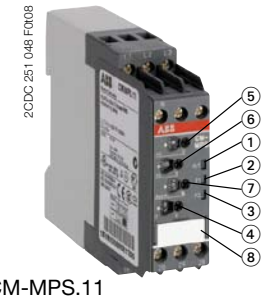
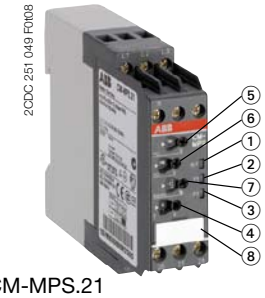
NEW

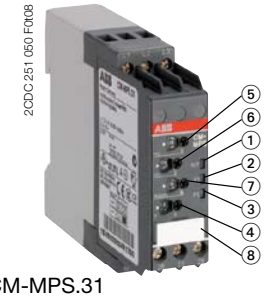
Multifunctional three-phase monitoring relays
CM-MPS.11, CM-MPS-21, CM-MPS.31 and CM-MPS.41
Data sheet



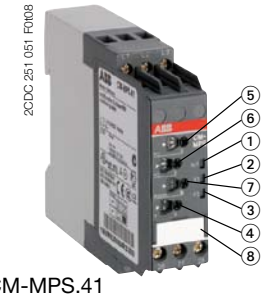
CM-MPS.11



CM-MPS.21



CM-MPS.31



CM-MPS.41

① R/T: yellow LED - relay status, timing
② F1: red LED - fault message
③ F2: red LED - fault message
④ Adjustment of the tripping delay t_v
⑤ Adjustment of the threshold value for overvoltage
⑥ Adjustment of the threshold value for undervoltage
⑦ Adjustment of the threshold value for phase unbalance
⑧ Function selection (see DIP switch functions) / Marker label

Features

- Monitoring of three-phase mains for phase sequence (can be switched off), phase failure, over- and undervoltage as well as phase unbalance
- Interrupted neutral monitoring possible with CM-MPS.11 and CM-MPS.21
- CM-MPS.11 and CM-MPS.21 can also be used to monitor single-phase mains
- Threshold values for phase unbalance, over- and undervoltage are adjustable as absolute values
- Tripping delay can be adjusted or switched off by means of a logarithmic scale
- ON-delayed or OFF-delayed tripping delay selectable
- Powered by the measuring circuit
- True RMS measuring principle
- 2 c/o (SPDT) contacts
- 3 LEDs for status indication

Approvals

UL 508, CAN/CSA C22.2 No.14
GL
GOST
CB scheme
CCC

Marks

CE
C-Tick

Order data

Type	Rated control supply voltage = measuring voltage	Interrupted neutral monitoring	Order code
CM-MPS.11	3x90-170 V AC	yes	**1SVR 630 885 R1300**
CM-MPS.21	3x180-280 V AC	yes	**1SVR 630 885 R3300**
CM-MPS.31	3x160-300 V AC	no	**1SVR 630 884 R1300**
CM-MPS.41	3x300-500 V AC	no	**1SVR 630 884 R3300**

Order data - Accessories

Type	Description	Order code
ADP.01	Adapter for screw mounting	**1SVR 430 029 R0100**
MAR.02	Marker label for devices with DIP switch	**1SVR 430 043 R0000**
COV.01	Sealable transparent cover	**1SVR 430 005 R0100**

Application

The CM-MPS.x1 are multifunctional monitoring relays for three-phase mains. They monitor the phase parameters phase sequence, phase failure, over- and undervoltage and phase unbalance. CM-MPS.11 and CM-MPS.21 also monitor the neutral for interruption. The threshold values for over- and undervoltage and phase unbalance are adjustable.

CM-MPS.11 and CM-MPS.21 are also suitable for monitoring single-phase mains. For this, all three external conductors (L1, L2, L3) have to be jumpered and connected as one single conductor. Phase sequence monitoring has to be deactivated and the threshold value for phase unbalance has to be set to the maximum (25 %).

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Operating mode

Configuration of the devices is made by means of setting elements accessible on the front of the unit and signalling is made by means of front-face LEDs.

Adjustment potentiometer

Threshold values

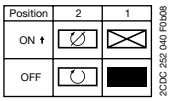
By means of three separate potentiometers with direct reading scales, the threshold values for over- and undervoltage as well as for phase unbalance can be adjusted within the measuring range.

	Measuring range for overvoltage	Measuring range for undervoltage	Measuring range for phase unbalance
CM-MPS.11	3x120-170 V AC	3x90-130 V AC	2-25 % of average of phase voltages
CM-MPS.21	3x240-280 V AC	3x180-220 V AC	

Tripping delay t_V

The tripping delay t_V can be adjusted within a range of 0.1-30 s by means of a potentiometer with logaritmic scale. By turning to the left stop, the tripping delay can be switched off.

DIP switches



DIP switch 1 = Timing function	
ON = ON-delayed ⊠	**OFF = OFF-delayed** ■
In case of a fault, the de-energizing of the output relays and the respective fault message are suppressed for the adjusted tripping delay t_V.	In case of a fault, the output relays de-energize instantaneously and a fault message is displayed and stored for the length of the adjusted tripping delay t_V. Thereby, also momentary undervoltage conditions are recognized.

DIP switch 2 = Phase sequence monitoring	
ON = Phase sequence monitoring deactivated ⌀	**OFF = Phase sequence monitoring activated** ↻
Phase sequence errors will not be recognized.	The output relays de-energize as soon as a phase sequence error occurs. The output relays re-energize automatically as soon as the phase sequence is correct again.

LEDs

Function	R/T: yellow LED	F1: red LED	F2: red LED
Control supply voltage applied, output relay energized		-	-
Tripping delay t_v active		-	-
Phase failure	-		
Phase sequence	-	alternating	
Overvoltage	-		-
Undervoltage	-	-	
Phase unbalance	-		
Interruption of the neutral	-		
Adjustment error [1]			

[1] Overlapping of the threshold values: An overlapping of the threshold values is given, if the threshold value for overvoltage is set to a smaller value than the threshold value for undervoltage.

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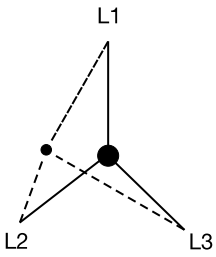
Function descriptions/diagrams

Function diagram legend

Control supply voltage not applied / Output contact open / LED off
Control supply voltage applied / Output contact closed / LED glowing

Interrupted neutral monitoring

The interruption of the neutral in the main to be monitored is detected by means of phase unbalance evaluation.
If the star point is displaced by asymmetrical load in the three-phase main, an interrupted neutral will be detected.
Determined by the system, in case of unloaded neutral, i.e. symmetrical load between all three phases, it may happen that an interruption of the neutral will not be detected.



Phase sequence and phase failure monitoring

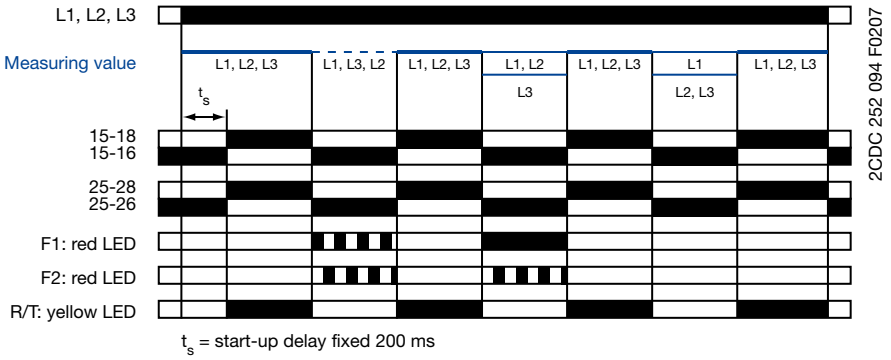
Applying control supply voltage begins the fixed start-up delay t_s. When t_s is complete and all phases are present with correct voltage, the output relays energize and the yellow LED R/T glows.

Phase sequence monitoring

If phase sequence monitoring is activated, the output relays de-energize as soon as a phase sequence error occurs. The fault is displayed by alternated flashing of the LEDs F1 and F2. The output relays re-energize automatically as soon as the phase sequence is correct again.

Phase failure monitoring

The output relays de-energize instantaneous if a phase failure occurs. The fault is indicated by lightning of LED F1 and flashing of LED F2. The output relays re-energize automatically as soon as the voltage returns to the tolerance range.



t_s = start-up delay fixed 200 ms

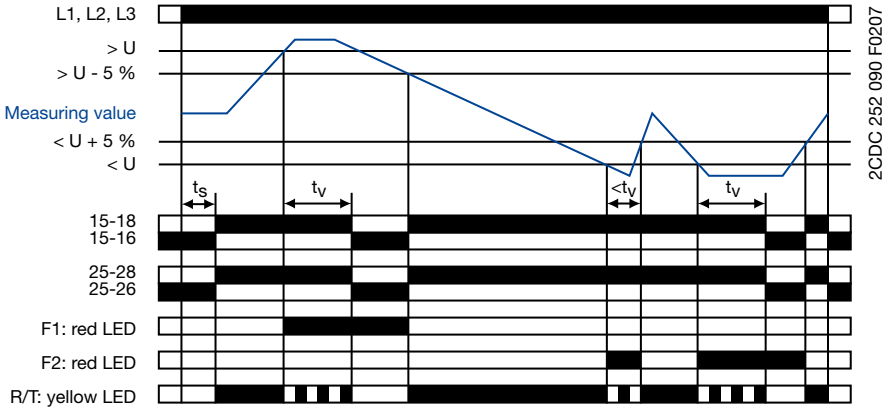
Over- and undervoltage monitoring

Applying control supply voltage begins the fixed start-up delay t_s. When t_s is complete and all phases are present with correct voltage and with correct phase sequence, the output relays energize and the yellow LED R/T glows.

Type of tripping delay = ON-delay ⊠

If the voltage to be monitored exceeds or falls below the set threshold value, the output relays de-energize after the set tripping delay t_v is complete. The LED R/T flashes during timing and turns off as soon as the output relays de-energize.

The output relays re-energize automatically as soon as the voltage returns to the tolerance range, taking into account a fixed hysteresis of 5 %. The LED R/T glows.

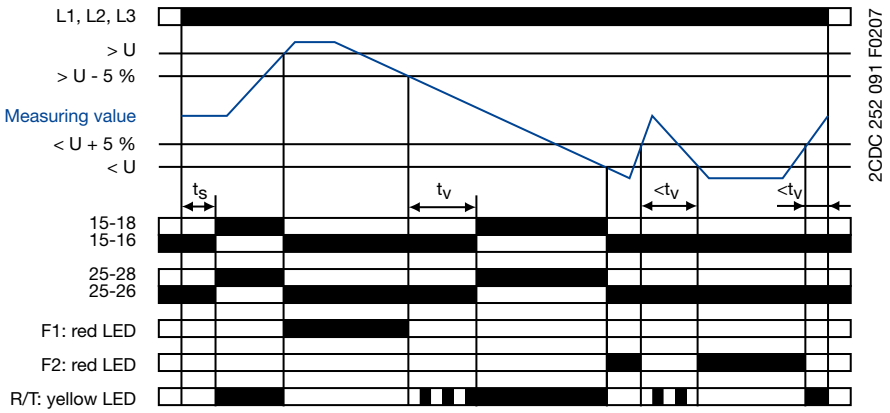


t_s = start-up delay fixed 200 ms
t_v = ajdustable tripping delay

Type of tripping delay = OFF-delay ■

If the voltage to be monitored exceeds or falls below the set threshold value, the output relays de-energize instantaneously and the LED R/T turns off.

As soon as the voltage returns to the tolerance range, taking into account a fixed hysteresis of 5 %, the output relays re-energize automatically after the set tripping delay t_v is complete. The LED R/T flashes during timing and turns steady when timing is complete.



t_s = start-up delay fixed 200 ms
t_v = ajdustable tripping delay

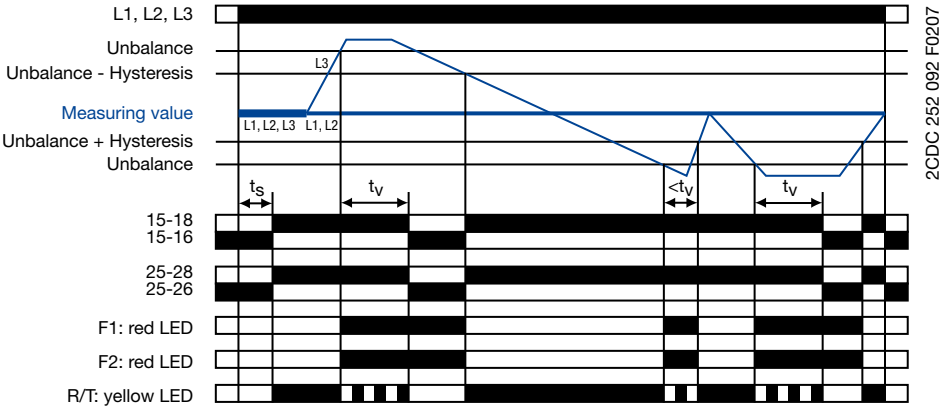
Phase unbalance monitoring

Applying control supply voltage begins the fixed start-up delay t_s. When t_s is complete and all phases are present with correct voltage and with correct phase sequence, the output relays energize and the yellow LED R/T glows.

Type of tripping delay = ON-delay ⊠

If the voltage to be monitored exceeds or falls below the set phase unbalance threshold value, the output relays de-energize after the set tripping delay t_v is complete. The LED R/T flashes during timing and turns off as soon as the output relays de-energize.

The output relays re-energize automatically as soon as the voltage returns to the tolerance range, taking into account a fixed hysteresis of 20 %. The LED R/T glows.

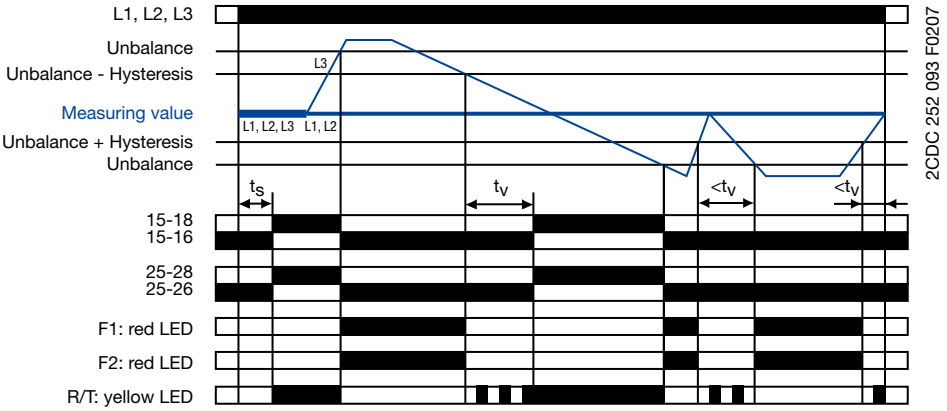


t_s = start-up delay fixed 200 ms
t_v = ajdustable tripping delay

Type of tripping delay = OFF-delay ■

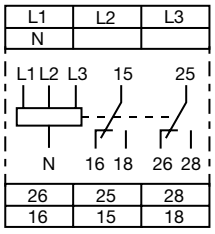
If the voltage to be monitored exceeds or falls below the set phase unbalance threshold value, the output relays de-energize instantaneously and the LED R/T turns off.

As soon as the voltage returns to the tolerance range, taking into account a fixed hysteresis of 20 %, the output relays re-energize automatically after the set tripping delay t_v is complete. The LED R/T flashes during timing and turns steady when timing is complete.



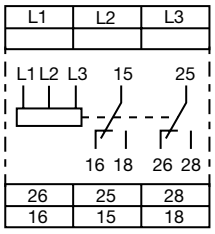
t_s = start-up delay fixed 200 ms
t_v = ajdustable tripping delay

Connection diagrams



L1, L2, L3, N	Control supply voltage = measuring voltage
15-16/18	Output contacts -
25-26/28	closed-circuit principle

CM-MPS.11 and CM-MPS.21



L1, L2, L3, N	Control supply voltage = measuring voltage
15-16/18	Output contacts -
25-26/28	closed-circuit principle

CM-MPS.31 and CM-MPS.41

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Data at T_a = 25 °C and rated values, if nothing else indicated

Type			CM-MPS.11	CM-MPS.21	CM-MPS.31	CM-MPS.41
Input circuit = Measuring circuit			**L1, L2, L3, N**		**L1, L2, L3**	
Rated control supply voltage U_S = measuring voltage			3x90-170 V AC	3x180-280 V AC	3x160-300 V AC	3x300-500 V AC
Rated control supply voltage U_S tolerance			-15...+10 %			
Rated frequency			50/60 Hz			
Frequency range			45-65 Hz			
Typical current / power consumption			25 mA / 10 VA (115 V AC)	25 mA / 18 VA (230 V AC)	25 mA / 10 VA (230 V AC)	25 mA / 18 VA (400 V AC)
Measuring circuit			**L1, L2, L3, N**		**L1, L2, L3**	
Monitoring functions		Phase failure	■	■	■	■
		Phase sequence	can be switched off			
		Automatic phase sequence correction	-	-	-	-
		Over-/undervoltage	■	■	■	■
		Phase unbalance	■	■	■	■
		Interrupted neutral	■	■	-	-
Measuring range		Overvoltage	3x120-170 V AC	3x240-280 V AC	3x220-300 V AC	3x420-500 V AC
		Undervoltage	3x90-130 V AC	3x180-220 V AC	3x160-230 V AC	3x300-380 V AC
		Phase unbalance	2-25 % of average of phase voltages			
Thresholds		Overvoltage	adjustable within measuring range			
		Undervoltage	adjustable within measuring range			
		Phase unbalance (switch-off value)	adjustable within measuring range			
Hysteresis related to the threshold value		Over-/undervoltage	fixed 5 %			
		Phase unbalance	fixed 20 %			
Rated frequency of the measuring signal			50/60 Hz			
Frequency range of the measuring signal			45-65 Hz			
Maximum measuring cycle time			100 ms			
Measuring error within the rated control supply voltage tolerance			≤ 0.5 %			
Measuring error within the temperature range			≤ 0.06 % / °C			
Measuring method			True RMS			
Timing circuit						
Start-up delay t_S			fixed 200 ms			
Tripping delay t_V			ON- or OFF-delay 0; 0.1-30 s adjustable			
Repeat accuracy (constant parameters)			< ±0.2 %			
Timing error within the rated control supply voltage tolerance			≤ 0.5 %			
Timing error within the temperature range			≤ 0.06 % / °C			
Indication of operational states			1 yellow LED, 2 red LEDs Details see operating mode and function description/diagrams			
Output circuits			**15-16/18, 25-26/28**			
Kind of output			1x2 c/o (SPDT) contacts (Relays)			
Operating principle [1]			closed-circuit principle			
Contact material			AgNi alloy, Cd free			
Rated voltage (VDE 0110, IEC 60947-1)			250 V			
Minimum switching power			24 V / 10 mA			
Maximum switching voltage			see load limit curves			
Rated operational current (IEC/EN 60947-5-1)		AC12 (resistive) 230 V	4 A			
		AC15 (inductive) 230 V	3 A			
		DC12 (resistive) 24 V	4 A			
		DC13 (inductive) 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			

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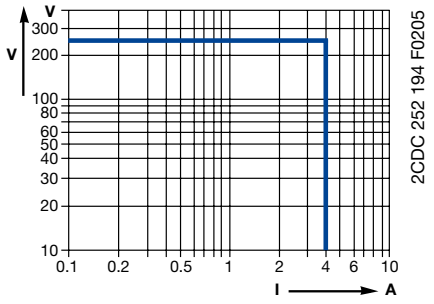
Type		CM-MPS.11	CM-MPS.21	CM-MPS.31	CM-MPS.41
Short-circuit proof, maximum fuse rating	n/c contact	6 A fast-acting			
	n/o contact	10 A fast-acting			
General data					
Duty time		100 %			
Dimensions (W x H x D)		22.5 x 78 x 100 mm (0.89 x 3.07 x 3.94 inch)			
Weight		0.14 kg (0.31 lb)		0.13 kg (0.29 lb)	
Mounting		DIN rail (EN 60715), snap-on mounting without any tool			
Mounting position		any			
Minimum distance to other units	lateral	10 mm (0.4 inch) in case of continuous voltage of ...			
		> 120 V	> 240 V	> 220 V	> 400 V
Degree of protection	enclosure / terminals	IP50 / IP20			
Electrical connection					
Wire size	fine-strand with(out) wire end ferrule	2 x 0.75-2.5 mm² (2 x 18-14 AWG)			
	rigid	2 x 0.5-4 mm² (2 x 20-12 AWG)			
Stripping length		7 mm (0.28 inch)			
Tightening torque		0.6-0.8 Nm			
Environmental data					
Ambient temperature ranges	operation / storage	-25...+60 °C / -40...+85 °C			
Damp heat (IEC 60068-2-30)		55 °C, 6 cycles			
Climatic category		3K3			
Vibration (sinusoidal) (IEC/EN 60255-21-1)		Class 2			
Shock (IEC/EN 60255-21-2)		Class 2			
Isolation data					
Rated insulation voltage U_i	input circuit / output circuit	600 V			
	output circuit 1 / output circuit 2	300 V			
Rated impulse withstand voltage U_{imp} (VDE 0110, IEC/EN 60664)	input circuit	6 kV; 1.2/50 µs			
	output circuit	4 kV; 1.2/50 µs			
Test voltage between all isolated circuits (type test)		2.5 kV, 50 Hz, 1 s			
Basis isolation	input circuit / output circuit	600 V			
Protective separation (VDE 0160 part 101 and 101/A, IEC/EN 61140)	input circuit / output circuit	yes		-	
Pollution degree (VDE 0110, IEC/EN 60664, UL 508)		3			
Overvoltage category (VDE 0110, IEC 60664, UL 508)		III			
Standards					
Product standard		IEC/EN 60255-6, EN 50178			
Low Voltage Directive		2006/95/EC			
EMC directive		2004/108/EC			
RoHS directive		2002/95/EC			
Electromagnetic compatibility					
Interference immunity		EN 61000-6-1, EN 61000-6-2			
electrostatic discharge (ESD)	IEC/EN 61000-4-2	Level 3 (6 kV / 8 kV)			
electromagnetic field (HF radiation resistance)	IEC/EN 61000-4-3	Level 3 (10 V/m)			
fast transients (Burst)	IEC/EN 61000-4-4	Level 3 (2 kV / 2 kHz)			
powerful impulses (Surge)	IEC/EN 61000-4-5	Level 4 (2 kV L-N)		Level 4 (2 kV L-L)	
HF line emission	IEC/EN 61000-4-6	Level 3 (10 V)			
Resistance to harmonics	EN 61000-4-13	Class 3			
Interference emission		EN 61000-6-3, EN 61000-6-4			
electromagn. field (HF radiation resistance)	IEC/CISPR 22, EN 50022	Class B			
HF line emission	IEC/CISPR 22, EN 50022	Class B			

[1] Closed-circuit principle: Output relay(s) de-energize(s) if measured value exceeds or falls below the adjusted threshold value

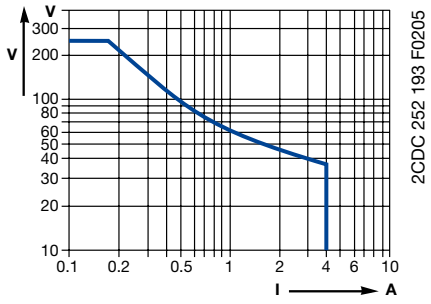
Technical diagrams

Load limit curves

AC load (resistive)

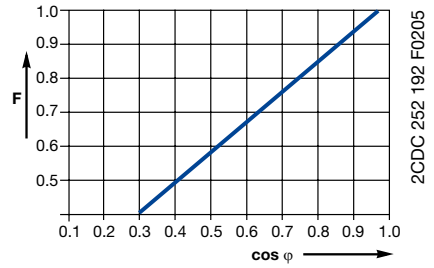


DC load (resistive)

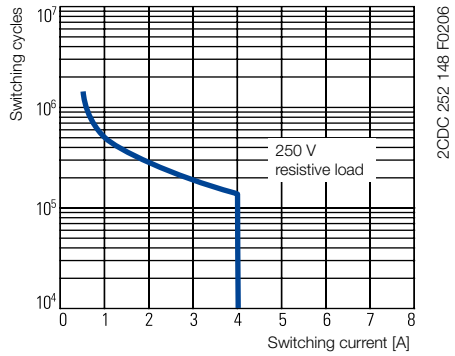


Derating factor F

at inductive AC load



Contact lifetime



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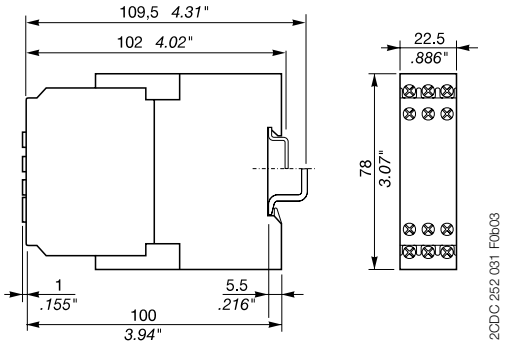
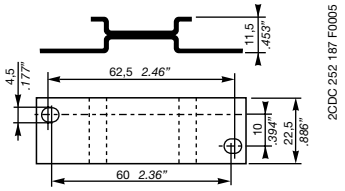
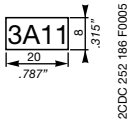
Dimensions
in mm



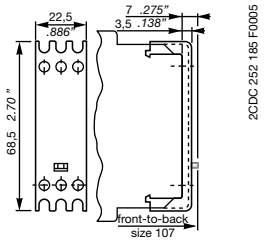
Dimensions - Accessories
in mm



ADP.01 - Adapter for screw mounting



MAR.02 - Marker label



COV.01 - Sealable transparent cover

Further documentation

Document title	Document type	Document number
Electronic Products and Relays	Technical catalogue	2CDC 110 004 C020x
CM-MPS.11, CM-MPS.21, CM-MPS.31, CM-MPS.41	Instruction manual	1SVC 630 520 M0000

You can find the documentation online at www.abb.com/lowvoltage → Control Products → ...

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Document number: 2CDC 112 126 D0201 (09/2008)

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