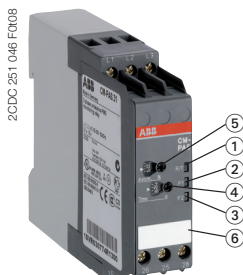


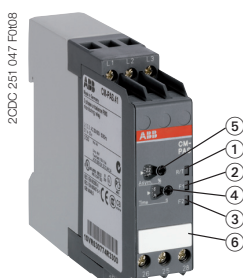
Three-phase monitoring relays

CM-PAS.31 and CM-PAS.41

Data sheet



CM-PAS.31



CM-PAS.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 phase unbalance
- ⑥ Marker label

Features

- Monitoring of three-phase mains for phase sequence, phase failure, phase unbalance
- Threshold value for phase unbalance adjustable as absolute value
- Tripping delay can be adjusted or switched off by means of a logarithmic scale
- ON-delayed tripping delay
- 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
- RMRS

Marks

- CE CE
- C-Tick

Order data

Type	Rated control supply voltage = measuring voltage	Order code
CM-PAS.31	3 x 160-300 V AC	1SVR 630 774 R1300
CM-PAS.41	3 x 300-500 V AC	1SVR 630 774 R3300

Order data - Accessories

Type	Description	Order code
ADP.01	Adapter for screw mounting	1SVR 430 029 R0100
MAR.01	Marker label	1SVR 366 017 R0100
COV.01	Sealable transparent cover	1SVR 430 005 R0100

Application

The CM-PAS.x1 are monitoring relays for three-phase mains. They monitor the phase parameters phase sequence, phase failure and phase unbalance. The threshold value for phase unbalance is adjustable.

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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 the potentiometer with direct reading scales, the threshold value for phase unbalance can be adjusted within the measuring range.

	Measuring range for phase unbalance
CM-PAS.31	2-25 % of average of phase voltages
CM-PAS.41	

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 logarithmic scale. By turning to the left stop, the tripping delay can be switched off.

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	
Phase unbalance	-		

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CM-PAS.31 and CM-PAS.41

Data sheet

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

Phase sequence and phase failure monitoring

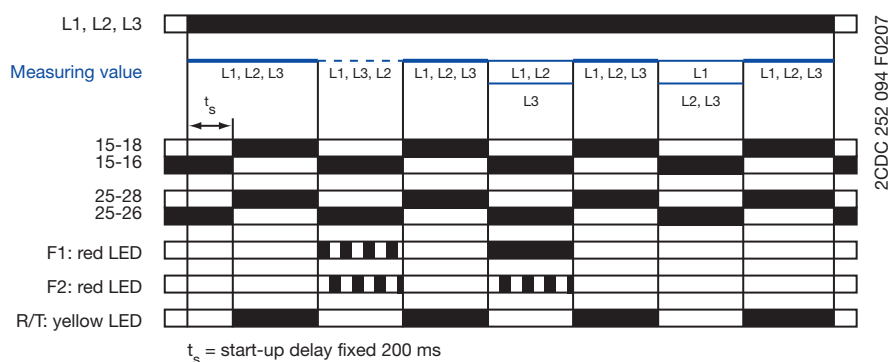
Applying control supply voltage begins the fixed start-up delay t_s . When t_s is complete and all phases are present with correct voltage, the output relays energize and the yellow LED R/T glows.

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.



Three-phase monitoring relays

CM-PAS.31 and CM-PAS.41

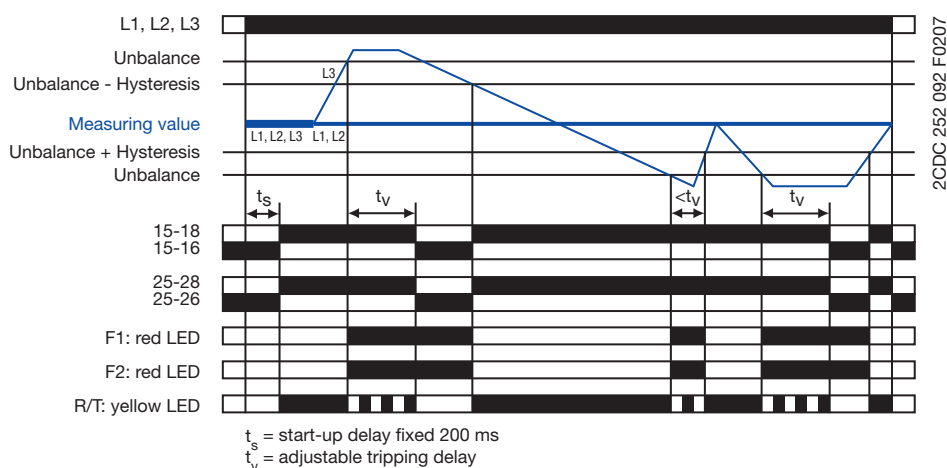
Data sheet

Phase unbalance monitoring

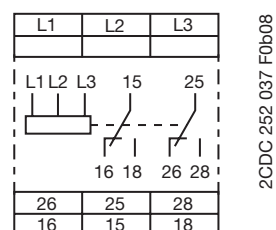
Applying control supply voltage begins the fixed start-up delay t_s . When t_s is complete and all phases are present with correct voltage and with correct phase sequence, the output relays energize and the yellow LED R/T glows.

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.



Connection diagram



L1, L2, L3
15-16/18
25-26/28

Control supply voltage = measuring voltage
Output contacts -
closed-circuit principle

CM-PAS.31 and CM-PAS.41

Three-phase monitoring relays

CM-PAS.31 and CM-PAS.41

Data sheet

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

Type		CM-PAS.31	CM-PAS.41
Input circuit = Measuring circuit		L1, L2, L3	
Rated control supply voltage U_s = measuring voltage		3 x 160-300 V AC	3 x 300-500 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 (230 V AC)	25 mA / 18 VA (400 V AC)
Measuring circuit		L1, L2, L3	
Monitoring functions	Phase failure	■	■
	Phase sequence	■	■
	Automatic phase sequence correction	-	-
	Over-/undervoltage	-	-
	Phase unbalance	■	■
	Neutral	-	-
Measuring range	Phase unbalance	2-25 % of average of phase voltages	
Threshold	Phase unbalance (switch-off value)	adjustable within the measuring range	
Hysteresis related to the threshold value	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	
Accuracy within the rated control supply voltage tolerance		$\Delta U \leq 0.5\text{ %}$	
Accuracy within the temperature range		$\Delta U \leq 0.06\text{ % / °C}$	
Measuring method		True RMS	
Timing circuit			
Start-up delay t_s		fixed 200 ms	
Tripping delay t_v		ON- delay 0; 0.1-30 s adjustable	
Repeat accuracy (constant parameters)		$< \pm 0.2\text{ %}$	
Accuracy within the rated control supply voltage tolerance		$\Delta t \leq 0.5\text{ %}$	
Accuracy within the temperature range		$\Delta t \leq 0.06\text{ % / °C}$	
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		2 x 1 c/o (SPDT) contacts (Relays)	
Operating principle ¹⁾		closed-circuit principle	
Contact material		AgNi alloy, Cd free	
Rated operational voltage U_e (IEC/EN 60947-1)		250 V	
Minimum switching power		24 V / 10 mA	
Maximum switching voltage		see load limit curve	
Rated operational current I_e (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	
Max. fuse rating to achieve short-circuit protection	n/c contact	6 A fast-acting	
	n/o contact	10 A fast-acting	

Three-phase monitoring relays

CM-PAS.31 and CM-PAS.41

Data sheet

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

Type		CM-PAS.31	CM-PAS.41
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		0.13 kg (0.29 lb)	
Mounting		DIN rail (IEC/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 ... > 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	input circuit / output circuit	600 V	
voltage U _i	output circuit 1 / output circuit 2	300 V	
Rated impulse withstand voltage U _{imp}	input circuit	6 kV; 1.2/50 µs	
(VDE 0110, IEC/EN 60664)	output circuit	4 kV; 1.2/50 µs	
Test voltage between all isolated circuits (routine test)		2.5 kV, 50 Hz, 1 s	
Basis isolation	input circuit / output circuit	600 V	
Protective separation (VDE 0106 part 101 and 101/A, IEC/EN 61140)	input circuit / output circuit	-	
Pollution degree (VDE 0110, IEC/EN 60664)		3	
Overvoltage category (VDE 0110, IEC 60664)		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 to		IEC/EN 61000-6-1, IEC/EN 61000-6-2	
electrostatic discharge	IEC/EN 61000-4-2	Level 3 (6 kV / 8 kV)	
radiated, radio-frequency, electro-magnetic field	IEC/EN 61000-4-3	Level 3 (10 V/m)	
electrical fast transient (burst)	IEC/EN 61000-4-4	Level 3 (2 kV / 2 kHz)	
surge	IEC/EN 61000-4-5	Level 4 (2 kV L-L)	
conducted disturbances, induced by radio-frequency fields	IEC/EN 61000-4-6	Level 3 (10 V)	
harmonics and interharmonics	IEC/EN 61000-4-13	Class 3	
Interference emission		IEC/EN 61000-6-3, IEC/EN 61000-6-4	
high-frequency radiated	IEC/CISPR 22, EN 55022	Class B	
high-frequency conducted	IEC/CISPR 22, EN 55022	Class B	

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

Three-phase monitoring relays

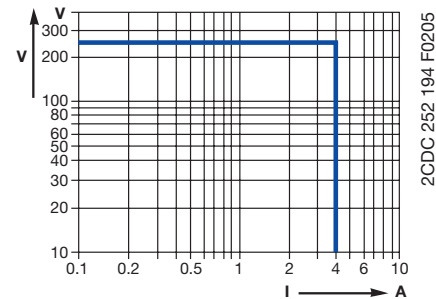
CM-PAS.31 and CM-PAS.41

Data sheet

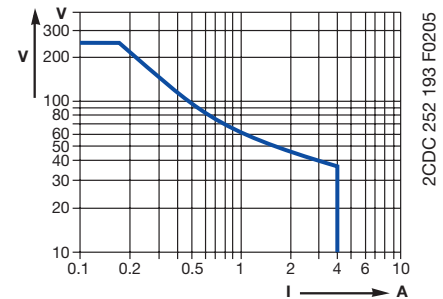
Technical diagrams

Load limit curves

AC load (resistive)

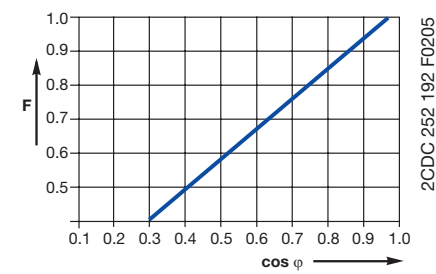


DC load (resistive)

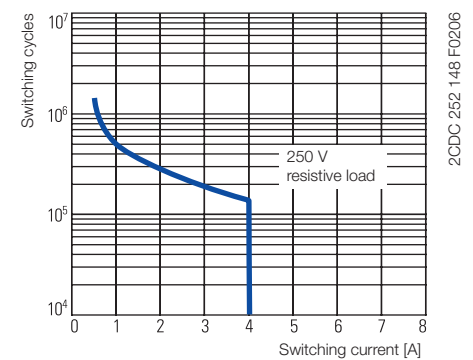


Derating factor F

at inductive AC load

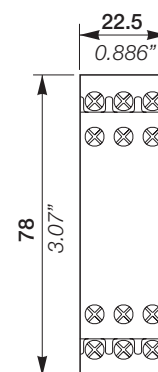
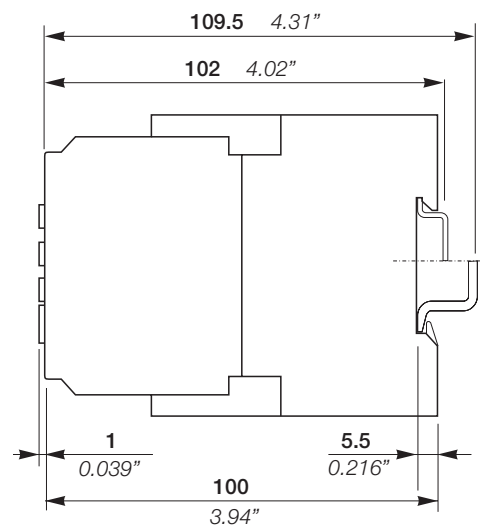


Contact lifetime



Dimensions

in mm



2CDC 252 031 F0003

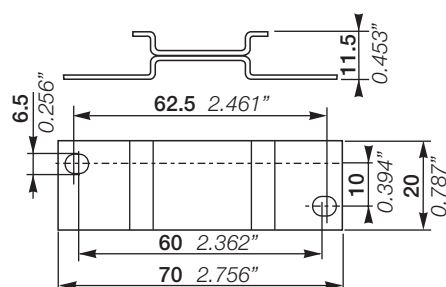
Three-phase monitoring relays

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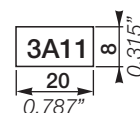
Dimensions - Accessories

in mm



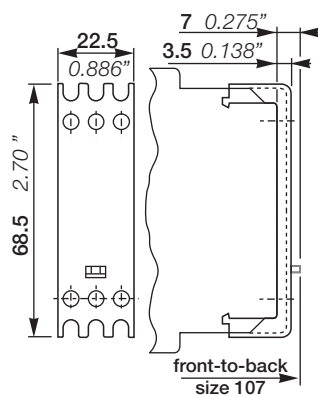
2CDC 252 008 F0010

ADP.01 - Adapter for screw mounting



2CDC 252 186 F0005

MAR.01 - Marker label



2CDC 252 185 F0005

COV.01 - Sealable transparent cover

Further documentation

Document title	Document type	Document number
Electronic Products and Relays	Technical catalogue	2CDC 110 004 C020x
CM-PAS, CM-PFS, CM-PSS, CM-PVS	Instruction manual	1SVC 630 510 M0000

You can find the documentation online at www.abb.com/lowvoltage -> Control Products -> Electronic Relays and Controls -> Three phase monitors.

CAD system files

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

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