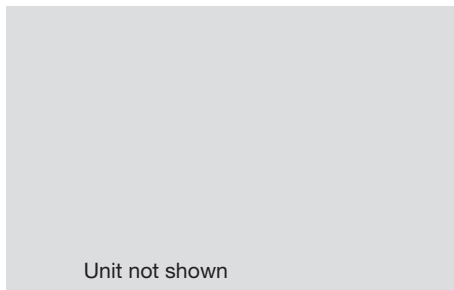


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Thermistor monitor S1MO Ex



The thermistor monitoring relay S1MO Ex is used as a protection device in temperature monitoring circuits in accordance with EN 44081. It protects motors, generators, storage areas, etc. from overheating.

Unit features

- ▶ Relay outputs:
 - 2 auxiliary contacts (C/O)
- ▶ Measuring circuit for connecting a temperature sensor (PTC resistor)
- ▶ Monitors the temperature sensor for short circuit
- ▶ Reset button
- ▶ Connection option for external reset button
- ▶ Manual reset with non-volatile reset latch
- ▶ LED as supply voltage indicator
- ▶ LED as fault indicator
- ▶ Ex areas:
 - II (3) G [Ex ic] IIC Gc
 - II (3) D [Ex ic] IIIC Dc

Unit description

The thermistor monitoring relay is enclosed in an S-95 slimline housing. There are 5 versions available for AC operation and one for AC and DC operation.

A temperature sensor is connected to the S1MO measuring circuit. If the temperature exceeds a defined value, i.e. the resistance of the temperature sensor reaches the response value, the output contacts switch. Contacts 11-14 and 21-24 open, contacts 11-12 and 21-22 close. If the temperature then falls, i.e. the resistance of the temperature sensor reaches the release value, the unit can only be switched back on by pressing the reset button S1 (or the external reset button). The non-volatile reset latch prevents the unit from starting up again automatically after a fault, when the voltage fails and is then restored.

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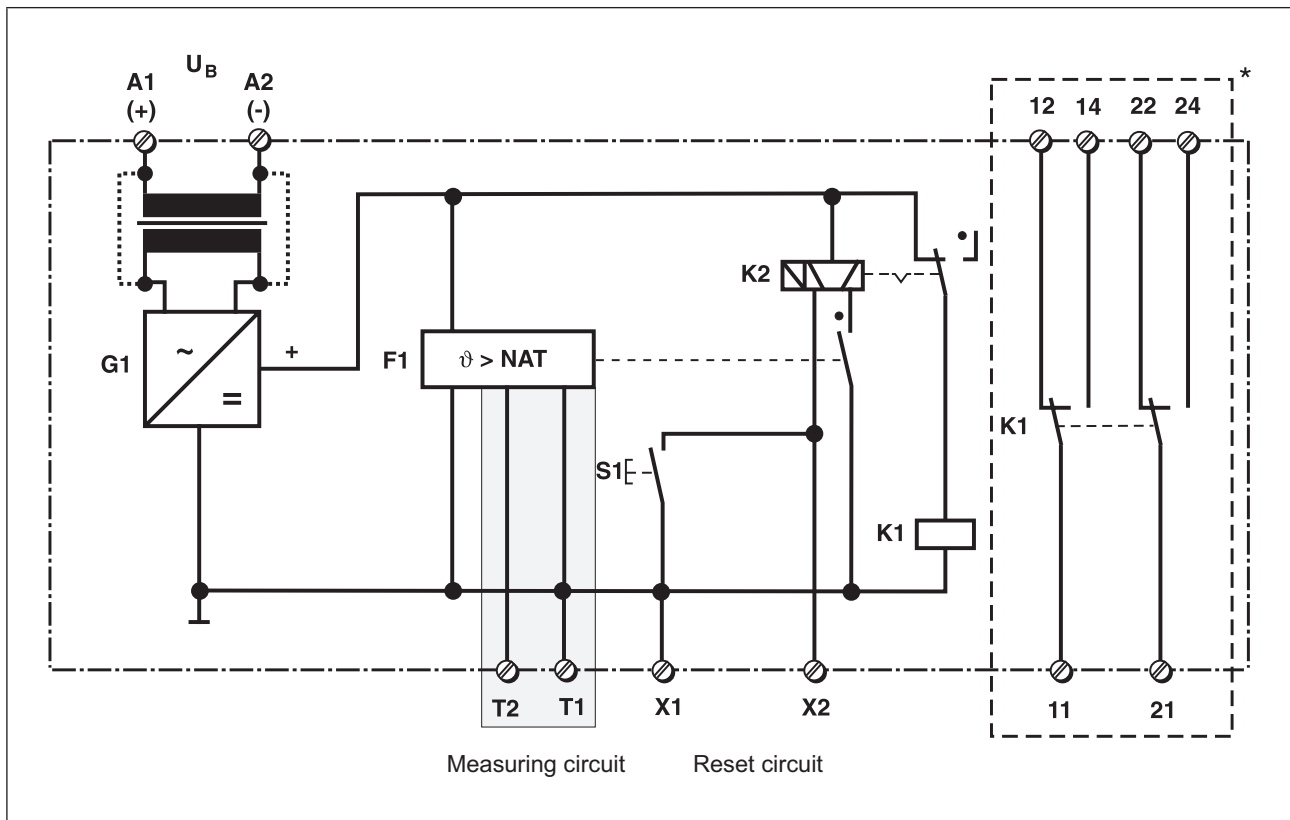
Thermistor monitor S1MO Ex

Safety features

The unit meets the following safety requirements:

- ▶ Operates to normally energised mode
- ▶ Protection of the monitored unit is maintained in the following cases:
 - Power failure
 - Coil defect
 - Open circuit
 - Short-circuit of the temperature sensor

Internal wiring diagram



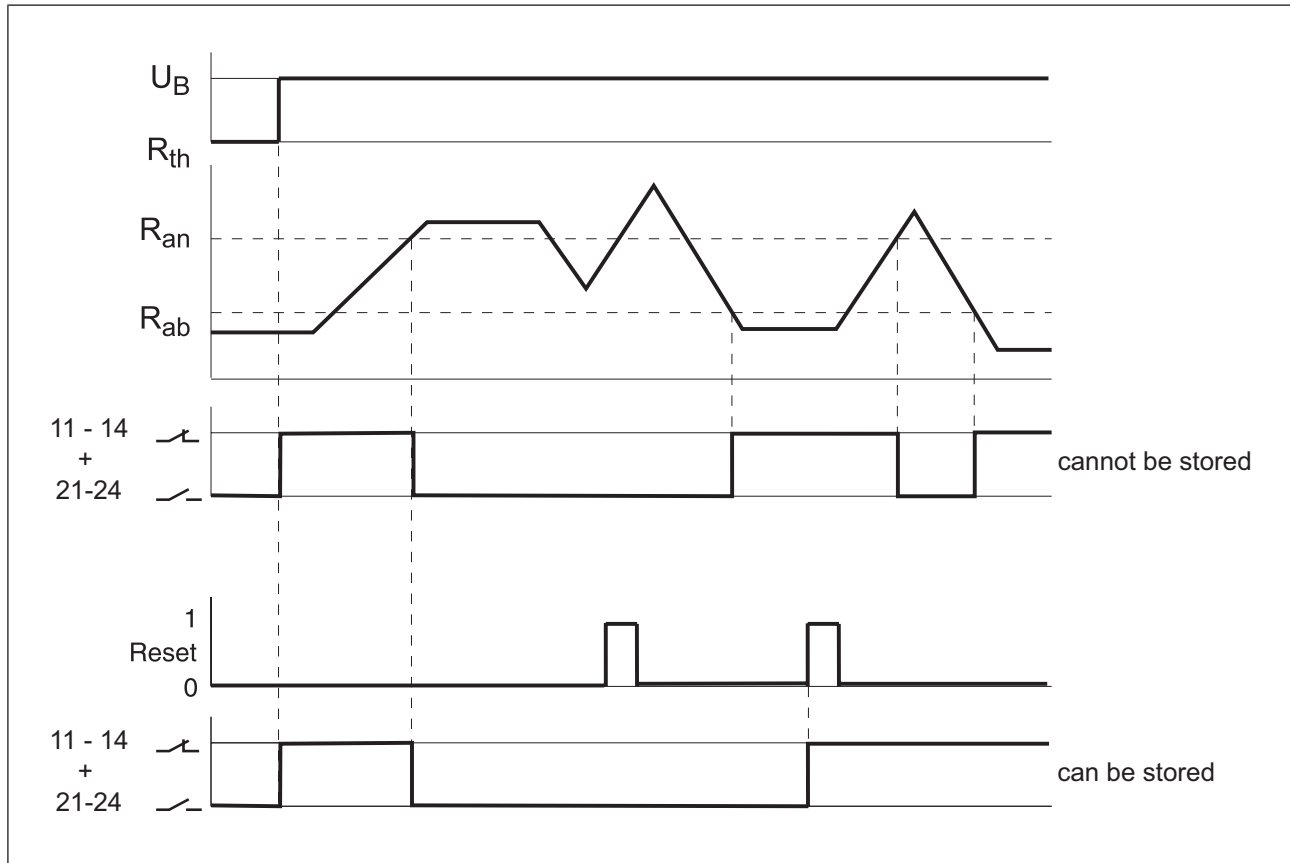
Shaded area: Intrinsically safe area

* Insulation between the non-marked area and the relay contacts: Basic insulation (over-voltage category III), safe separation (over-voltage category II)

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Thermistor monitor S1MO Ex

Timing diagram



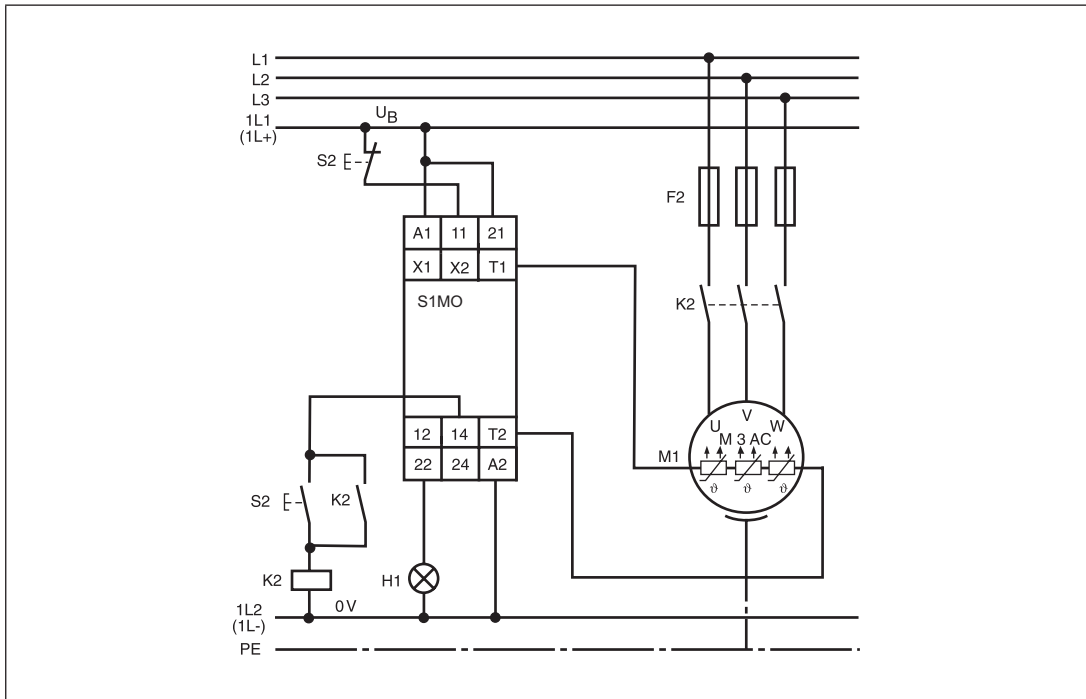
Legend:

- ▶ U_B Supply voltage
- ▶ R_{on} Response value
- ▶ R_{off} Release value
- ▶ R_{th} PTC resistor

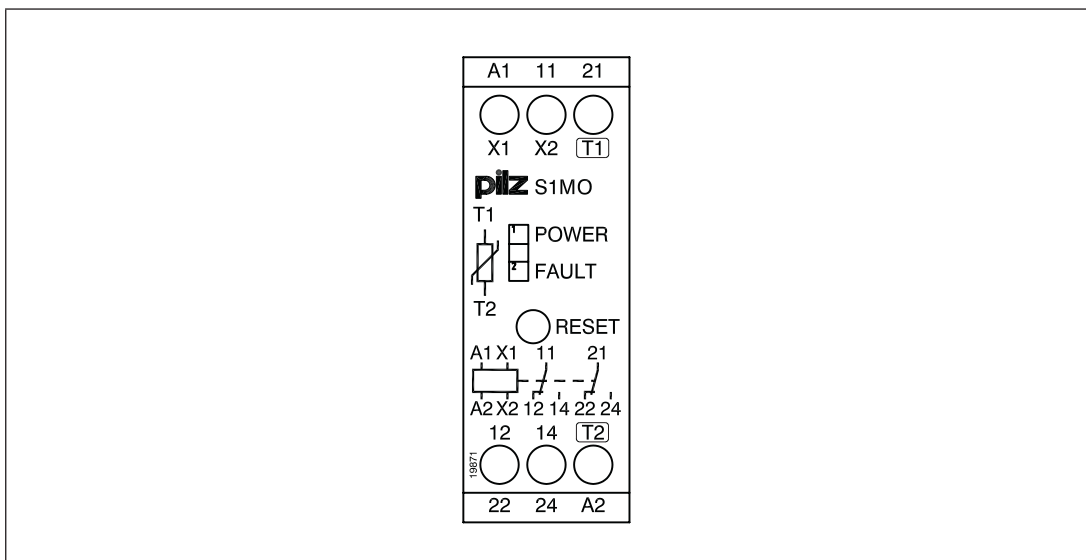
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Thermistor monitor S1MO Ex

Connection example



Terminal configuration



Thermistor monitor S1MO Ex

Installation

- ▶ The unit should be installed in a control cabinet with a protection type of at least IP54
 - that meets the requirements of EX e in accordance with EN 60079-7
 - or
 - that is located in a dry room that is cleaned regularly. No notable dust deposits or humidity effects must be allowed to occur.
- ▶ Use the notch to attach it to a DIN rail.
- ▶ If you are mounting the unit onto a vertical DIN rail (35 mm), ensure that it is mounted securely (e.g. by using a retaining bracket or an end angle).

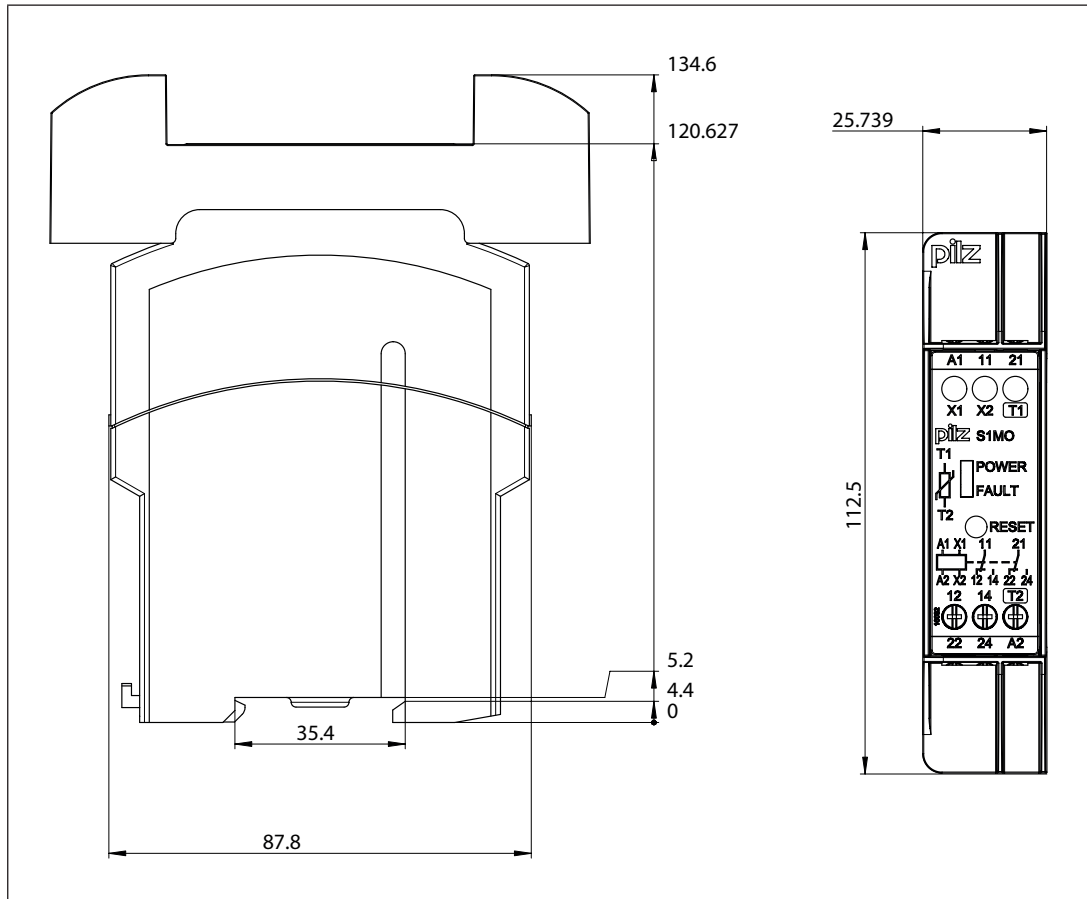
CAUTION!

- The unit should always be installed outside the potentially explosive area or inside an Ex-protected space. Only the intrinsically safe output circuit (terminals T1, T2) may be brought into the potentially explosive area.
- The wiring must meet the requirements of EN 60079-11:2011, Clause 6.3.11.

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Thermistor monitor S1MO Ex

Dimensions



Electronic monitoring relays PMDsrangle

Thermistor monitor S1MO Ex

Technical details

Order no. 839600, 839620, 839630

See below for more order numbers

General	839600	839620	839630
Approvals	CCC, CE, cULus Listed	CCC, CE, cULus Listed	CCC, CE, cULus Listed
Electrical data	839600	839620	839630
Supply voltage			
Voltage	24 V	48 V	110 V
Type	AC/DC	AC	AC
Voltage tolerance	-15 %/+10 %	-15 %/+10 %	-15 %/+10 %
Output of external power supply (AC)	3,5 VA	3,5 VA	3,5 VA
Output of external power supply (DC)	2,0 W	–	–
Frequency range AC	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Max. inrush current at UB	10,00 A	10,00 A	10,00 A
Continuous duty	100 %	100 %	100 %
Min. unit fuse protection	1,00 A	1,00 A	1,00 A
Max. unit fuse protection F1	Max. conductor cross section	Max. conductor cross section	Max. conductor cross section
Measuring circuit	839600	839620	839630
Response value Ron	3,6 kOhm, ±10 %	3,6 kOhm, ±10 %	3,6 kOhm, ±10 %
Release value Rab	1,8 kOhm, ±10 %	1,8 kOhm, ±10 %	1,8 kOhm, ±10 %
Cold resistance at 20 °C	1,5 kOhm	1,5 kOhm	1,5 kOhm
Relay outputs	839600	839620	839630
Utilisation category			
In accordance with the standard	EN 60947-4-1	EN 60947-4-1	EN 60947-4-1
Auxiliary contacts, AC1 at	240 V	240 V	240 V
Min. current	0,10 A	0,10 A	0,10 A
Max. current	5,0 A	5,0 A	5,0 A
Max. power	1200 VA	1200 VA	1200 VA
Auxiliary contacts, DC1 at	24 V	24 V	24 V
Min. current	0,10 A	0,10 A	0,10 A
Max. current	5,0 A	5,0 A	5,0 A
Max. power	120 W	120 W	120 W

Electronic monitoring relays PMDsrangle

Thermistor monitor S1MO Ex

Relay outputs	839600	839620	839630
Utilisation category			
In accordance with the standard	EN 60947-5-1	EN 60947-5-1	EN 60947-5-1
Auxiliary contacts, AC15 at	230 V	230 V	230 V
Max. current	2,0 A	2,0 A	2,0 A
Auxiliary contacts, DC13 (6 cycles/min) at	24 V	24 V	24 V
Max. current	1,5 A	1,5 A	1,5 A
Contact fuse protection, external auxiliary contacts			
Blow-out fuse, quick	6 A	6 A	6 A
Blow-out fuse, slow	4 A	4 A	4 A
Circuit breaker, 24 V AC/DC, characteristic B/C	4 A	4 A	4 A
Contact material	AgCdO + 3,0 µm Au	AgCdO + 3,0 µm Au	AgCdO + 3,0 µm Au
Times	839600	839620	839630
Switch-on delay			
Typ. switch-on delay	350 ms	350 ms	350 ms
Environmental data	839600	839620	839630
Climatic suitability	EN 60068-2-78	EN 60068-2-78	EN 60068-2-78
Ambient temperature			
Temperature range	-10 - 55 °C	-10 - 55 °C	-10 - 55 °C
Storage temperature			
Temperature range	-40 - 85 °C	-40 - 85 °C	-40 - 85 °C
EMC	EN 60947-5-1, EN 61000-6-2	EN 60947-5-1, EN 61000-6-2	EN 60947-5-1, EN 61000-6-2
Vibration			
In accordance with the standard	EN 60068-2-6	EN 60068-2-6	EN 60068-2-6
Frequency	10,0 - 55,0 Hz	10,0 - 55,0 Hz	10,0 - 55,0 Hz
Amplitude	0,35 mm	0,35 mm	0,35 mm
Airgap creepage			
In accordance with the standard	EN 60079-11, EN 60947-1	EN 60079-11, EN 60947-1	EN 60079-11, EN 60947-1
Overvoltage category	III / II	III / II	III / II
Pollution degree	2	2	2
Rated insulation voltage	250 V	250 V	250 V
Rated impulse withstand voltage	4,00 kV	4,00 kV	4,00 kV

Electronic monitoring relays PMDsrangle

Thermistor monitor S1MO Ex

Environmental data	839600	839620	839630
Protection type			
Mounting (e.g. cabinet)	IP54	IP54	IP54
Housing	IP40	IP40	IP40
Terminals	IP20	IP20	IP20
Mechanical data	839600	839620	839630
Mounting position	Any	Any	Any
Mechanical life	10,000,000 cycles	10,000,000 cycles	10,000,000 cycles
Material			
Bottom	PPO UL 94 V0	PPO UL 94 V0	PPO UL 94 V0
Front	ABS UL 94 V0	ABS UL 94 V0	ABS UL 94 V0
Top	PPO UL 94 V0	PPO UL 94 V0	PPO UL 94 V0
Conductor cross section with screw terminals			
1 core flexible	0,20 - 4,00 mm², 24 - 10 AWG	0,20 - 4,00 mm², 24 - 10 AWG	0,20 - 4,00 mm², 24 - 10 AWG
2 core with the same cross section, flexible with crimp connectors, no plastic sleeve	0,20 - 2,50 mm², 24 - 14 AWG	0,20 - 2,50 mm², 24 - 14 AWG	0,20 - 2,50 mm², 24 - 14 AWG
2 core with the same cross section, flexible without crimp connectors or with TWIN crimp connectors	0,20 - 2,50 mm², 24 - 14 AWG	0,20 - 2,50 mm², 24 - 14 AWG	0,20 - 2,50 mm², 24 - 14 AWG
Torque setting with screw terminals	0,60 Nm	0,60 Nm	0,60 Nm
Connection type	Screw terminal	Screw terminal	Screw terminal
Mounting type	Fixed	Fixed	Fixed
Dimensions			
Height	112,5 mm	112,5 mm	112,5 mm
Width	26,0 mm	26,0 mm	26,0 mm
Depth	135,0 mm	135,0 mm	135,0 mm
Weight	130 g	180 g	180 g

Electronic monitoring relays PMDsrangle

Thermistor monitor S1MO Ex

Order no. 839650, 839655

General	839650	839655
Approvals	CCC, CE, cULus Listed	CCC, CE, cULus Listed
Electrical data	839650	839655
Supply voltage		
Voltage	230 V	240 V
Type	AC	AC
Voltage tolerance	-15 %/+10 %	-15 %/+10 %
Output of external power supply (AC)	3,5 VA	3,5 VA
Frequency range AC	50 - 60 Hz	50 - 60 Hz
Max. inrush current at UB	10,00 A	10,00 A
Continuous duty	100 %	100 %
Min. unit fuse protection	1,00 A	1,00 A
Max. unit fuse protection F1	Max. conductor cross section	Max. conductor cross section
Measuring circuit	839650	839655
Response value Ron	3,6 kOhm, ±10 %	3,6 kOhm, ±10 %
Release value Rab	1,8 kOhm, ±10 %	1,8 kOhm, ±10 %
Cold resistance at 20 °C	1,5 kOhm	1,5 kOhm
Relay outputs	839650	839655
Utilisation category		
In accordance with the standard	EN 60947-4-1	EN 60947-4-1
Auxiliary contacts, AC1 at	240 V	240 V
Min. current	0,10 A	0,10 A
Max. current	5,0 A	5,0 A
Max. power	1200 VA	1200 VA
Auxiliary contacts, DC1 at	24 V	24 V
Min. current	0,10 A	0,10 A
Max. current	5,0 A	5,0 A
Max. power	120 W	120 W
Utilisation category		
In accordance with the standard	EN 60947-5-1	EN 60947-5-1
Auxiliary contacts, AC15 at	230 V	230 V
Max. current	2,0 A	2,0 A
Auxiliary contacts, DC13 (6 cycles/min) at	24 V	24 V
Max. current	1,5 A	1,5 A
Contact fuse protection, external auxiliary contacts		
Blow-out fuse, quick	6 A	6 A
Blow-out fuse, slow	4 A	4 A
Circuit breaker, 24 V AC/DC, characteristic B/C	4 A	4 A

Electronic monitoring relays PMDsrangle

Thermistor monitor S1MO Ex

Relay outputs	839650	839655
Contact material	AgCdO + 3,0 µm Au	AgCdO + 3,0 µm Au
Times	839650	839655
Switch-on delay		
Typ. switch-on delay	350 ms	350 ms
Environmental data	839650	839655
Climatic suitability	EN 60068-2-78	EN 60068-2-78
Ambient temperature		
Temperature range	-10 - 55 °C	-10 - 55 °C
Storage temperature		
Temperature range	-40 - 85 °C	-40 - 85 °C
EMC	EN 60947-5-1, EN 61000-6-2	EN 60947-5-1, EN 61000-6-2
Vibration		
In accordance with the standard	EN 60068-2-6	EN 60068-2-6
Frequency	10,0 - 55,0 Hz	10,0 - 55,0 Hz
Amplitude	0,35 mm	0,35 mm
Airgap creepage		
In accordance with the standard	EN 60079-11, EN 60947-1	EN 60079-11, EN 60947-1
Overvoltage category	III / II	III / II
Pollution degree	2	2
Rated insulation voltage	250 V	250 V
Rated impulse withstand voltage	4,00 kV	4,00 kV
Protection type		
Mounting (e.g. cabinet)	IP54	IP54
Housing	IP40	IP40
Terminals	IP20	IP20
Mechanical data	839650	839655
Mounting position	Any	Any
Mechanical life	10,000,000 cycles	10,000,000 cycles
Material		
Bottom	PPO UL 94 V0	PPO UL 94 V0
Front	ABS UL 94 V0	ABS UL 94 V0
Top	PPO UL 94 V0	PPO UL 94 V0
Conductor cross section with screw terminals		
1 core flexible	0,20 - 4,00 mm², 24 - 10 AWG	0,20 - 4,00 mm², 24 - 10 AWG
2 core with the same cross section, flexible with crimp connectors, no plastic sleeve	0,20 - 2,50 mm², 24 - 14 AWG	0,20 - 2,50 mm², 24 - 14 AWG
2 core with the same cross section, flexible without crimp connectors or with TWIN crimp connectors	0,20 - 2,50 mm², 24 - 14 AWG	0,20 - 2,50 mm², 24 - 14 AWG
Torque setting with screw terminals	0,60 Nm	0,60 Nm

Electronic monitoring relays PMDsrangle

Thermistor monitor S1MO Ex

Mechanical data	839650	839655
Connection type	Screw terminal	Screw terminal
Mounting type	Fixed	Fixed
Dimensions		
Height	112,5 mm	112,5 mm
Width	26,0 mm	26,0 mm
Depth	135,0 mm	135,0 mm
Weight	180 g	180 g

Order reference

Order reference				
Product type	Features		Terminals	Order no.
S1MO Ex	24 VAC/DC		Screw terminals	839 600
S1MO Ex	48 VAC		Screw terminals	839 620
S1MO Ex	110 VAC		Screw terminals	839 630
S1MO Ex	230 VAC		Screw terminals	839 650
S1MO Ex	240 V AC		Screw terminals	839 655

Order reference: Accessories		
Product type	Features	Order no.
Ex separating chamber attachment	Separating chamber attachment	839 399