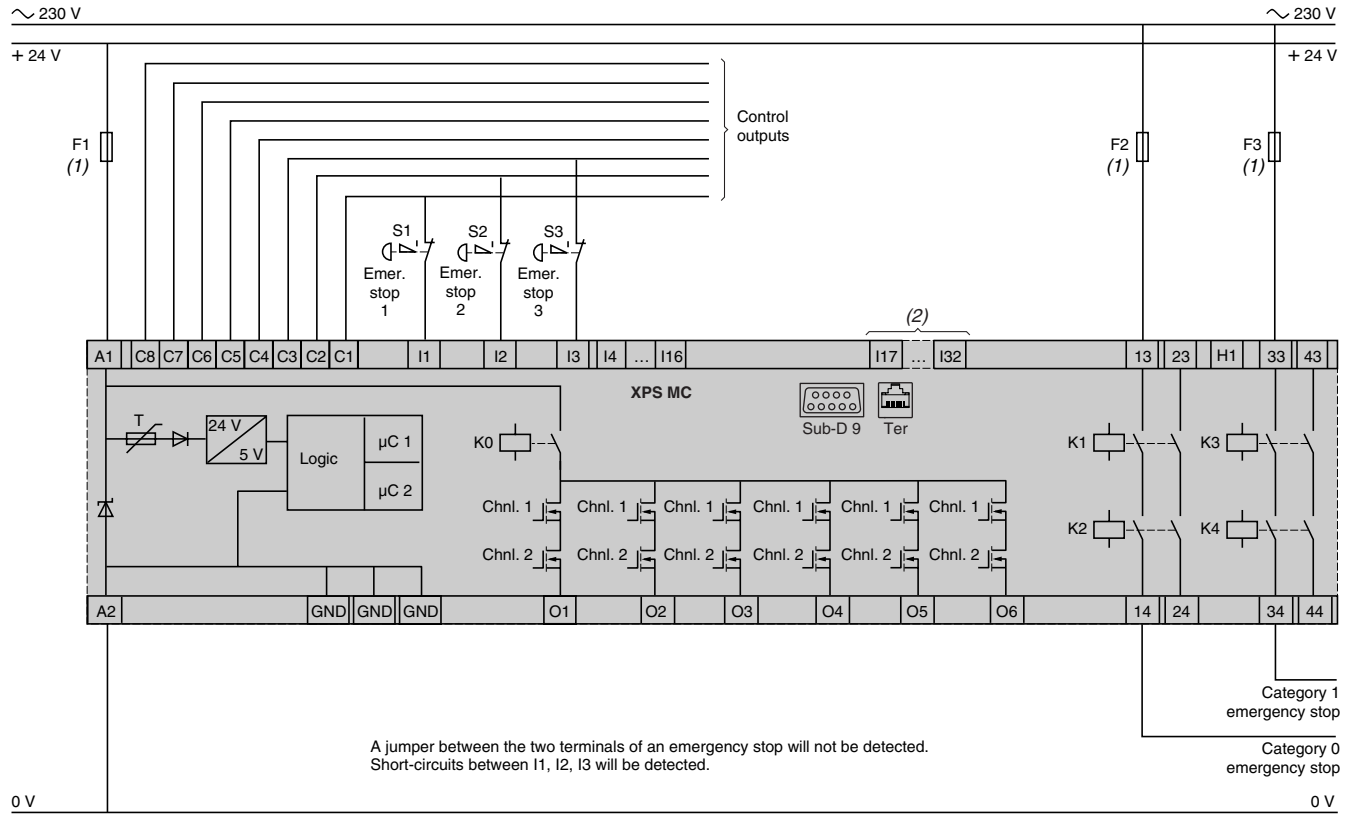


(1) 6.02" (153 mm) with screw connector XPSMCTS●●. 5.96" (151.4 mm) with spring clip connector XPSMCTC●●.
(2) Metal adaptor for mounting on metal 35 mm rail.

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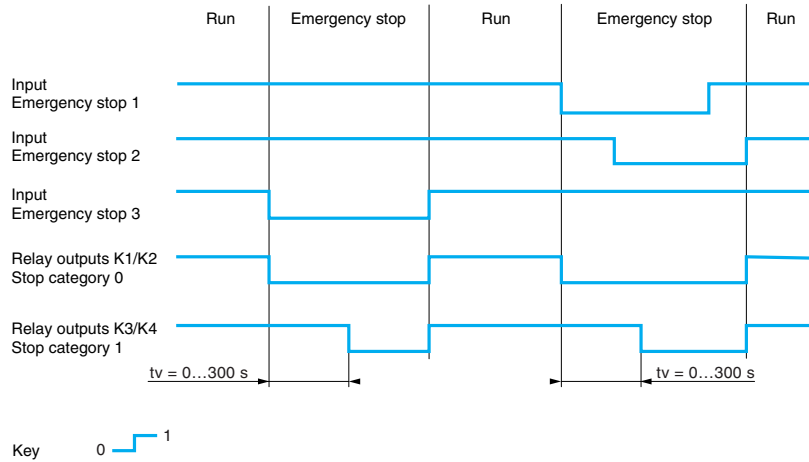
Preventa™ XPSMC Safety Controllers Wiring Diagrams

Emergency stop monitoring, with or without time delay, 1-channel wiring, with automatic start



(1) Technical characteristics for maximum rating of fuses, see page 8.
(2) Only applicable to XPSMC32Z.

Functional diagram

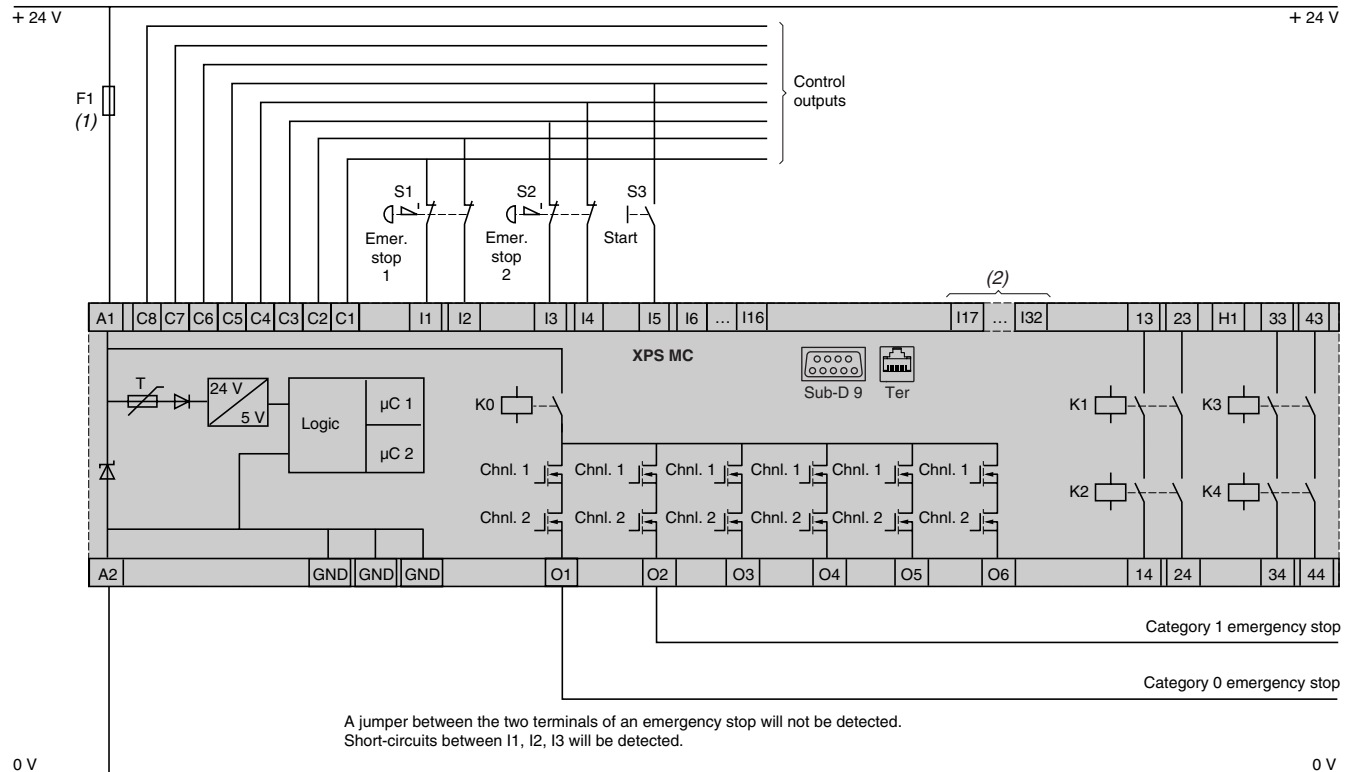


tv = delay time

Overview 4-7
 Technical Data 8, 9
 Ordering Information 10, 11
 Dimensions 11

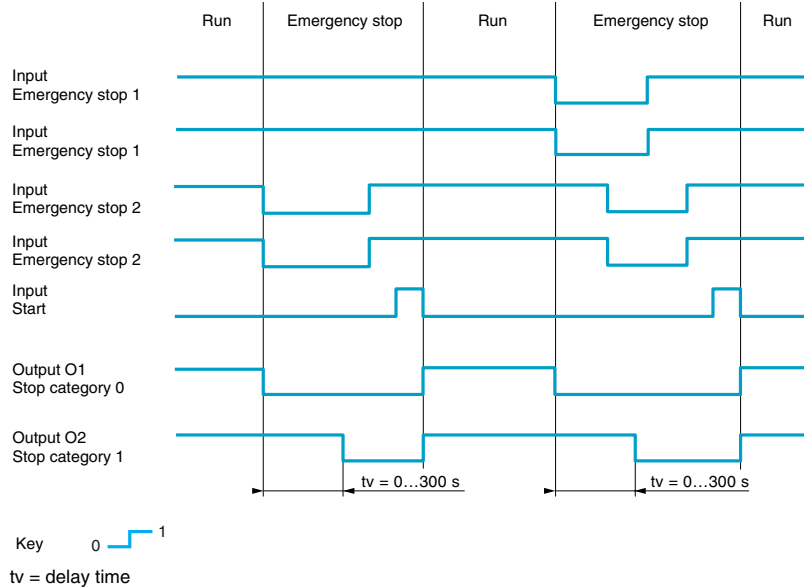
Preventa™ XPSMC Safety Controllers Wiring Diagrams

Emergency stop monitoring, with or without time delay, 2-channel wiring, with start button Category 4 conforming to standard EN 954-1.



(1) Technical characteristics for maximum rating of fuses, see page 8.
(2) Only applicable to XPSMC32Z.

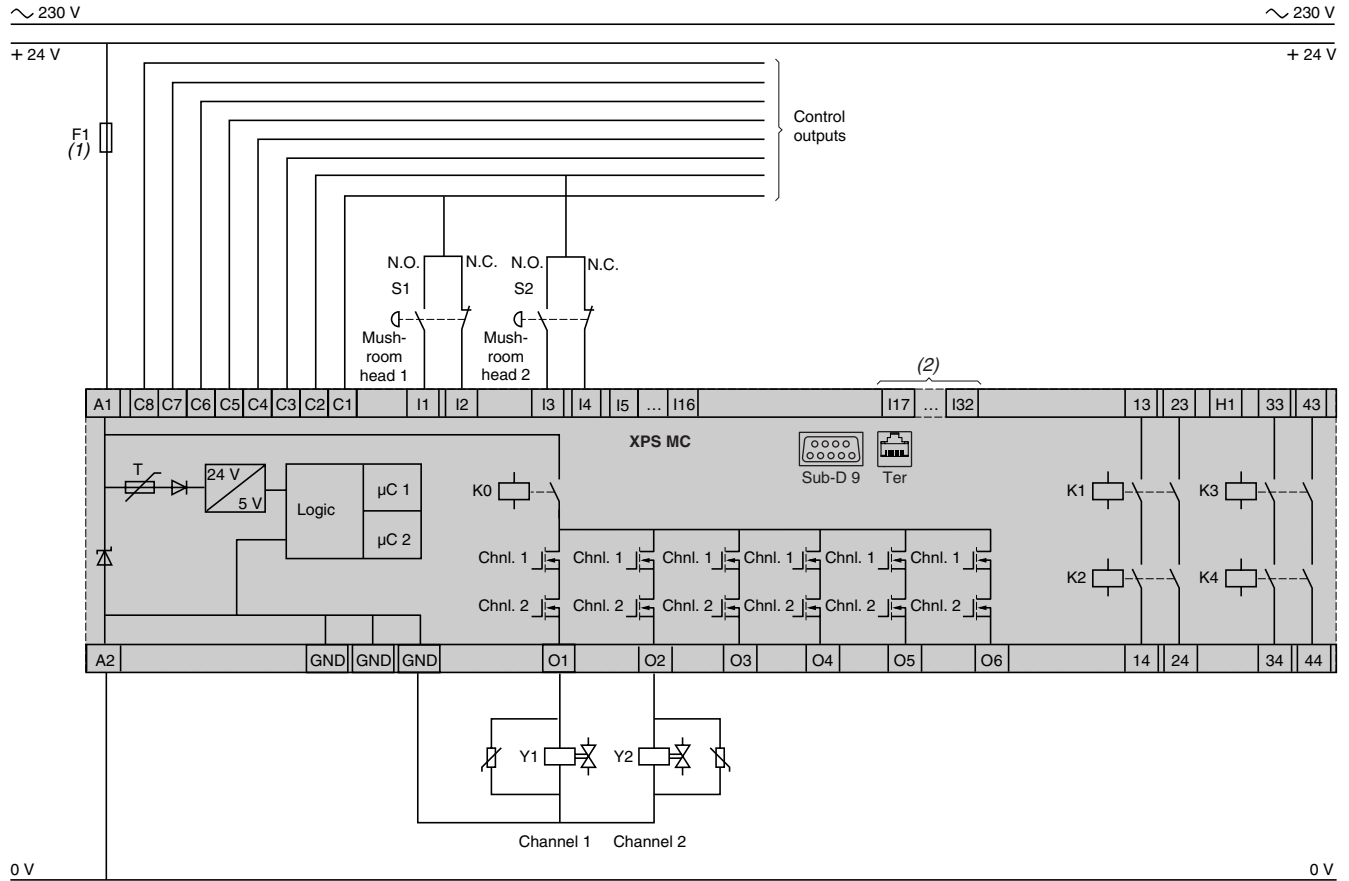
Functional diagram



Overview 4-7
 Technical Data 8, 9
 Ordering Information 10, 11
 Dimensions 11

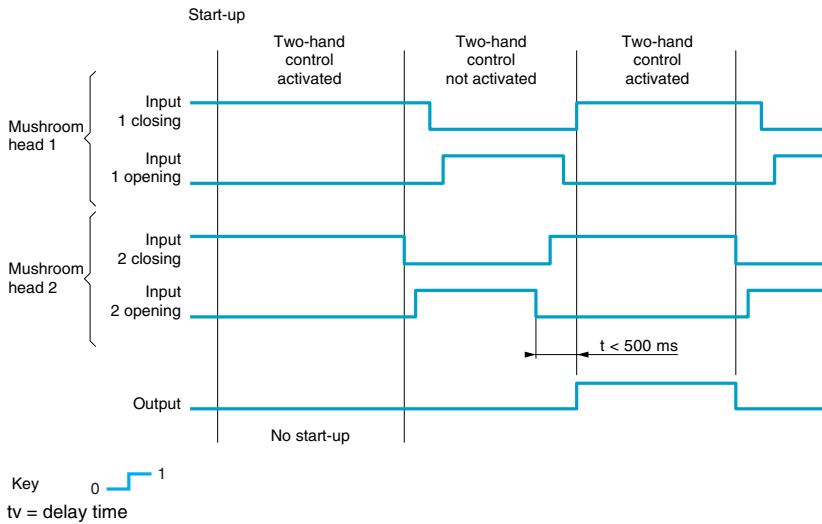
Preventa™ XPSMC Safety Controllers Wiring Diagrams

Two-hand control (type III-C conforming to EN 574-1) Category 4 conforming to standard EN 954-1.



(1) Technical characteristics for maximum rating of fuses, see page 8.
(2) Only applicable to XPSMC32Z.

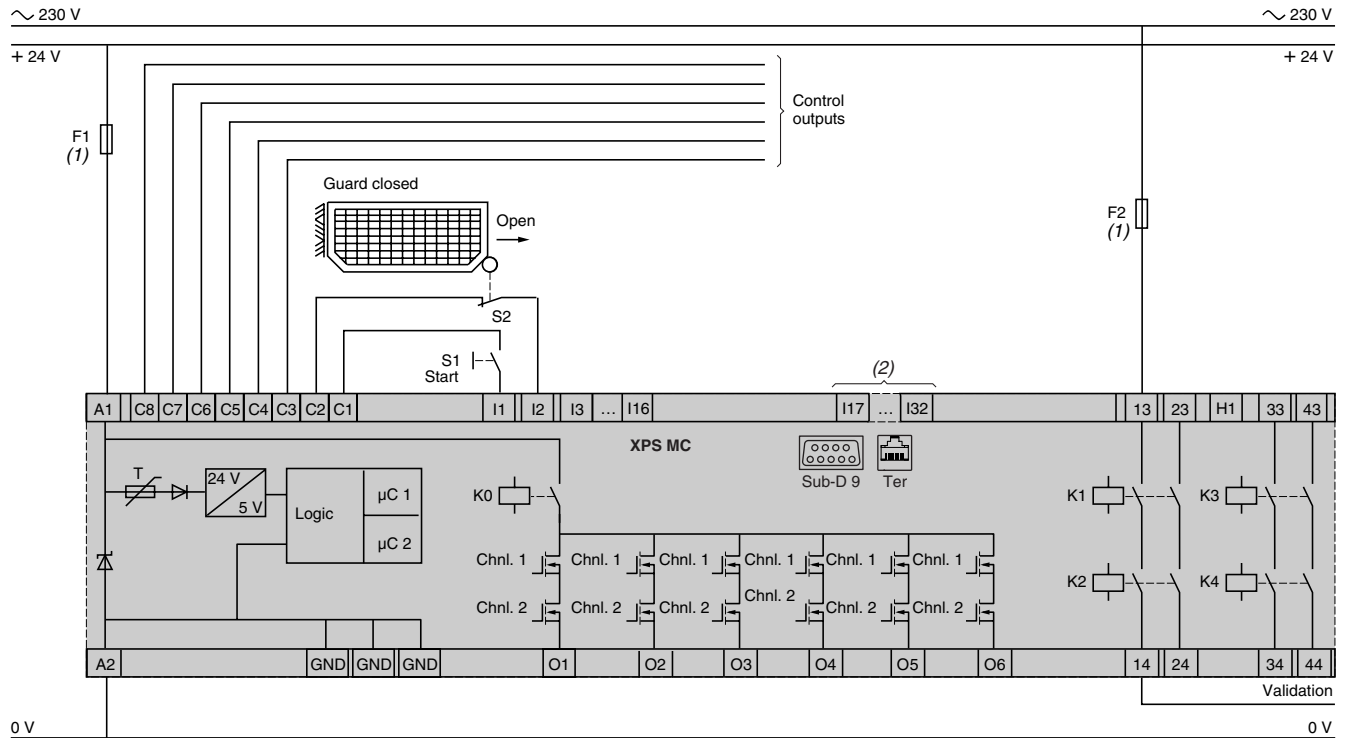
Functional diagram



Overview 4-7
Technical Data 8, 9
Ordering Information 10, 11
Dimensions 11

Preventa™ XPSMC Safety Controllers Wiring Diagrams

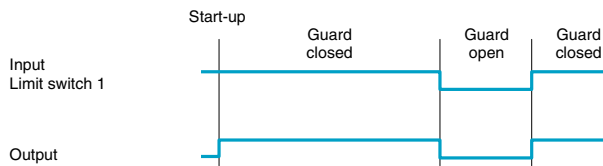
Guard monitoring with 1 limit switch or safety interlock Category 1 conforming to standard EN 954-1.



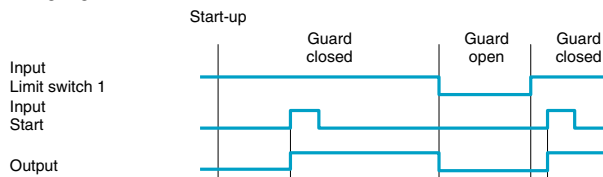
Functional diagrams

Start test = NO

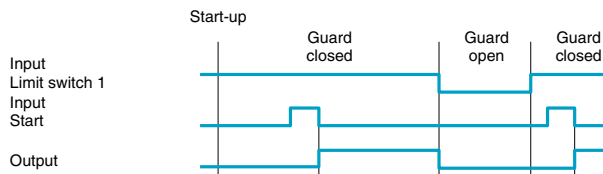
Automatic start



Rising edge monitored start

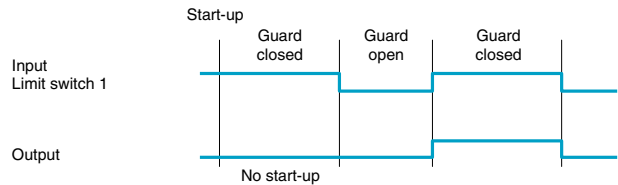


Falling edge monitored start

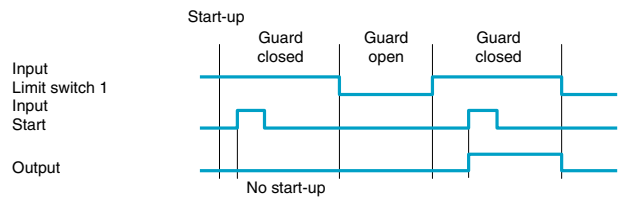


Start test = YES

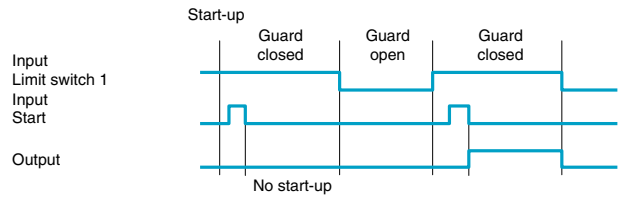
Automatic start



Rising edge monitored start



Falling edge monitored start

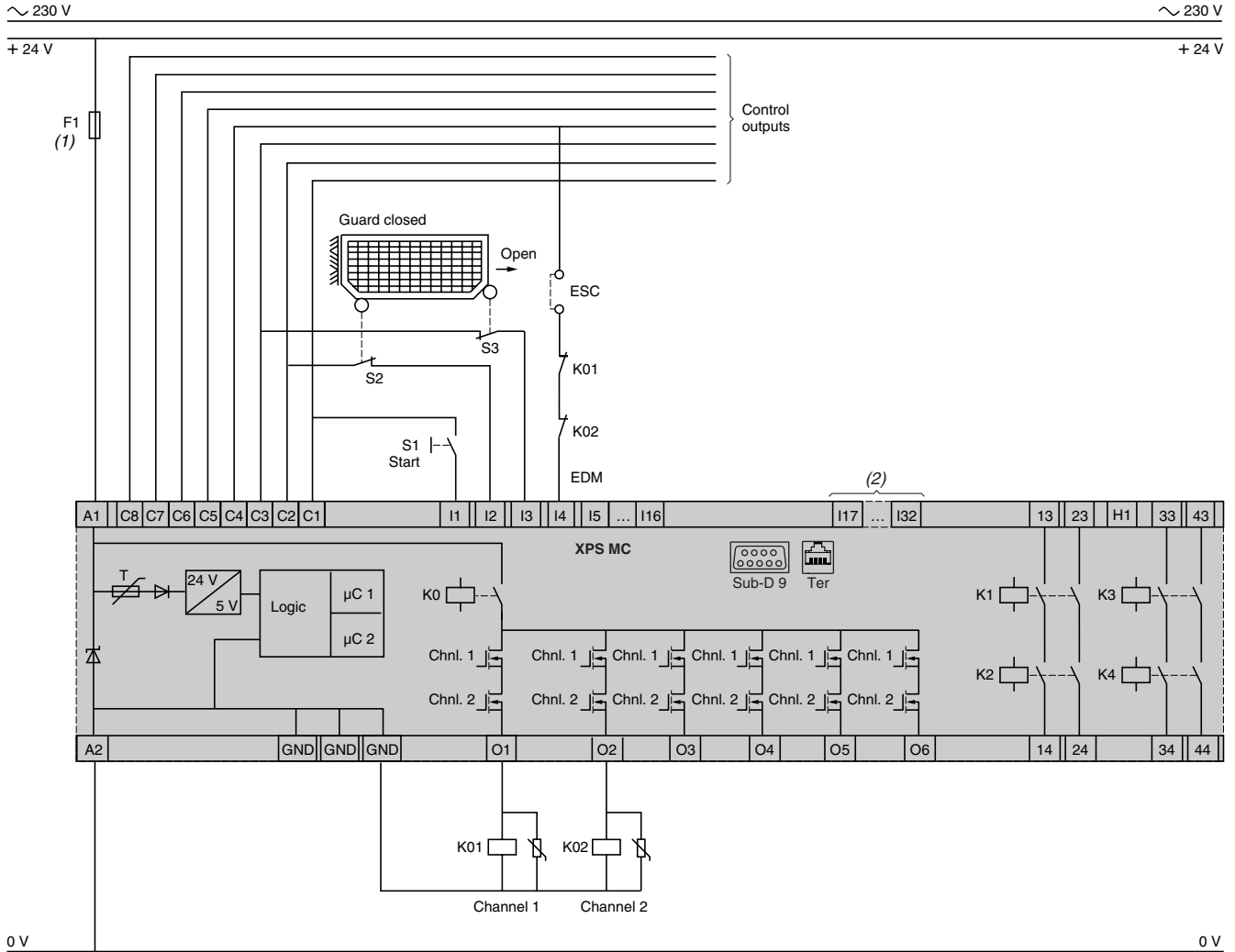


Key 0 1

Overview 4-7
 Technical Data 8, 9
 Ordering Information 10, 11
 Dimensions 11

Preventa™ XPSMC Safety Controllers Wiring Diagrams

Guard monitoring with 2 limit switches or safety interlocks Category 4 conforming to standard EN 954-1.



ESC = external start conditions
EDM = external devices monitoring

(1) Technical characteristics for maximum rating of fuses, see page 8.
(2) Only applicable to XPSMC32Z.

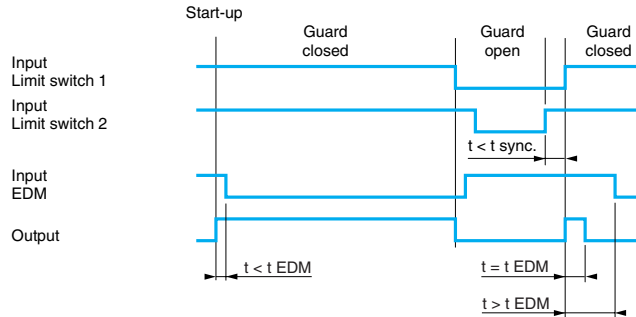
Overview 4-7
Technical Data 8, 9
Ordering Information 10, 11
Dimensions 11

Guard monitoring with 2 limit switches or safety interlocks (continued)

Functional diagrams

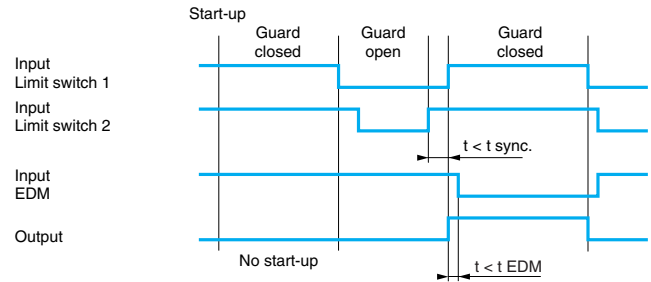
Start test = NO

Automatic start

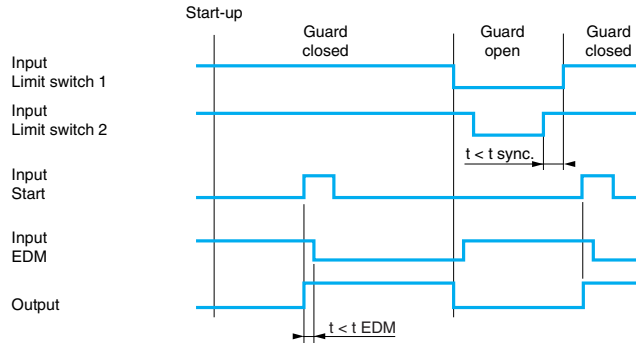


Start test = YES

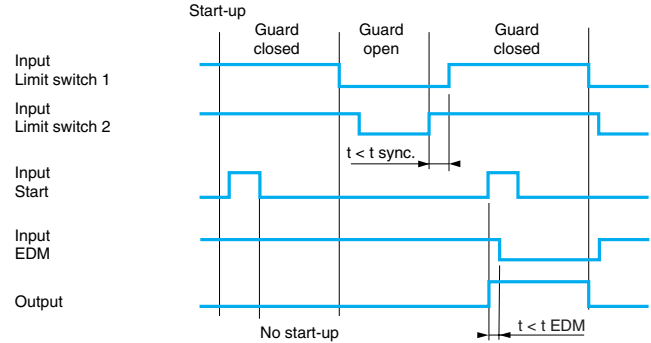
Automatic start



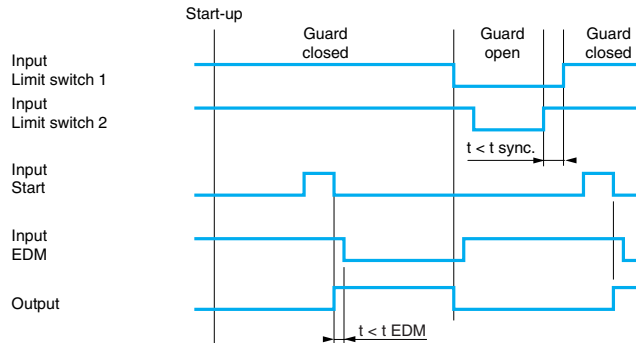
Rising edge monitored start



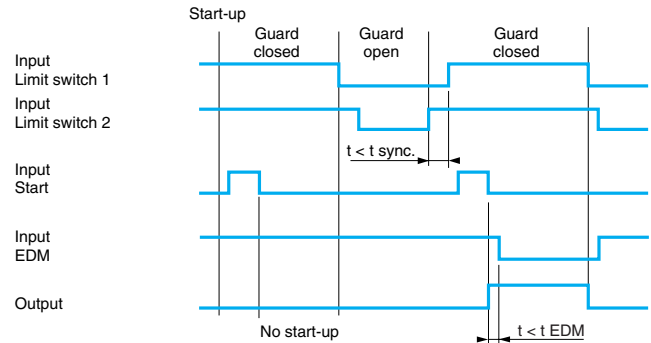
Rising edge monitored start



Falling edge monitored start



Falling edge monitored start



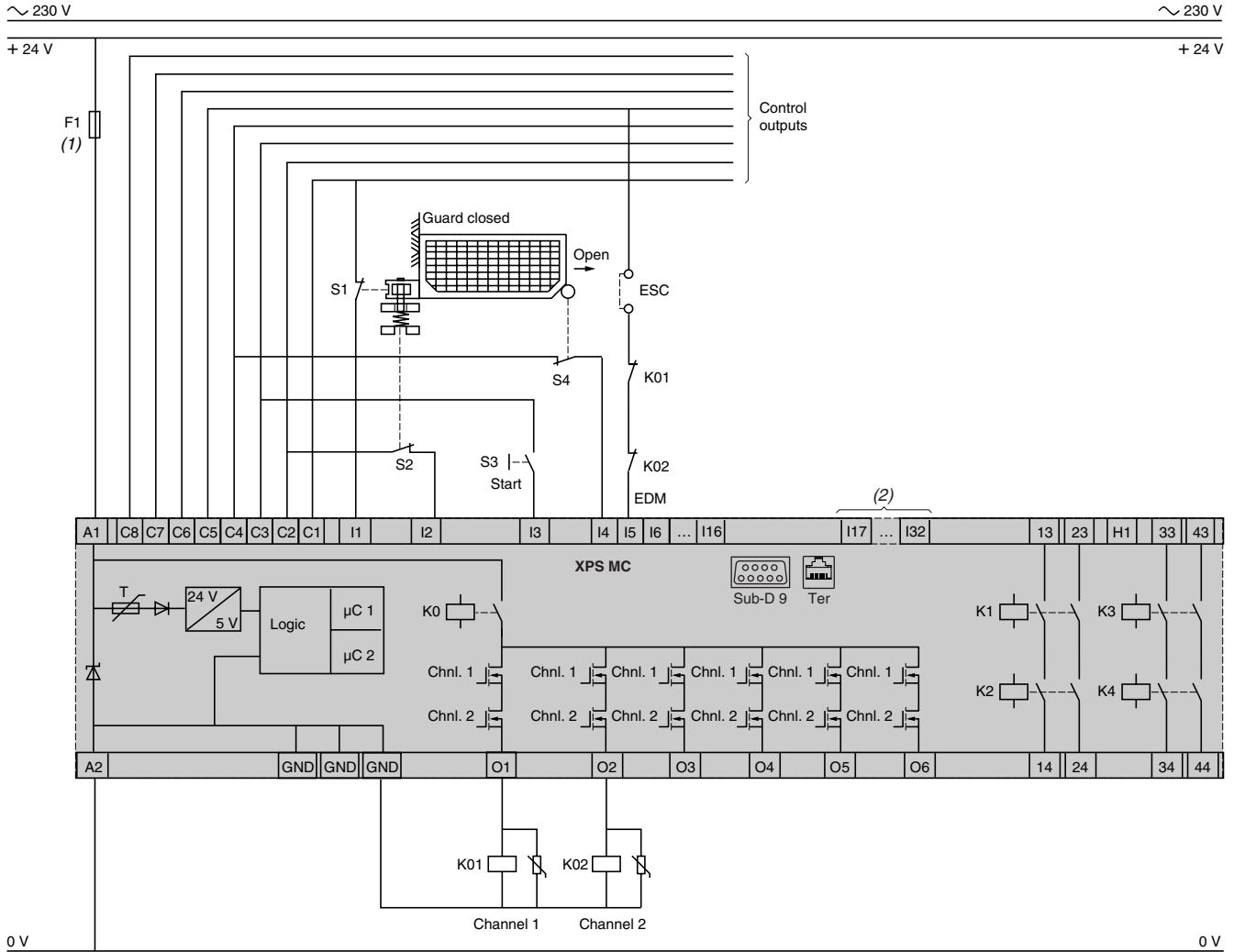
Key 0 1

EDM = external devices monitoring
t EDM = maximum monitoring time of external devices
t sync. = synchronization time

Overview 4-7
Technical Data 8, 9
Ordering Information 10, 11
Dimensions 11

Preventa™ XPSMC Safety Controllers Wiring Diagrams

Guard monitoring with 2 limit switches or safety interlocks, with guard locking Category 4 conforming to standard EN 954-1.



ESC = external start conditions
EDM = external devices monitoring

(1) Technical characteristics for maximum rating of fuses, see page 8.
(2) Only applicable to XPSMC32Z●.

Overview	4-7
Technical Data	8, 9
Ordering Information	10, 11
Dimensions	11

Guard monitoring with 2 limit switches or safety interlocks, with guard locking (continued)

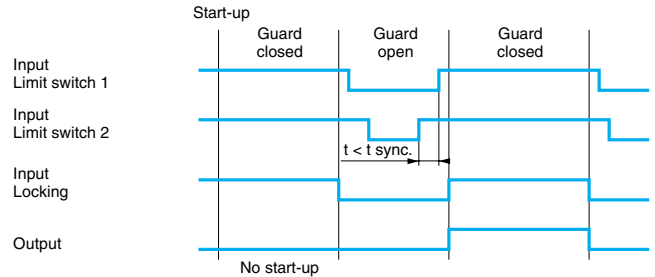
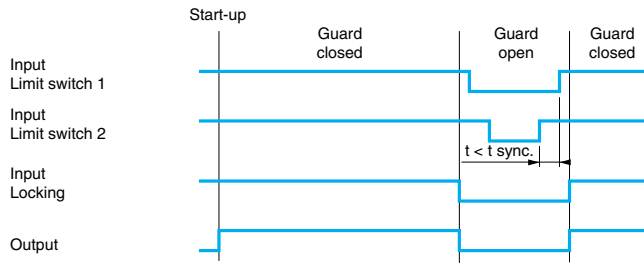
Functional diagrams

Start test = NO

Start test = YES

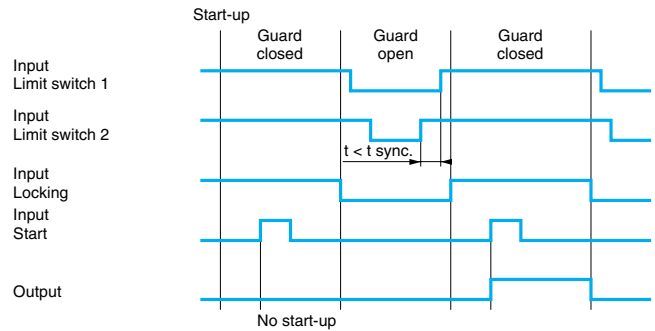
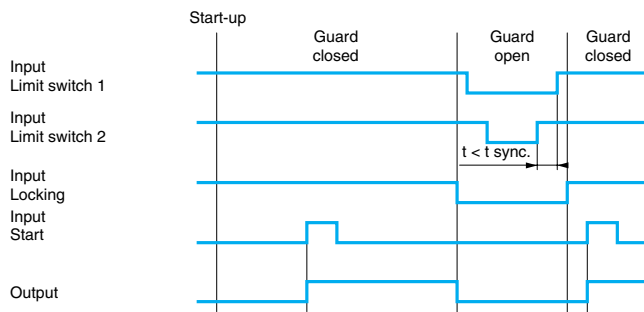
Automatic start

Automatic start



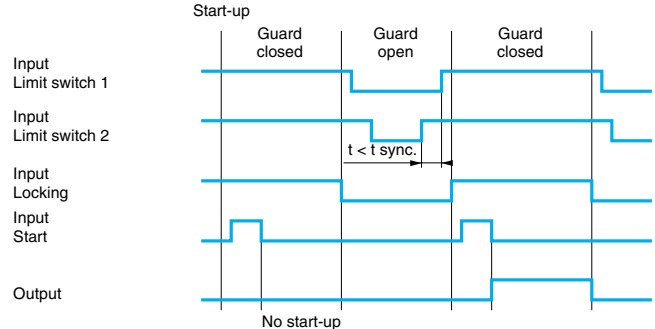
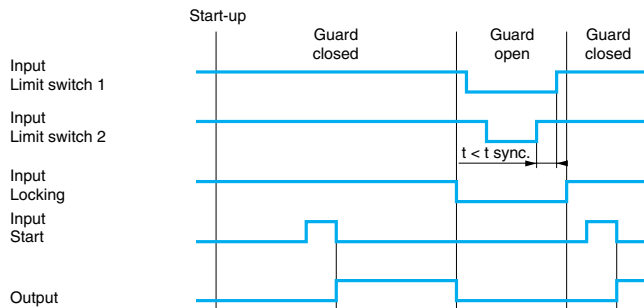
Rising edge monitored start

Rising edge monitored start



Falling edge monitored start

Falling edge monitored start



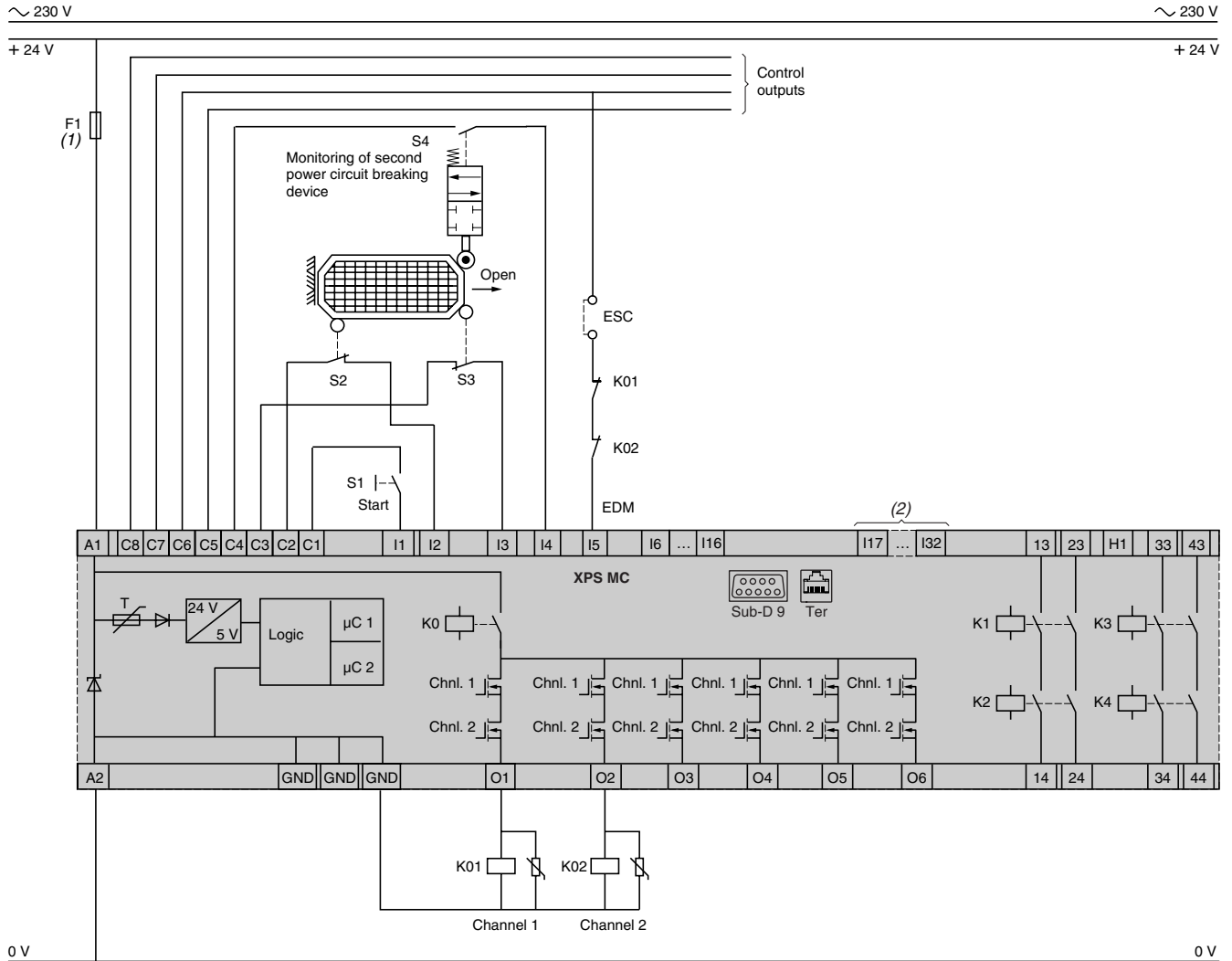
Key 0 1

t sync. = synchronization time

Overview 4-7
 Technical Data 8, 9
 Ordering Information 10, 11
 Dimensions 11

Preventa™ XPSMC Safety Controllers Wiring Diagrams

Guard monitoring for injection presses and blowing machines Category 4 conforming to standard EN 954-1.



ESC = external start conditions
EDM = external devices monitoring

(1) Technical characteristics for maximum rating of fuses, see page 8.
(2) Only applicable to XPSMC32Z.

Overview 4-7
 Technical Data 8, 9
 Ordering Information 10, 11
 Dimensions 11

Guard monitoring for injection presses and blowing machines (continued)

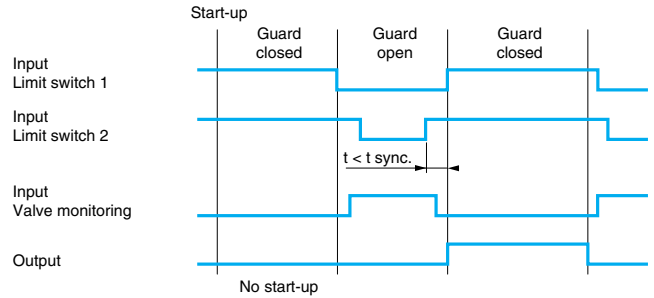
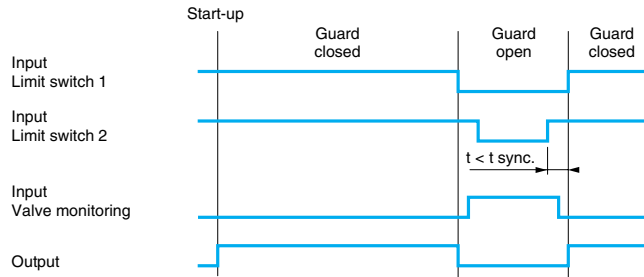
Functional diagrams

Start test = NO

Start test = YES

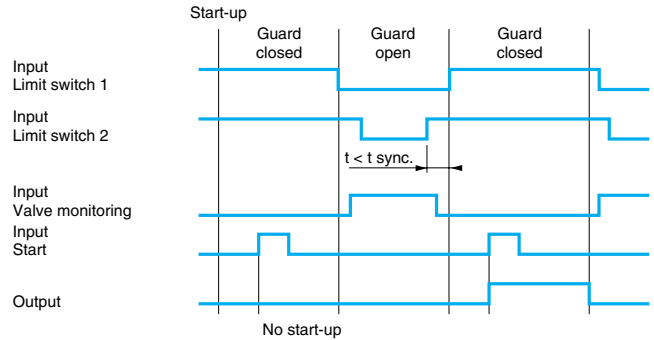
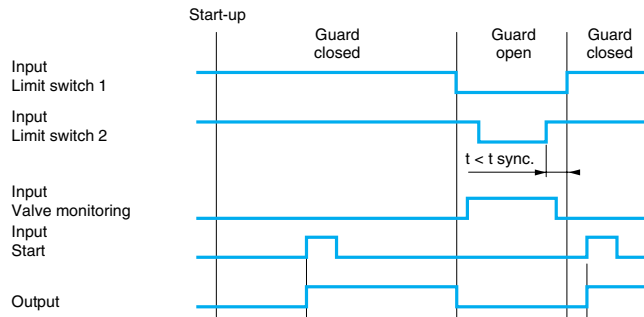
Automatic start

Automatic start



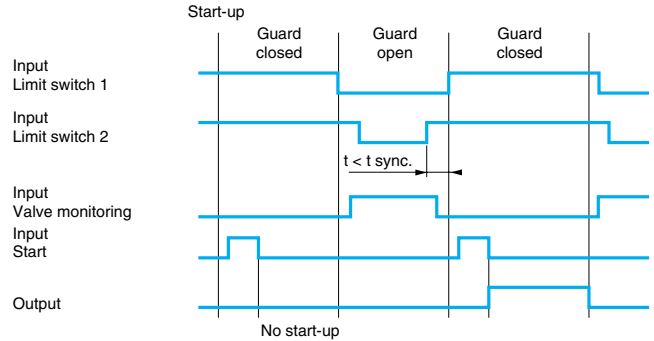
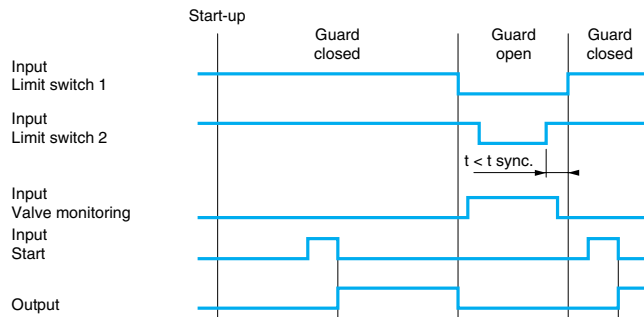
Rising edge monitored start

Rising edge monitored start



Falling edge monitored start

Falling edge monitored start



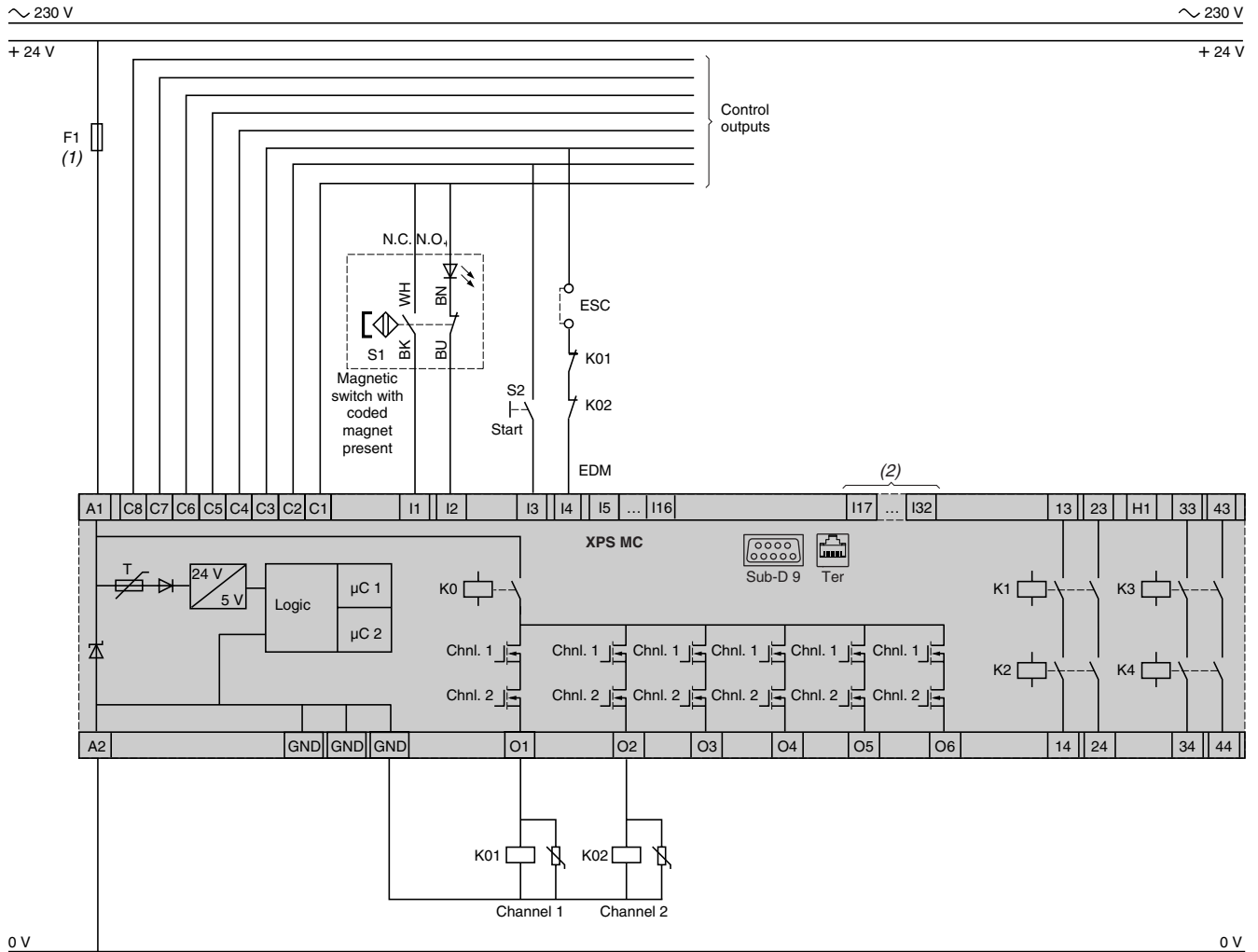
Key 0 1

$t_{sync.}$ = synchronization time

Overview 4-7
 Technical Data 8, 9
 Ordering Information 10, 11
 Dimensions 11

Preventa™ XPSMC Safety Controllers Wiring Diagrams

Non-contact safety interlock switch monitoring



ESC = external start conditions
EDM = external devices monitoring

(1) Technical characteristics for maximum rating of fuses, see page 8.
(2) Only applicable to XPSMC32Z.

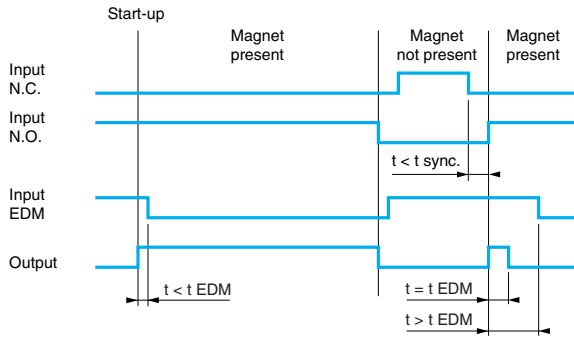
Overview 4-7
 Technical Data 8, 9
 Ordering Information 10, 11
 Dimensions 11

Non-contact safety interlock switch monitoring (continued)

Functional diagrams

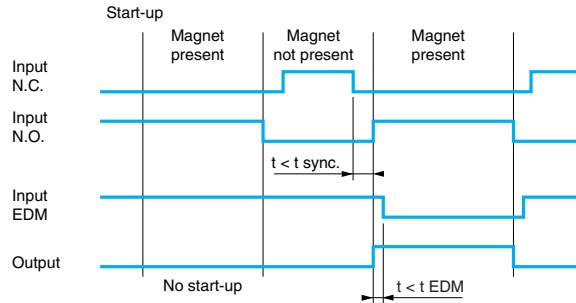
Start test = NO

Automatic start

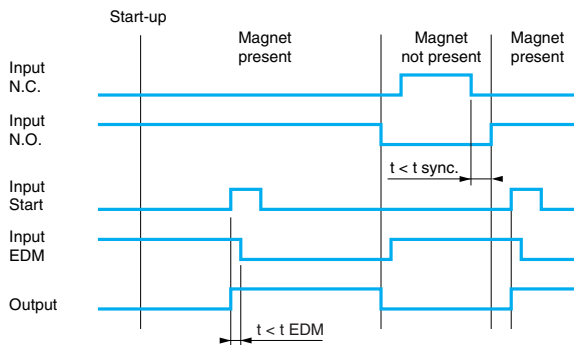


Start test = YES

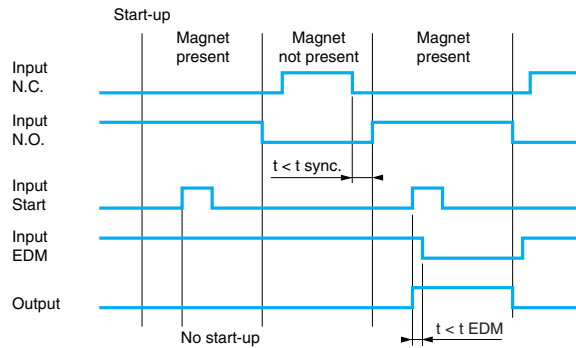
Automatic start



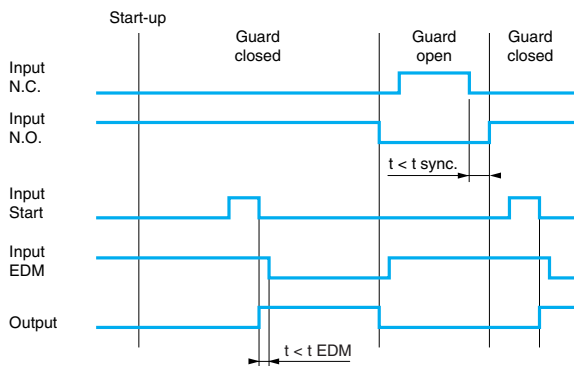
Rising edge monitored start



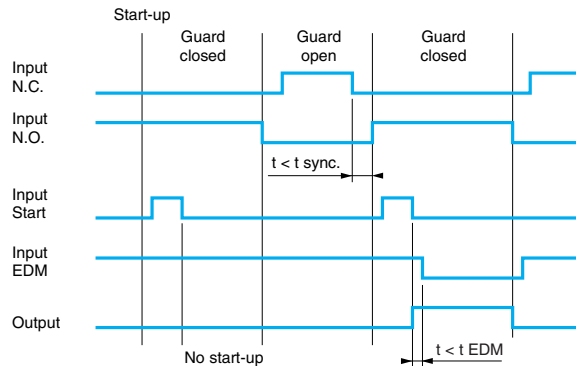
Rising edge monitored start



Falling edge monitored start



Falling edge monitored start



Key 0 1

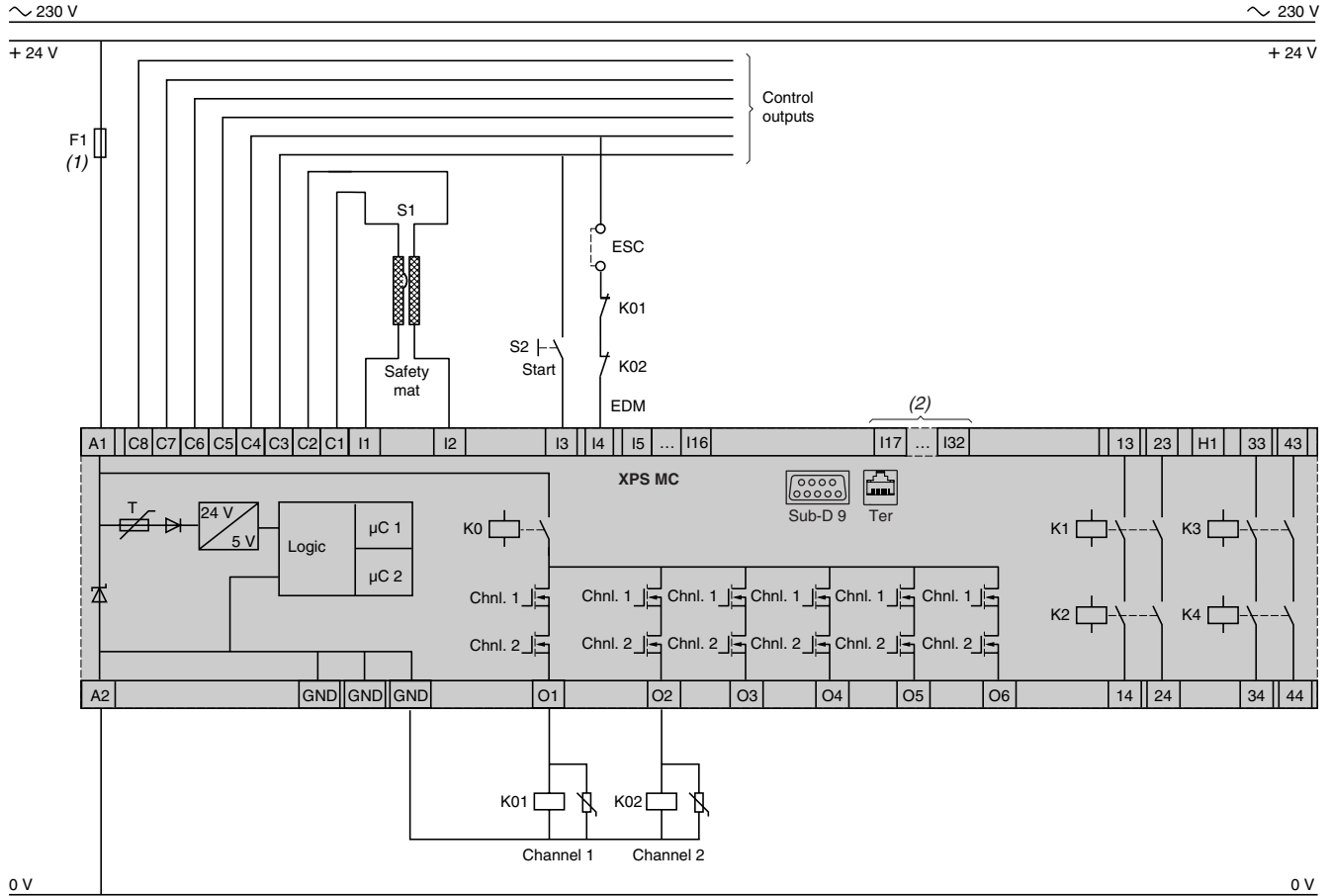
EDM = external devices monitoring
t EDM = maximum monitoring time of external devices
t sync. = synchronization time

Overview 4-7
Technical Data 8, 9
Ordering Information 10, 11
Dimensions 11

Preventa™ XPSMC Safety Controllers Wiring Diagrams

Safety mat monitoring

- Category 3 conforming to standard EN 954-1.
- Control outputs connected to a safety mat cannot be used for other items.



ESC = external start conditions
EDM = external devices monitoring

- (1) Technical characteristics for maximum rating of fuses, see page 8.
(2) Only applicable to XPSMC32Z.

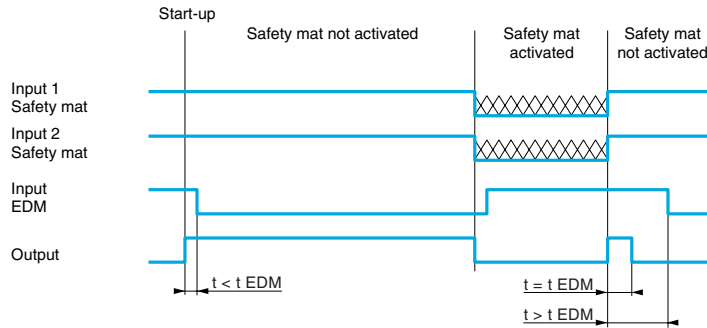
Overview 4-7
 Technical Data 8, 9
 Ordering Information 10, 11
 Dimensions 11

Safety mat monitoring (continued)

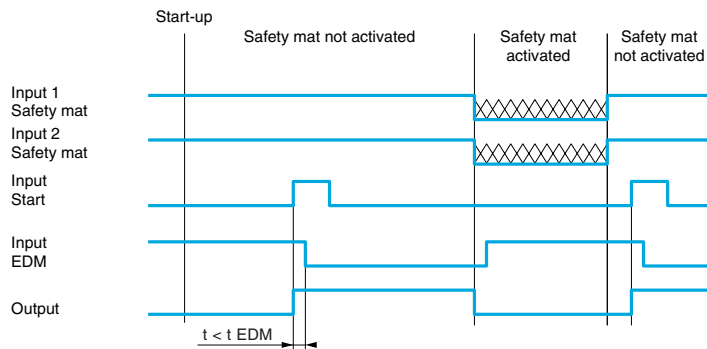
Functional diagrams

Start-up test

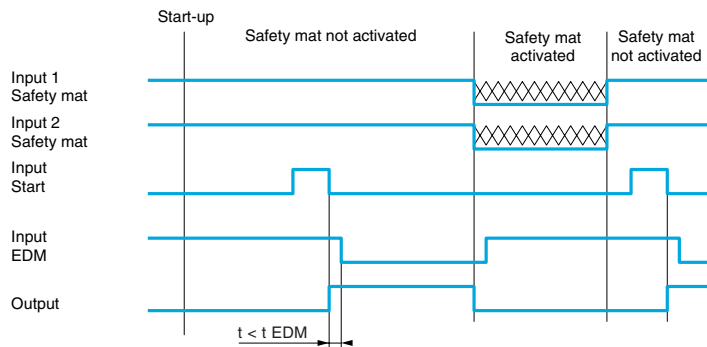
Automatic start



Rising edge monitored start



Falling edge monitored start



Key 0 1

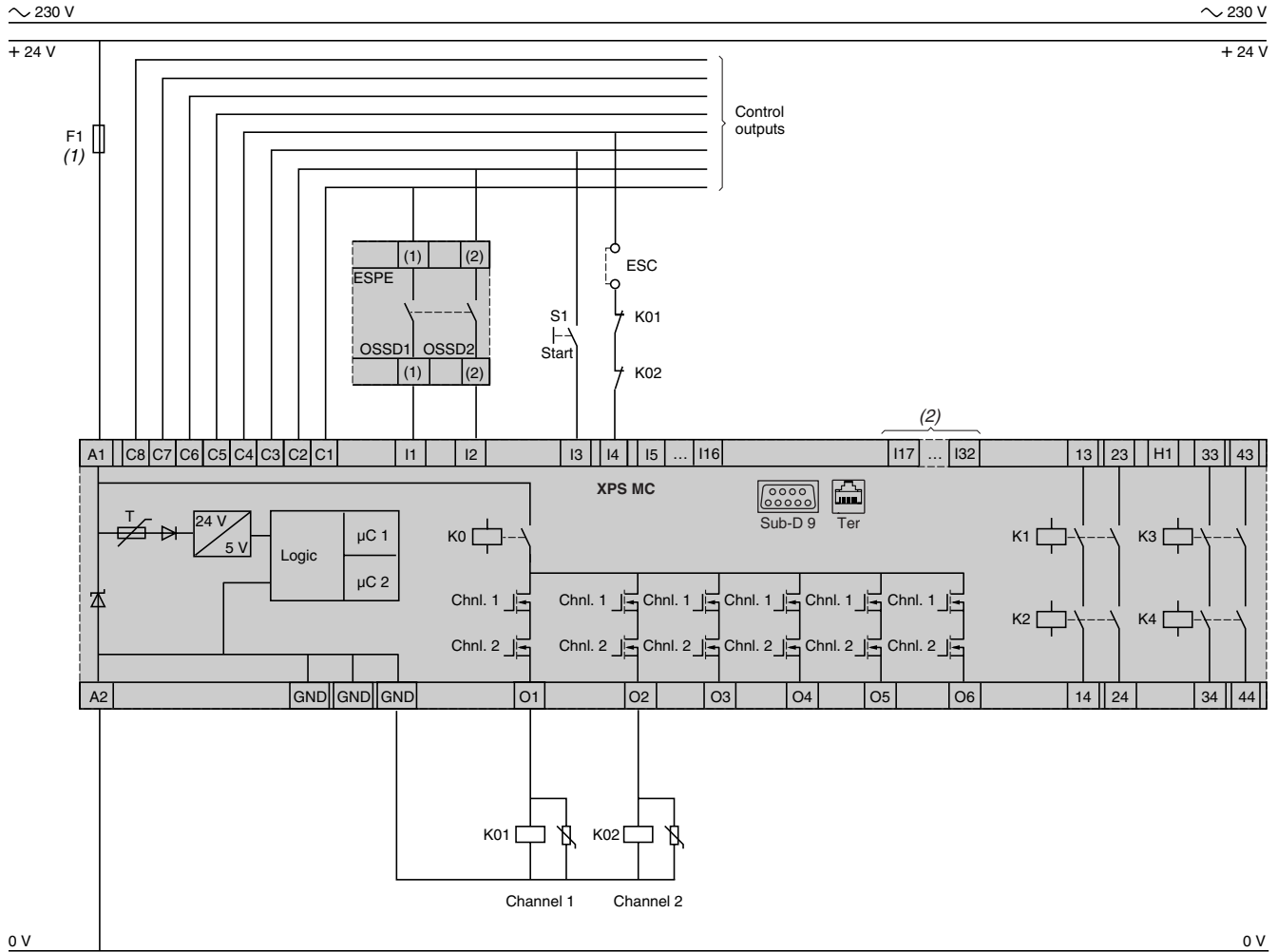
EDM = external devices monitoring

t EDM = maximum monitoring time of external devices

Overview	4-7
Technical Data	8, 9
Ordering Information	10, 11
Dimensions	11

Preventa™ XPSMC Safety Controllers Wiring Diagrams

Light curtain monitoring, relay output type Category 4 conforming to standard EN 954-1.



ESC = external start conditions
 ESPE = electro-sensitive protection equipment (i.e.: light curtains)
 OSSD1/OSSD2 = output signal switching device

(1) Technical characteristics for maximum rating of fuses, see page 8.
 (2) Only applicable to XPSMC32Z.

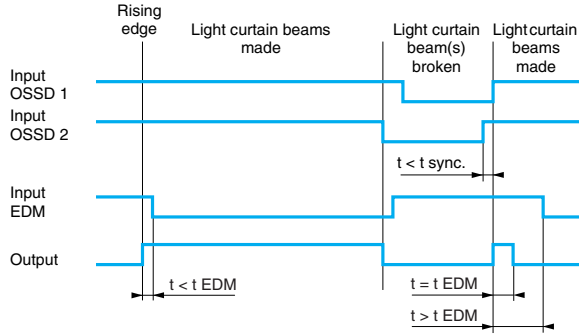
Overview 4-7
 Technical Data 8, 9
 Ordering Information 10, 11
 Dimensions 11

Light curtain monitoring, relay output type (continued)

Functional diagrams

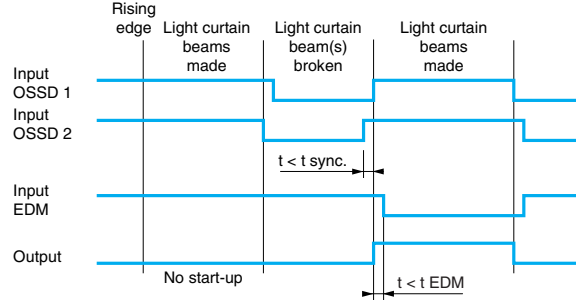
Start test = NO

Automatic start

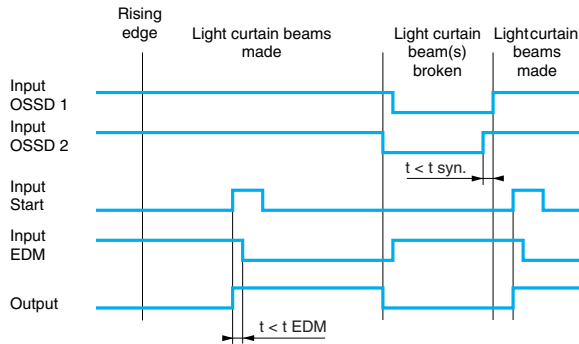


Start test = YES

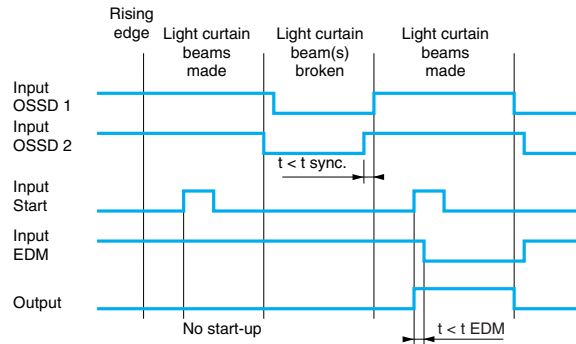
Automatic start



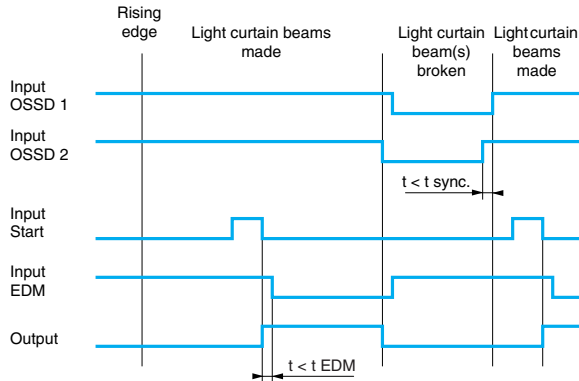
Rising edge monitored start



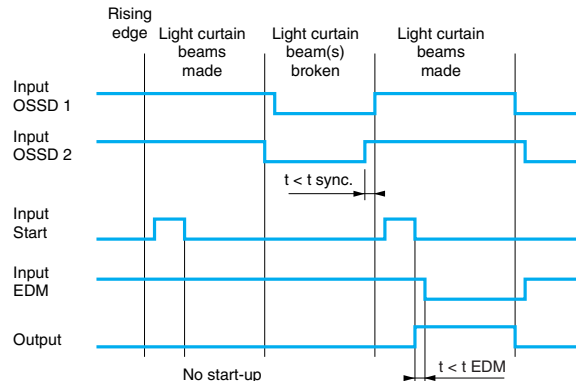
Rising edge monitored start



Falling edge monitored start



Falling edge monitored start

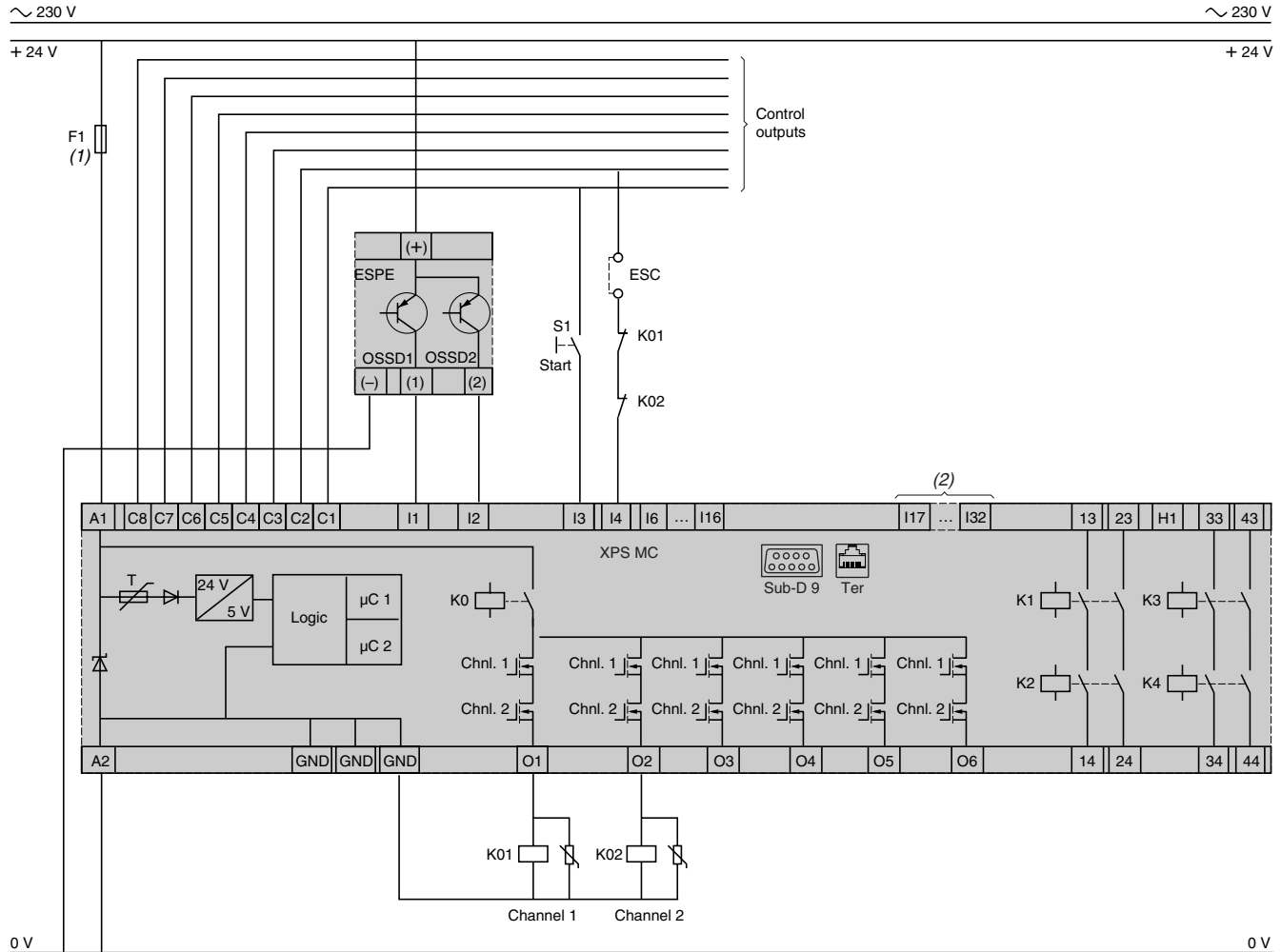


EDM = external devices monitoring
 t EDM = maximum monitoring time of external devices
 t sync. = synchronization time

Overview 4-7
 Technical Data 8, 9
 Ordering Information 10, 11
 Dimensions 11

Preventa™ XPSMC Safety Controllers Wiring Diagrams

Light curtain monitoring, solid-state output type Category 4 conforming to standard EN 954-1.



ESC = external start conditions
 ESPE = electro-sensitive protection equipment (i.e.: light curtains)
 OSSD1/OSSD2 = output signal switching device

(1) Technical characteristics for maximum rating of fuses, see page 8.
 (2) Only applicable to XPSMC32Z.

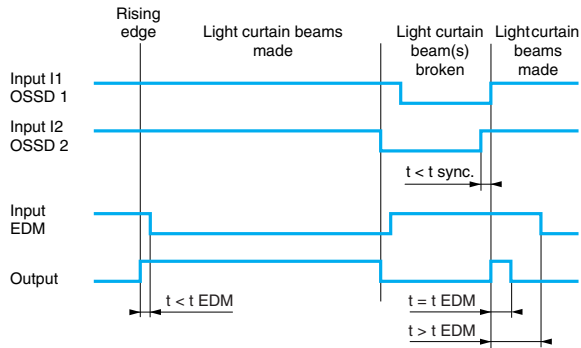
Overview 4-7
 Technical Data 8, 9
 Ordering Information 10, 11
 Dimensions 11

Light curtain monitoring, solid-state output type (continued)

Functional diagrams

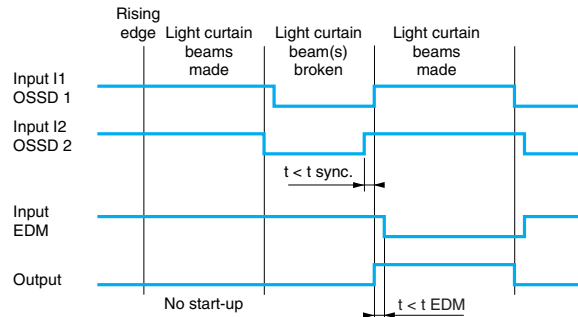
Start test = NO

Automatic start

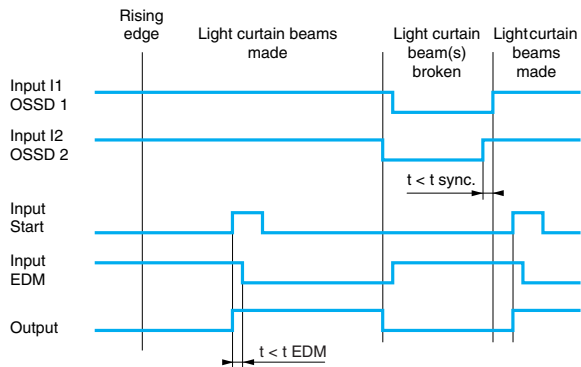


Start test = YES

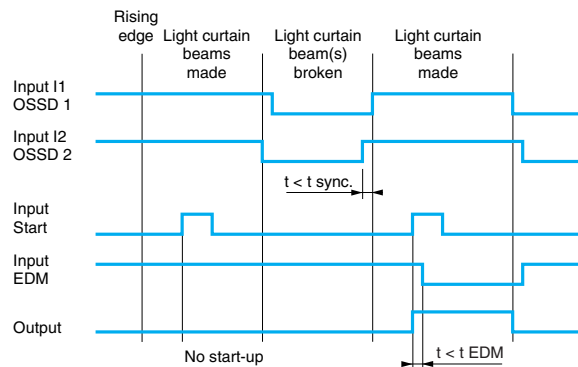
Automatic start



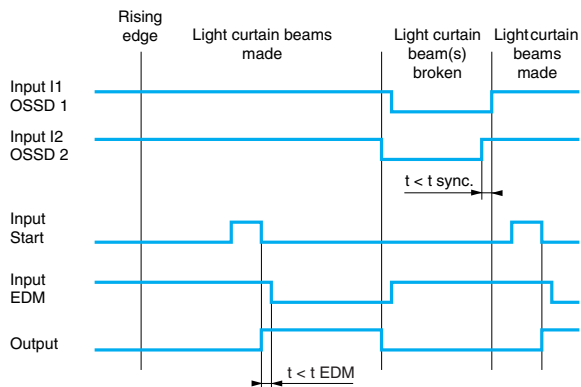
Rising edge monitored start



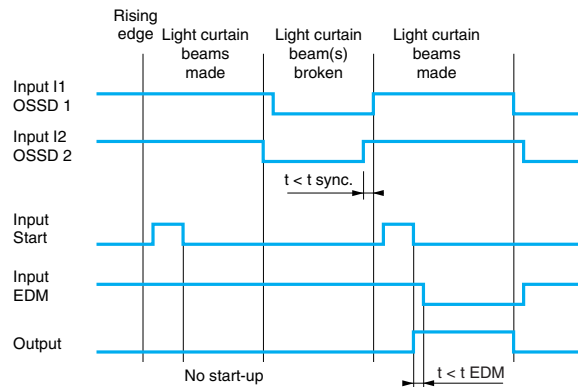
Rising edge monitored start



Falling edge monitored start



Falling edge monitored start



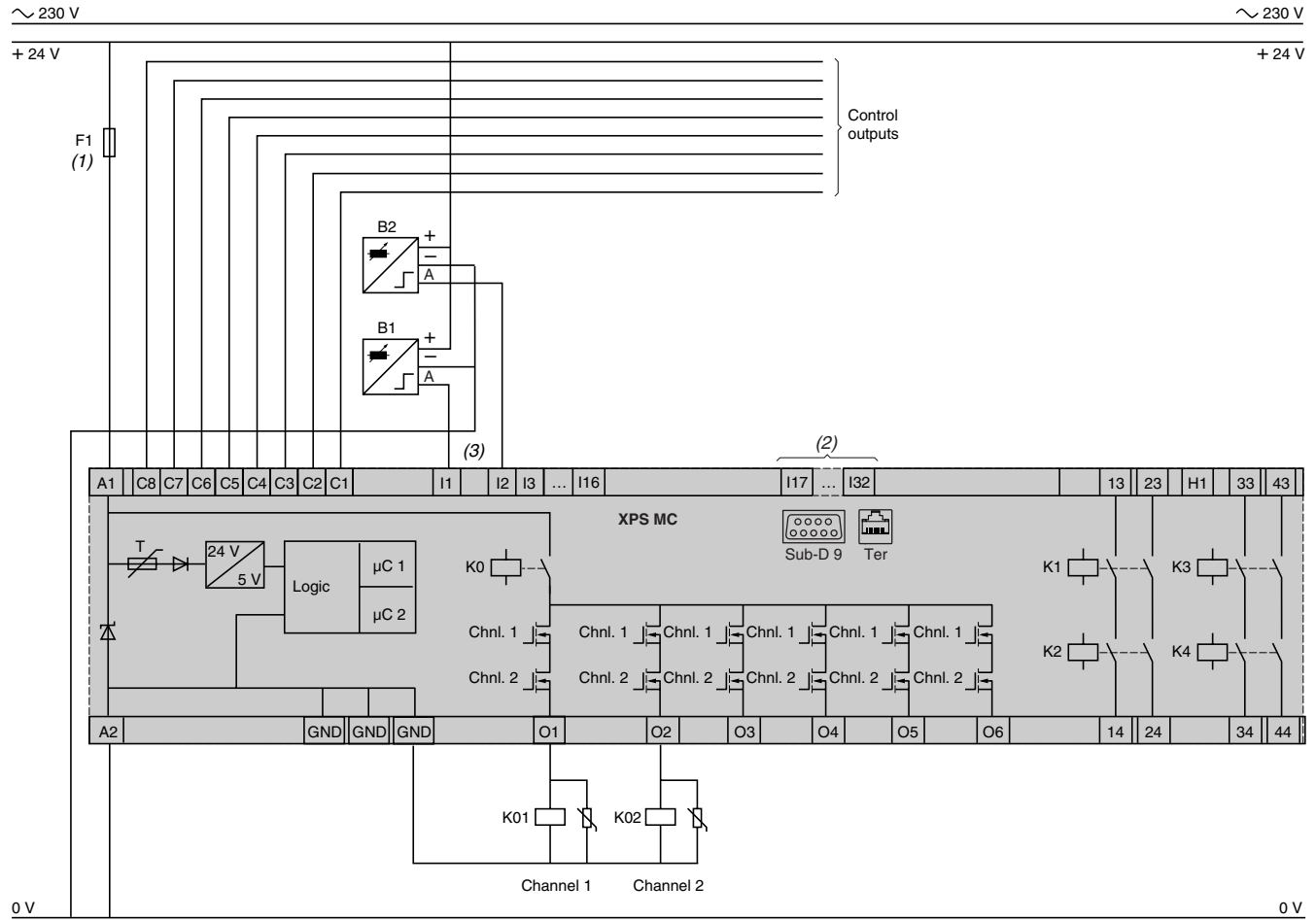
Key 0 1

EDM = external devices monitoring
t EDM = maximum monitoring time of external devices
t sync. = synchronization time

Overview 4-7
Technical Data 8, 9
Ordering Information 10, 11
Dimensions 11

Preventa™ XPSMC Safety Controllers Wiring Diagrams

Zero speed detection Category 4 conforming to standard EN 954-1.



The zero speed signal (validation of the output) will be activated only if:
 1: one input is in a high state,
 2: the other input is in a low state,
 3: the frequency of the two inputs is less than the stated value.

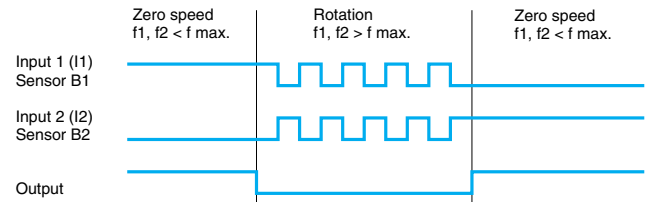
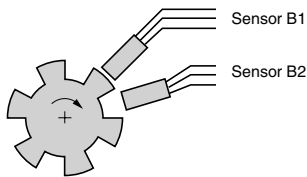
(1) Technical characteristics for maximum rating of fuses, see page 8.

(2) Only applicable to XPSMC32Z.

(3) Only one "Zero speed detection" function can be connected to an XPSMC controller, and only to the inputs i1 and i2.

Functional diagram

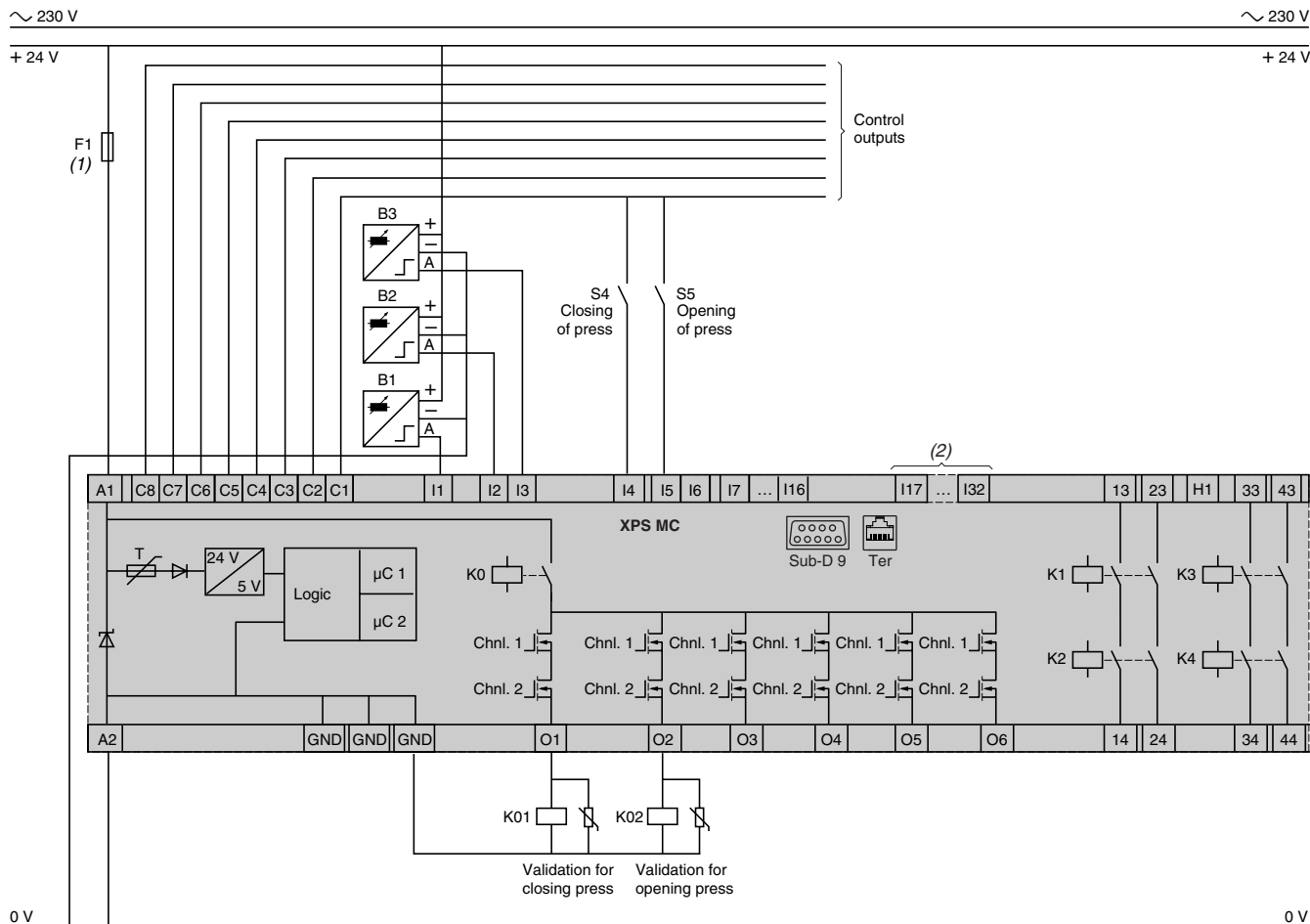
Sensor control



Overview 4-7
 Technical Data 8, 9
 Ordering Information 10, 11
 Dimensions 11

Preventa™ XPSMC Safety Controllers Wiring Diagrams

Dynamic monitoring of hydraulic valves on linear presses Category 4 conforming to standard EN 954-1.

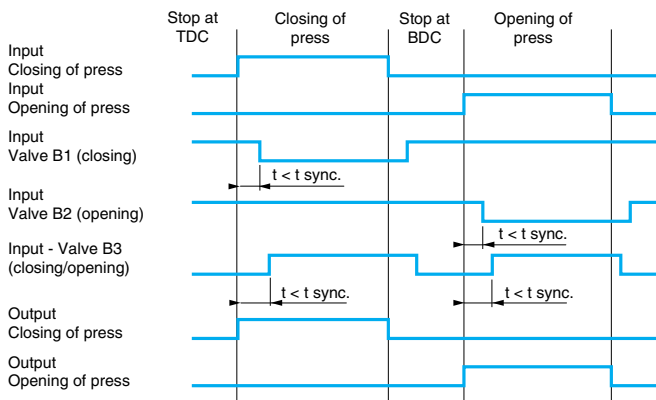


ESC = external start conditions

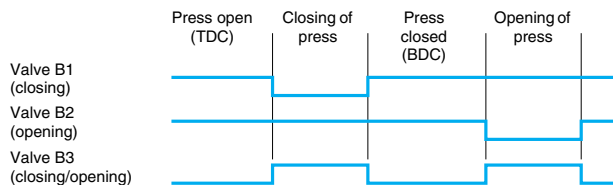
(1) Technical characteristics for maximum rating of fuses, see page 8.
(2) Only applicable to XPSMC32Z.

Functional diagrams

Valve control



Valve sensor signals



Note: The valve sensor signals must function as described above.

Key 0 1
BDC = Bottom Dead Center
TDC = Top Dead Center
t sync. = synchronization time

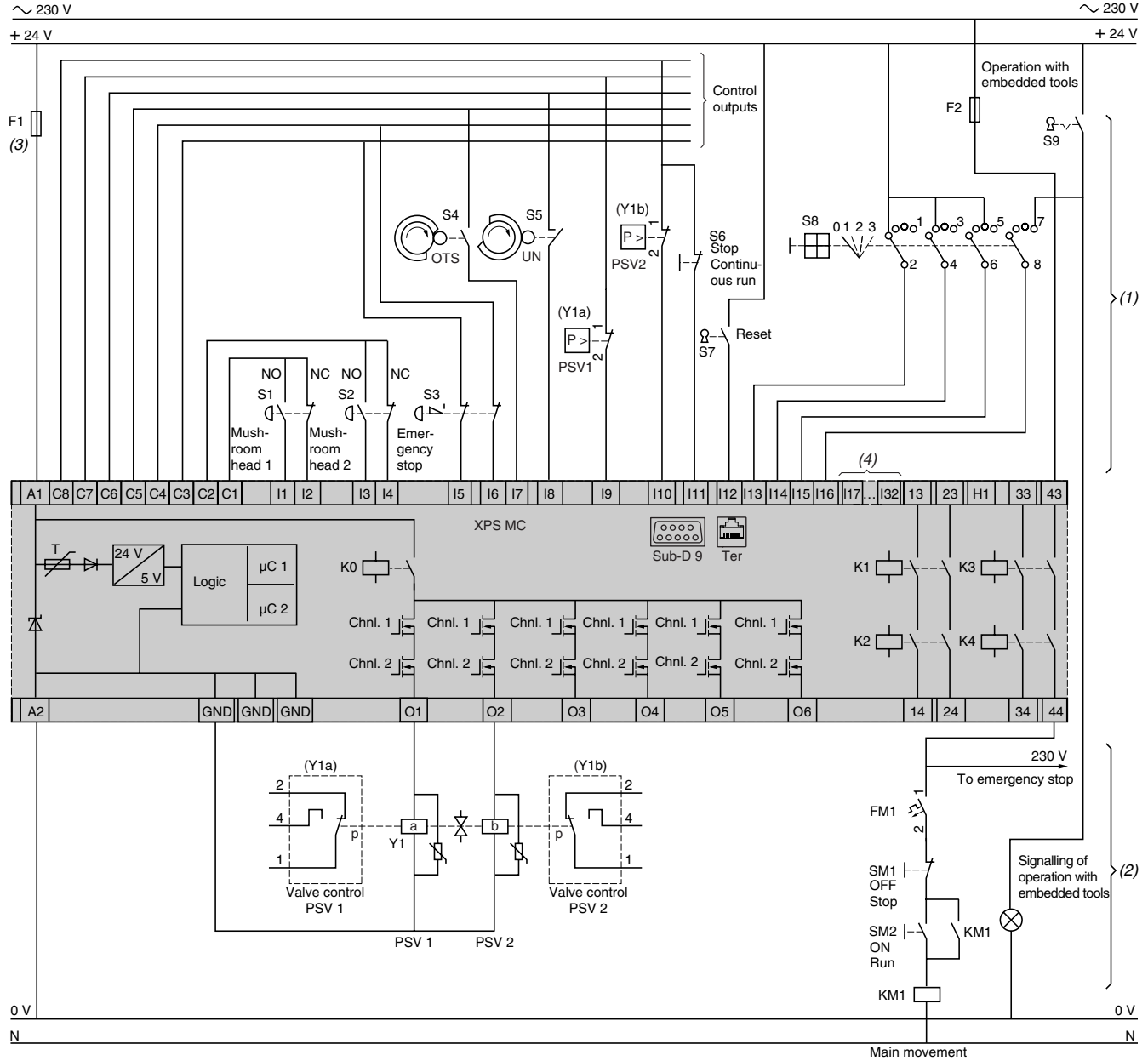
Overview 4-7
Technical Data 8, 9
Ordering Information 10, 11
Dimensions 11

Preventa™ XPSMC Safety Controllers Wiring Diagrams

Monitoring safety stop at top dead center on eccentric press Category 4 conforming to standard EN 954-1.

This function comprises several monitoring modes including:

- Safety stop at top dead center (1),
- monitoring braking travel,
- as an option, dynamic monitoring of doubled-bodied solenoid valves (2).



S1 and S2: Mushroom buttons for two hand control.

S8: Operating modes:

- 0 - stop,
- 1 - adjust,
- 2 - jog,
- 3 - automatic continuous run.

OTS = Limit switch associated with top dead center (TDC)
UN = Limit switch associated with bottom dead center (BDC)
PSV = safety valve

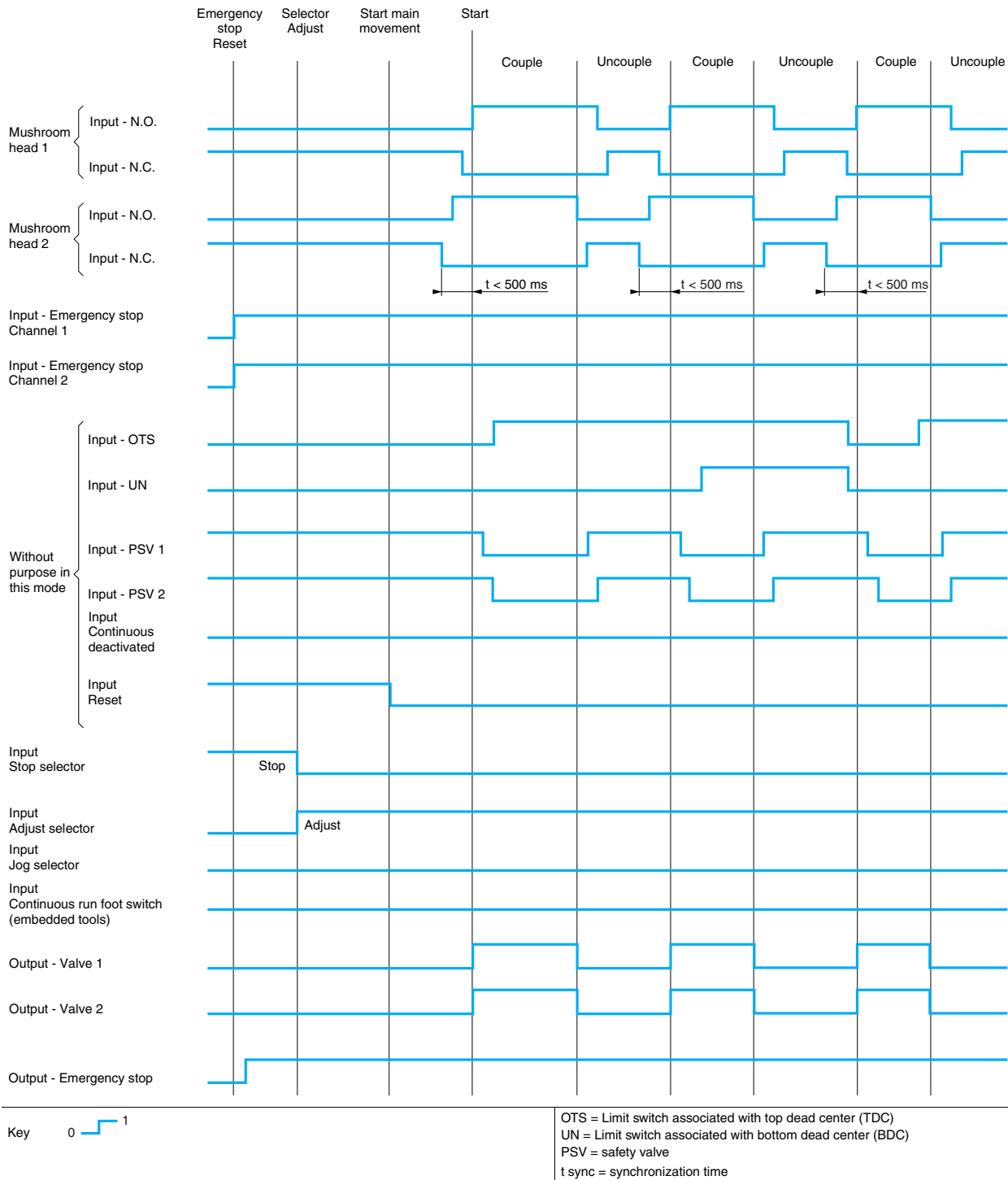
(3) Technical characteristics for maximum rating of fuses, see page 8.

(4) Only applicable to XPSMC32Z.

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Monitoring safety stop at top dead center on eccentric press (continued)

Functional diagram in adjust mode

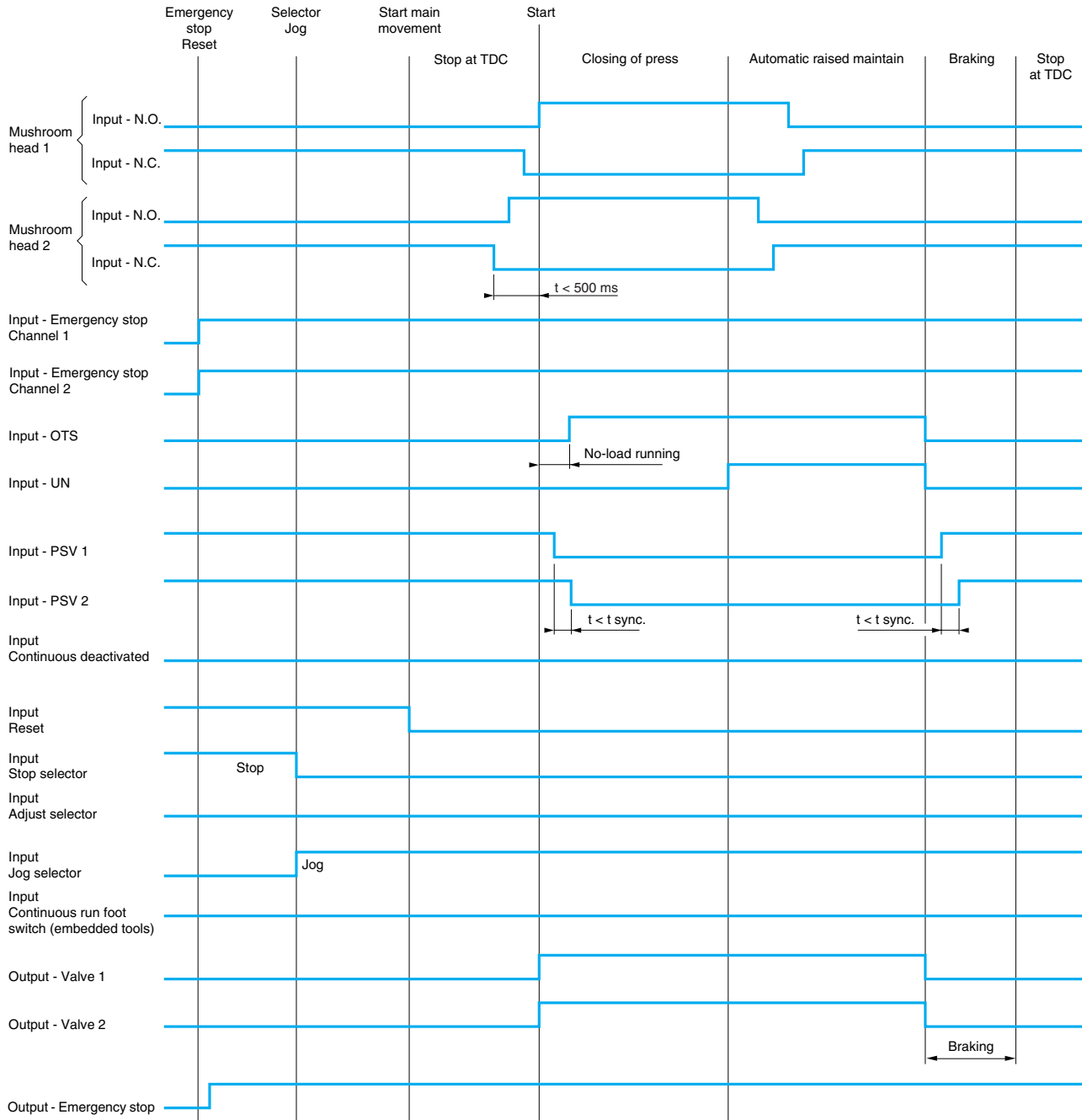


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Preventa™ XPSMC Safety Controllers Wiring Diagrams

Monitoring safety stop at top dead center on eccentric press (continued)

Functional diagram in jog mode



Key 0 1

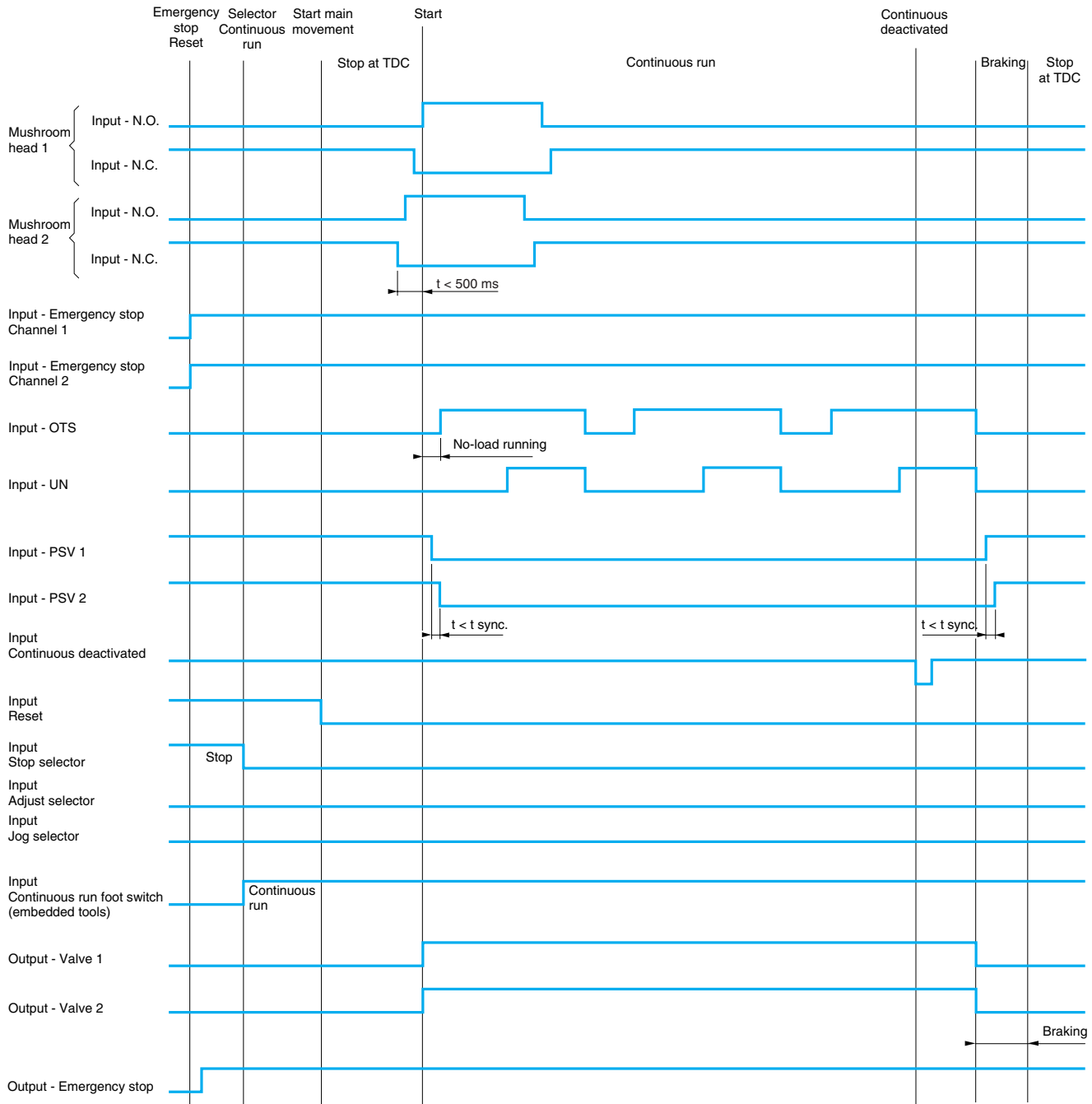
BDC = Bottom Dead Center
TDC = Top Dead Center

OTS = Limit switch associated with top dead center (TDC)
UN = Limit switch associated with bottom dead center (BDC)
PSV = safety valve
t sync = synchronization time

Overview 4-7
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Monitoring safety stop at top dead center on eccentric press (continued)

Functional diagram in automatic continuous run mode



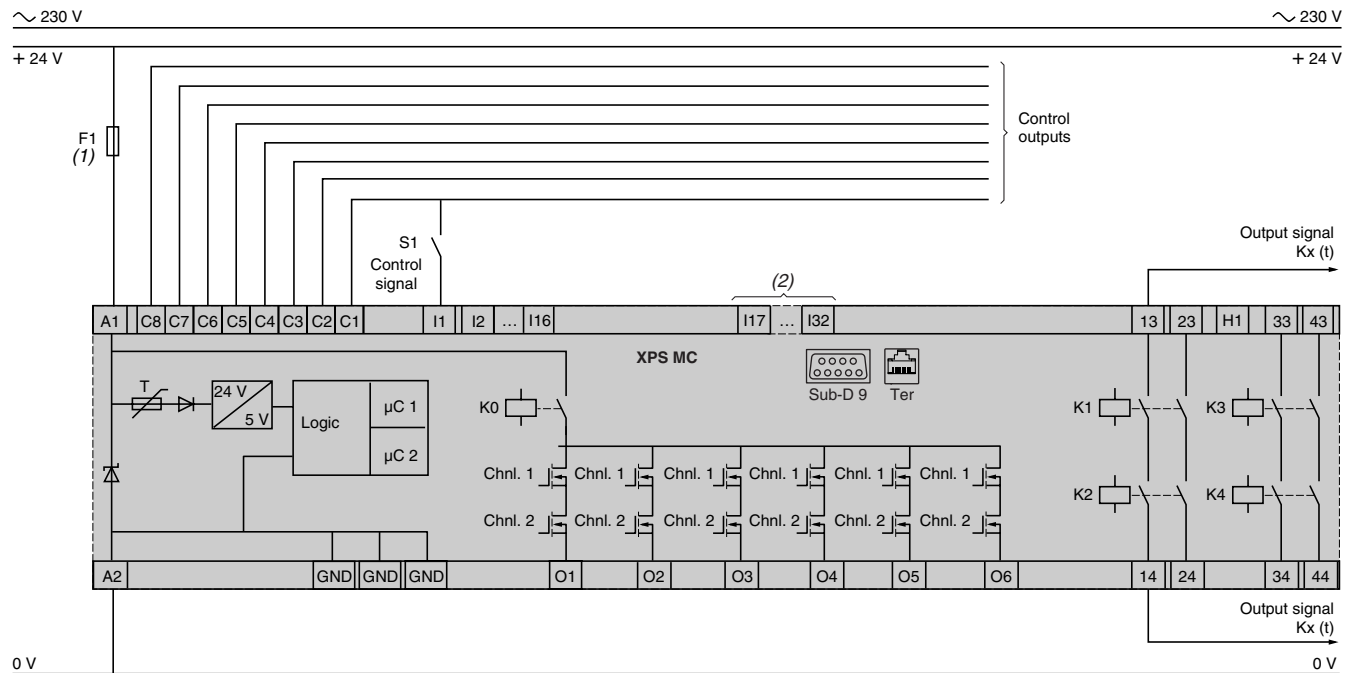
Key 0 1
 BDC = Bottom Dead Center
 TDC = Top Dead Center

OTS = Limit switch associated with top dead center (TDC)
 UN = Limit switch associated with bottom dead center (BDC)
 PSV = safety valve
 t sync = synchronization time

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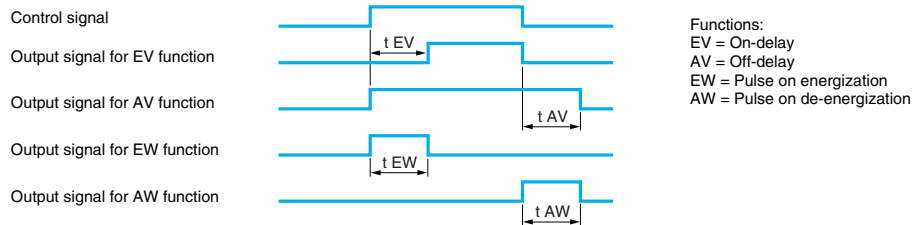
Preventa™ XPSMC Safety Controllers Wiring Diagrams

Safety time delays Category 4 conforming to standard EN 954-1.

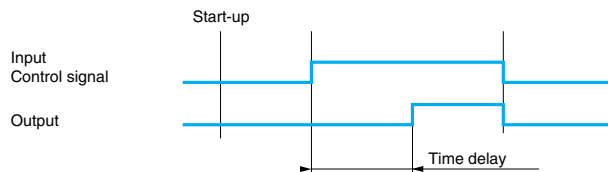


(1) Technical characteristics for maximum rating of fuses, see page 8.
(2) Only applicable to XPSMC32Z.

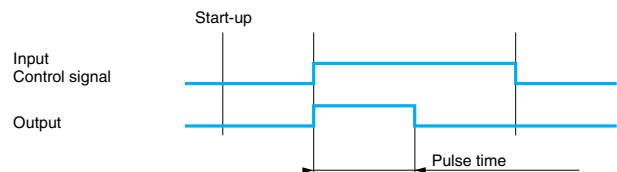
Functional diagrams



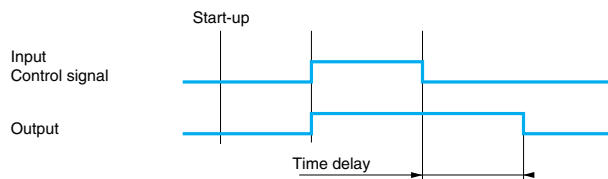
On-delay



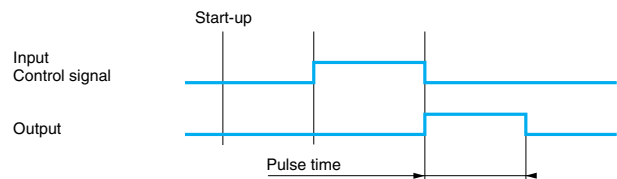
Pulse on energization



Off-delay



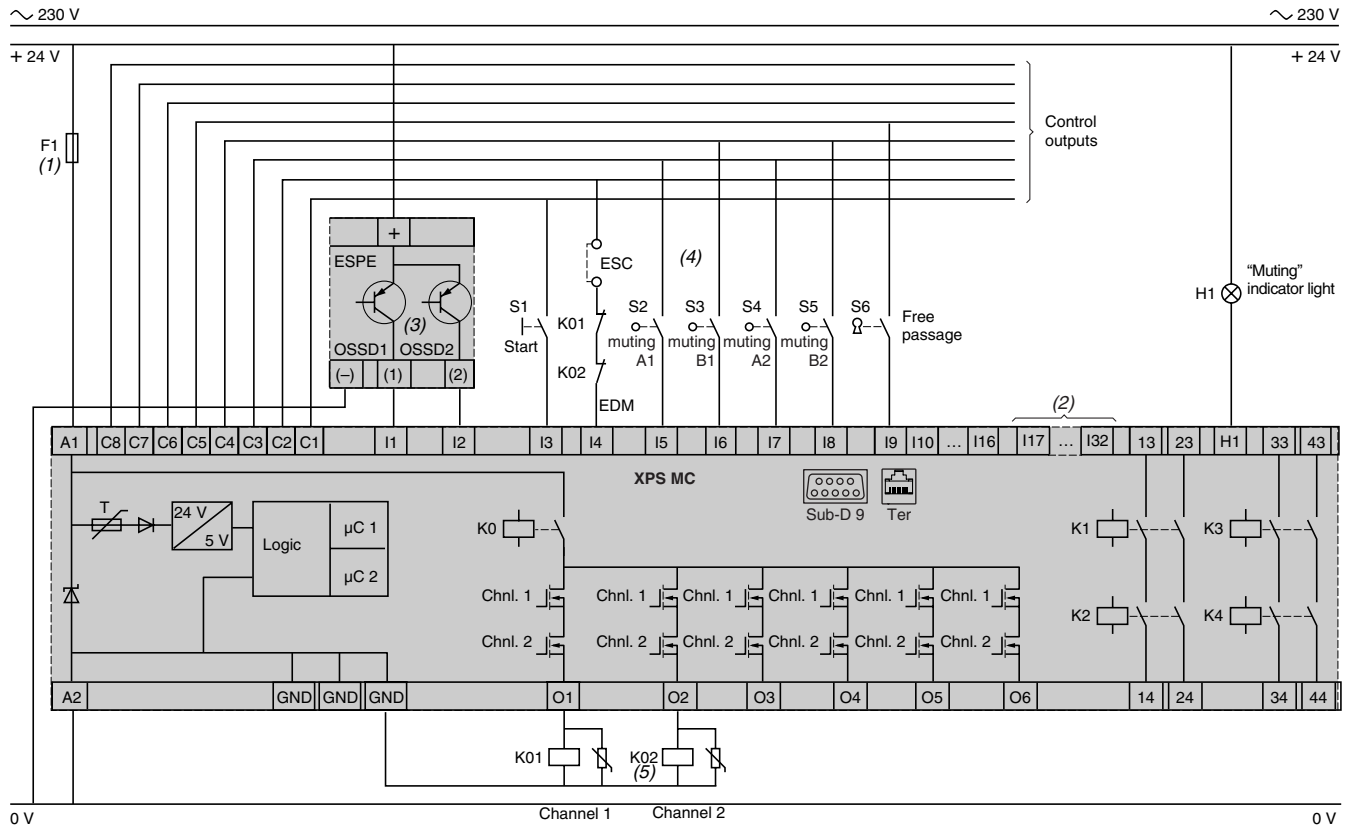
Pulse on de-energization



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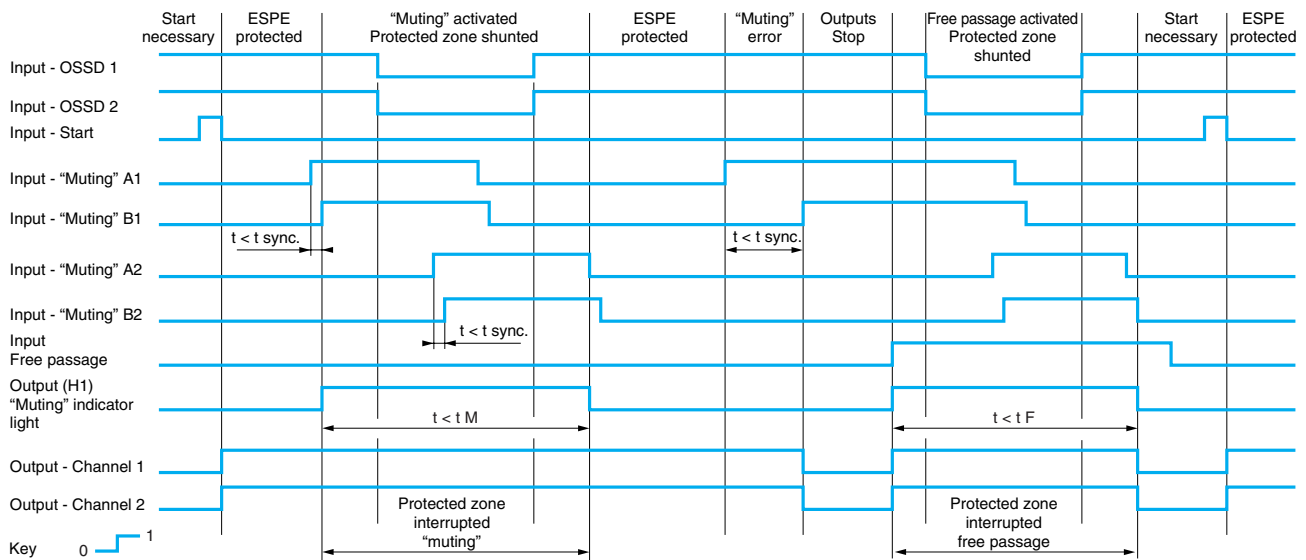
Preventa™ XPSMC Safety Controllers Wiring Diagrams

“Muting” function for light curtains Category 4 conforming to standard EN 954-1.



- ESC = external start conditions
 - EDM = external devices monitoring
 - ESPE = electro-sensitive protection equipment (i.e.: light curtains)
 - OSSD1/OSSD2 = output signal switching device
- (1) Technical characteristics for maximum rating of fuses, see page 8.
 - (2) Only applicable to XPSMC32Z.
 - (3) A light curtain with relay outputs can also be used with the “Muting” function.
 - (4) Only one “Muting” function can be connected to an XPS MC controller.
 - (5) Example using 2 safety outputs to control 2 contactors linked to one safety function.

Functional diagram

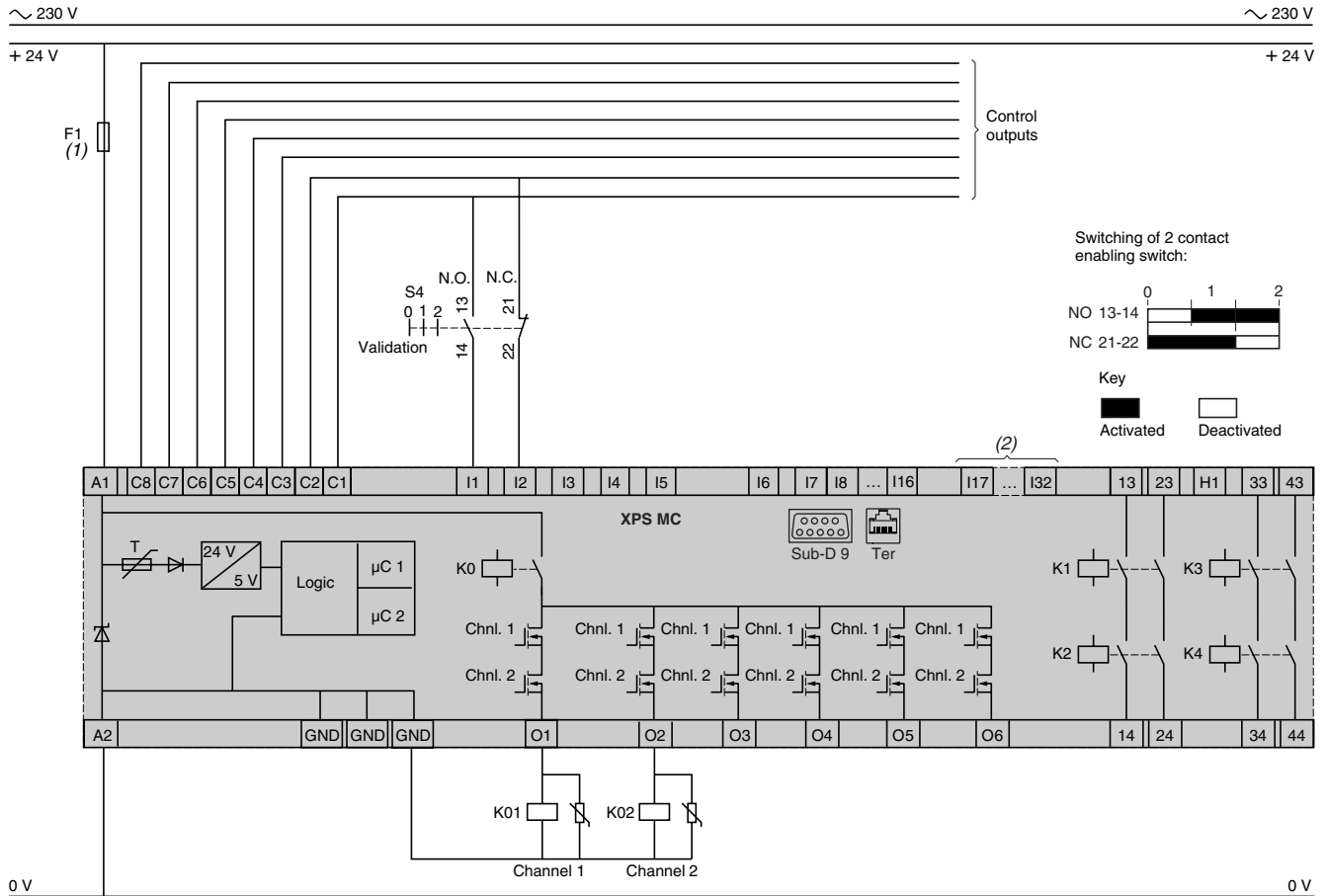


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tM = “Muting” time
 tF = free passage activation time
 t sync. = synchronization time

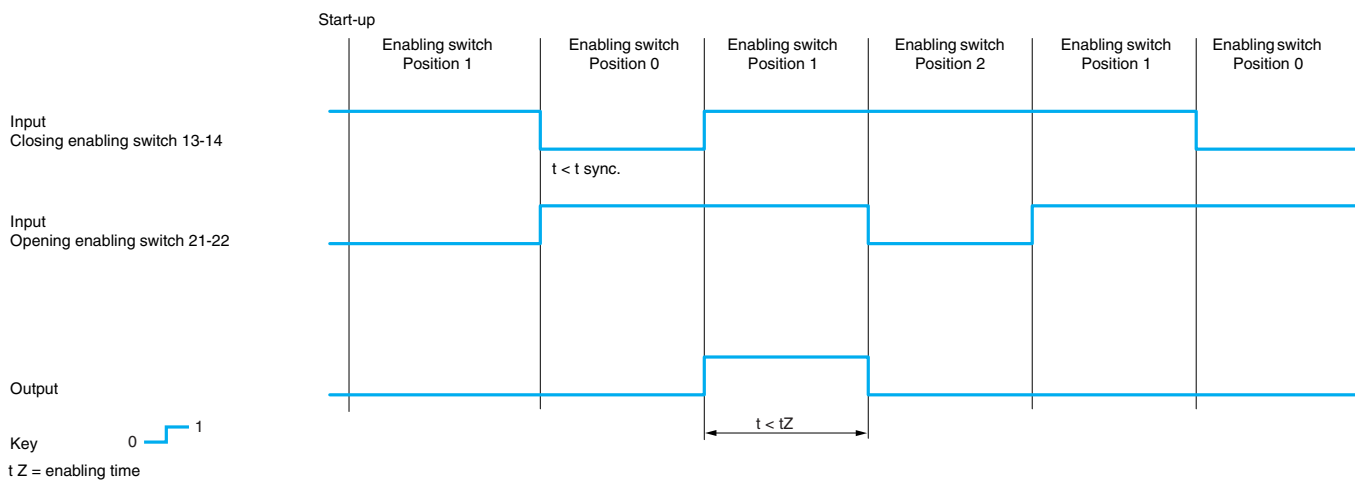
Preventa™ XPSMC Safety Controllers Wiring Diagrams

Enabling switch monitoring, 2 contact type Category 1 conforming to standard EN 954-1.



(1) Technical characteristics for maximum rating of fuses, see page 8.
 (2) Only applicable to XPSMC32Z.

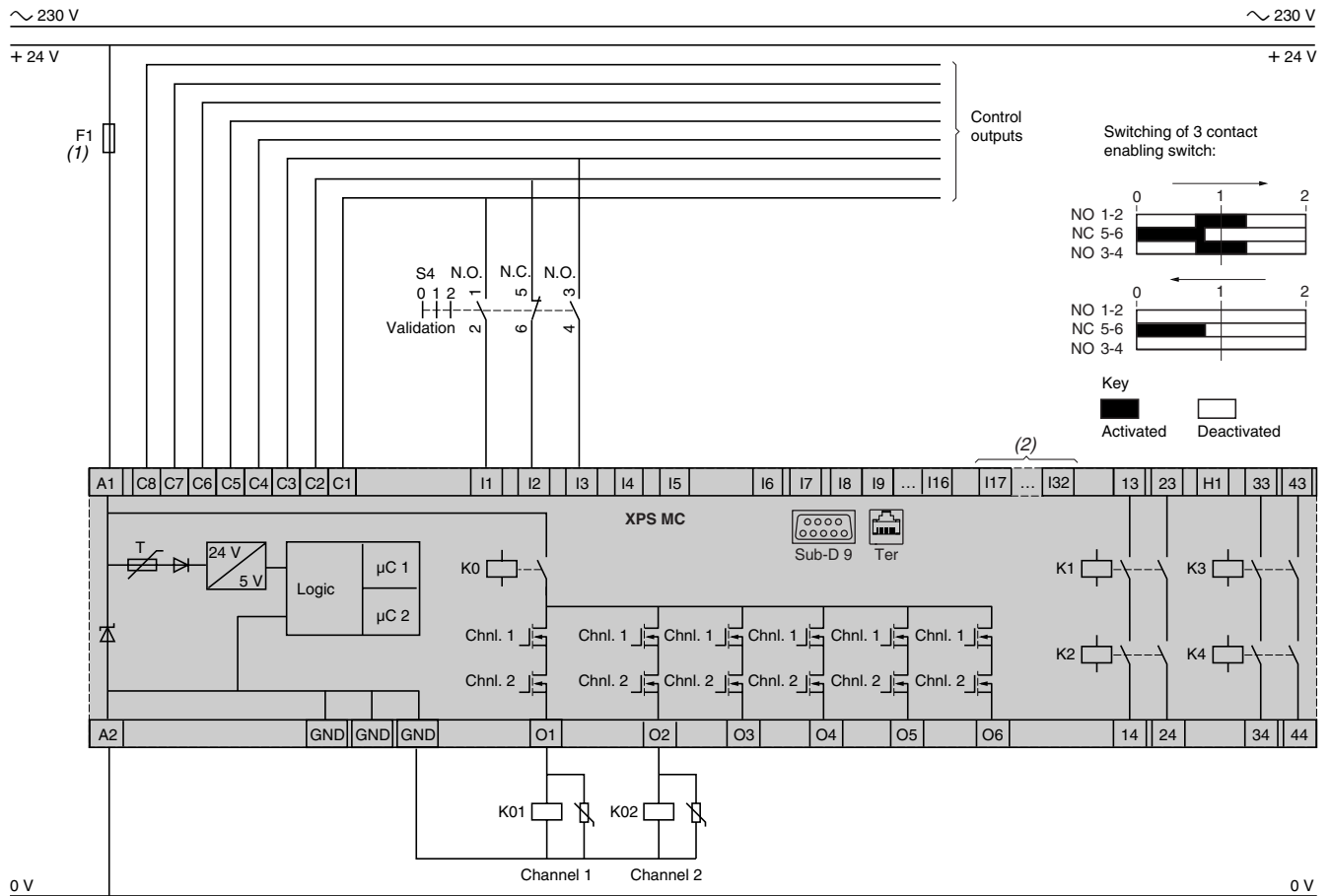
Functional diagram



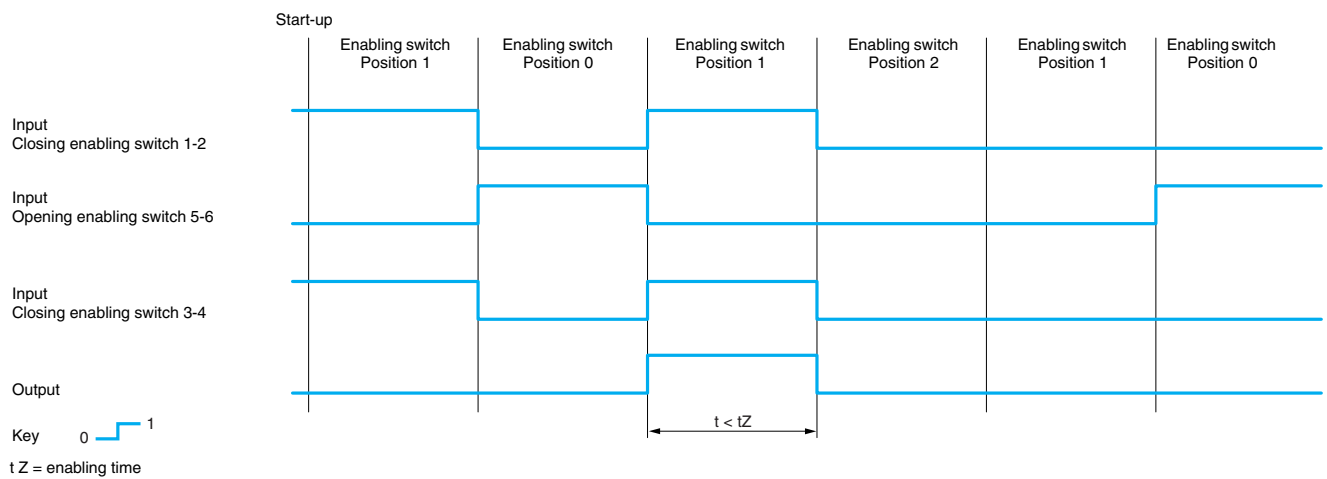
Overview 4-7
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Preventa™ XPSMC Safety Controllers Wiring Diagrams

Enabling switch monitoring, 3 contact type Category 4 conforming to standard EN 954-1.



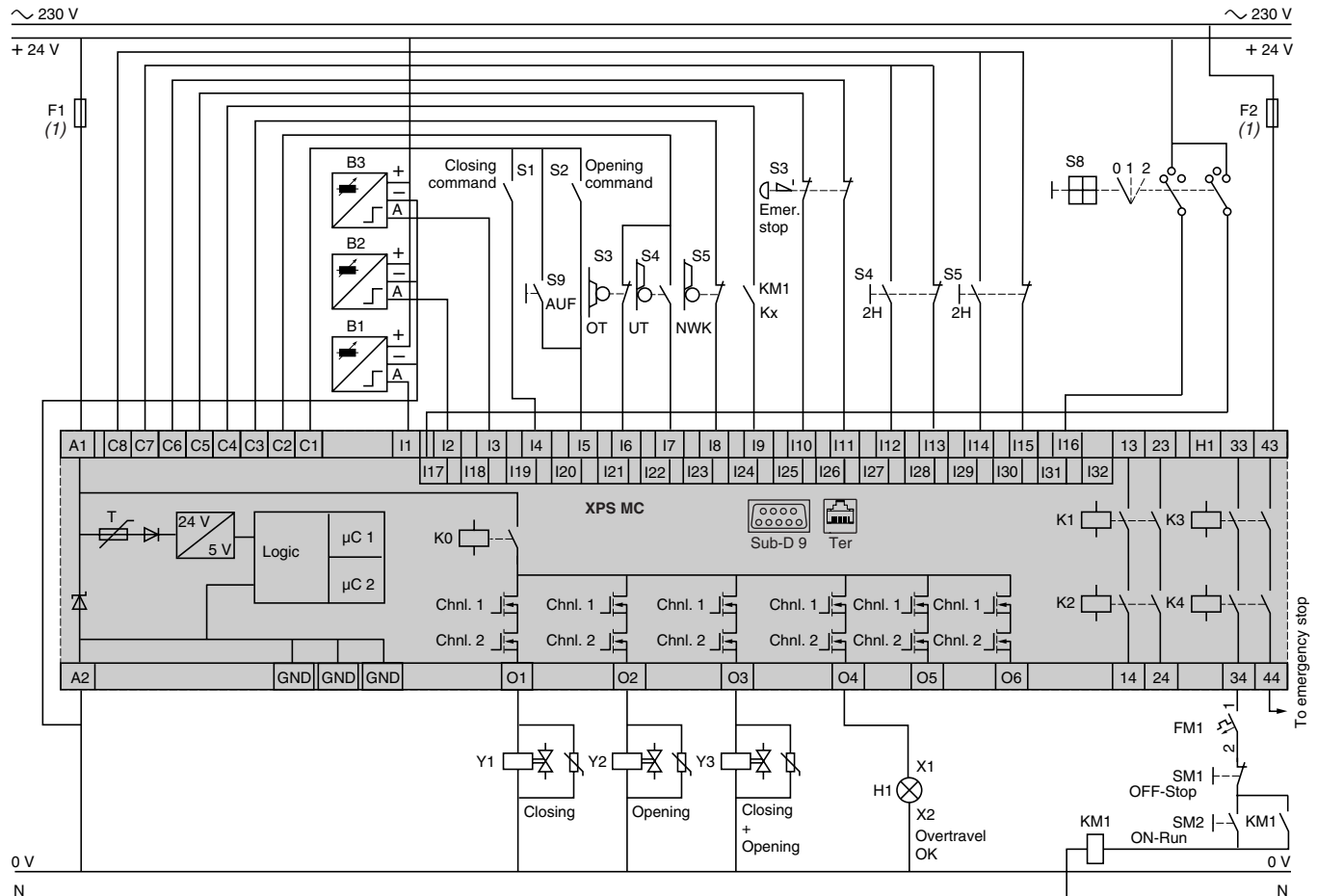
Functional diagram



Overview 4-7
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Preventa™ XPSMC Safety Controllers Wiring Diagrams

Hydraulic press Category 4 conforming to standard EN 954-1.



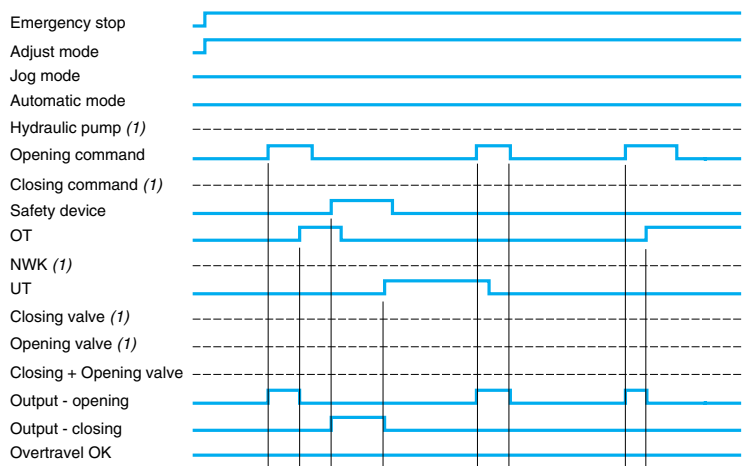
S8: Operating modes:
 0 - stop,
 1 - adjust,
 2 - jog.

AUF = open, to be used in inching.
 OT = Limit switch associated with top dead center (TDC).
 UT = Limit switch associated with bottom dead center (BDC).
 NWK = overtravel monitoring.

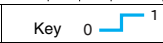
(1) Technical characteristics for maximum rating of fuses, see page 8.
 (2) Only applicable to XPSMC32Z.

Functional diagram

Hydraulic press, adjust mode



(1) Not used.

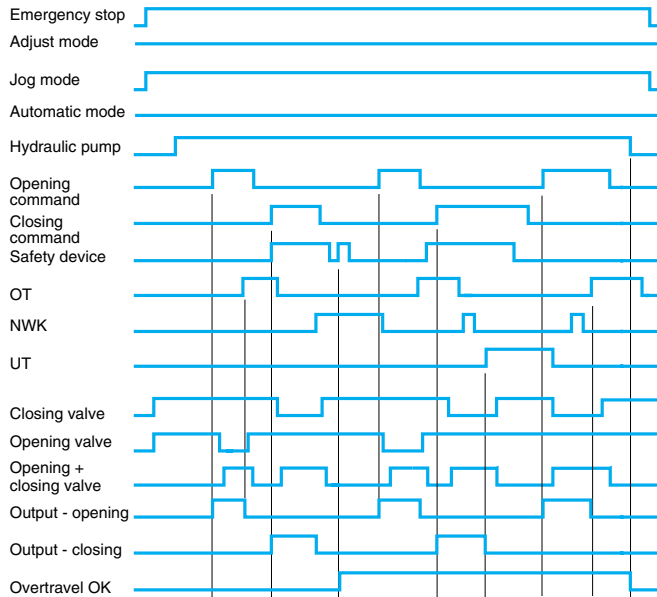


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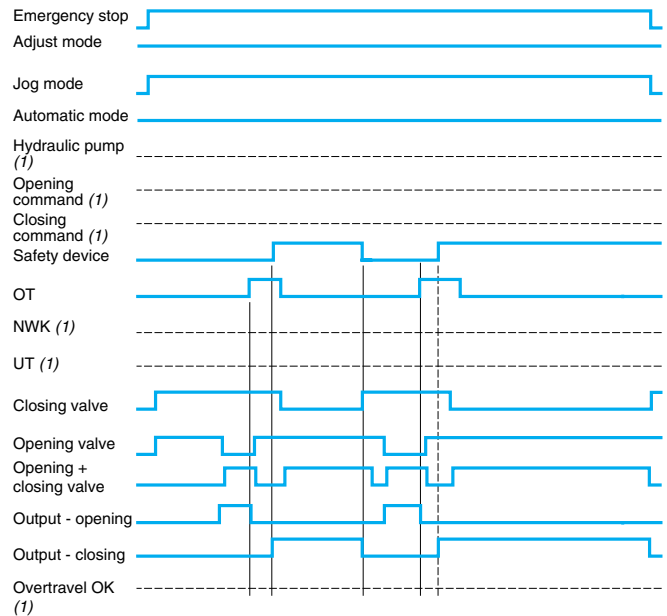
Hydraulic press

Functional diagrams (continued)

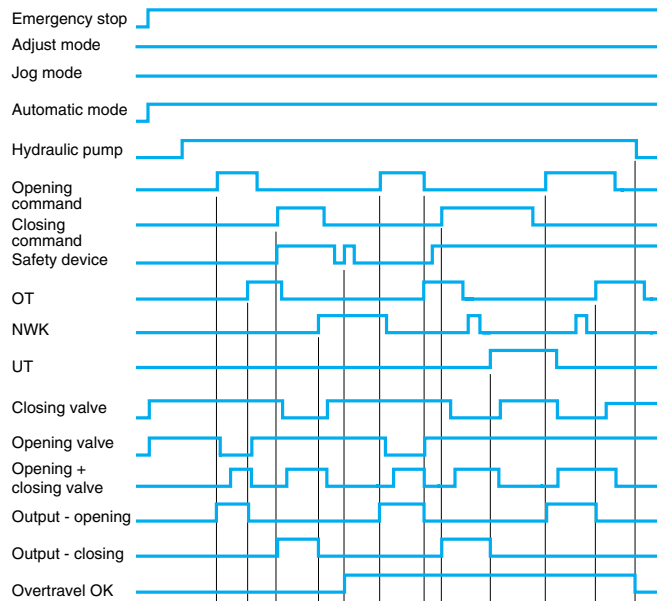
Hydraulic press, mode = jog, with overtravel monitoring and opening and closing control coming from the automation platform



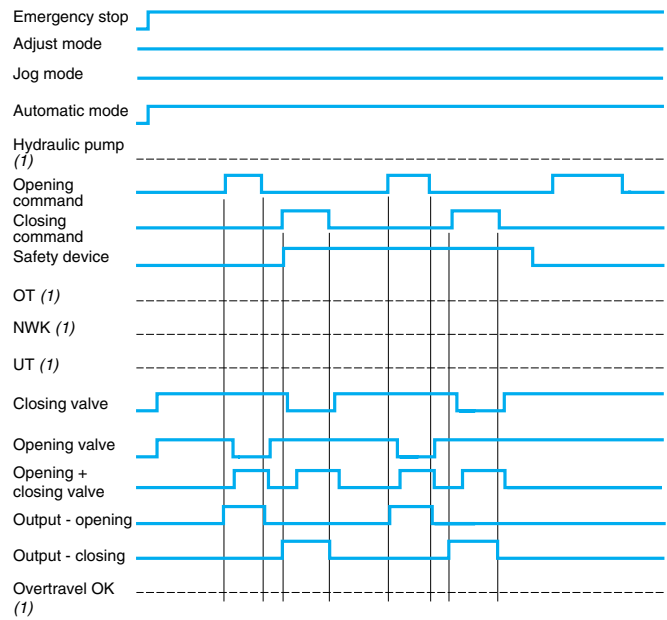
Hydraulic press, mode = jog



Hydraulic press, mode = automatic, with overtravel monitoring and opening and closing control coming from the automation platform



Hydraulic press, mode = automatic



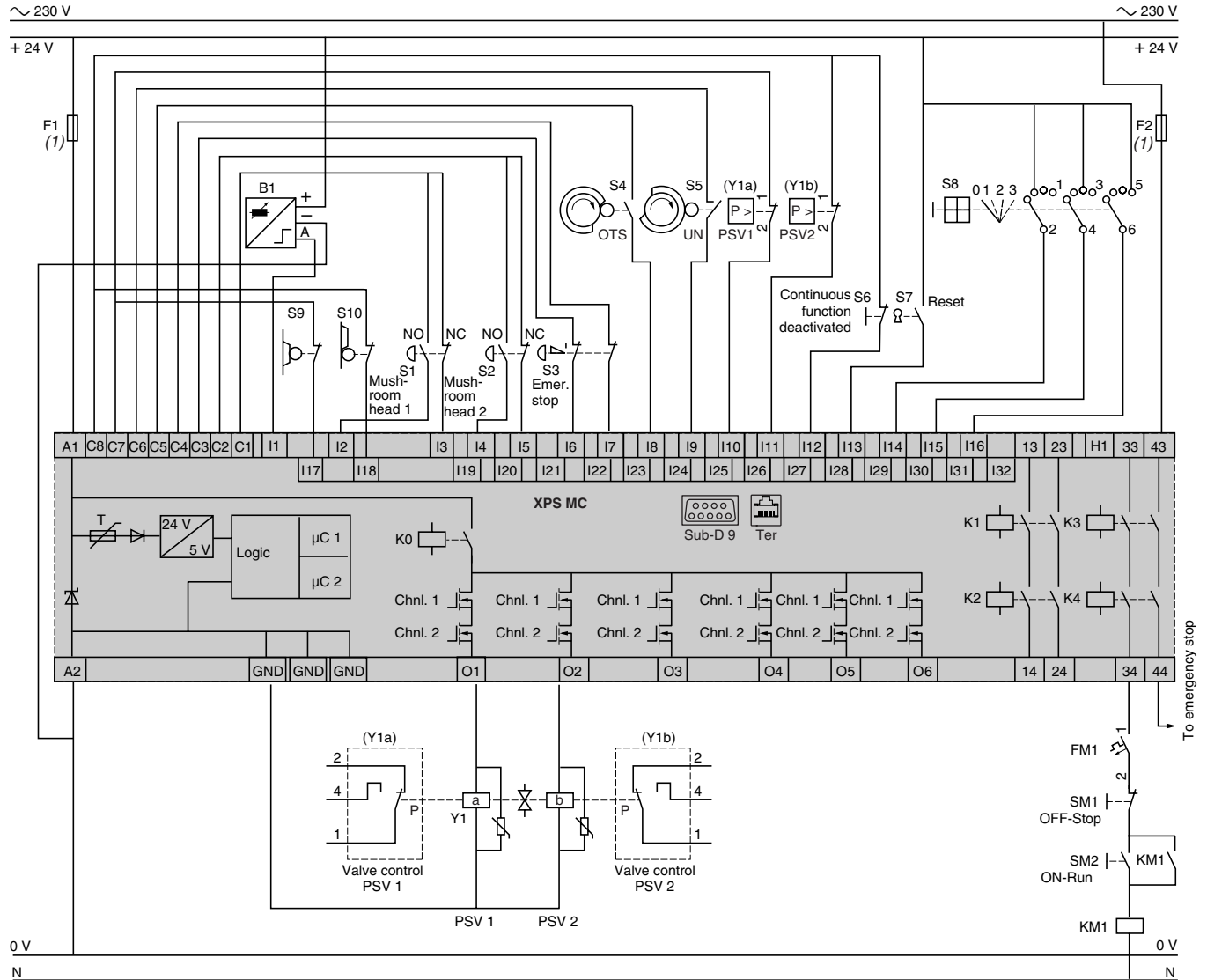
Key 0 1

(1) Not used.

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Preventa™ XPSMC Safety Controllers Wiring Diagrams

Eccentric press Category 4 conforming to standard EN 954-1.



S1 and S2: mushroom buttons for two hand control

S8: Operating modes:

- 0 - stop,
- 1 - adjust,
- 2 - jog,
- 3 - automatic continuous run.

OTS = Limit switch associated with top dead center (TDC) (S4)

UN = Limit switch associated with bottom dead center (BDC) (S5)

PSV = safety valve

B1 = sensor at tooth wheel in cam switch mechanism.

(1) Technical characteristics for maximum rating of fuses, see page 8.

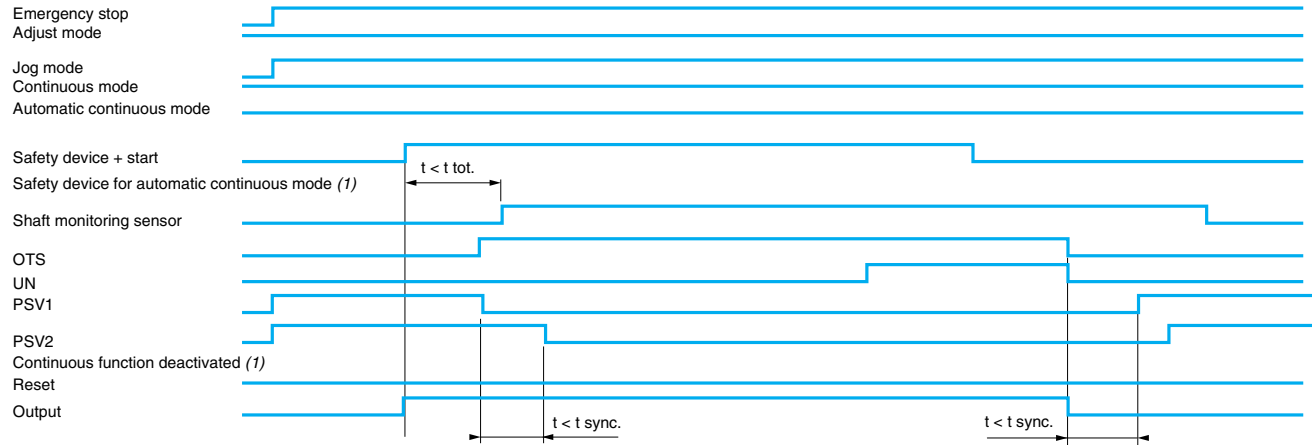
(2) Only applicable to XPSMC32Z.

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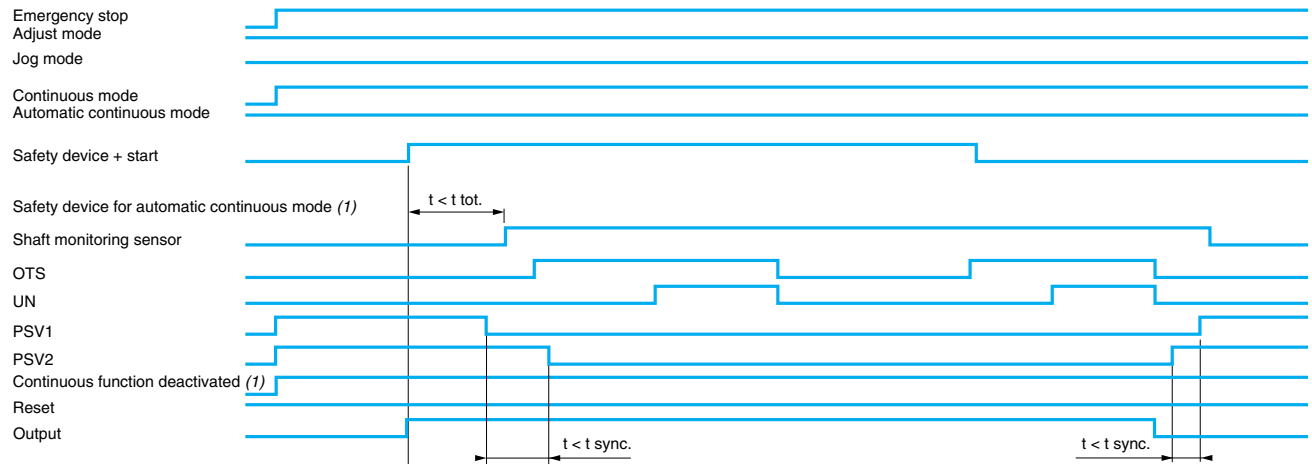
Eccentric press (continued)

Functional diagrams

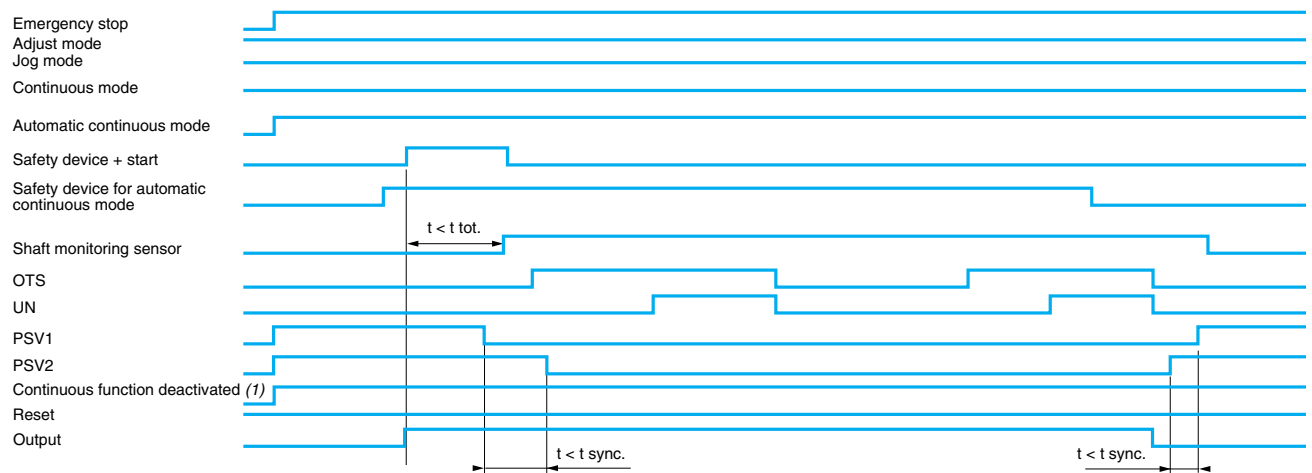
Eccentric press: Jog




Eccentric press: Continuous



Eccentric press: automatic continuous

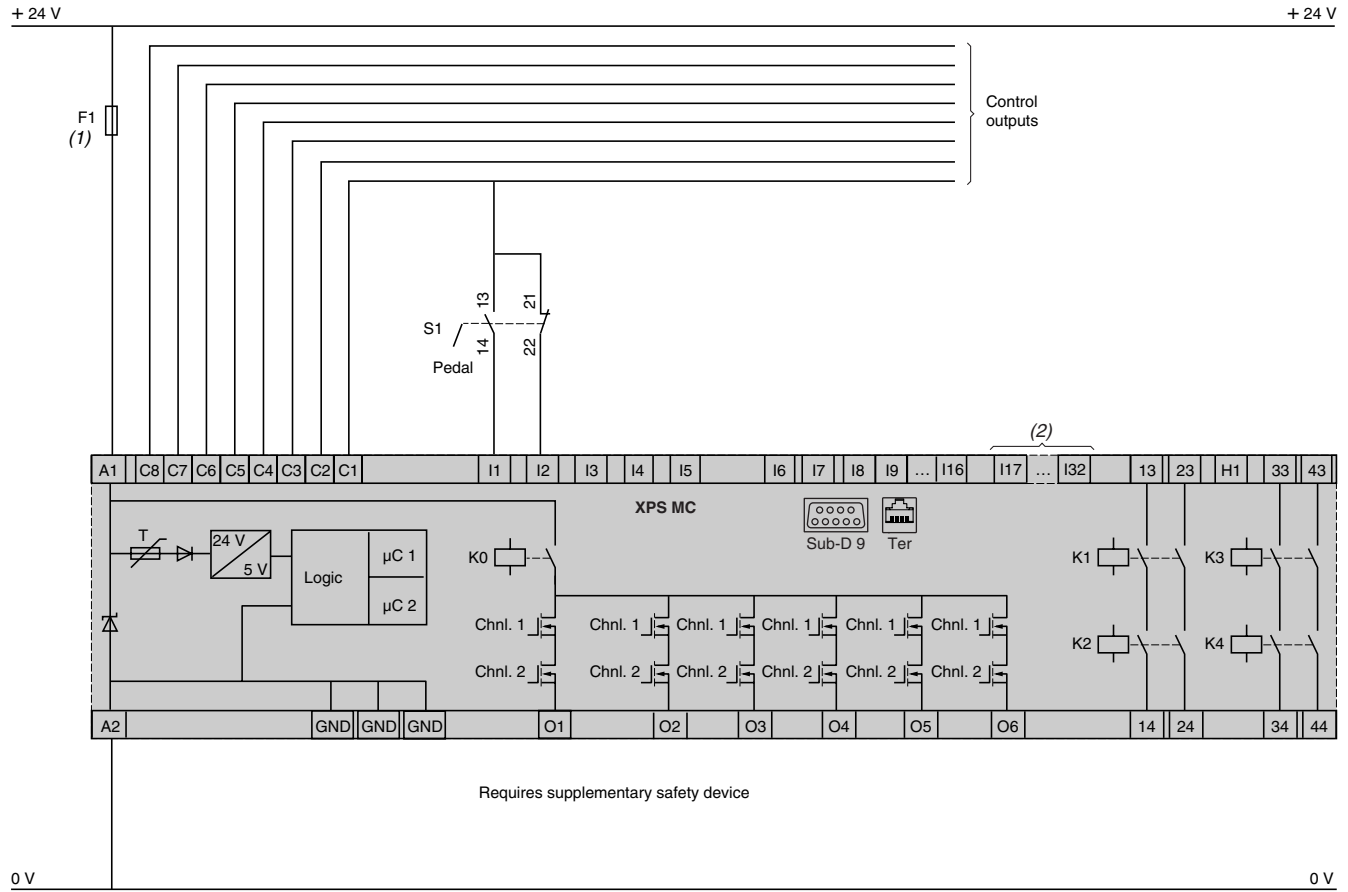


Key 
 $t_{sync.}$ = synchronization time
 $t_{tot.}$ = dead time
 Not used.

Overview 4-7
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Preventa™ XPSMC Safety Controllers Wiring Diagrams

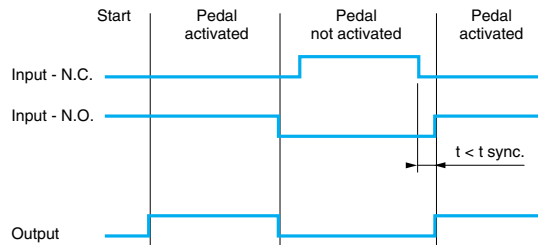
Foot switch monitoring



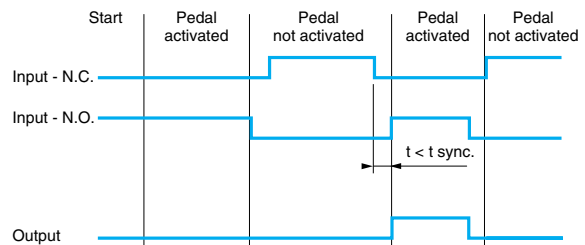
(1) Technical characteristics for maximum rating of fuses, see page 8.
 (2) Only applicable to XPSMC32Z.

Functional diagrams

Without start interlock



With start interlock

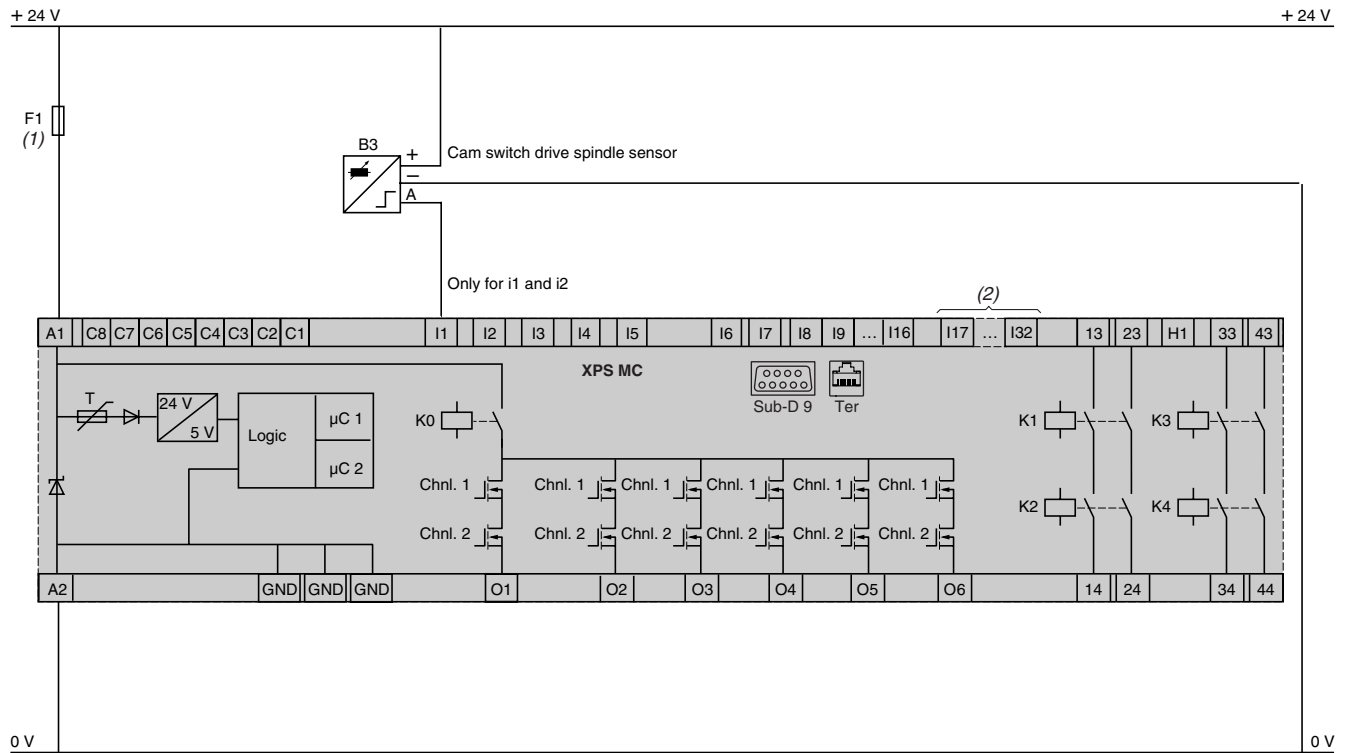


Key 0 1

t sync. = synchronization time

Overview 4-7
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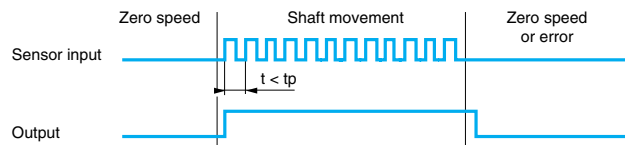
Chain shaft breakage monitoring



(1) Technical characteristics for maximum rating of fuses, see page 8.

(2) Only applicable to XPSMC32Z●.

Functional diagrams

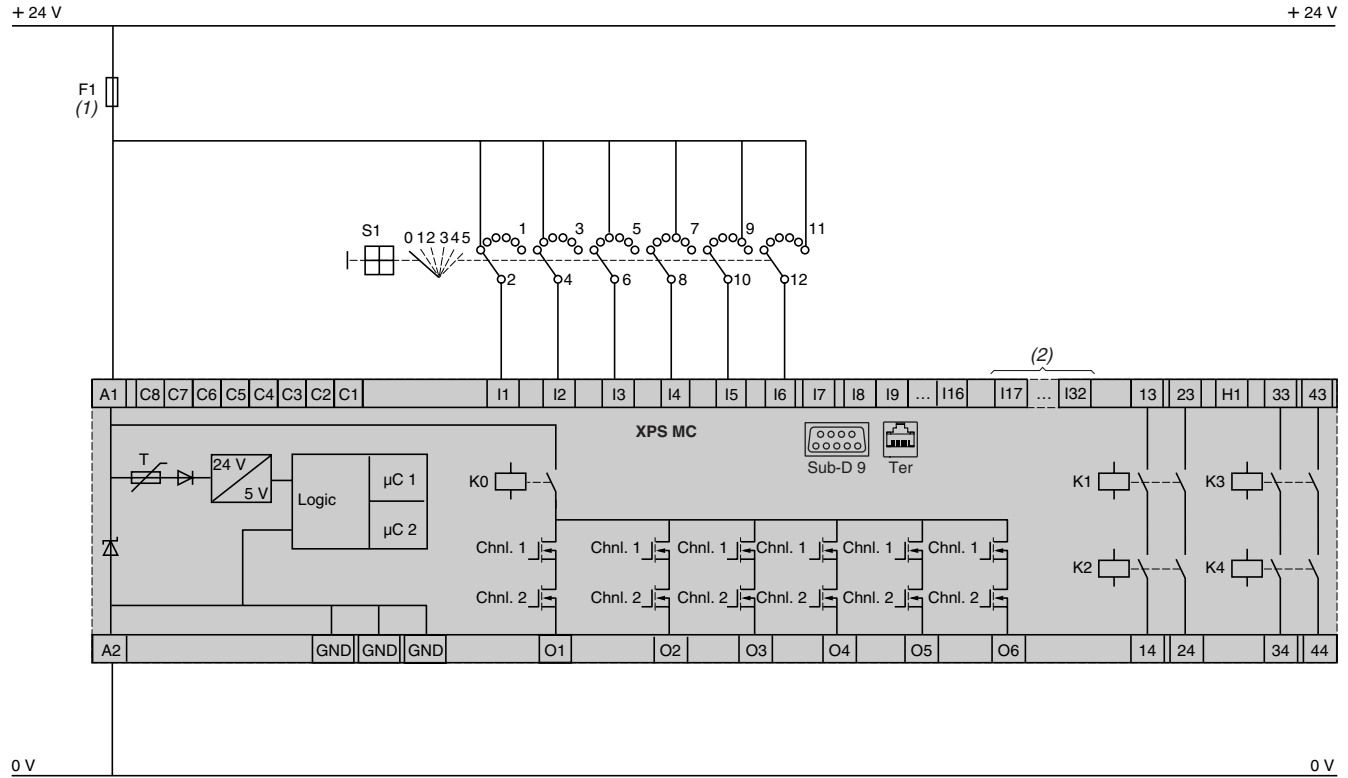


tp = pulse time

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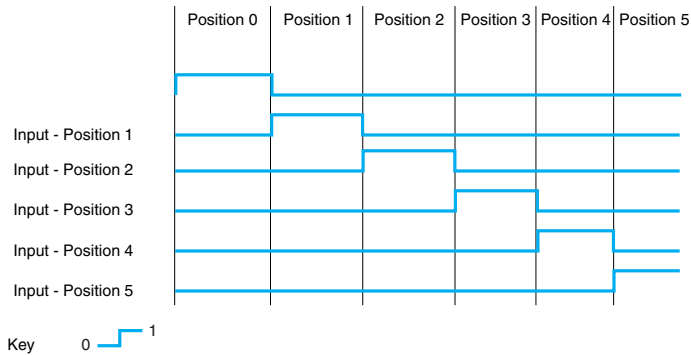
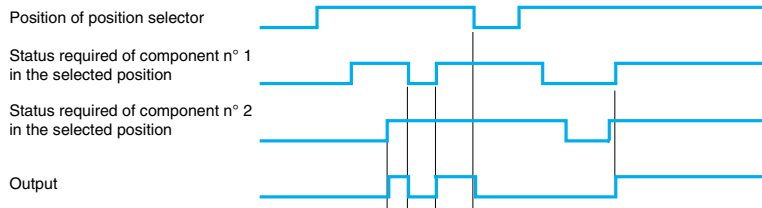
Preventa™ XPSMC Safety Controllers Wiring Diagrams

Position selector



(1) Technical characteristics for maximum rating of fuses, see page 8.
 (2) Only applicable to XPSMC32Z.

Functional diagrams



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Preventa™ XPSMC Safety Controllers

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