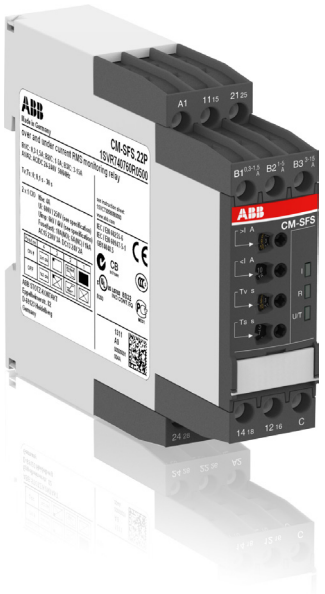
Data sheet

Current monitoring relay CM-SFS.2
For single-phase AC/DC currents

The CM-SFS.2 is an electronic current monitoring relay that monitors single-phase mains (DC or AC) for 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 connecting terminals) and the completely tool-free Easy Connect Technology (push-in terminals).



2CDC 251 056 V0011

Characteristics

- Monitoring of DC and AC currents (3 mA to 15 A)
- TRMS measuring principle
- One device includes 3 measuring ranges
- Over- and undercurrent monitoring
- ON- or OFF-delay configurable
- Open- or closed-circuit principle configurable
- Latching function configurable
- Threshold values for >I and <I adjustable
- Fixed hysteresis (5 %)
- Start-up delay T_S adjustable (0 s; 0.1-30 s)
- Tripping delay T_V adjustable (0 s; 0.1-30 s)
- 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
- 1x2 c/o (SPDT) contacts (common signal) or 2x1 c/o (SPDT) contact (separate signals for >I and <I) configurable
- 22.5 mm (0.89 in) width
- 3 LEDs for status indication

Approvals

UL 508, CAN/CSA C22.2 No.14
GL
EAC
CCC
RMRS

Marks

CE
RCM

Power and productivity for a better world™

Order data

Current monitoring relays

Type	Rated control supply voltage	Connection technology	Measuring ranges	Order code
CM-SFS.21P	24-240 V AC/DC	Push-in terminals	3-30 mA, 10-100 mA, 0.1-1 A	1SVR740760R0400
CM-SFS.21S		Screw type terminals		1SVR730760R0400
CM-SFS.22S			0.3-1.5 A, 1-5 A, 3-15 A	1SVR730760R0500

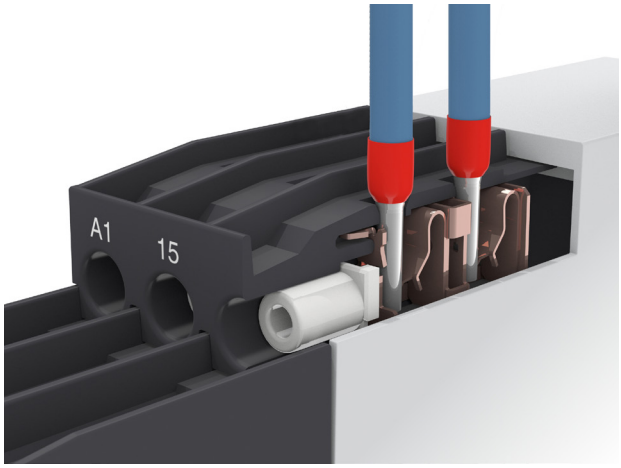
Accessories

Type	Description	Order code
ADP.01	Adapter for screw mounting	1SVR430029R0100
MAR.12	Marker label for devices with DIP switches	1SVR730006R0000
COV.11	Sealable transparent cover	1SVR730005R0100

Connection technology

Maintenance free Easy Connect Technology with push-in terminals

Type designation CM-xxS.yyP



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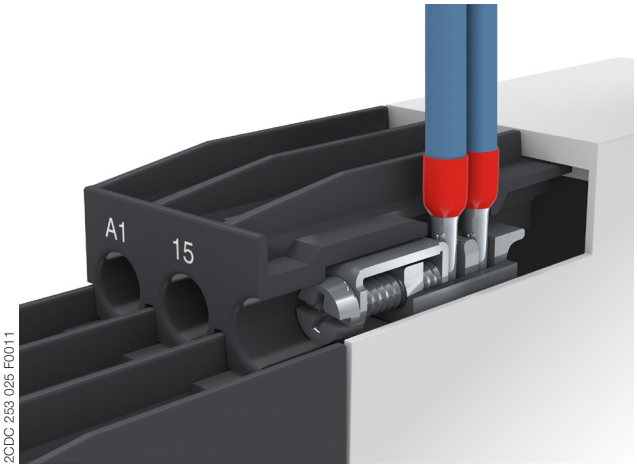
Push-in terminals

Push-in terminals

- Tool-free connection of rigid and flexible wires with wire end ferrule
- Easy connection of flexible wires without wire end ferrule by opening the terminals
- No retightening necessary
- One operation lever for opening both connecting 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 ø 4.5 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 connecting terminals

Type designation CM-xxS.yyS



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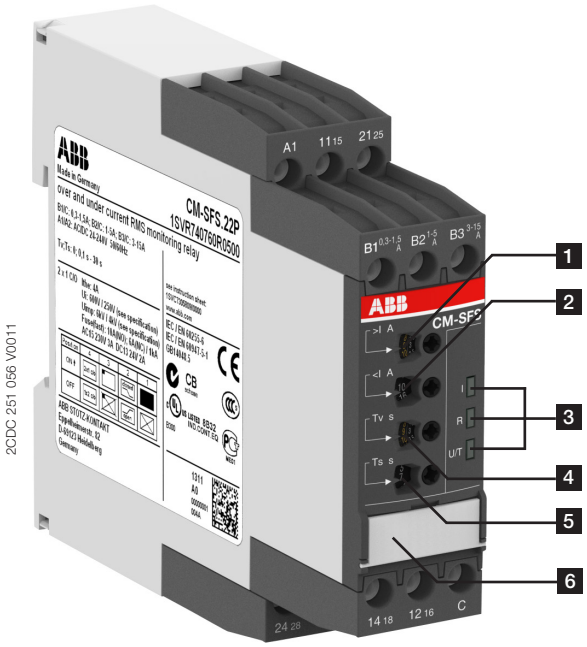
Double-chamber cage connecting terminals

- Terminal spaces for different wire sizes
- 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 ø 4.5 mm (0.177 in)

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

Functions

Operating controls



1 **Adjustment of the threshold value >I for overcurrent**

2 **Adjustment of the threshold value <I for undercurrent**

3 **Indication of operational states**

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

R: yellow LED – relay status

I: 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 current monitoring relays CM-SFS.2 are designed for use in single-phase AC and/or DC systems for the simultaneous monitoring of over- and undercurrents. Depending on the configuration, one c/o (SPDT) contact each or both c/o (SPDT) contacts in parallel can be used for the over- and 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-SFS.2 with 2 c/o (SPDT) contacts is available in 2 versions with 3 measuring ranges: 3-30 mA, 10-100 mA, 0.1-1 A (CM-SFS.21) and 0.3-1.5 A, 1-5 A, 3-15 A (CM-SFS.22). 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: ON-delay ⊠ or OFF-delay ■, open- or closed-circuit principle, latching function ON or OFF ⊠ and 2x1 c/o or 1x2 c/o (SPDT) contacts is made with DIP switches. Potentiometers, with direct reading scale, allow the adjustment of the threshold $value_{max}$ (>I) for overcurrent, the threshold $value_{min}$ (<I) for undercurrent, the tripping delay T_V and the start-up delay T_S. The tripping delay T_V and the start-up delay T_S are adjustable over a range of instantaneous to a 30 s delay. The hysteresis is fixed at 5 %. Timing is displayed by a flashing green LED labelled U/T.

Function diagrams

Current window monitoring 1x2 c/o (SPDT) contacts 1x2 c/o ON-delayed without latching

Open-circuit principle open

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 during the start-up delay T_S and then turns steady. During the start-up delay T_S under- or overcurrent is only displayed by glowing (overcurrent) or flashing (undercurrent) of the red LED.

If the measured value exceeds the threshold $value_{max}$ (>I) or drops below the threshold $value_{min}$ (<I) when T_S is complete, the tripping delay T_V starts and the red LED glows, or flashes respectively. Timing of T_V is displayed by the flashing green LED.

When T_V is complete and the measured value still exceeds the threshold $value_{max}$ minus the fixed hysteresis (5 %) or is still below the threshold $value_{min}$ plus the fixed hysteresis (5 %), the output relays energize and the yellow LED (relay energized) glows.

If the measured value decreases below the threshold $value_{max}$ minus the fixed hysteresis (5 %) or exceeds the threshold $value_{min}$ plus the fixed hysteresis (5 %), 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 closed

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 output relays energize and the yellow LED (relays energized) glows. The green LED flashes during the start-up delay T_S and then turns steady. During the start-up delay T_S under- or overcurrent is only displayed by glowing (overcurrent) or flashing (undercurrent) of the red LED.

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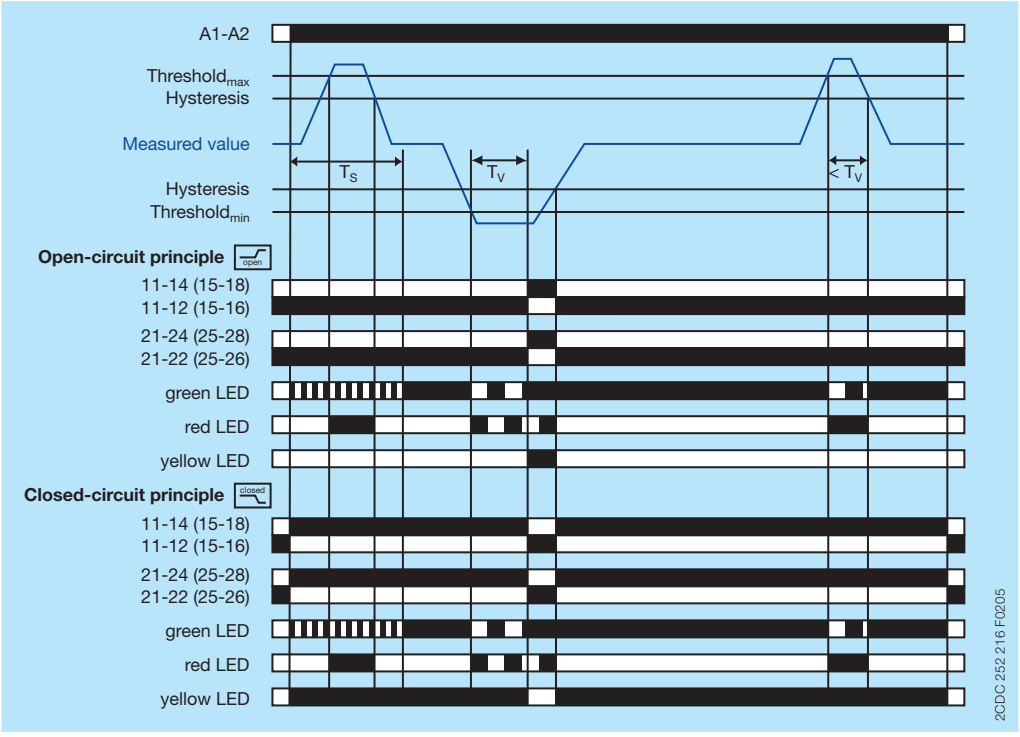
If the measured value decreases below the threshold $value_{max}$ minus the fixed hysteresis (5 %) or exceeds the threshold $value_{min}$ plus the fixed hysteresis (5 %), the output relays re-energize, the yellow LED glows and the red LED turns off.

If control supply voltage is interrupted, the output relays de-energize and the yellow and green LEDs turn off.



Current window monitoring 1x2 c/o (SPDT) contacts OFF-delayed 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 during the start-up delay T_S and then turns steady. During the start-up delay T_S under- or overcurrent is only displayed by glowing (overcurrent) or flashing (undercurrent) of the red LED.

If the measured value exceeds the threshold $value_{max}$ (>I) or drops below the threshold $value_{min}$ (<I) when T_S is complete, the output relays energize, the yellow LED (relays energized) glows and the red LED glows (overcurrent), or flashes (undercurrent) respectively.

If the measured value decreases below the threshold $value_{max}$ minus the fixed hysteresis (5 %) or exceeds the threshold $value_{min}$ plus the fixed hysteresis (5 %), the tripping delay T_V starts and the red LED turns off.

Timing of T_V is displayed by the flashing green LED. When T_V is complete, the output relays de-energize and the yellow LED (relay energized) turns off.

If control supply voltage is interrupted, the green LED turns off.

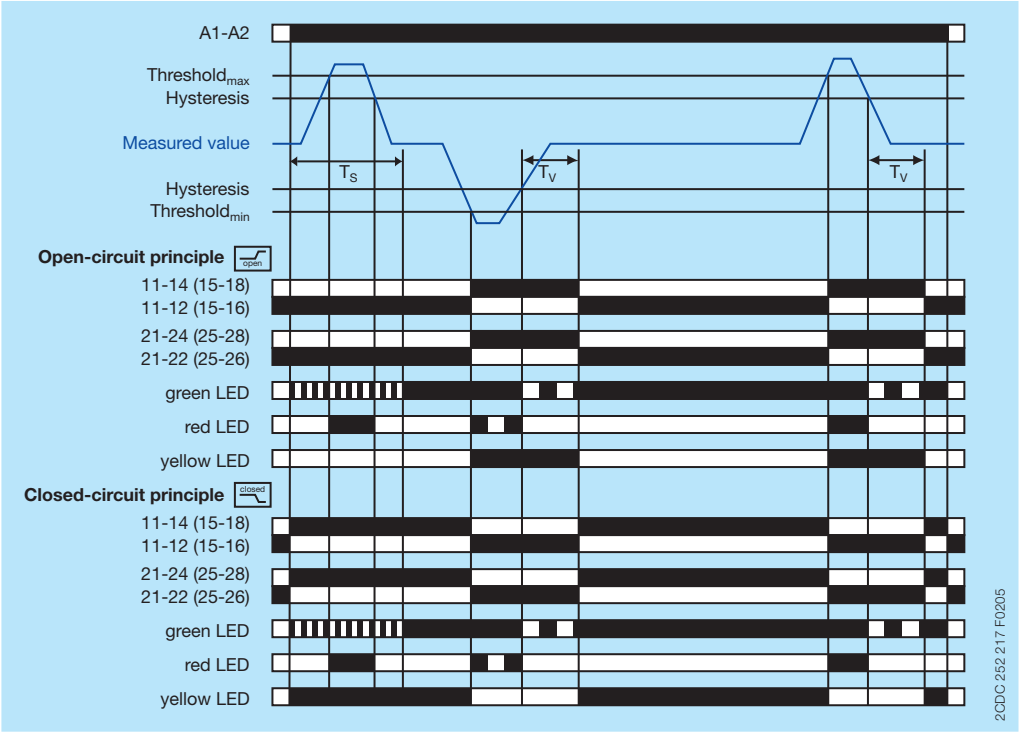
Closed-circuit principle

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 output relays energize and the yellow LED (relays energized) glows. The green LED flashes during the start-up delay T_S and then turns steady. During the start-up delay T_S under- or overcurrent is only displayed by glowing (overcurrent) or flashing (undercurrent) of the red LED.

If the measured value exceeds the threshold $value_{max}$ (>I) or drops below the threshold $value_{min}$ (<I) when T_S is complete, the output relays de-energize, the yellow LED turns off and the red LED glows (overcurrent), or flashes (undercurrent) respectively.

If the measured value decreases below the threshold $value_{max}$ minus the fixed hysteresis (5 %) or exceeds the threshold $value_{min}$ plus the fixed hysteresis (5 %), the tripping delay T_V starts and the red LED turns off. Timing of T_V is displayed by the flashing green LED. When T_V is complete, the output relays energize and the yellow LED (relay energized) glows.

If control supply voltage is interrupted, the output relays de-energize and the yellow and green LEDs turn off.



Current window monitoring 1x2 c/o (SPDT) contacts ON-delayed with 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 during the start-up delay T_S and then turns steady. During the start-up delay T_S under- or overcurrent is only displayed by glowing (overcurrent) or flashing (undercurrent) of the red LED.

If the measured value exceeds the threshold $value_{max}$ (>I) or drops below the threshold $value_{min}$ (<I) when T_S is complete, the tripping delay T_V starts and the red LED glows, or flashes respectively. Timing of T_V is displayed by the flashing green LED.

When T_V is complete and the measured value still exceeds the threshold $value_{max}$ minus the fixed hysteresis (5 %) or is still below the threshold $value_{min}$ plus the fixed hysteresis (5 %), the output relays energize and the yellow LED (relay energized) flashes.

If the measured value decreases below the threshold $value_{max}$ minus the fixed hysteresis (5 %) or exceeds the threshold $value_{min}$ plus the fixed hysteresis (5 %), the red LED turns off. The output relays remain energized (latching function).

If control supply voltage is interrupted (reset), the output relays de-energize and the yellow and green LEDs turn off.

Closed-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 output relays energize and the yellow LED (relays energized) glows. The green LED flashes during the start-up delay T_S and then turns steady. During the start-up delay T_S under- or overcurrent is only displayed by glowing (overcurrent) or flashing (undercurrent) of the red LED.

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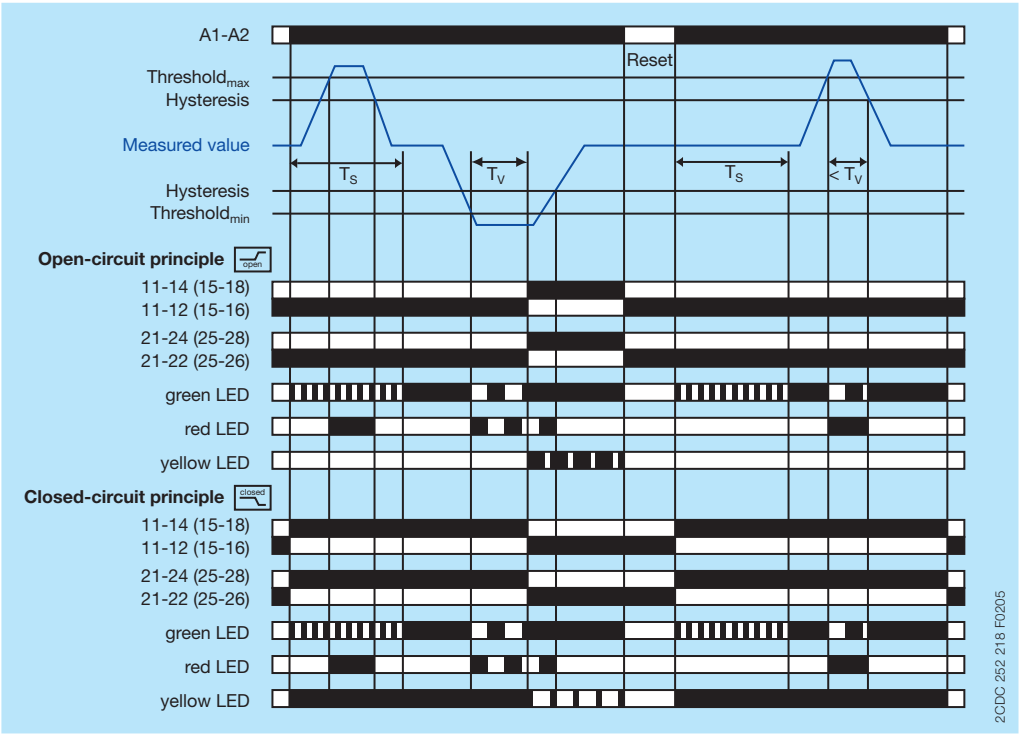
If the measured value decreases below the threshold $value_{max}$ minus the fixed hysteresis (5 %) or exceeds the threshold $value_{min}$ plus the fixed hysteresis (5 %), the red LED turns off. The output relays remain de-energized (latching function).

If control supply voltage is interrupted (reset), the yellow and green LEDs turn off. The output relays energize again when control supply voltage is re-applied.



Current window monitoring 1x2 c/o (SPDT) contacts OFF-delayed with 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 during the start-up delay T_S and then turns steady. During the start-up delay T_S under- or overcurrent is only displayed by glowing (overcurrent) or flashing (undercurrent) of the red LED.

If the measured value exceeds the threshold $value_{max}$ (>I) or drops below the threshold $value_{min}$ (<I) when T_S is complete, the output relays energize, the yellow LED (relays energized) flashes and the red LED glows (overcurrent), or flashes (undercurrent) respectively.

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Closed-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 output relays energize and the yellow LED (relays energized) glows. The green LED flashes during the start-up delay T_S and then turns steady. During the start-up delay T_S under- or overcurrent is only displayed by glowing (overcurrent) or flashing (undercurrent) of the red LED.

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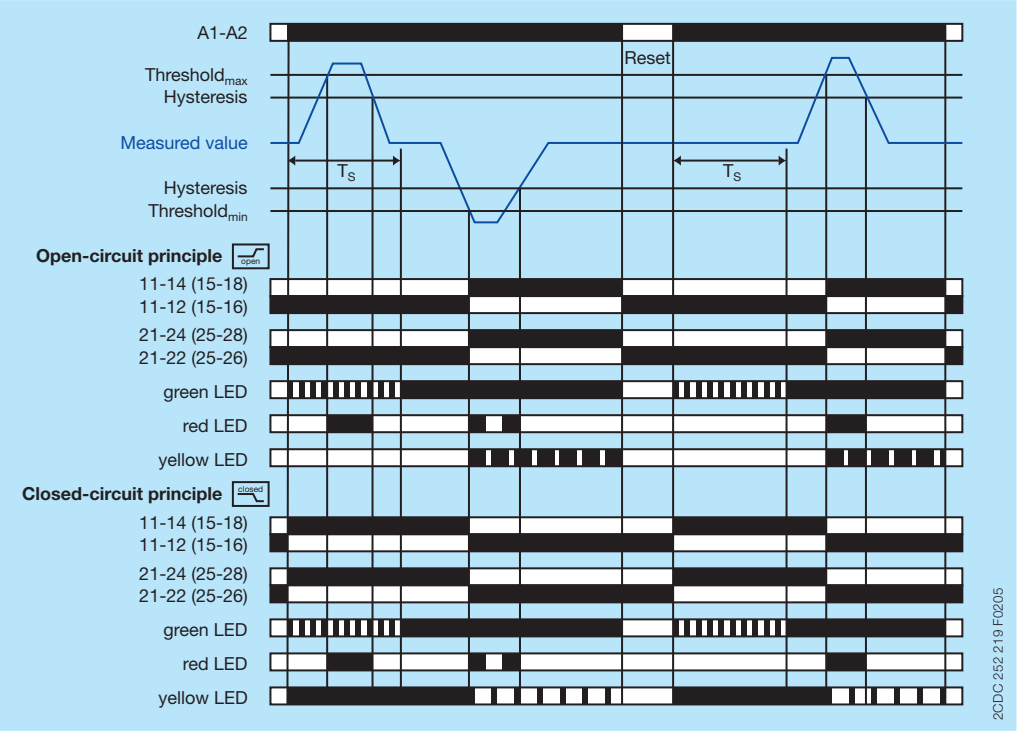
If control supply voltage is interrupted (reset), the yellow and green LEDs turn off. The output relays energize again when control supply voltage is re-applied.



Current window monitoring 2x1 c/o (SPDT) contact 2x1 c/o ON-delayed without latching

Open-circuit principle open

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 during the start-up delay T_S and then turns steady. During the start-up delay T_S under- or overcurrent is only displayed by glowing (overcurrent) or flashing (undercurrent) of the red LED.

If the measured value exceeds the threshold $value_{max}$ (>I) or drops below the threshold $value_{min}$ (<I) when T_S is complete, the tripping delay T_V starts and the red LED glows (overcurrent), or flashes (undercurrent) respectively. Timing of T_V is displayed by the flashing green LED.

When T_V is complete and the measured value still exceeds the threshold $value_{max}$ minus the fixed hysteresis (5 %) or is still below the threshold $value_{min}$ plus the fixed hysteresis (5 %), the output relay 11_{15}-12_{16}/14_{18} (>I), or 21_{25}-22_{26}/24_{28} (<I) respectively, energizes and the yellow LED (relay energized) glows.

If the measured value decreases below the threshold $value_{max}$ minus the fixed hysteresis (5 %) or exceeds the threshold $value_{min}$ plus the fixed hysteresis (5 %), the output relay 11_{15}-12_{16}/14_{18} (>I), or 21_{25}-22_{26}/24_{28} (<I) respectively, de-energizes and the red and yellow LEDs turn off.

If control supply voltage is interrupted, the green LED turns off.

Closed-circuit principle closed

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 output relays energize and the yellow LED (relays energized) glows. The green LED flashes during the start-up delay T_S and then turns steady. During the start-up delay T_S under- or overcurrent is only displayed by glowing (overcurrent) or flashing (undercurrent) of the red LED.

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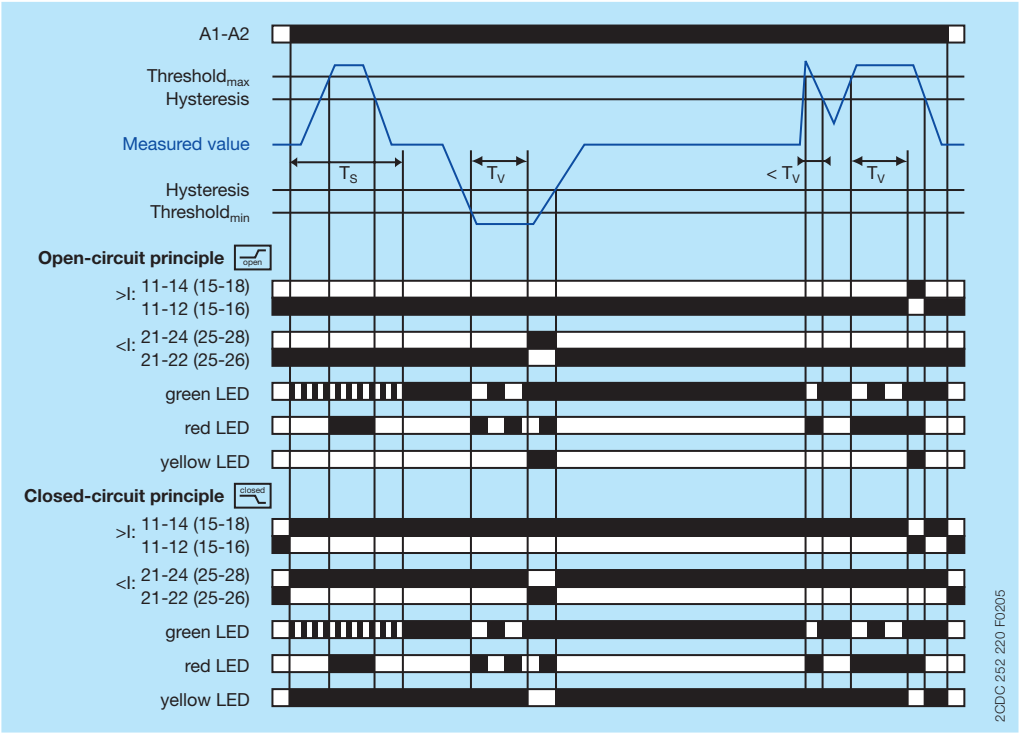
If control supply voltage is interrupted, the output relays de-energize and the yellow and green LEDs turn off.



Current window monitoring 2x1 c/o (SPDT) contact OFF-delayed 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 during the start-up delay T_S and then turns steady. During the start-up delay T_S under- or overcurrent is only displayed by glowing (overcurrent) or flashing (undercurrent) of the red LED.

If the measured value exceeds the threshold $value_{max}$ (>I) or drops below the threshold $value_{min}$ (<I) when T_S is complete, the output relay 11_{15}-12_{16}/14_{18} (>I), or 21_{25}-22_{26}/24_{28} (<I) respectively, energizes, the yellow LED (relays energized) glows and the red LED glows (overcurrent), or flashes (undercurrent) respectively.

If the measured value decreases below the threshold $value_{max}$ minus the fixed hysteresis (5 %) or exceeds the threshold $value_{min}$ plus the fixed hysteresis (5 %), the tripping delay T_V starts and the red LED turns off. Timing of T_V is displayed by the flashing green LED. When T_V is complete, the output relay 11_{15}-12_{16}/14_{18} (>I), or 21_{25}-22_{26}/24_{28} (<I) respectively, de-energizes and the yellow LED (relay energized) turns off.

If control supply voltage is interrupted, the green LED turns off.

Closed-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 output relays energize and the yellow LED (relays energized) glows. The green LED flashes during the start-up delay T_S and then turns steady. During the start-up delay T_S under- or overcurrent is only displayed by glowing (overcurrent) or flashing (undercurrent) of the red LED.

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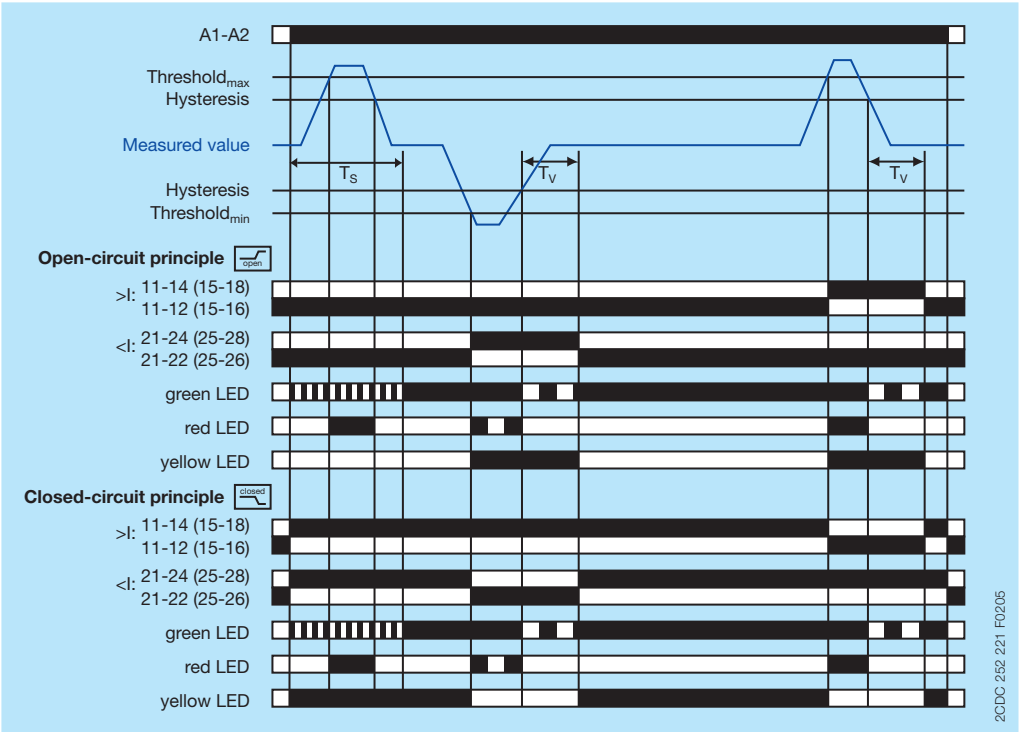
If the measured value decreases below the threshold $value_{max}$ minus the fixed hysteresis (5 %) or exceeds the threshold $value_{min}$ plus the fixed hysteresis (5 %), the tripping delay T_V starts and the red LED turns off. Timing of T_V is displayed by the flashing green LED. When T_V is complete, the output relay 11_{15}-12_{16}/14_{18} (>I), or 21_{25}-22_{26}/24_{28} (<I) respectively, energizes and the yellow LED (relay energized) glows.

If control supply voltage is interrupted, the output relays de-energize and the yellow and green LEDs turn off.



Current window monitoring 2x1 c/o (SPDT) contact 2x1 c/o ON-delayed with 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 during the start-up delay T_S and then turns steady. During the start-up delay T_S under- or overcurrent is only displayed by glowing (overcurrent) or flashing (undercurrent) of the red LED.

If the measured value exceeds the threshold $value_{max}$ (>I) or drops below the threshold $value_{min}$ (<I) when T_S is complete, the tripping delay T_V starts and the red LED glows, or flashes respectively. Timing of T_V is displayed by the flashing green LED.

When T_V is complete and the measured value still exceeds the threshold $value_{max}$ minus the fixed hysteresis (5 %) or is still below the threshold $value_{min}$ plus the fixed hysteresis (5 %), the output relay 11_{15}-12_{16}/14_{18} (>I), or 21_{25}-22_{26}/24_{28} (<I) respectively, energizes and the yellow LED (relay energized) flashes.

If the measured value decreases below the threshold $value_{max}$ minus the fixed hysteresis (5 %) or exceeds the threshold $value_{min}$ plus the fixed hysteresis (5 %), the red LED turns off. The output relay 11_{15}-12_{16}/14_{18} (>I), or 21_{25}-22_{26}/24_{28} (<I) respectively, remains energized (latching function).

If control supply voltage is interrupted (reset), the output relay 11_{15}-12_{16}/14_{18} (>I), or 21_{25}-22_{26}/24_{28} (<I) respectively, de-energizes and the yellow and green LEDs turn off.

Closed-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 output relays energize and the yellow LED (relays energized) glows. The green LED flashes during the start-up delay T_S and then turns steady. During the start-up delay T_S under- or overcurrent is only displayed by glowing (overcurrent) or flashing (undercurrent) of the red LED.

If the measured value exceeds the threshold $value_{max}$ (>I) or drops below the threshold $value_{min}$ (<I) when T_S is complete, the tripping delay T_V starts and the red LED glows, or flashes respectively. Timing of T_V is displayed by the flashing green LED.

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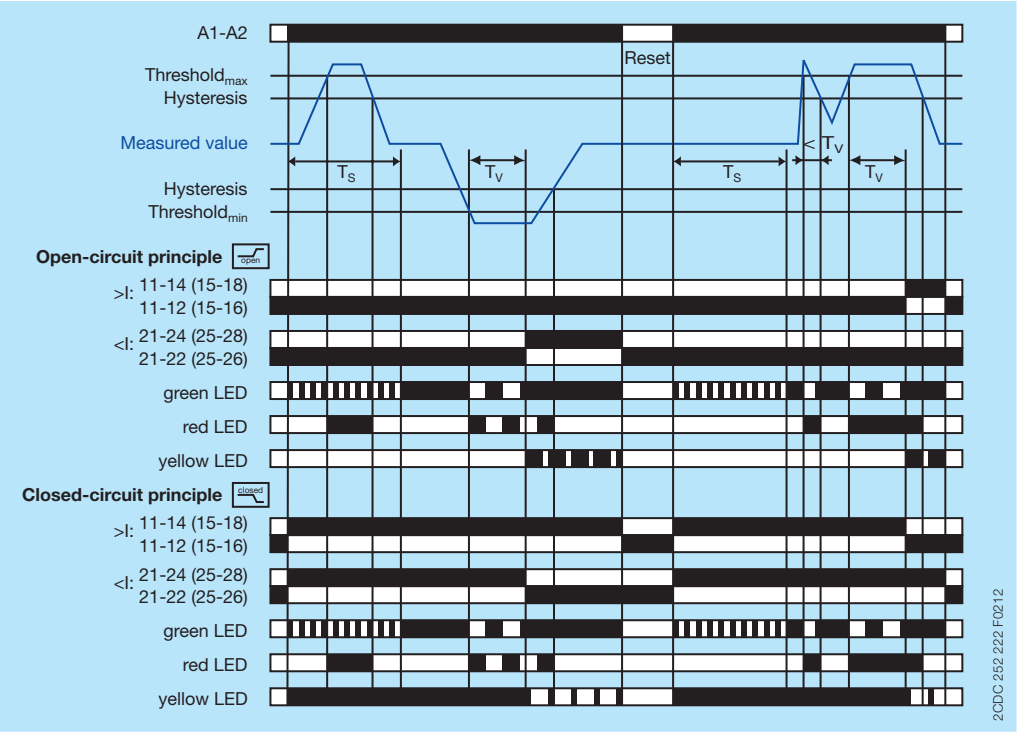
If the measured value decreases below the threshold $value_{max}$ minus the fixed hysteresis (5 %) or exceeds the threshold $value_{min}$ plus the fixed hysteresis (5 %), the red LED turns off. The output relay 11_{15}-12_{16}/14_{18} (>I), or 21_{25}-22_{26}/24_{28} (<I) respectively, remains de-energized (latching function).

If control supply voltage is interrupted (reset), the yellow and green LEDs turn off. The output relays energize again when control supply voltage is re-applied.



Current window monitoring 2x1 c/o (SPDT) contact OFF-delayed with 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 during the start-up delay T_S and then turns steady. During the start-up delay T_S under- or overcurrent is only displayed by glowing (overcurrent) or flashing (undercurrent) of the red LED.

If the measured value exceeds the threshold $value_{max}$ (>I) or drops below the threshold $value_{min}$ (<I) when T_S is complete, the output relay 11_{15}-12_{16}/14_{18} (>I), or 21_{25}-22_{26}/24_{28} (<I) respectively, energizes, the yellow LED (relays energized) flashes and the red LED glows (overcurrent), or flashes (undercurrent) respectively.

If the measured value decreases below the threshold $value_{max}$ minus the fixed hysteresis (5 %) or exceeds the threshold $value_{min}$ plus the fixed hysteresis (5 %), the red LED turns off. The output relay 11_{15}-12_{16}/14_{18} (>I), or 21_{25}-22_{26}/24_{28} (<I) respectively, remains energized (latching function).

If control supply voltage is interrupted (reset), the output relays de-energize and the yellow and green LEDs turn off.

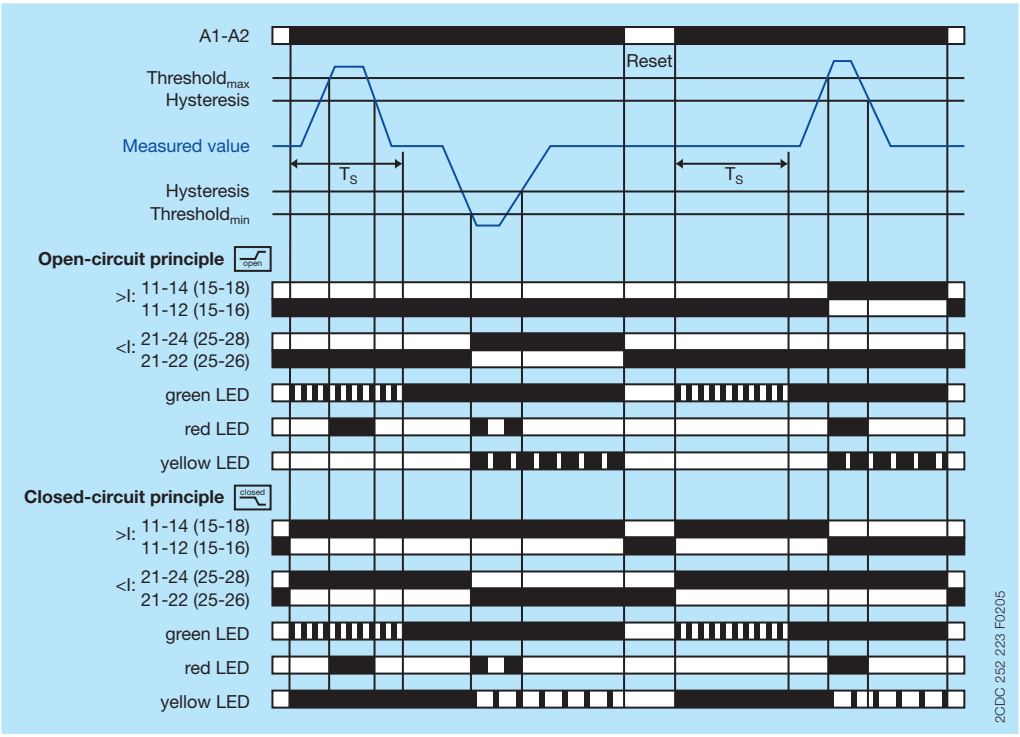
Closed-circuit principle

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 output relays energize and the yellow LED (relays energized) glows. The green LED flashes during the start-up delay T_S and then turns steady. During the start-up delay T_S under- or overcurrent is only displayed by glowing (overcurrent) or flashing (undercurrent) of the red LED.

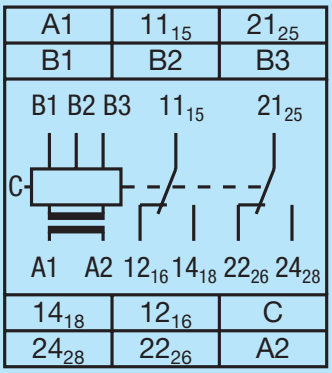
If the measured value exceeds the threshold $value_{max}$ (>I) or drops below the threshold $value_{min}$ (<I) when T_S is complete, the output relay 11_{15}-12_{16}/14_{18} (>I), or 21_{25}-22_{26}/24_{28} (<I) respectively, de-energizes, the yellow LED (relays energized) flashes and the red LED glows (overcurrent), or flashes (undercurrent) respectively.

If the measured value decreases below the threshold $value_{max}$ minus the fixed hysteresis (5 %) or exceeds the threshold $value_{min}$ plus the fixed hysteresis (5 %), the red LED turns off. The output relay 11_{15}-12_{16}/14_{18} (>I), or 21_{25}-22_{26}/24_{28} (<I) respectively, remains de-energized (latching function).

If control supply voltage is interrupted (reset), the yellow and green LEDs turn off. The output relays energize again when control supply voltage is re-applied.



Electrical connection

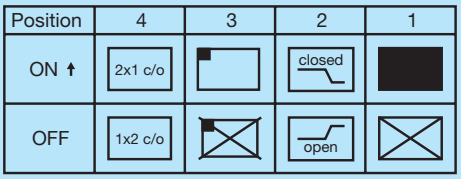


2CDC 252 205 F0005

A1-A2	Rated control supply voltage
B1-C	Measuring range 1: CM-SFS.21: 3-30 mA CM-SFS.22: 0.3-1.5 A
B2-C	Measuring range 2: CM-SFS.21: 10-100 mA CM-SFS.22: 1-5 A
B3-C	Measuring range 3: CM-SFS.21: 0.1-1 A CM-SFS.22: 3-15 A
11_{15}-12_{16}/14_{18} 21_{25}-22_{26}/24_{28}	Output contacts - open- or closed-circuit principle

Connection diagram

DIP switches



2CDC 252 274 F0005

1	ON	OFF-delay
	OFF	ON-delay
2	ON	Closed-circuit principle
	OFF	Open-circuit principle
3	ON	Latching function activated
	OFF	Latching function not activated
4	ON	2x1 c/o (SPDT) contact
	OFF	1x2 c/o (SPDT) contacts

OFF = Default

Technical data

Data at T_a = 25 °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- and undercurrent monitoring					
Measuring method		TRMS measuring principle					
Measuring inputs		CM-SFS.21			CM-SFS.22[1)]		
	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
	input resistance	3.3 Ω	1 Ω	0.1 Ω	0.05 Ω	0.01 Ω	0.0025 Ω
	pulse overload capacity t < 1 s	500 mA	1 A	10 A	15 A	50 A	100 A
	continuous capacity	50 mA	150 mA	1.5 A	2 A	7 A	17 A
Threshold value		>I and <I adjustable within the indicated measuring range					
Tolerance of the adjusted threshold value		10 % of the range end value					
Hysteresis related to the threshold value		5 % fixed					
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		ΔU ≤ 0.5 %					
Accuracy within the temperature range		ΔU ≤ 0.06 % / °C					

Timing circuit	
Start-up delay 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)	±0.07 % of full scale
Tolerance of the adjusted time delay	-
Accuracy within the rated control supply voltage tolerance	Δt ≤ 0.5 %
Accuracy within temperature range	Δt ≤ 0.06 % / °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	I: 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

[1)] For usage of the current monitoring relays according to UL, following limitations for the measuring circuits are applicable: The load on any single measuring circuit should not exceed 15 A at 51-150 V, 10 A at 151-300 V or 5 A at 301-600 V.
This limitation is only valid for application according to UL and not for IEC applications.

Output circuits

Kind of output	11-12/14	relay, 1st c/o (SPDT) contact
	21-22/24	relay, 2nd c/o (SPDT) contact
		1 x 2 c/o (SPDT) contacts (common signal) or
		2 x 1 c/o (SPDT) contact (separate signal for >I and <I)
		configurable
Operating principle		open- or closed-circuit principle configurable (open-circuit principle: output relays energize if the measured value exceeds ⧸ / falls below ⧹ the adjusted threshold value, closed-circuit principle: output relays de-energize if measured value exceeds ⧸ / falls below ⧹ the adjusted threshold value)
Contact material		AgNi
Rated operational voltage U_e		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	AC-12 (resistive) at 230 V	4 A
	AC-15 (inductive) at 230 V	3 A
	DC-12 (resistive) at 24 V	4 A
	DC-13 (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	AC-12, 230 V, 4 A	0.1 x 10^6 switching cycles
Maximum fuse rating to achieve short-circuit protection	n/c contact	6 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-SFS.21	0.150 kg (0.331 lb)	0.139 kg (0.306 lb)
		CM-SFS.22	0.158 kg (0.348 lb)	-
	gross weight	CM-SFS.21	0.173 kg (0.381 lb)	0.162 kg (0.371 lb)
		CM-SFS.22	0.180 kg (0.397 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)
Connecting capacity	fine-strand with(out) wire end ferrule	1 x 0.5-2.5 mm² (1 x 18-14 AWG) 2 x 0.5-1.5 mm² (2 x 18-16 AWG)	2 x 0.5-1.5 mm² (2 x 18-16 AWG)
	rigid	1 x 0.5-4 mm² (1 x 20-12 AWG) 2 x 0.5-2.5 mm² (2 x 20-14 AWG)	2 x 0.5-1.5 mm² (2 x 20-16 AWG)
Stripping length		8 mm (0.32 in)	
Tightening torque		0.6 - 0.8 Nm (7.08 lb.in)	-

Environmental data

Ambient temperature ranges	operation	-25...+60 °C (-13...+140 °F)
	storage	-40...+85 °C (-40...+185 °F)
Damp heat, cyclic (IEC/EN 60068-2-30)		55 °C, 6 cycles
Vibration, sinusoidal		Class 2
Shock		Class 2

Isolation data

Rated insulation voltage U_i	supply / measuring circuit / output	600 V
	output 1 / output 2	250 V
Rated impulse withstand voltage U_{imp}	supply / measuring circuit / output	6 kV 1.2/50 µs
	output 1 / output 2	4 kV 1.2/50 µs
Pollution degree		3
Overvoltage category		III

Standards / Directives

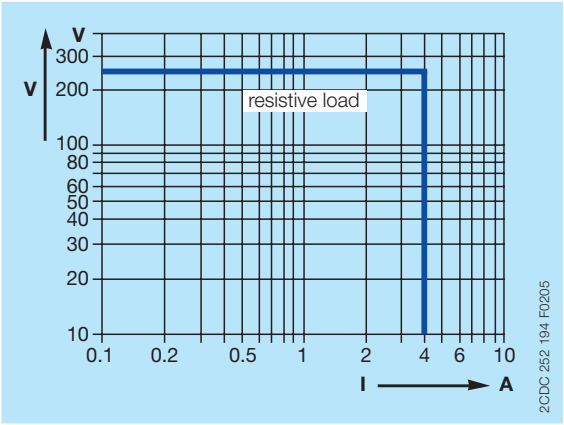
Standards	IEC/EN 60947-5-1, IEC/EN 60255-27, EN 50178
Low Voltage Directive	2014/35/EU
EMC Directive	2014/30/EU
RoHS Directive	2011/65/EU

Electromagnetic compatibility

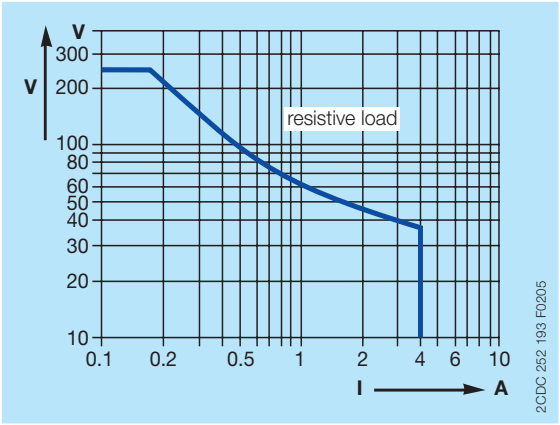
Interference immunity to		IEC/EN 61000-6-2
electrostatic discharge	IEC/EN 61000-4-2	Level 3
radiated, radio-frequency, electromagnetic field	IEC/EN 61000-4-3	Level 3
electrical fast transient / burst	IEC/EN 61000-4-4	Level 3
surge	IEC/EN 61000-4-5	Level 3
conducted disturbances, induced by radio-frequency 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

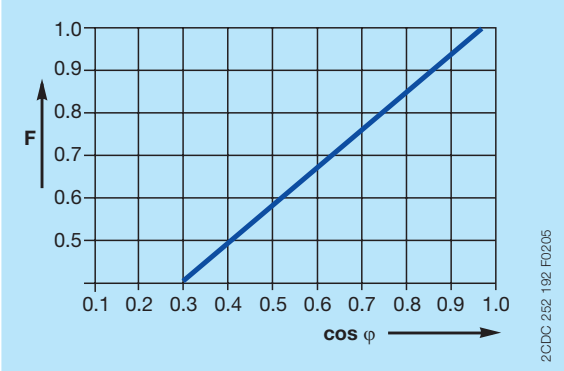
Load limit curves



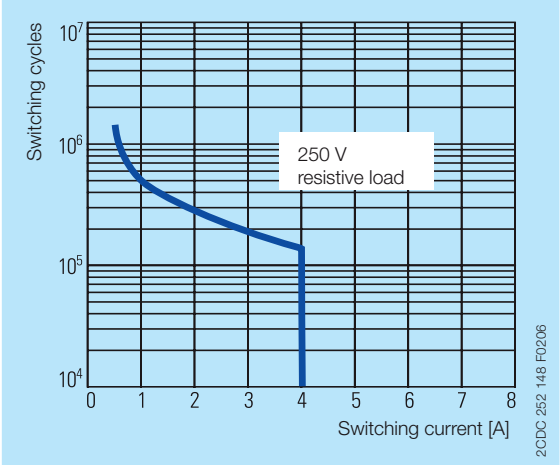
AC load (resistive)



DC load (resistive)



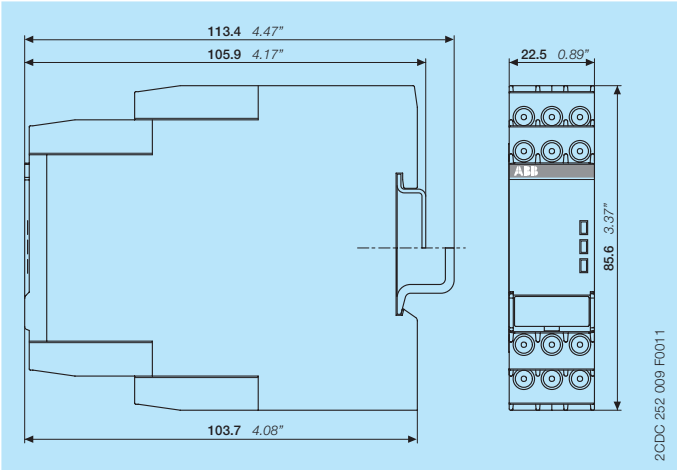
Derating factor F for inductive AC load



Contact lifetime

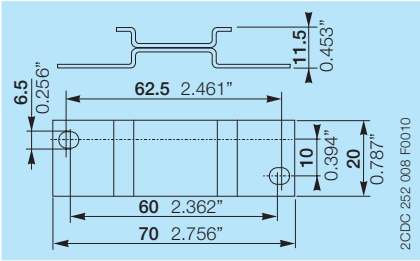
Dimensions

in **mm** and inches

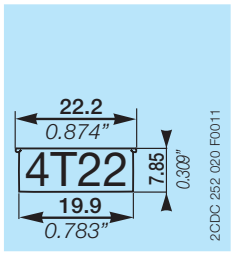


Accessories

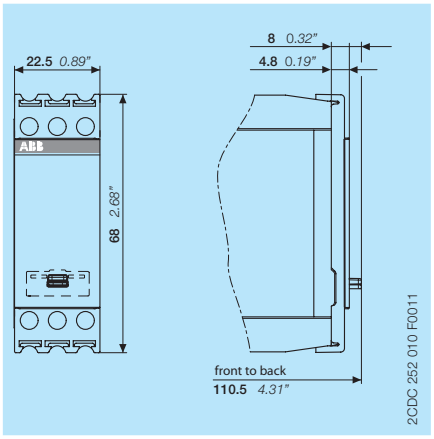
in **mm** and inches



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 C02xx
CM-SFS.2	Instruction manual	1SVC 730 580 M0000

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

CAD system files

You can find the CAD files for CAD systems at
http://abb-control-products.partcommunity.com/portal/portal/abb-control-products
-> Low Voltage Products & Systems -> Control Products -> Electronic Relays and Controls
-> Single Phase Monitors -> CM-SFx - Single Phase Monitors.

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