

CM-E Range

# Thermistor motor protection



Thermistor motor protection



## Thermistor motor protection relays

### Benefits and advantages

### Selection table

### Operating principle and fields of application for thermistor motor protection relays

The CM range of thermistor motor protection relays are used to control motors equipped with PTC temperature sensors. The PTC temperature sensors are incorporated in the motor windings to measure the motor heating. This enables direct control and evaluation of the following operating conditions:

- heavy duty starting
- increased switching frequency
- single-phase operation
- high ambient temperature
- insufficient cooling
- break operation
- unbalance

The relay is independent of the rated motor current, the insulation class and the method of starting.

The PTC sensors are connected in series to the terminals  $T_a$  and  $T_b$  (or  $T_a$  and  $T_{bx}$  without short-circuit detection). The number of possible PTC sensors per measuring circuit is limited by the sum of the individual PTC sensor resistances:  $R_G = R_1 + R_2 + R_N \leq 1.5 \text{ k}\Omega$ .

Under normal operating conditions the resistance is below the response threshold. If only one of the PTC resistors heats up excessively, the output relay de-energizes. If the autoreset function is configured, the output relay energizes automatically after cooling down.

Devices with manual (pushbutton on front-side) or remote reset configuration have to be controlled via the control input by the required signal.

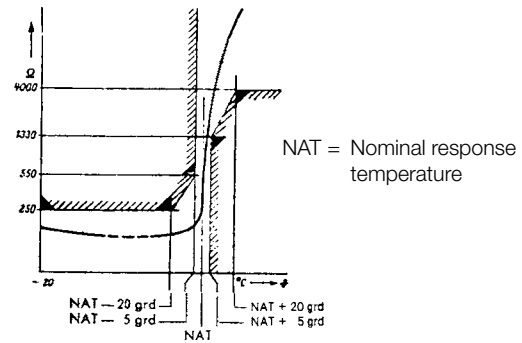
#### Further applications:

Temperature monitoring of equipment with PTC sensors integrated, such as

- machine rolling bearings,
- hot-air ventilators,
- oil,
- air,
- heating installations, etc.

#### Resistance characteristic

for one single temperature sensor acc. to DIN 44 081.



### Selection table thermistor motor protection relays

| Type                                | CM-MSE                   | CM-MSS (1)      | CM-MSS (2)      | CM-MSS (3)      | CM-MSS (4)      | CM-MSS (5)      | CM-MSS (6)               | CM-MSS (7)                            | CM-MSN                                |
|-------------------------------------|--------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|--------------------------|---------------------------------------|---------------------------------------|
| Function                            |                          |                 |                 |                 |                 |                 |                          |                                       |                                       |
| Measuring range                     |                          |                 |                 |                 |                 |                 |                          |                                       |                                       |
| Number of sensor circuits           | 1                        | 1               | 1               | 1               | 1               | 1               | 2                        | 3                                     | 6                                     |
| Wire break monitoring               | •                        | •               | •               | •               | •               | •               | •                        | •                                     | •                                     |
| Short-circuit detection             | –                        | –               | –               | • 1)            | •               | •               | •                        | •                                     | •                                     |
| Non-volatile fault storage          | –                        | –               | –               | –               | • 2)            | • 2)            | –                        | • 2)                                  | • 2)                                  |
| Operation/Reset                     |                          |                 |                 |                 |                 |                 |                          |                                       |                                       |
| Auto reset                          | •                        | •               | •               | •               | • 2)            | • 2)            | • 2)                     | • 2)                                  | • 2)                                  |
| Manual reset                        | –                        | –               | •               | •               | •               | •               | •                        | •                                     | •                                     |
| Remote reset                        | –                        | –               | •               | •               | •               | •               | •                        | •                                     | •                                     |
| Test button                         | –                        | –               | –               | –               | •               | •               | •                        | •                                     | •                                     |
| Output contacts                     |                          |                 |                 |                 |                 |                 |                          |                                       |                                       |
| Operational principle               | closed-circuit principle |                 |                 |                 |                 |                 |                          |                                       |                                       |
| Number / type                       | 1 c/o                    | 1 c/o           | 2 c/o           | 2 c/o           | 1 n/o + 1 n/c   | 2 c/o           | 1 c/o per sensor circuit | 1 n/o + 1 n/c accumulative evaluation | 1 n/o + 1 n/c accumulative evaluation |
| Width of housing                    | 22.5 mm                  |                 |                 |                 |                 |                 |                          |                                       | 45 mm                                 |
| Supply voltages and Reference codes |                          |                 |                 |                 |                 |                 |                          |                                       |                                       |
| 24 V AC                             | 1SVR550805R9300          |                 | 1SVR430811R9300 |                 |                 |                 |                          |                                       |                                       |
| 24 V AC/DC                          |                          | 1SVR430800R9100 | 1SVR430810R9300 | 1SVR430710R9300 |                 |                 |                          |                                       |                                       |
| 110-130 V AC                        | 1SVR550800R9300          |                 | 1SVR430811R0300 | 1SVR430711R0300 |                 |                 |                          |                                       |                                       |
| 220-240 V AC                        | 1SVR550801R9300          | 1SVR430801R1100 | 1SVR430811R1300 | 1SVR430711R1300 |                 |                 |                          |                                       |                                       |
| 380-440 V AC                        |                          |                 |                 | 1SVR430711R2300 |                 |                 |                          |                                       |                                       |
| 24-240 V AC/DC                      |                          |                 |                 |                 | 1SVR430720R0400 | 1SVR430720R0300 | 1SVR430710R0200          | 1SVR430720R0500                       | 1SVR450025R0100                       |

1) configurable via terminals

2) Auto reset without non-volatile fault storage configurable by permanent jumpering of connecting terminals S1-T2 or S1/X1-S2/X2

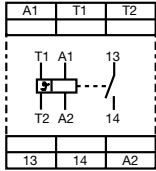
# Thermistor motor protection relays

## Product overview

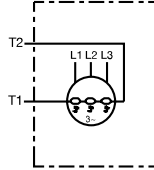
Measuring &  
monitoring relays  
CM Range

### CM-MSE

- Auto reset
- Connection of several sensors (max. 6 sensors conn. in series)
- Monitoring of bimetals
- 1 n/o contact
- Excellent cost / performance ratio

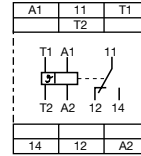


A1-A2 Rated control supply voltage  
T1-T2 Sensor circuit  
13-14 Output contact - Closed-circuit principle

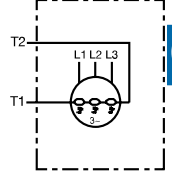


### CM-MSS (1), 1 c/o contact

- Auto reset
- Connection of several sensors
- Monitoring of bimetals
- 1 c/o contact
- 2 LEDs for status indication

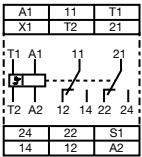


A1-A2 Rated control supply voltage  
T1-T2 Sensor circuit  
11-12/14 Output contact - Closed-circuit principle

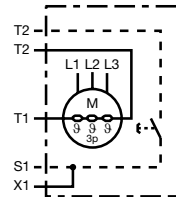


### CM-MSS (2), 2 c/o contacts

- Fault storage can be switched off
- Auto reset configurable
- Reset button
- Remote reset
- Monitoring of bimetals
- 2 c/o contacts
- 2 LEDs for status indication

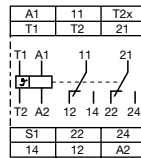


A1-A2 Rated control supply voltage  
T1-T2 Sensor circuit  
S1-T2 Remote reset jumper = no storage  
11-12/14 Output contacts - Closed-circuit principle

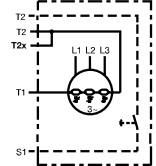


### CM-MSS (3), 2 c/o contacts, short-circuit monitoring configurable

- Fault storage can be switched off
- Auto reset configurable
- Reset button
- Remote reset
- Monitoring of bimetals
- Short-circuit monitoring of the sensor circuit configurable
- 2 c/o contacts
- 2 LEDs for status indication



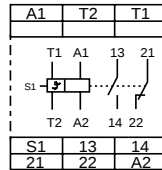
A1-A2 Rated control supply voltage  
S1-T2 Remote reset jumper = without storage  
T1-T2x measuring circuit without short-circuit monitoring  
T1-T2 measuring circuit with short-circuit monitoring  
11-12/14 Output contacts - Closed-circuit principle



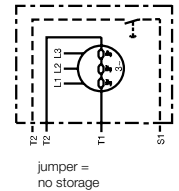
### CM-MSS (4) + CM-MSS (5), 1-channel

- Short-circuit monitoring of the sensor circuit
- Wide supply voltage range: 24-240 V AC/DC
- Non-volatile fault storage selectable
- Reset and test button
- Remote reset
- Auto reset configurable
- Output contacts: 1 n/c and 1 n/o or 2 c/o contacts
- 2 LEDs for status indication

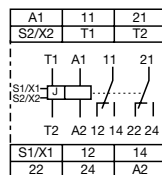
### CM-MSS (4)



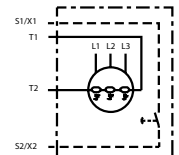
A1-A2 Rated control supply voltage  
T1-T2 Sensor circuit  
S1-T2 Remote reset  
13-14 Output contacts - Closed-circuit principle



### CM-MSS (5)



A1-A2 Rated control supply voltage  
T1-T2 Sensor circuit  
S1/X1-S2/X2 Reset  
11-12/14 Output contacts - Closed-circuit principle

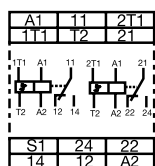


## Thermistor motor protection relays

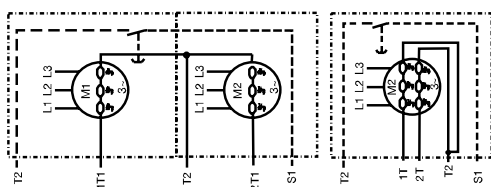
### Product overview

#### CM-MSS (6), 2-channel, single evaluation

- Short-circuit monitoring for the sensor circuits
- Wide supply voltage range: 24-240 V AC/DC
- 2 separate sensor circuits for monitoring of two motors or one motor with 2 sensor circuits (prewarning and final switch off)
- Reset button
- Auto reset configurable
- Output contacts: 2 x 1 c/o contact
- 3 LEDs for status indication



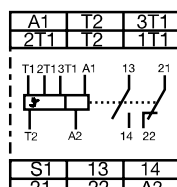
A1-A2 Rated control supply voltage  
11-12/14, 21-22/24 Output contacts - Closed-circuit principle  
1T1-T2 Sensor circuit  
2T1-T2



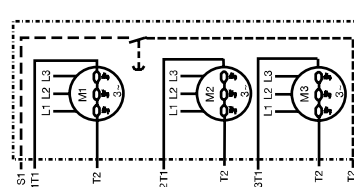
S1-T2 jumpered = no storage

#### CM-MSS (7), 3 sensor circuits, accumulative evaluation

- Short-circuit monitoring for the sensor circuits
- Wide supply voltage range: 24-240 V AC/DC
- Non-volatile fault storage configurable
- Remote reset
- Auto reset configurable
- Reset and test button
- Output contacts: 1 n/c and 1 n/o contact
- 4 LEDs for status indication



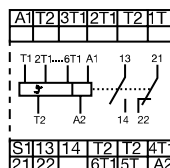
A1-A2 Rated control supply voltage  
13-14 Output contacts - Closed-circuit principle  
21-22



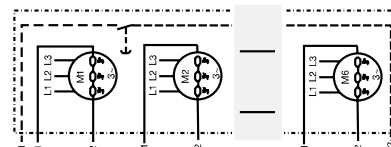
1T1-T2 Sensor circuits  
2T1-T2 3T1-T2  
S1-T2 Remote reset jumpered = no storage

#### CM-MSN, 6 sensor circuits, accumulative evaluation

- Short-circuit monitoring of the sensor circuit
- Wide supply voltage range: 24-240 V AC/DC
- Non-volatile fault storage configurable
- Remote reset
- Auto reset configurable
- Reset and test button
- Output contacts: 1 n/c, 1 n/o contact
- 7 LEDs for status indication



A1-A2 Rated control supply voltage  
13-14 Output contacts - Closed-circuit principle  
21-22



accumulative evaluation = if any input exceeds the threshold, the output relay will trip

## Thermistor motor protection relays

### Ordering details

#### Description

The thermistor motor protection relays CM-MSE, CM-MSS and CM-MSN are used to control motors equipped with PTC temperature sensors. The PTC temperature sensors are incorporated in the motor windings to measure the motor heating. This enables direct control and evaluation of various operating conditions. Depending on the products also ATEX approvals for use in hazardous areas are available.

ABB also offers PTC temperature sensors C011 (according to DIN 44081) which are suitable for embedding in motor windings.

#### Ordering details

| Rated control supply voltage =<br>measuring voltage | Reference<br>code        | Catalog<br>number | Weight<br>(1 pce)<br>kg (lb) |
|-----------------------------------------------------|--------------------------|-------------------|------------------------------|
| 24 V AC                                             | CM-MSE                   | 1SVR550805R9300   | 0.11 (0.24)                  |
| 110-130 V AC                                        |                          | 1SVR550800R9300   | 0.11 (0.24)                  |
| 220-240 V AC                                        |                          | 1SVR550801R9300   | 0.11 (0.24)                  |
| 24 V AC/DC <sup>1)</sup>                            | CM-MSS (1)               | 1SVR430800R9100   | 0.15 (0.33)                  |
| 220-240 V AC                                        |                          | 1SVR430801R1100   | 0.15 (0.33)                  |
| 24 V AC/DC <sup>1)</sup>                            | CM-MSS (2)               | 1SVR430810R9300   | 0.15 (0.33)                  |
| 24 V AC                                             |                          | 1SVR430811R9300   | 0.15 (0.33)                  |
| 110-130 V AC                                        |                          | 1SVR430811R0300   | 0.15 (0.33)                  |
| 220-240 V AC                                        | CM-MSS (3)               | 1SVR430811R1300   | 0.15 (0.33)                  |
| 24 V AC/DC <sup>1)</sup>                            |                          | 1SVR430710R9300   | 0.15 (0.33)                  |
| 110-130 V AC                                        |                          | 1SVR430711R0300   | 0.15 (0.33)                  |
| 220-240 V AC                                        | CM-MSS (3)               | 1SVR430711R1300   | 0.15 (0.33)                  |
| 380-440 V AC                                        |                          | 1SVR430711R2300   | 0.15 (0.33)                  |
| 24-240 V AC/DC                                      | CM-MSS (4) <sup>2)</sup> | 1SVR430720R0400   | 0.15 (0.33)                  |
|                                                     | CM-MSS (5) <sup>3)</sup> | 1SVR430720R0300   | 0.15 (0.33)                  |
|                                                     | CM-MSS (6)               | 1SVR430710R0200   | 0.15 (0.33)                  |
|                                                     | CM-MSS (7)               | 1SVR430720R0500   | 0.15 (0.33)                  |
|                                                     | CM-MSN                   | 1SVR450025R0100   | 0.23 (0.51)                  |
|                                                     |                          |                   |                              |

<sup>1)</sup> Not electrically isolated

<sup>2)</sup> CM-MSS (4): 1-channel 1 n/c, 1 n/o

<sup>3)</sup> CM-MSS (5): 1-channel 2 c/o



CM-MSE



CM-MSS (5)



CM-MSN

## Thermistor motor protection relays

### Ordering details

### PTC temperature sensors C011

#### Description



The PTC temperature sensors (temperature-dependent with positive temperature coefficient) are selected by the manufacturer of the motor depending on:

- the motor insulation class according to IEC/EN 60034-11,
- the special characteristics of the motor, such as the conductor cross-section of the windings, the permissible overload factor etc.
- special conditions prescribed by the user, such as the permissible ambient temperature, risks resulting from locked rotor, extent of permitted overload etc.

One temperature sensor must be embedded in each phase winding. For instance, in case of three-phase squirrel cage motors, three sensors are embedded in the stator windings. For pole-changing motors with one winding (Dahlander connection), 3 sensors are also sufficient. Pole-changing motors with two windings, however, require The sensors are suitable for embedding in motor windings with rated operating voltages of up to 600 V AC. Conductor length: 500 mm per sensor. A 14 V varistor can be connected in parallel to protect the sensors from overvoltage. Due to their characteristics, the thermistor motor protection relays can also be used with PTC temperature sensors of other manufacturers which comply with DIN 44 081 and DIN 44 082 6 sensors.

If an additional warning is required before the motor is switched off, separate sensors for a correspondingly lower temperature must be embedded in the winding. They have to be connected to a second control unit.

#### Ordering details

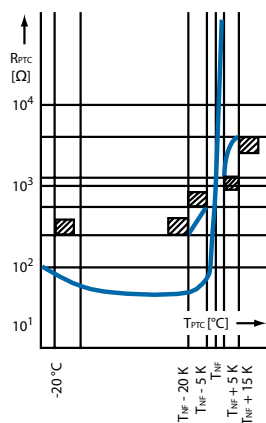
| Rated response temperature $T_{NF}$ | Color Coding | Reference code           | Catalog number  | Weight (1 pce)<br>kg (lb) |
|-------------------------------------|--------------|--------------------------|-----------------|---------------------------|
| 70 °C                               | white-brown  | C011-70 <sup>1)</sup>    | GHC0110003R0001 | 0.02 (0.044)              |
| 80 °C                               | white-white  | C011-80 <sup>1)</sup>    | GHC0110003R0002 | 0.02 (0.044)              |
| 90 °C                               | green-green  | C011-90 <sup>1)</sup>    | GHC0110003R0003 | 0.02 (0.044)              |
| 100 °C                              | red-red      | C011-100 <sup>1)</sup>   | GHC0110003R0004 | 0.02 (0.044)              |
| 110 °C                              | brown-brown  | C011-110 <sup>1)</sup>   | GHC0110003R0005 | 0.02 (0.044)              |
| 120 °C                              | gray-gray    | C011-120 <sup>1)</sup>   | GHC0110003R0006 | 0.02 (0.044)              |
| 130 °C                              | blue-blue    | C011-130 <sup>1)</sup>   | GHC0110003R0007 | 0.02 (0.044)              |
| 140 °C                              | white-blue   | C011-140 <sup>1)</sup>   | GHC0110003R0011 | 0.02 (0.044)              |
| 150 °C                              | black-black  | C011-150 <sup>1)</sup>   | GHC0110003R0008 | 0.02 (0.044)              |
| 160 °C                              | blue-red     | C011-160 <sup>1)</sup>   | GHC0110003R0009 | 0.02 (0.044)              |
| 170 °C                              | white-green  | C011-170 <sup>1)</sup>   | GHC0110003R0010 | 0.02 (0.044)              |
| 150 °C                              | black-black  | C011-3-150 <sup>2)</sup> | GHC0110033R0008 | 0.05 (0.11)               |

<sup>1)</sup>Temperature sensor C011, standard version acc. to DIN 44081

<sup>2)</sup>Triple temperature sensor C011-3

#### Temperature sensor characteristics

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# Thermistor motor protection relays

## Technical information

### PTC temperature sensors C011

Measuring &  
monitoring relays  
CM Range

#### Technical data

##### Characteristic data

|                                                                                |                                               |
|--------------------------------------------------------------------------------|-----------------------------------------------|
| Cold-state resistance                                                          | Sensor type C011<br>50 -100 $\Omega$ at 25 °C |
| Warm-state resistance $\pm 5$ up to 6 K of rated response temperature $T_{NF}$ | 10 000 $\Omega$                               |
| Thermal time constant, sensor open <sup>1)</sup>                               | < 5 s                                         |
| Permitted ambient temperature                                                  | +180 °C                                       |

| Rated response temperature w tolerance TNF w iTNF | PTC resistance R from -20 °C to TNF - 20 K | PTC resistance R at PTC temperatures of: |                           |                           |
|---------------------------------------------------|--------------------------------------------|------------------------------------------|---------------------------|---------------------------|
|                                                   |                                            | TNF - iTNF (UPTC m 2.5 V)                | TNF + iTNF (UPTC m 2.5 V) | TNF + 15 K (UPTC m 7.5 V) |
| 70 $\pm 5$ °C                                     | $\leq 100 \Omega$                          | $\leq 570 \Omega$                        | $\geq 570 \Omega$         | -                         |
| 80 $\pm 5$ °C                                     |                                            | $\leq 550 \Omega$                        | $\geq 1330 \Omega$        | $\geq 4000 \Omega$        |
| 90 $\pm 5$ °C                                     |                                            |                                          |                           |                           |
| 100 $\pm 5$ °C                                    |                                            |                                          |                           |                           |
| 110 $\pm 5$ °C                                    |                                            |                                          |                           |                           |
| 120 $\pm 5$ °C                                    |                                            |                                          |                           |                           |
| 130 $\pm 5$ °C                                    |                                            |                                          |                           |                           |
| 140 $\pm 5$ °C                                    |                                            |                                          |                           |                           |
| 150 $\pm 5$ °C                                    |                                            |                                          |                           |                           |
| 160 $\pm 5$ °C                                    |                                            | $\leq 570 \Omega$                        | $\geq 570 \Omega$         | -                         |
| 170 $\pm 7$ °C                                    |                                            |                                          |                           |                           |

<sup>1)</sup> Not embedded in windings.

<sup>2)</sup> For triple temperature sensor take values x 3.

# Thermistor motor protection relays

## Technical data

| Type                                                                 | CM-MSE                                             | CM-MSS                                                                                                                     | CM-MSN                                                                                                                 |
|----------------------------------------------------------------------|----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| <b>Input circuit</b>                                                 |                                                    |                                                                                                                            |                                                                                                                        |
| Rated control supply voltage $U_s$                                   | A1-A2                                              | 24 V AC approx. 1.5 VA                                                                                                     |                                                                                                                        |
| power consumption                                                    | A1-A2                                              | 24 V AC/DC approx. 1.1 VA / 0.6 W                                                                                          |                                                                                                                        |
|                                                                      | A1-A2                                              | 110-130 V AC approx. 1.5 VA                                                                                                |                                                                                                                        |
|                                                                      | A1-A2                                              | 220-240 V AC approx. 1.5 VA                                                                                                |                                                                                                                        |
|                                                                      | A1-A2                                              | 380-440 V AC approx. 1.7 VA                                                                                                |                                                                                                                        |
|                                                                      | A1-A2                                              | 24-240 V AC/DC approx. 1.4-1.7 W / approx. 3.5-5.7 VA                                                                      |                                                                                                                        |
| Rated control supply voltage $U_s$ tolerance                         |                                                    | -15 % ... +10 %                                                                                                            |                                                                                                                        |
| Rated frequency                                                      |                                                    | AC: 50-60 Hz / 24-240 V AC/DC versions: 15-400 Hz                                                                          |                                                                                                                        |
| Duty time                                                            |                                                    | 100 %                                                                                                                      |                                                                                                                        |
| <b>6 Measuring circuit</b>                                           | T1-T2                                              | T1-T2/T2x, 1T1...6T1-T2                                                                                                    | 1T1...6T1-T2                                                                                                           |
| Monitoring function                                                  |                                                    | temperature monitoring by means of PTC sensors                                                                             |                                                                                                                        |
| Number of sensor circuits                                            | 1                                                  | 1, 2 oder 3 (see order details)                                                                                            | 6                                                                                                                      |
| Short-circuit monitoring                                             | -                                                  | see ordering details                                                                                                       | yes                                                                                                                    |
| Non-volatile fault storage                                           | -                                                  | see ordering details                                                                                                       | configurable                                                                                                           |
| Test function                                                        | -                                                  | see ordering details                                                                                                       | yes                                                                                                                    |
| <b>Sensor circuit</b>                                                |                                                    |                                                                                                                            |                                                                                                                        |
| Temperature threshold (relay de-energizes)                           | 2.7-3.7 k $\Omega$                                 | CM-MSS (1+2): 3050 $\pm$ 550 $\Omega$                                                                                      | 3.6 k $\Omega$ $\pm$ 5 %                                                                                               |
|                                                                      |                                                    | CM-MSS (3-7): 3.6 k $\Omega$ $\pm$ 5 %                                                                                     |                                                                                                                        |
| Temperature hysteresis (relay energizes)                             | 1.7-2.3 k $\Omega$                                 | CM-MSS (1+2): 1900 $\pm$ 400 $\Omega$                                                                                      | 1.6 k $\Omega$ $\pm$ 5 %                                                                                               |
|                                                                      |                                                    | CM-MSS (3-7): 1.6 k $\Omega$ $\pm$ 5 %                                                                                     |                                                                                                                        |
| Short-circuit threshold (relay de-energizes)                         |                                                    | <18 $\Omega$                                                                                                               |                                                                                                                        |
| Short-circuit hysteresis (relay energizes)                           |                                                    | >45 $\Omega$                                                                                                               |                                                                                                                        |
| Maximum total resistance of sensors connected in series (cold state) |                                                    | $\leq$ 1.5 k $\Omega$                                                                                                      |                                                                                                                        |
| Maximum sensor cable length for short-circuit detection              |                                                    | 2 x 100 m at 0.75 mm <sup>2</sup> ; 2 x 400 m at 2.5 mm <sup>2</sup>                                                       |                                                                                                                        |
| Response time                                                        |                                                    | <100 ms                                                                                                                    |                                                                                                                        |
| <b>Control circuit for storage and hysteresis function</b>           |                                                    |                                                                                                                            |                                                                                                                        |
| Remote reset                                                         | S1-T2 or S1/X1-S2/X2                               | -                                                                                                                          | n/o contact                                                                                                            |
| Maximum no-load voltage                                              |                                                    | -                                                                                                                          | approx. 25 V, 24-240 V; AC/DC versions: 5.5 V                                                                          |
| Maximum cable length                                                 |                                                    | -                                                                                                                          | $\leq$ 50 m, 100-200 m if shielded                                                                                     |
| <b>Indication of operational states</b>                              |                                                    |                                                                                                                            |                                                                                                                        |
| Control supply voltage                                               | U: green LED                                       | -                                                                                                                          |  : control supply voltage applied |
| Fault indication                                                     | F: red LED                                         | -                                                                                                                          |  : output relay de-energized      |
| <b>Output circuits</b>                                               | 13-14                                              | 11-12/14, 21-22/24, 13-14, 21-22                                                                                           | 13-14, 21-22                                                                                                           |
| Kind of output                                                       | 1 n/o contact                                      | CM-MSS (1): 1 c/o contact<br>CM-MSS (2,3,5): 2 c/o contacts<br>CM-MSS (4, 7): 1 n/o + 1 n/c<br>CM-MSS (6): 2x1 c/o contact | 1 n/o + 1 n/c contact                                                                                                  |
| Operational principle                                                |                                                    | closed-circuit principle (output relay de-energizes if the measured value exceeds/drops below the adjusted threshold)      |                                                                                                                        |
| Contact material                                                     | AgCdO                                              | CM-MSS (1+2+6): AgCdO<br>CM-MSS (3+4+5+7): AgNi                                                                            | AgNi                                                                                                                   |
| Rated voltage (VDE 0110, IEC 664-1, IEC 60947-1)                     |                                                    | 250 V                                                                                                                      |                                                                                                                        |
| Maximum switching voltage                                            |                                                    | 250 V                                                                                                                      |                                                                                                                        |
| Rated operational current $I_o$ (IEC/EN 60947-5-1)                   | AC12 (resistive) at 230 V                          | 4 A                                                                                                                        |                                                                                                                        |
|                                                                      | AC15 (inductive) at 230 V                          | 3 A                                                                                                                        |                                                                                                                        |
|                                                                      | DC12 (resistive) at 24 V                           | 4 A                                                                                                                        |                                                                                                                        |
|                                                                      | DC13 (resistive) at 24 V                           | 2 A (1.5 A - n/c contact <sup>1)</sup> )                                                                                   |                                                                                                                        |
| AC rating (UL 508)                                                   | Utilization category (Control Circuit Rating Code) |                                                                                                                            |                                                                                                                        |
|                                                                      | max. rated operational voltage                     | 300 V AC                                                                                                                   |                                                                                                                        |
|                                                                      | max. continuous thermal current at B 300           | 5 A                                                                                                                        |                                                                                                                        |
|                                                                      | max. making/breaking apparent power at B300        | 3600/360 VA                                                                                                                |                                                                                                                        |
| Mechanical lifetime                                                  |                                                    | 30 (10 <sup>11</sup> ) x 10 <sup>6</sup> switching cycles                                                                  |                                                                                                                        |
| Electrical lifetime (AC12, 230 V, 4 A)                               |                                                    | 0.1 x 10 <sup>6</sup> switching cycles                                                                                     |                                                                                                                        |
| Max. fuse rating to achieve short-circuit protection                 | n/c contact                                        | 10 A fast-acting                                                                                                           | 10 A fast-acting                                                                                                       |
|                                                                      | n/o contact                                        | 10 A fast-acting                                                                                                           | 10 A fast-acting                                                                                                       |
|                                                                      |                                                    | 4 A (10 A <sup>1)</sup> ) fast-acting                                                                                      |                                                                                                                        |
|                                                                      |                                                    | 6 A (10 A <sup>1)</sup> ) fast-acting                                                                                      |                                                                                                                        |
| <b>General data</b>                                                  |                                                    |                                                                                                                            |                                                                                                                        |
| Dimensions (W x H x D)                                               | 22.5 x 78 x 78.5 mm (0.89 x 3.07 x 3.09 in)        | 22.5 x 78 x 100 mm (0.89 x 3.07 x 3.94 in)                                                                                 | 45 x 78 x 100 mm (1.77 x 3.07 x 3.94 in)                                                                               |
| Weight                                                               | approx. 0.11 kg (0.24 lb)                          | approx. 0.15 kg (0.33 lb)                                                                                                  | approx. 0.23 kg (0.51 lb)                                                                                              |
| Mounting position                                                    |                                                    | any                                                                                                                        |                                                                                                                        |
| Degree of protection                                                 | housing / terminals                                | IP50 / IP20                                                                                                                |                                                                                                                        |
| Ambient temperature range                                            | operation                                          | -20...+60 °C                                                                                                               | -25...+65 °C                                                                                                           |
|                                                                      | storage                                            | -40...+85 °C                                                                                                               |                                                                                                                        |
| Mounting                                                             |                                                    | DIN rail (IEC/EN 60715)                                                                                                    |                                                                                                                        |

<sup>1)</sup> 1SVR 430 710 R 0200, 1SVR 430 8xx R xxxx

# Thermistor motor protection relays

## Technical data

Measuring &  
monitoring relays  
CM Range

| Type                                                          |                                      | CM-MSE                                                   | CM-MSS                                          | CM-MSN |
|---------------------------------------------------------------|--------------------------------------|----------------------------------------------------------|-------------------------------------------------|--------|
| Electrical connection                                         |                                      |                                                          |                                                 |        |
| Wire size                                                     | fine strand with wire end ferrule    | 2 x 1.5 mm <sup>2</sup><br>(2 x 16 AWG)                  | 2 x 2.5 mm <sup>2</sup><br>(2 x 14 AWG)         |        |
|                                                               | fine strand without wire end ferrule | 2 x 0.75-1.5 mm <sup>2</sup><br>(2 x 18-16 AWG)          | 2 x 0.75-2.5 mm <sup>2</sup><br>(2 x 18-14 AWG) |        |
|                                                               | rigid                                | 2 x 1-1.5 mm <sup>2</sup><br>(2 x 18-16 AWG)             | 2 x 0.75-2.5 mm <sup>2</sup><br>(2 x 18-14 AWG) |        |
| Stripping length                                              |                                      | 2 x 0.75-1.5 mm <sup>2</sup><br>(2 x 18-16 AWG)          | 2 x 0.5-4 mm <sup>2</sup><br>(2 x 20-12 AWG)    |        |
| Tightening torque                                             |                                      | 10 mm (0.39 inch)                                        | 7 mm (0.28 inch)                                |        |
| Standards                                                     |                                      |                                                          |                                                 |        |
| Product standard                                              |                                      | IEC 255-6, EN 60255-6                                    |                                                 |        |
| Low Voltage Directive                                         |                                      | 2006/95/EC                                               |                                                 |        |
| EMC Directive                                                 |                                      | 2004/108/EC, 91/263/EEC, 92/31/EEC, 93/68/EEC, 93/67/EEC |                                                 |        |
| Electromagnetic compatibility                                 |                                      |                                                          |                                                 |        |
| electrostatic discharge                                       | IEC/EN 61000-4-2                     | EN 61000-6-2, EN 61000-6-4                               |                                                 |        |
| radiated, radio-frequency, electromagnetic field              | IEC/EN 61000-4-3                     | Level 3 (6 kV / 8 kV)                                    |                                                 |        |
| electrical fast transient /burst                              | IEC/EN 61000-4-4                     | Level 3 (10 V/m)                                         |                                                 |        |
| surge                                                         | IEC/EN 61000-4-5                     | Level 3 (2 kV / 5 kHz)                                   |                                                 |        |
| conducted disturbances, induced by radio-frequency fields     | IEC/EN 61000-4-6                     | Level 3/4 (1/2 kV)                                       |                                                 |        |
| Operational reliability (IEC 68-2-6)                          |                                      | 6 g                                                      | 4 g                                             | 5 g    |
| Resistance to vibration (IEC 68-2-6)                          |                                      | 10 g                                                     | 6 g                                             | 10 g   |
| Environmental testing (IEC 68-2-30)                           |                                      | 24 h cycle time, 55 °C, 93 % rel., 96 h                  |                                                 |        |
| Isolation data                                                |                                      |                                                          |                                                 |        |
| Rated voltage between supply, measuring and output circuit    |                                      | 250 V                                                    |                                                 |        |
| Rated impulse withstand voltage between all isolated circuits |                                      | 4 kV / 1.2 - 50 µs                                       |                                                 |        |
| Test voltage between all isolated circuits                    |                                      | 2.5 kV, 50 Hz, 1 min.                                    |                                                 |        |
| Pollution degree                                              |                                      | 3                                                        |                                                 |        |
| Overvoltage category                                          |                                      | III                                                      |                                                 |        |