

Current monitoring relays CM-SRS.M

For single-phase AC/DC currents

The CM-SRS.M is an electronic current monitoring relay that protects single-phase mains (DC or AC) from over- and undercurrent from 3 mA to 15 A. All devices are available with two different terminal versions. You can choose between the proven screw connection technology (double-chamber cage connection terminals) and the completely tool-free Easy Connect Technology (Push-in terminals).

Characteristics

- Monitoring of DC and AC currents (3 mA to 15 A)
- TRMS measuring principle
- One device includes 3 measuring ranges
- Over- or undercurrent monitoring configurable
- Open- or closed-circuit principle configurable
- Latching function configurable
- Hysteresis adjustable (3-30 %)
- Precise adjustment by front-face operating controls
- Screw connection technology or Easy Connect Technology available
- Housing material for highest fire protection classification UL 94 V-0
- Tool-free mounting on DIN rail as well as demounting
- Start-up delay T_S adjustable (0 s; 0.1-30 s)
- Tripping delay T_V adjustable (0 s; 0.1-30 s)
- 2 c/o (SPDT) contacts
- 22.5 mm (0.89 in) width
- 3 LEDs for status indication

Order data

Current monitoring relays

| Type | Rated control supply voltage | Connection technology | Measuring ranges | Order code |
|------------|------------------------------|-----------------------|-----------------------------|--------------------|
| CM-SRS.M1P | 24-240 V AC/DC | Push-in terminals | 3-30 mA, 10-100 mA, 0.1-1 A | 1SVR 740 840 R0600 |
| CM-SRS.M1S | | Screw type terminals | | 1SVR 730 840 R0600 |
| CM-SRS.M2S | | | 0.3-1.5 A, 1-5 A, 3-15 A | 1SVR 730 840 R0700 |

Accessories

| Type | Description | Order code |
|--------|--|--------------------|
| ADP.01 | Adapter for screw mounting | 1SVR 430 029 R0100 |
| MAR.12 | Marker label for devices with DIP switches | 1SVR 730 006 R0000 |
| COV.11 | Sealable transparent cover | 1SVR 730 005 R0100 |



Approvals

- UL 508, CAN/CSA C22.2 No.14
- GL (pending)
- GOST
- CB Scheme
- CCC
- RMRS

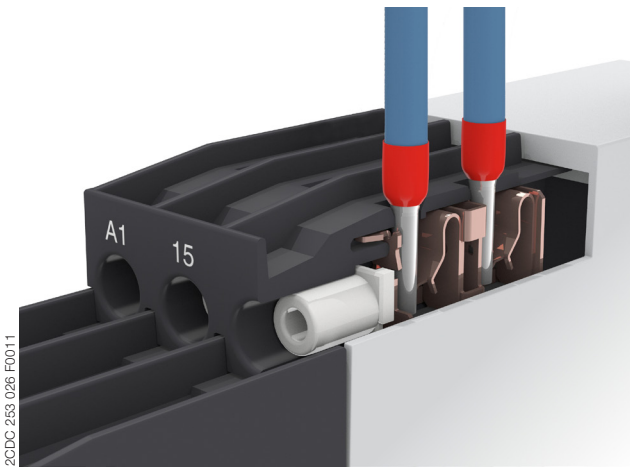
Marks

- CE
- C-Tick

Connection technology

Maintenance free Easy Connect Technology with Push-in terminals

Type designation CM-xxS.yyP

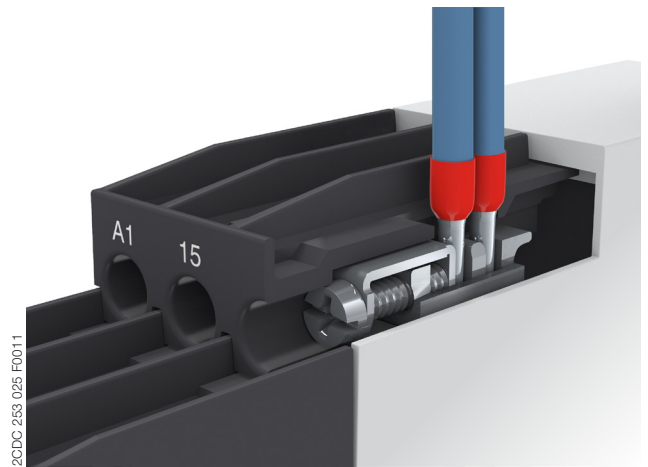


Push-in terminals

- Tool-free connection of rigid and flexible wires with wire end ferrule according to DIN 46228-1-A, DIN 46228-4-E
Wire size: $2 \times 0.5-1.5 \text{ mm}^2$, (2 x 20 - 16 AWG)
- Easy connection of flexible wires without wire end ferrule by opening the terminals
- No retightening necessary
- One operation lever for opening both connection terminals
- For triggering the lever and disconnecting of wires you can use the same tool (Screwdriver according to DIN ISO 2380-1 Form A 0.8 x 4 mm (0.0315 x 0.157 in), DIN ISO 8764-1 PZ1 $\varnothing 4.5 \text{ mm}$ (0.177 in))
- Constant spring force on terminal point independent of the applied wire type, wire size or ambient conditions (e. g. vibrations or temperature changes)
- Opening for testing the electrical contacting
- Gas-tight

Approved screw connection technology with double-chamber cage connection terminals

Type designation CM-xxS.yyS



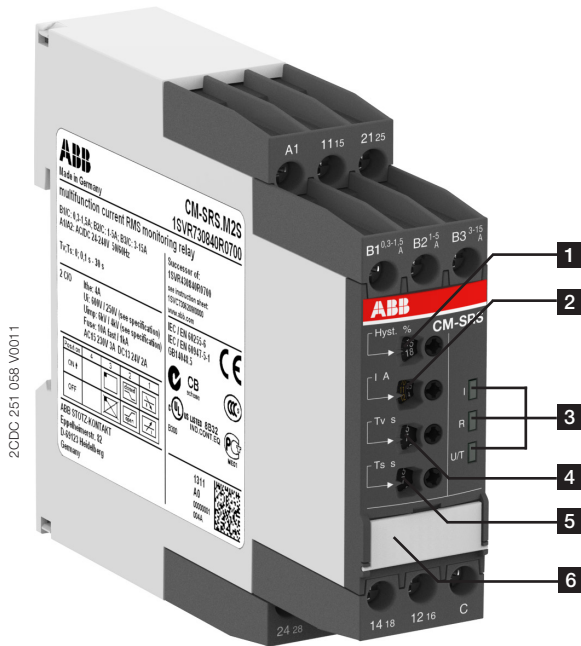
Double-chamber cage connection terminals

- Terminal spaces for different wire sizes:
fine-strand with/without wire end ferrule:
 $1 \times 0.5-2.5 \text{ mm}^2$ (2 x 20 - 14 AWG),
 $2 \times 0.5-1.5 \text{ mm}^2$ (2 x 20 - 16 AWG)
rigid:
 $1 \times 0.5-4 \text{ mm}^2$ (1 x 20 - 12 AWG),
 $2 \times 0.5-2.5 \text{ mm}^2$ (2 x 20 - 14 AWG)
- One screw for opening and closing of both cages
- Pozidrive screws for pan- or crosshead screwdrivers according to DIN ISO 2380-1 Form A 0.8 x 4 mm (0.0315 x 0.157 in), DIN ISO 8764-1 PZ1 $\varnothing 4.5 \text{ mm}$ (0.177 in)

Both the Easy Connect Technology with Push-in terminals and screw connection technology with double-chamber cage connection terminals have the same connection geometry as well as terminal position.

Functions

Operating controls



1 Adjustment of the hysteresis (MIN = Default)

2 Adjustment of the threshold value (MIN = Default)

3 Indication of operational states

U/T: green LED – control supply voltage/timing

R: yellow LED – relay status

U: red LED – over- / undercurrent

4 Adjustment of the tripping delay T_V

5 Adjustment of the start-up delay T_S

6 DIP switches (see DIP switch functions)

Application

The multifunctional current monitoring relays CM-SRS.M are designed for use in single-phase AC and/or DC systems for over- or undercurrent monitoring. The devices operate over an universal range of supply voltages, provide an adjustable start-up as well as tripping delay and work according to the open-or closed-circuit principle.

Operating mode

The CM-SRS.M with 2 c/o (SPDT) contacts are available in 2 versions with 3 measuring ranges: 3-30 mA, 10-100 mA, 0.1-1 A (CM-SRS.M1) and 0.3-1.5 A, 1-5 A, 3-15 A (CM-SRS.M2). The measuring range is selected by connecting the monitored wire to the corresponding terminal B1/B2/B3-C.

The units are adjusted with front-face operating controls. The selection of over- or undercurrent monitoring , open- or closed-circuit principle and latching function ON or OFF is made with DIP switches. Potentiometers, with direct reading scale, allow the adjustment of the threshold value I, the hysteresis %, the tripping delay T_V and the start-up delay T_S. The hysteresis % is adjustable within a range of 3 to 30 % of the threshold value and the tripping delay T_V and the start-up delay T_S are adjustable over a range of instantaneous to a 30 s delay. Timing is displayed by a flashing green LED labelled U/T.

Function diagrams

Overcurrent monitoring without latching

Open-circuit principle

The current to be monitored (measured value) is applied to terminals B1/B2/B3-C. When control supply voltage is applied to terminals A1-A2, the start-up delay T_S begins. The green LED flashes $\square\square\square\square$ during the start-up delay T_S and then turns steady. During the start-up delay T_S overcurrent is only displayed by glowing of the red LED.

If the measured value exceeds the adjusted threshold value, when T_S is complete, the tripping delay T_V starts and the red LED glows. Timing of T_V is displayed by the flashing $\square\square\square$ green LED. When T_V is complete and the measured value still exceeds the threshold value minus the adjusted hysteresis, the output relays energize and the yellow LED (relay energized) glows.

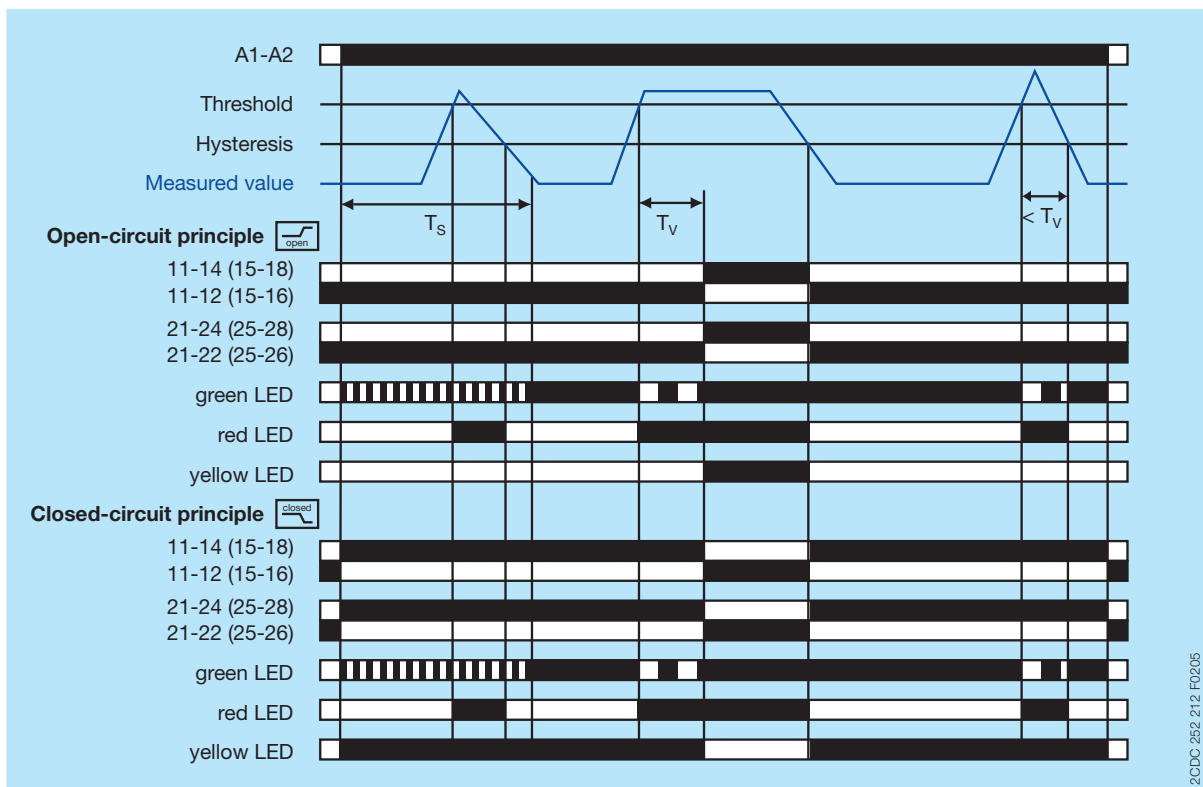
If the measured value decreases below the threshold value minus the hysteresis, the output relays de-energize and the red and yellow LEDs turn off. If control supply voltage is interrupted, the green LED turns off.

Closed-circuit principle

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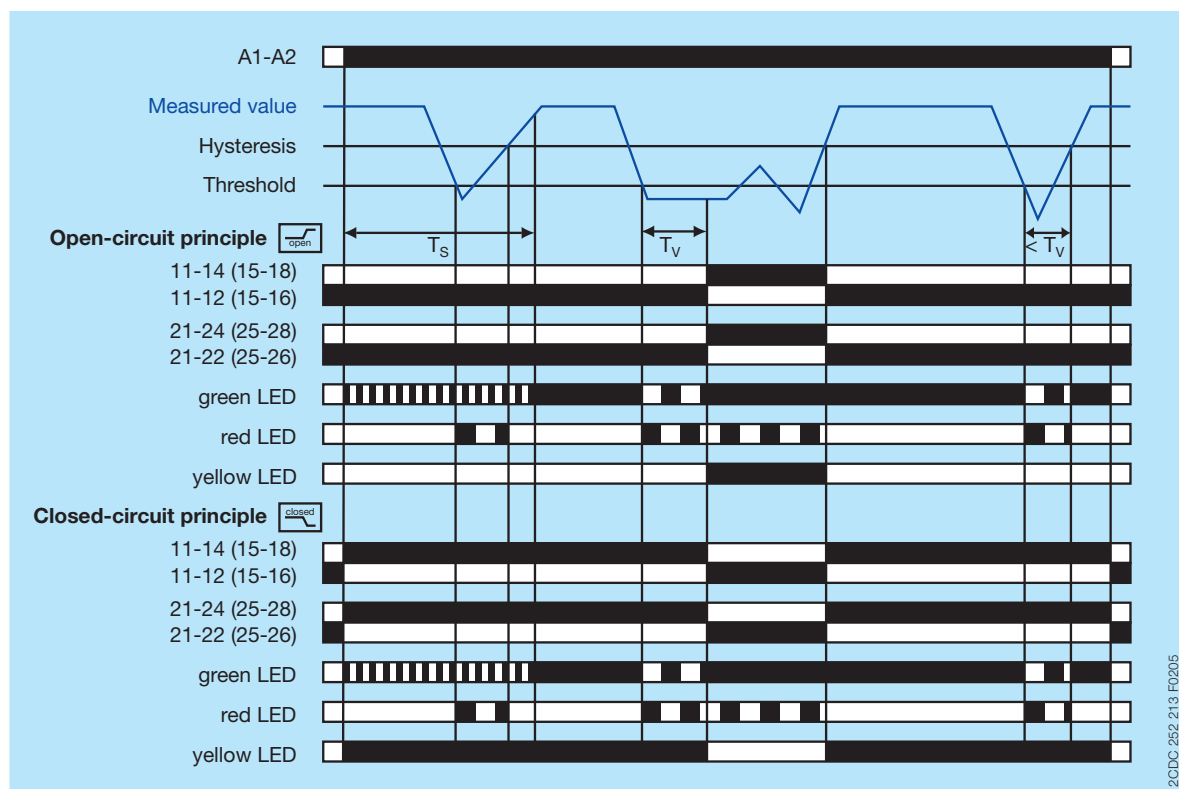
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Overcurrent monitoring  with latching 


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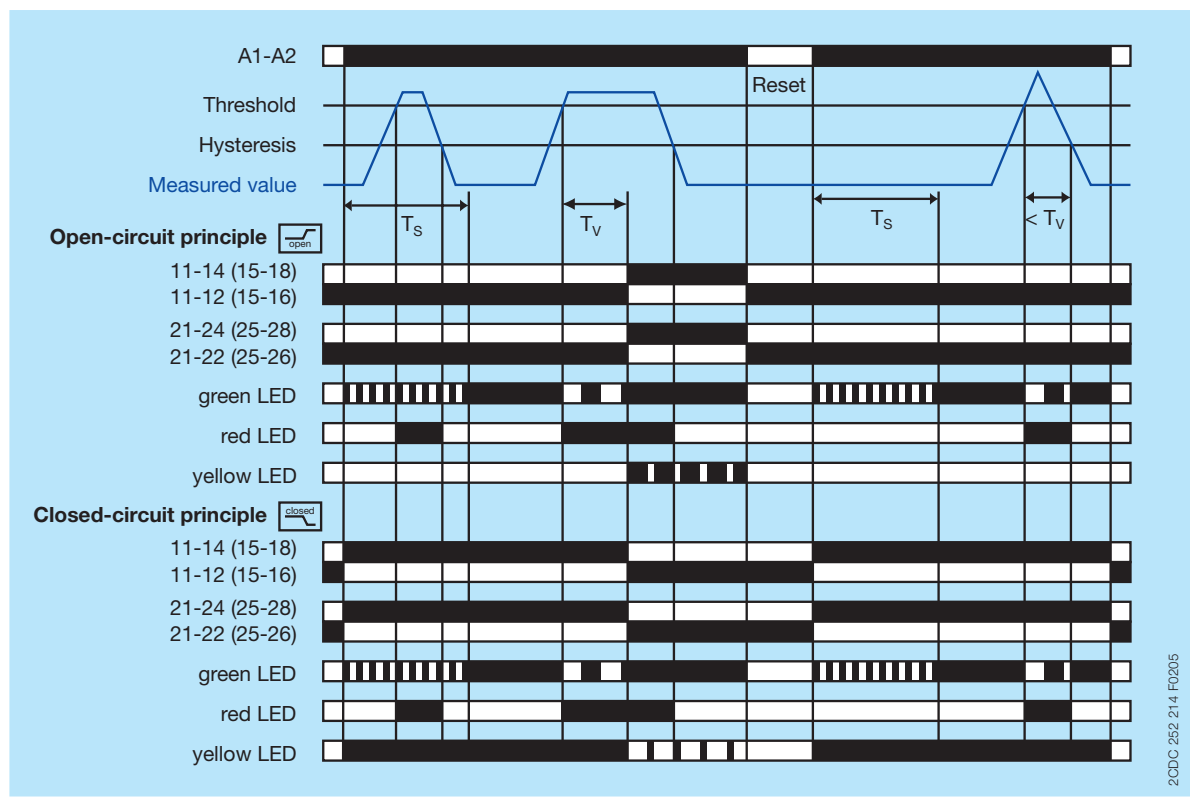
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Undercurrent monitoring  with latching 



Open-circuit principle 




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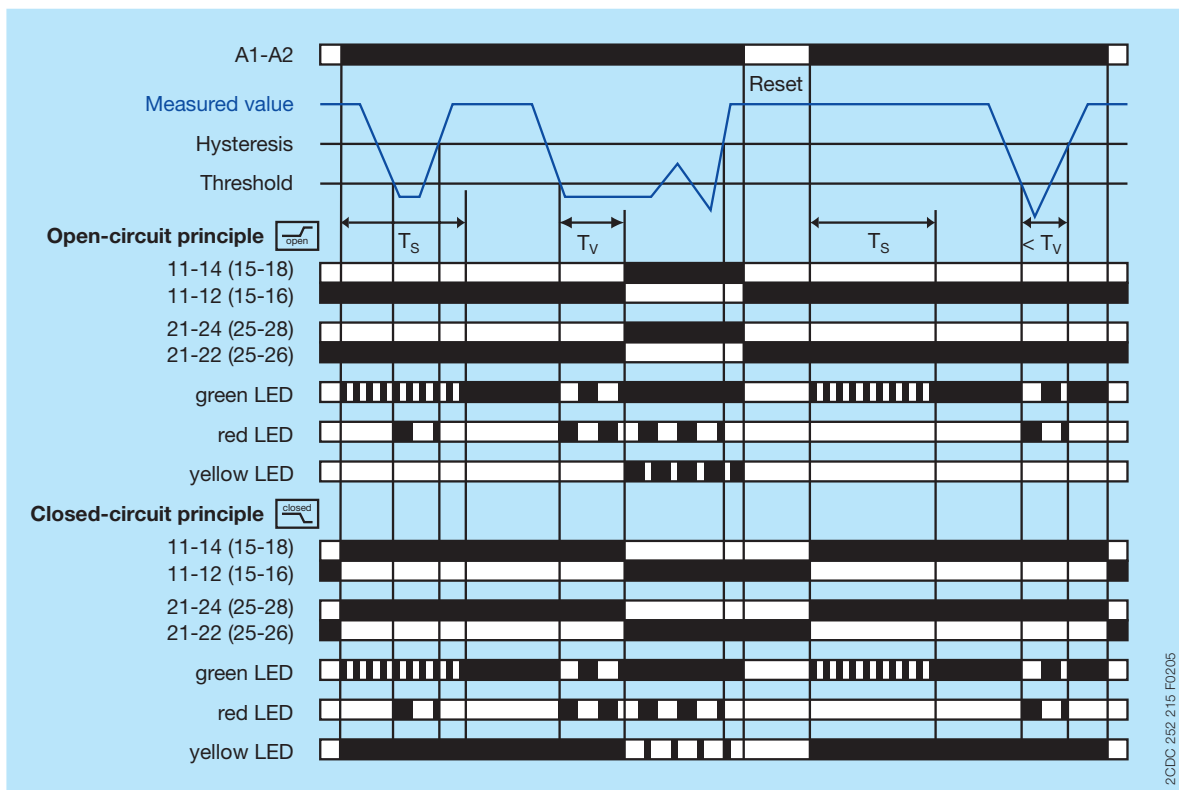
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Closed-circuit principle 

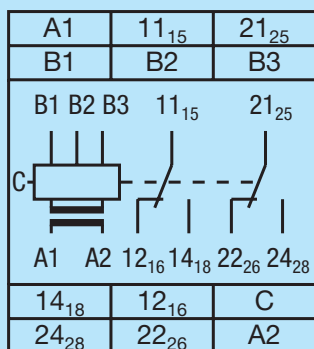
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Electrical connection

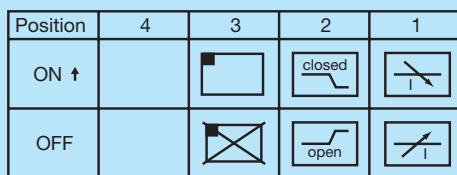


2CDC 252 205 F0005

- A1-A2 Rated control supply voltage
- B1-C Measuring range 1: CM-SRS.M1: 3-30 mA
CM-SRS.M2: 0.3-1.5 A
- B2-C Measuring range 2: CM-SRS.M1: 10-100 mA
CM-SRS.M2: 1-5 A
- B3-C Measuring range 3: CM-SRS.M1: 0.1-1 A
CM-SRS.M2: 3-15 A
- 11₁₅-12₁₆/14₁₈ Output contacts – open- or closed-circuit principle
- 21₂₅-22₂₆/24₂₈

Connection diagram

DIP switches



2CDC 252 273 F0005

- 1 ON Undercurrent monitoring
- OFF Overcurrent monitoring
- 2 ON Closed-circuit principle
- OFF Open-circuit principle
- 3 ON Latching function activated
- OFF Latching function not activated
- OFF = Default

Technical data

Data at $T_a = 25\text{ °C}$ and rated values, unless otherwise indicated

Input circuits









| Supply circuit | A1-A2 |
|--|---|
| Rated control supply voltage U_s | 24-240 V AC/DC |
| Rated control supply voltage U_s tolerance | -15...+10 % |
| Rated frequency | 50/60 Hz or DC |
| Typical current / power consumption | 24 V DC: 30 mA / 0.75 W 115 V AC: 17 mA / 1.9 VA 230 V AC: 11 mA / 2.6 VA |
| Power failure buffering time | 20 ms |
| Transient overvoltage protection | varistors |

| Measuring circuit | B1/B2/B3-C | | | | | | |
|--|---|---|------------|--------------|---------------|---------------|----------------------|
| Monitoring function | over- or undercurrent monitoring configurable | | | | | | |
| Measuring method | TRMS measuring principle | | | | | | |
| Measuring inputs | CM-SRS.M1 | | | CM-SRS.M2 | | | |
| | terminal connection | B1-C | B2-C | B3-C | B1-C | B2-C | B3-C |
| | measuring range | 3-30 mA | 10-100 mA | 0.1-1 A | 0.3-1.5 A | 1-5 A | 3-15 A ¹⁾ |
| | input resistance | 3.3 Ω | 1 Ω | 0.1 Ω | 0.05 Ω | 0.01 Ω | 0.0025 Ω |
| | pulse overload capacity $t < 1\text{ s}$ | 500 mA | 1 A | 10 A | 1 A | 50 A | 100 A |
| | continuous capacity | 50 mA | 150 mA | 1.5 A | 2 A | 7 A | 17 A |
| | Threshold value | adjustable within the indicated measuring range | | | | | |
| Tolerance of the adjusted threshold value | 10 % of the range end value | | | | | | |
| Hysteresis related to the threshold value | 3-30 % adjustable | | | | | | |
| Measuring signal frequency range | DC / 15 Hz - 2 kHz | | | | | | |
| Rated measuring signal frequency range | DC / 50-60 Hz | | | | | | |
| Maximum response time | AC | 80 ms | | | | | |
| | DC | 120 ms | | | | | |
| Accuracy within the rated control supply voltage tolerance | $\Delta U \leq 0.5\%$ | | | | | | |
| Accuracy within the temperature range | $\Delta U \leq 0.06\% / \text{°C}$ | | | | | | |

¹⁾ In case of measured currents $> 10\text{ A}$, lateral spacing has to be min. 10 mm

| Timing circuit | |
|--|------------------------------------|
| Start-up time T_s | 0 s or 0.1-30 s adjustable |
| Time delay T_v | 0 s or 0.1-30 s adjustable |
| Repeat accuracy (constant parameters) | $\pm 0.07\%$ of full scale |
| Tolerance of the adjusted time delay | - |
| Accuracy within the rated control supply voltage tolerance | $\Delta t \leq 0.5\%$ |
| Accuracy within temperature range | $\Delta t \leq 0.06\% / \text{°C}$ |

User interface

| Indication of operational states | | |
|----------------------------------|----------------|--|
| Control supply voltage | U/T: green LED |  : control supply voltage applied  : start-up delay T_s active  : tripping delay T_v active |
| Measured value | U: red LED |  : overcurrent  : undercurrent |
| Relay status | R: yellow LED |  : output relay energized, no latching function  : output relay energized, active latching function  : output relay de-energized, active latching function |

Output circuits

| | | |
|--|--|--|
| Kind of output | 11 ₁₅ -12 ₁₆ /14 ₁₈ | relay, 1st c/o (SPDT) contact |
| | 21 ₂₅ -22 ₂₆ /24 ₂₈ | relay, 2nd c/o (SPDT) contact |
| Operating principle | | open- or closed-circuit principle configurable (open-circuit principle: output relays energize if the measured value exceeds \square / falls below \square the adjusted threshold value, closed-circuit principle: output relays de-energize if measured value exceeds \square / falls below \square the adjusted threshold value) |
| Contact material | | AgNi |
| Rated operational voltage U_o (VDE 0110, IEC/EN 60947-1) | | 250 V |
| Minimum switching voltage / Minimum switching current | | 24 V / 10 mA |
| Maximum switching voltage / Maximum switching current | | 250 V AC / 4 A AC |
| Rated operational current I_e (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 (inductive) at 24 V | 2 A |
| AC rating (UL 508) | utilization category (Control Circuit Rating Code) | B 300 |
| | max. rated operational voltage | 300 V AC |
| | max. continuous thermal current at B 300 | 5 A |
| | max. making/breaking apparent power at B 300 | 3600/360 VA |
| Mechanical lifetime | | 30 x 10 ⁶ switching cycles |
| Electrical lifetime | AC12, 230 V, 4 A | 0.1 x 10 ⁶ switching cycles |
| Maximum fuse rating to achieve short-circuit protection | n/c contact | 10 A fast-acting |
| | n/o contact | 10 A fast-acting |

General data

| | | | | |
|---------------------------------|----------------------|---|--|---------------------|
| MTBF | | on request | | |
| Duty time | | 100 % | | |
| Dimensions (W x H x D) | product dimensions | 22.5 x 85.6 x 103.7 mm (0.89 x 3.37 x 4.08 in) | | |
| | packaging dimensions | 97 x 109 x 30 mm (3.82 x 4.29 x 1.18 in) | | |
| Weight | | Screw connection technology | Easy Connect Technology (Push-in) | |
| | net weight | CM-SRS.M1 | 0.153 kg (0.337 lb) | 0.142 kg (0.313 lb) |
| | | CM-SRS.M2 | 0.155 kg (0.342 lb) | - |
| | gross weight | CM-SRS.M1 | 0.175 kg (0.386 lb) | 0.164 kg (0.362 lb) |
| CM-SRS.M2 | | 0.177 kg (0.390 lb) | - | |
| Mounting | | DIN rail (IEC/EN 60715), snap-on mounting without any tool | | |
| Mounting position | | any | | |
| Minimum distance to other units | | 10 mm (0.39 in) at measured current > 10 A | | |
| Material of housing | | UL 94 V-0 | | |
| Degree of protection | housing | IP50 | | |
| | terminals | IP20 | | |

Electrical connection

| | | Screw connection technology | Easy Connect Technology (Push-in) |
|-------------------|--|--|--|
| Wire size | fine-strand with(out) wire end ferrule | 1 x 0.5-2.5 mm ² (1 x 20-14 AWG) 2 x 0.5-1.5 mm ² (2 x 20-16 AWG) | 2 x 0.5-1.5 mm ² (2 x 20-16 AWG) |
| | rigid | 1 x 0.5-4 mm ² (1 x 20-12 AWG) 2 x 0.5-2.5 mm ² (2 x 20-14 AWG) | 2 x 0.5-1.5 mm ² (2 x 20-16 AWG) |
| Stripping length | | 8 mm (0.32 in) | |
| Tightening torque | | 0.6 - 0.8 Nm (5.31 - 7.08 lb.in) | - |

Environmental data

| | | |
|---|-----------|----------------|
| Ambient temperature ranges | operation | -20...+60 °C |
| | storage | -40...+85 °C |
| Damp heat, cyclic (IEC 60068-2-30) | | 55 °C, 6 cycle |
| Vibration, sinusoidal (IEC/EN 60255-21-1) | | Class 2 |
| Shock (IEC/EN 60255-21-2) | | Class 2 |

Isolation data

| | | |
|--|-------------------------------------|----------------|
| Rated insulation voltage (VDE 0110, IEC/EN 60947-1, IEC/EN 60255-5) | supply / measuring circuit / output | 600 V |
| | supply / output 1 / output 2 | 250 V |
| Rated impulse withstand voltage U _{imp} (IEC/EN 60947-1, IEC/EN 60255-5) | supply / measuring circuit / output | 6 kV 1.2/50 μs |
| | supply / output 1 / output 2 | 4 kV 1.2/50 μs |
| Test voltage between all isolated circuits (type test) | rated insulation voltage 250 V | 2.0 kV, 50 Hz |
| | rated insulation voltage 600 V | 2.5 kV, 50 Hz |
| Pollution degree (VDE 0110, IEC/EN 60664, IEC/EN 60255-5) | | 3 |
| Overvoltage category (VDE 0110, IEC/EN 60664, IEC/EN 60255-5) | | III |

Standards

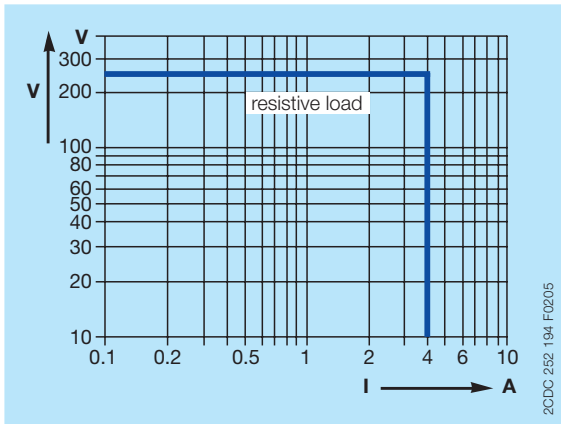
| | |
|-----------------------|----------------|
| Product standard | IEC/EN 60255-6 |
| Low Voltage Directive | 2006/95/EC |
| EMC Directive | 2004/108/EC |
| RoHS Directive | 2002/95/EC |

Electromagnetic compatibility

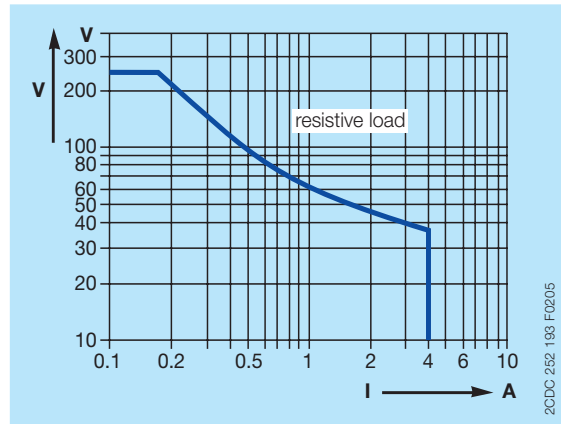
| | | |
|---|------------------------|------------------|
| Interference immunity to | | IEC/EN 61000-6-2 |
| electrostatic discharge | IEC/EN 61000-4-2 | Level 3 |
| radiated, radio-frequency, electromagnetic field | IEC/EN 61000-4-3 | Level 3 |
| electrical fast transient / burst | IEC/EN 61000-4-4 | Level 3 |
| surge | IEC/EN 61000-4-5 | Level 3 |
| conducted disturbances, induced by radio-frequency fields | IEC/EN 61000-4-6 | Level 3 |
| Interference emission | | IEC/EN 61000-6-3 |
| high-frequency radiated | IEC/CISPR 22, EN 55022 | Class B |
| high-frequency conducted | IEC/CISPR 22, EN 55022 | Class B |

Technical diagrams

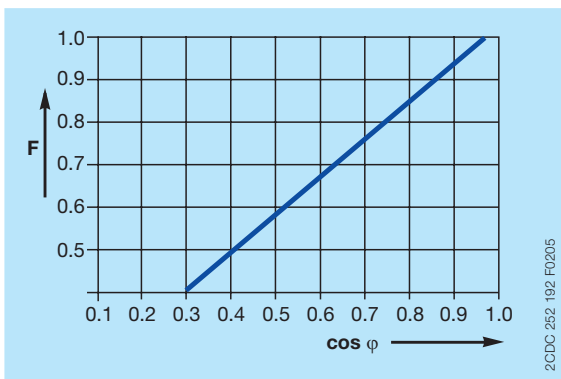
Load limit curves



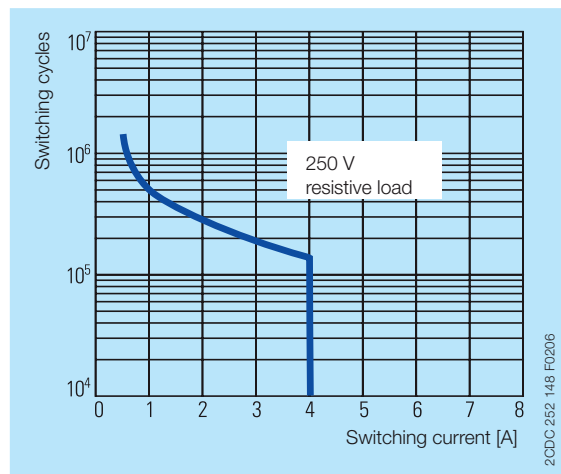
AC load (resistive)



DC load (resistive)



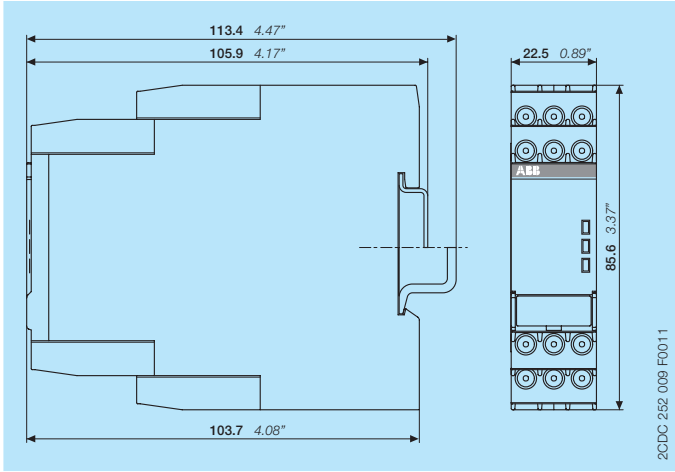
Derating factor F for inductive AC load



Contact lifetime

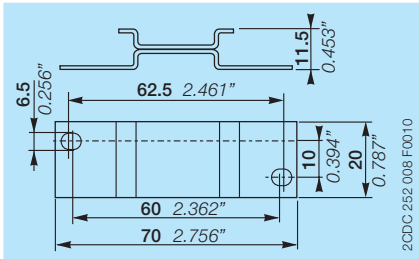
Dimensions

in **mm** and *inches*

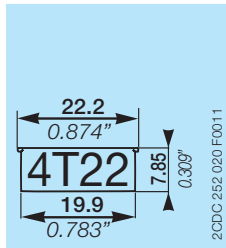


Accessories

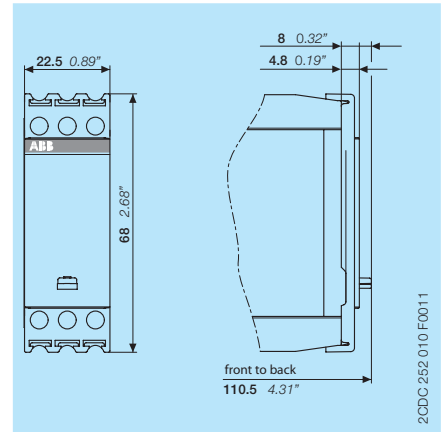
in **mm** and *inches*



ADP.01 - Adapter for screw mounting



MAR.12 - Marker label for devices with DIP switches



COV.11 - Sealable transparent cover

Further documentation

| Document title | Document type | Document number |
|--------------------------------|---------------------|--------------------|
| Electronic products and relays | Technical catalogue | 2CDC 110 004 C020x |
| CM-SRS.M | Instruction manual | 1SVC 730 620 M0000 |

You can find the documentation on the internet at www.abb.com/lowvoltage -> Control Products -> Electronic Relays and Controls -> Single Phase Monitors

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