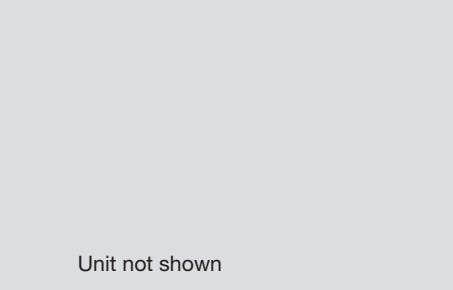
Thermistor monitor
S1MN Ex



The thermistor monitoring relay S1MN 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 (2 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
- LED as supply voltage indicator
- LED as fault indicator
- Two operating modes:
  - automatic reset
  - manual reset (reset latch)
- 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. Different versions are available for AC operation and one version is available for AC and DC operation.

A temperature sensor is connected to the measuring circuit of the unit. If the temperature exceeds a defined value, i.e. the resistance of the temperature sensor reaches the response value, the output contacts switch. If the temperature then falls again, i.e. the resistance of the temperature sensor reaches the release value, the auxiliary contacts switch again if automatic reset is selected. The unit is ready for operation. If manual reset is selected, an internal/external button must be operated. The unit can also be reset by interrupting the supply voltage.

Pilz GmbH & Co. KG, Felix-Wankel-Straße 2, 73760 Ostfildern, Germany
Telephone: +49 711 3409-0, Telefax: +49 711 3409-133, E-Mail: pilz.gmbh@pilz.de

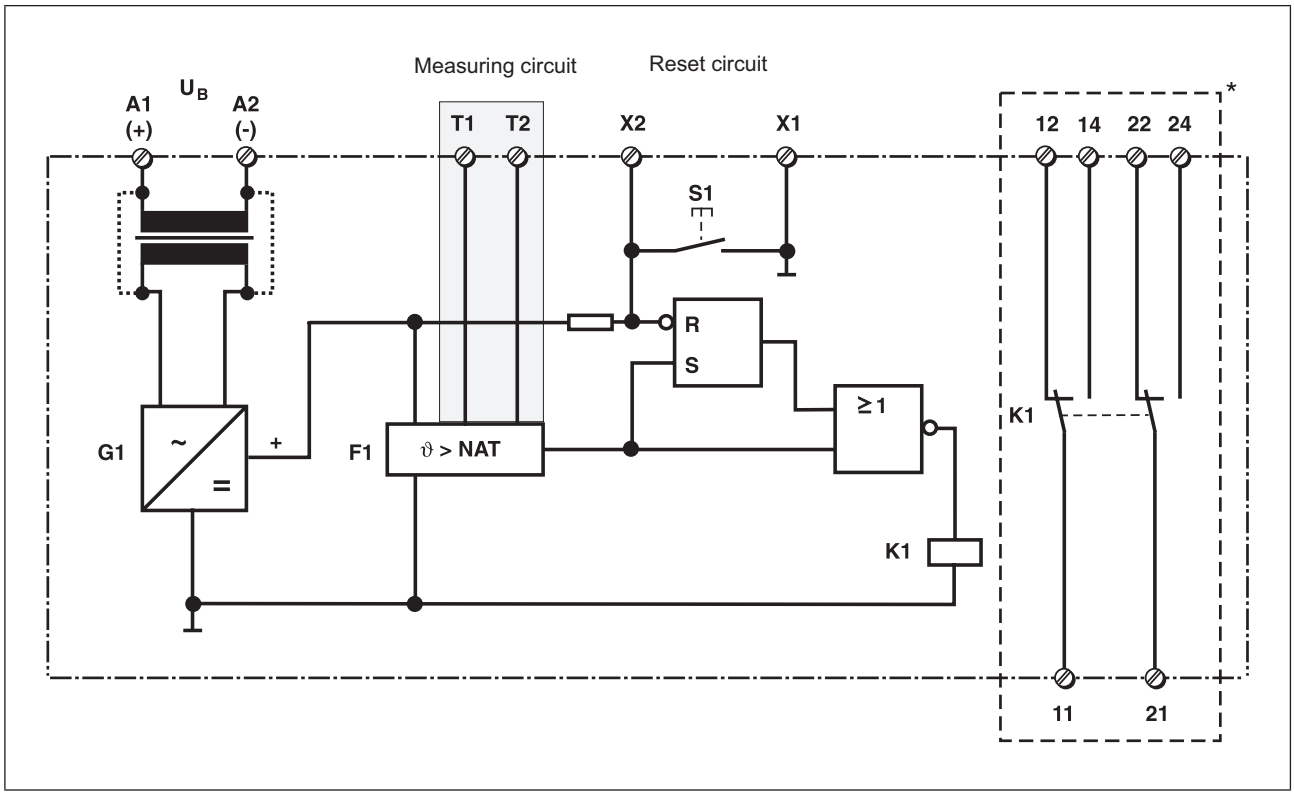
Thermistor monitor
S1MN Ex

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

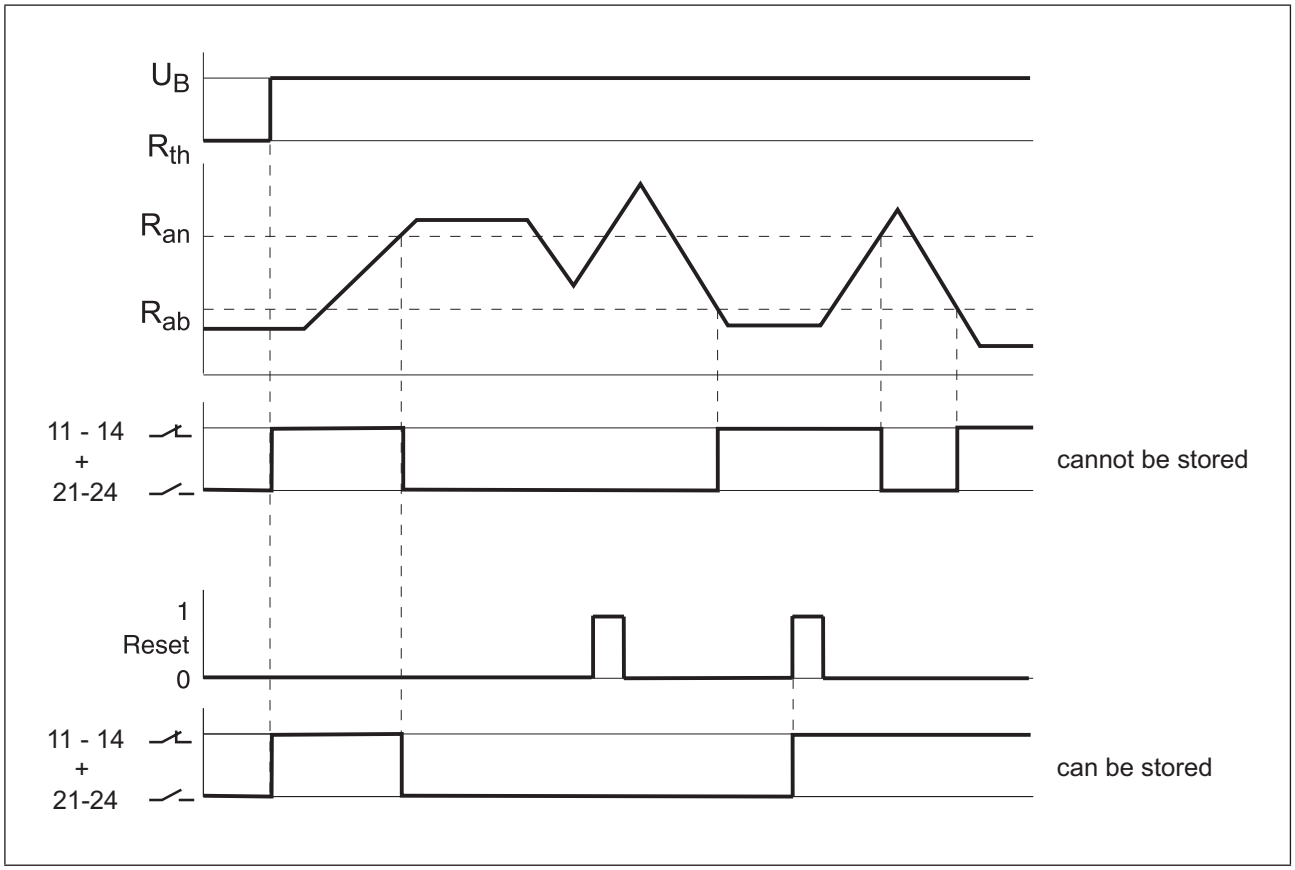


Shaded area: Intrinsically safe area

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

Thermistor monitor
S1MN Ex

Timing diagram

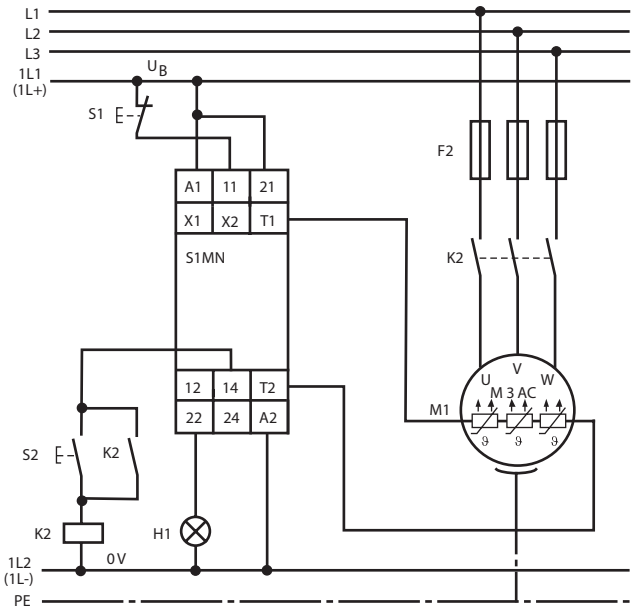


Legend:

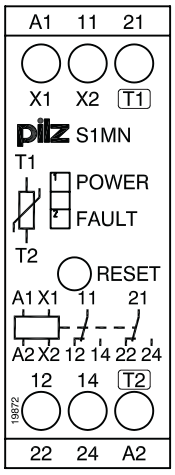
- U_B Supply voltage
- R_{on} Response value
- R_{off} Release value
- R_{th} PTC resistor

Thermistor monitor
S1MN Ex

Connection example



Terminal configuration



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

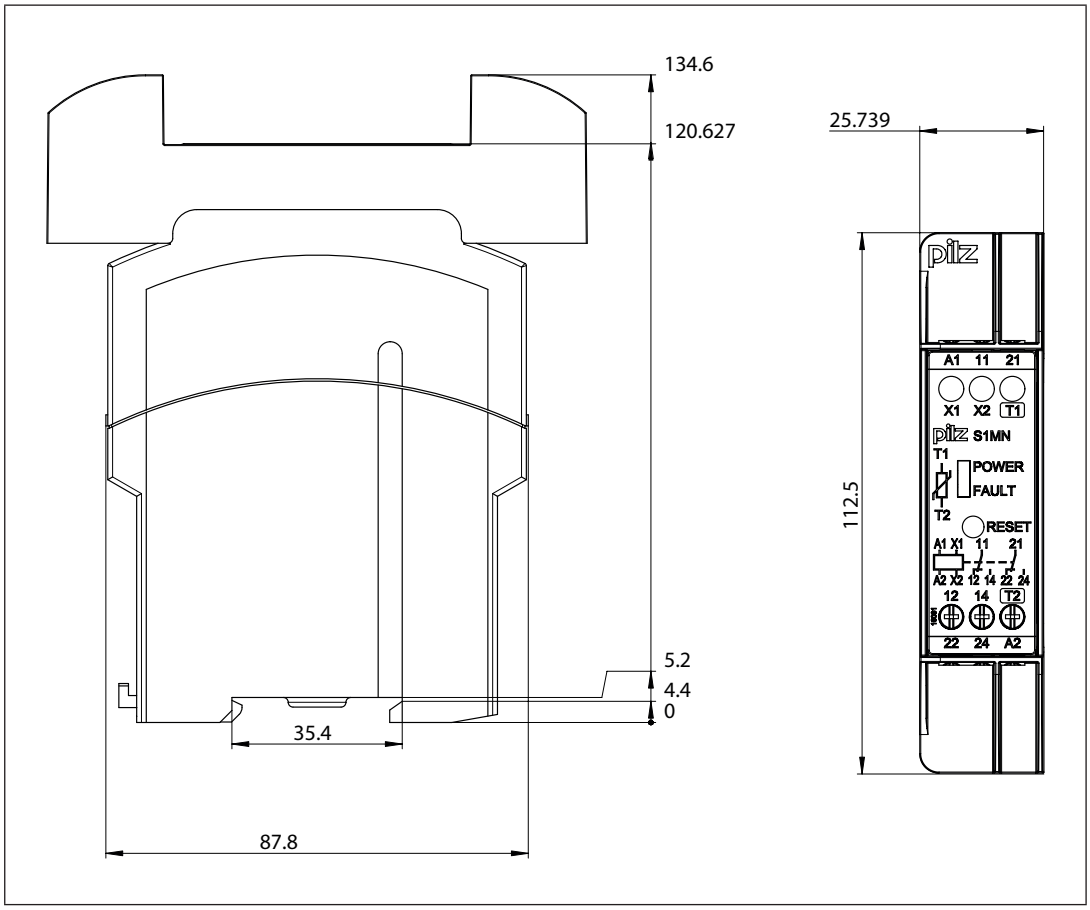
    or
  - that is located in a dry room that is cleaned regularly. No notable dust deposits or humidity effects must be allowed to occur.
- Use the notch to attach it to a DIN rail.
- If you are mounting the unit onto a vertical DIN rail (35 mm), ensure that it is mounted securely (e.g. by using a retaining 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.

Thermistor monitor
S1MN Ex

Dimensions



Thermistor monitor
S1MN Ex

Technical details

Order no. 839400, 839405, 839410

See below for more order numbers

General	839400	839405	839410
Approvals	**CCC, CE, cULus Listed**	**CCC, CE, cULus Listed**	**CCC, CE, cULus Listed**
Electrical data	**839400**	**839405**	**839410**
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	**839400**	**839405**	**839410**
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	**839400**	**839405**	**839410**
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**

Thermistor monitor
S1MN Ex

Relay outputs	839400	839405	839410
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	**839400**	**839405**	**839410**
Switch-on delay			
Typ. switch-on delay	**350 ms**	**350 ms**	**350 ms**
Environmental data	**839400**	**839405**	**839410**
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**

Thermistor monitor
S1MN Ex

Environmental data	839400	839405	839410
Protection type			
Mounting (e.g. cabinet)	**IP54**	**IP54**	**IP54**
Housing	**IP40**	**IP40**	**IP40**
Terminals	**IP20**	**IP20**	**IP20**
Mechanical data	**839400**	**839405**	**839410**
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**	**175 g**	**175 g**

Thermistor monitor
S1MN Ex

Order no. 839415, 839420

General	839415	839420
Approvals	**CCC, CE, cULus Listed**	**CCC, CE, cULus Listed**
Electrical data	**839415**	**839420**
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	**839415**	**839420**
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	**839415**	**839420**
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**

Thermistor monitor
S1MN Ex

Relay outputs	839415	839420
Contact material	**AgCdO + 3,0 µm Au**	**AgCdO + 3,0 µm Au**
Times	**839415**	**839420**
Switch-on delay		
Typ. switch-on delay	**350 ms**	**350 ms**
Environmental data	**839415**	**839420**
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	**839415**	**839420**
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**

Thermistor monitor
S1MN Ex

Mechanical data	839415	839420
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	**175 g**	**175 g**

Order reference

Order reference				

Product type	Features		Terminals	Order no.
S1MN Ex	24 VAC/DC		Screw terminals	839 400
S1MN Ex	48 VAC		Screw terminals	839 405
S1MN Ex	110 VAC		Screw terminals	839 410
S1MN Ex	230 VAC		Screw terminals	839 415
S1MN Ex	240 VAC		Screw terminals	839 420

Order reference: Accessories		

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