

Current monitoring relays CM-SRS.M2

For single-phase AC/DC currents

The CM-SRS.M2 is an electronic current monitoring relay that monitors single-phase mains (DC or AC) for over- and undercurrent from 0.3 A to 15 A.

This device is available with the proven screw connection technology (double-chamber cage connecting terminals).



Characteristics

- Monitoring of DC and AC currents (0.3 A 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
- 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

Approvals / Marks



Classifications:

EN 50155, IEC 60571, NF F 16-101/102, EN 45545-2

EN 50155, IEC 60571

Temp. class	Voltage supply				Vibration and shock acc to IEC/EN 61373	Coated pcb.
	S1	S2	C1	C2		
T3	■	■	■	-	Cat 1, Class B	no

NF F 16-101/102

Flammability index	Opticity and toxicity of smoke index	EN 45545-2 Risk level achieved
I2	F2	HL3

Order data

Current monitoring relays

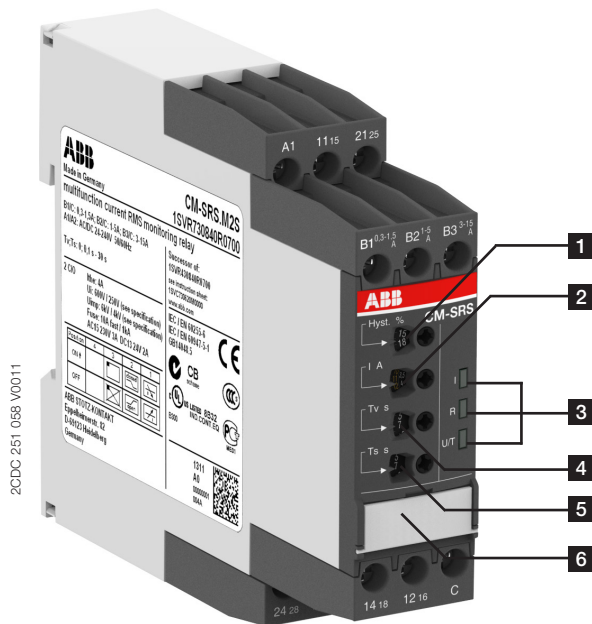
Type	Rated control supply voltage	Connection technology	Measuring ranges	Order code
CM-SRS.M2S	24-240 V AC/DC	Screw type terminals	0.3-1.5 A, 1-5 A, 3-15 A	1SVR730840R0700

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

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
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 multifunctional current monitoring relay CM-SRS.M2 is designed for use in single-phase AC and/or DC systems for over- or undercurrent monitoring. The device operates over an universal range of supply voltages, provides an adjustable start-up as well as tripping delay and work according to the open- or closed-circuit principle.

Operating mode


The CM-SRS.M2 with 2 c/o (SPDT) contacts offers the following 3 selectable measuring ranges: 0.3-1.5 A, 1-5 A, 3-15 A. 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  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  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.

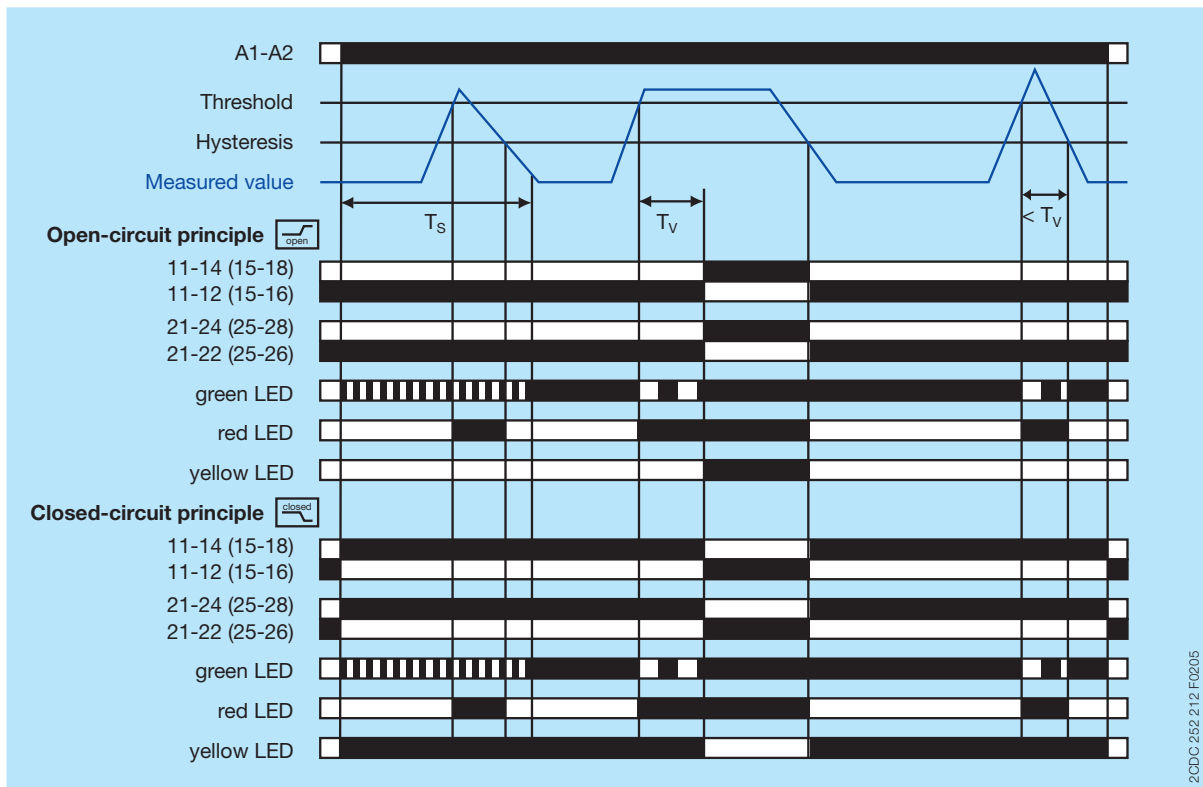
If the measured value decreases below the threshold value minus the hysteresis, the output relays de-energize and the red and yellow LEDs turn off. If control supply voltage is interrupted, the green LED turns off.

Closed-circuit principle 

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 overcurrent is only displayed by glowing of the red LED.


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If the measured value decreases below the threshold value minus the hysteresis, 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 green and yellow LEDs turn off.





2GDC 252 212 F0205

Undercurrent 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  during the start-up delay T_S and then turns steady. During the start-up delay T_S undercurrent is only displayed by flashing  of the red LED.

If the measured value decreases below the adjusted threshold value, when T_S is complete, the tripping delay T_V starts and the red LED flashes . Timing of T_V is displayed by the flashing  green LED. When T_V is complete and the measured value is still below the threshold value plus the adjusted hysteresis, the output relays energize and the yellow LED (relays energized) turns off.

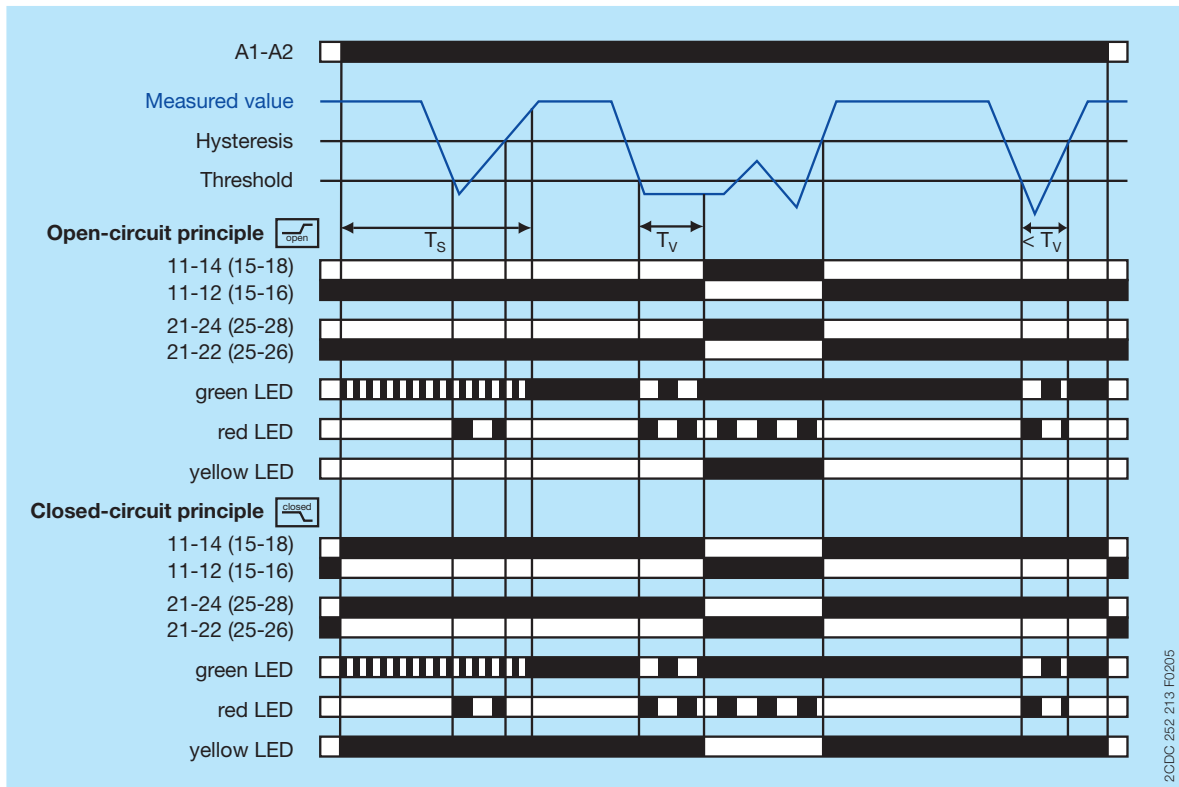
If the measured value exceeds the threshold value plus the hysteresis, the output relays de-energize and the red and yellow LEDs turn off. If control supply voltage is interrupted, the green LED turns off.

Closed-circuit principle 

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 undercurrent is only displayed by flashing  of the red LED.

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2CDC 252 213 F0205

Overcurrent monitoring  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 overcurrent is only displayed by glowing of the red LED.

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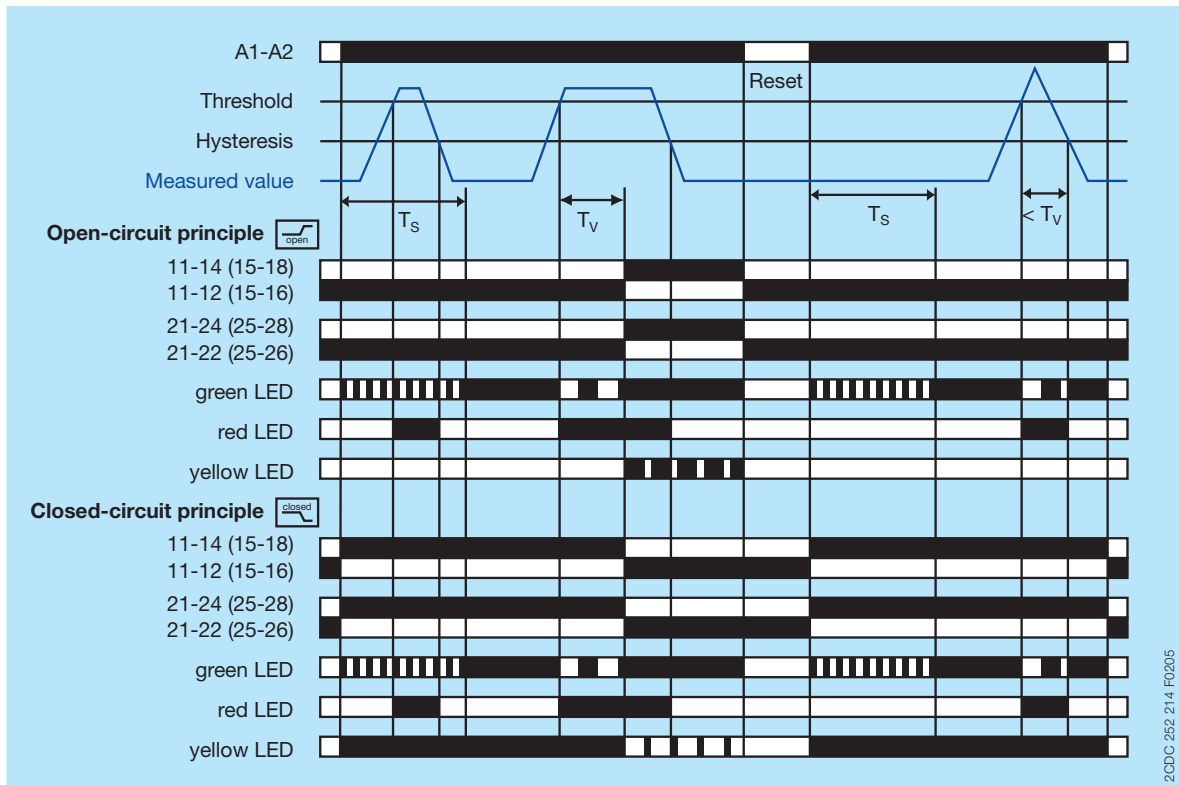
If the measured value decreases below the threshold value minus the hysteresis, the red LED turns off. The output relays remain energized (latching function). If control supply voltage is interrupted (reset), the output relays de-energize and the green and yellow LEDs turn off.

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 overcurrent is only displayed by glowing of the red LED.

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If the measured value decreases below the threshold value minus the hysteresis, the red LED turns off. The output relays remain de-energized (latching function). If control supply voltage is interrupted (reset), the green and yellow LEDs turn off. The output relays energize again when control supply voltage is re-applied.






200C 252 214 F0205

Undercurrent monitoring  with latching 



Open-circuit principle 




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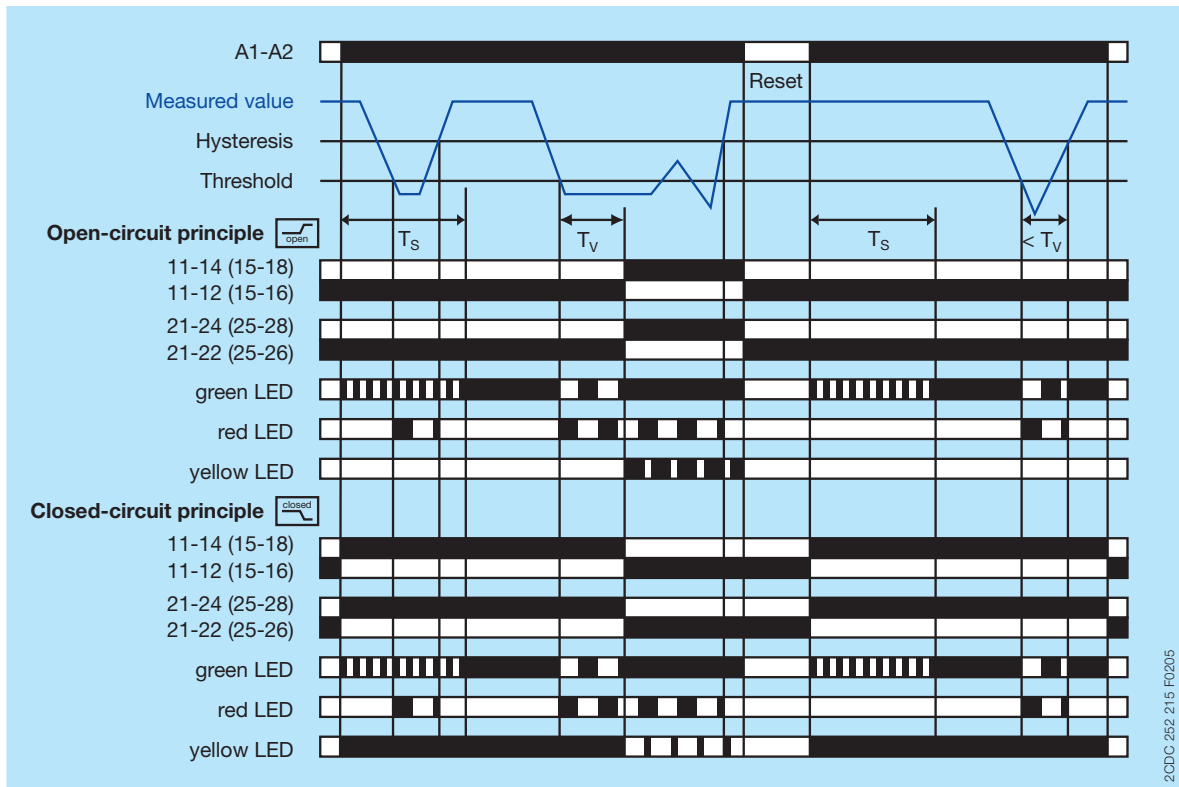
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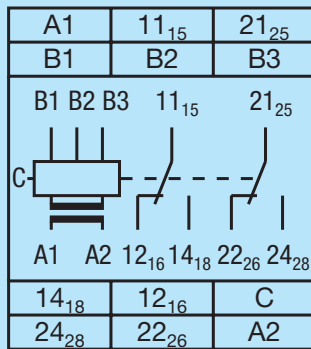
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If the measured value exceeds the threshold value plus the hysteresis, the red LED turns off. The output relays remain de-energized (latching function). If control supply voltage is interrupted (reset), the green and yellow LEDs turn off. The output relays energize again when control supply voltage is re-applied.



200C 252 215 F0205

Electrical connection



2CDC 252 205 F0005

A1-A2

Rated control supply voltage

B1-C

Measuring range 1: 0.3-1.5 A

B2-C

Measuring range 2: 1-5 A

B3-C

Measuring range 3: 3-15 A

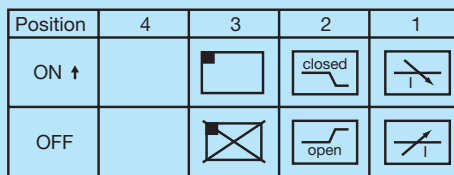
11₁₅-12₁₆/14₁₈

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 ¹⁾	terminal connection	B1-C	B2-C	B3-C
	measuring range	0.3-1.5 A	1-5 A	3-15 A
	input resistance	0.05 Ω	0.01 Ω	0.0025 Ω
	pulse overload capacity $t < 1\text{ s}$	15 A	50 A	100 A
	continuous capacity	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		$\Delta U \leq 0.06\% / \text{°C}$		
Timing circuit				
Start-up time T_S		0 s or 0.1-30 s adjustable		
Time delay T_V		0 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	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 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  / 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	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	net weight	0.155 kg (0.342 lb)
	gross weight	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

Connecting capacity	fine-strand with(out)	1 x 0.5-2.5 mm ² (1 x 18-14 AWG)
	wire end ferrule	2 x 0.5-1.5 mm ² (2 x 18-16 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)
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 μ s
	output 1 / output 2	4 kV 1.2/50 μ s
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

Railway application standards

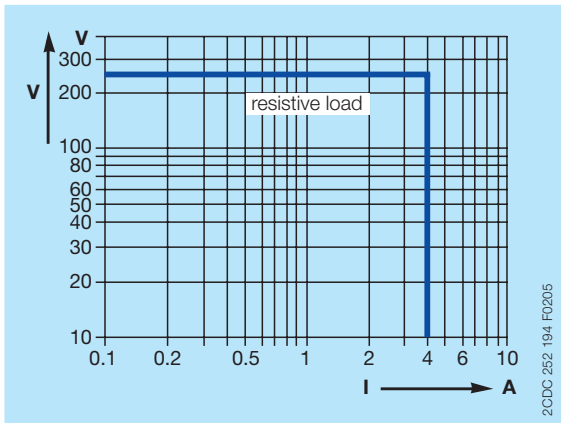
EN 50155, IEC 60571	temperature class	T3
"Railway applications – Electronic equipment used on rolling stock"	supply voltage category	S1, S2, C1
		Category 1, Class B
IEC/EN 61373		Category 1, Class B
"Railway applications – Rolling stock equipment – Shock and vibration tests"		
EN 45545-2 Railway applications – Fire protection on railway vehicles – part 2:		HL3
Requirements for fire behavior of materials and components	ISO 4589-2	LOI 32.3 %
	NF X-70-100-1	C.I.T. (T12) 0.45
	EN ISO 5659-2	Ds max (T10.03) 104
NF F 16-101: Rolling stock. Fire behaviour. Materials choosing		I2 / F2
NF F 16-102: Railway rolling stock. Fire behaviour. Materials choosing, application for electric equipment		
DIN 5510-2 Preventive fire protection in railway vehicles. Part 2: Fire behaviour and fire side effects of materials and parts		fulfilled

Electromagnetic compatibility

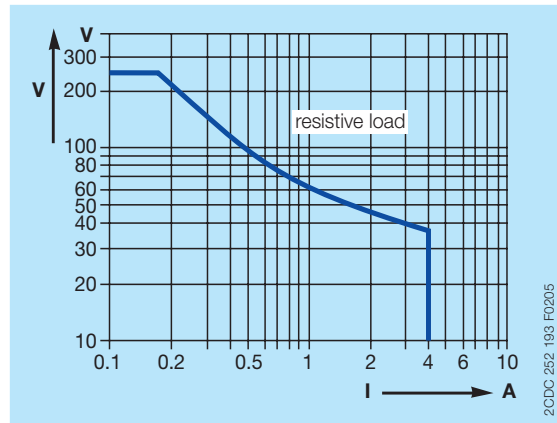
Interference immunity to		IEC/EN 61000-6-2
electrostatic discharge	IEC/EN 61000-4-2	Level 3
radiated, radio-frequency, electromagnetic field	IEC/EN 61000-4-3	Level 3
electrical fast transient / burst	IEC/EN 61000-4-4	Level 3
surge	IEC/EN 61000-4-5	Level 3
conducted disturbances, induced by radio-frequency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

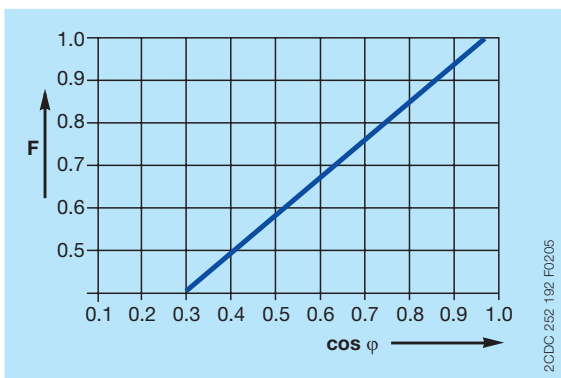
Load limit curves



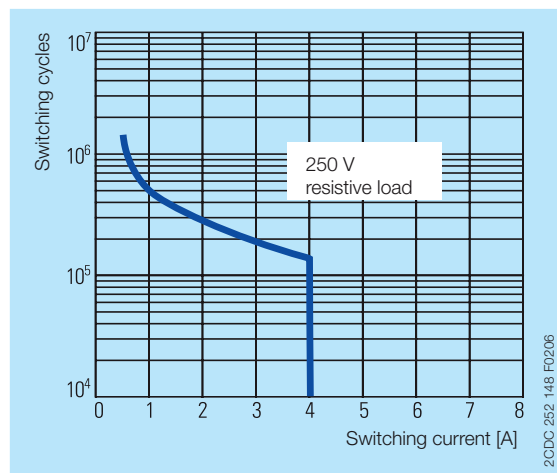
AC load (resistive)



DC load (resistive)



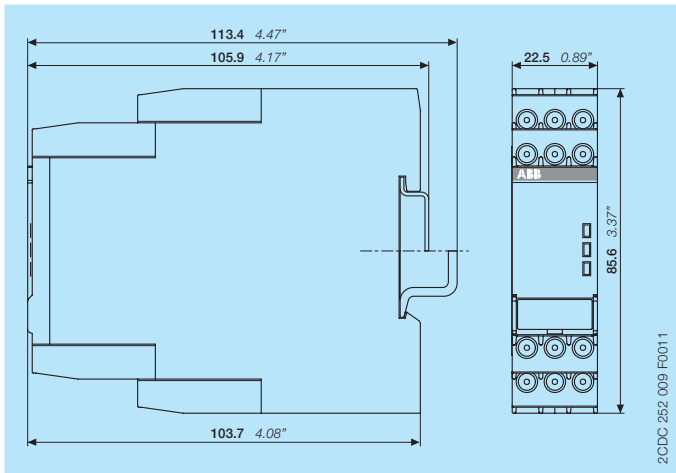
Derating factor F for inductive AC load



Contact lifetime

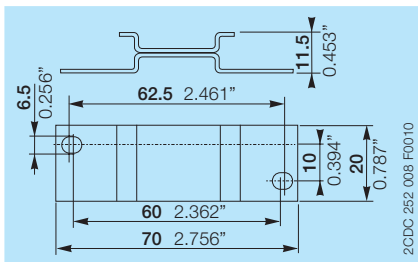
Dimensions

in **mm** and inches

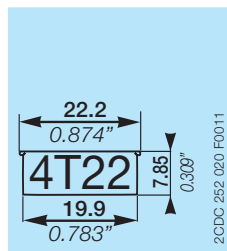


Accessories

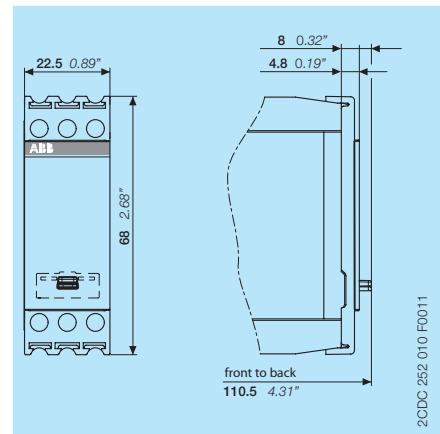
in **mm** and inches



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-SRS.M	Instruction manual	1SVC 730 620 M0000

You can find the documentation on the internet at www.abb.com/lowvoltage

-> Automation, control and protection -> Electronic relays and controls -> Measuring and monitoring relays.

CAD system files

You can find the CAD files for CAD systems at <http://abb-control-products.partcommunity.com>

-> Low Voltage Products & Systems -> Control Products -> Electronic Relays and Controls.

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-> Low Voltage Products and Systems

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