

# Three-phase monitoring relay CM-PVE

The three-phase monitoring relay CM-PVE monitors the phase parameter phase failure as well as over- and undervoltage in three-phase mains.



20DC 251 006 S0012

## Characteristics

- Monitoring of three-phase mains for phase failure, over- and undervoltage
- With or without neutral monitoring
- Device with neutral monitoring can also be used to monitor single-phase mains
- Powered by the measuring circuit
- 1 n/o contact
- 25 mm (0.89 in) width
- 1 LED for the indication of operational states

## Order data

### Three-phase monitoring relays

Type	Rated control supply voltage = measuring voltage	Neutral monitoring	Order code
CM-PVE	3 x 320-460 V AC, 185-265 V AC	yes	1SVR550870R9400
CM-PVE	3 x 320-460 V AC	no	1SVR550871R9500

## Functions

### Operating controls



#### 1 Indication of operational states

R: yellow LED – Relay status

### Application / operating mode

The CM-PVE is designed for use in three-phase mains for monitoring the phase parameter phase failure as well as over- and undervoltage. The CM-PVE with neutral monitoring is 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.

The CM-PVE works according to the closed-circuit principle.

## Function descriptions / diagrams

### 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 relay energizes and the yellow LED R glows. If a phase failure occurs, the output relay de-energizes instantaneously and the LED R turns off.

As soon as the voltage returns to the tolerance range  $t_s$  starts again. After  $t_s$  is complete, the output relay re-energizes automatically and the LED R glows.

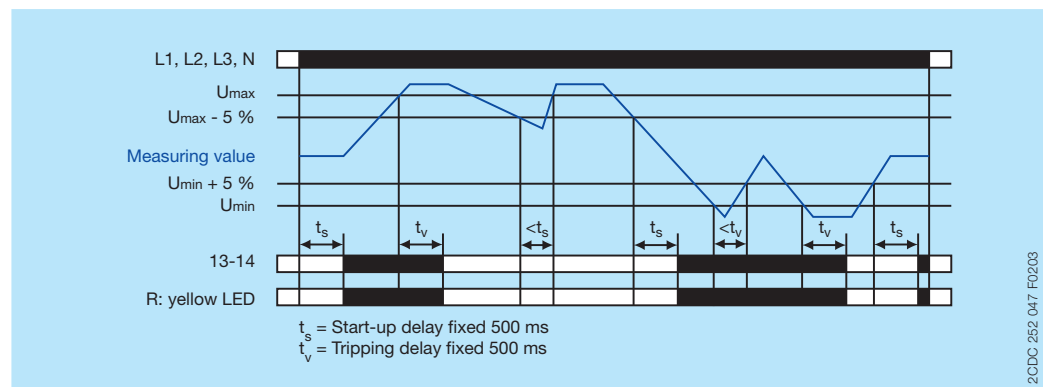
### Over- and undervoltage monitoring

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, the output relay energizes and the LED R glows.

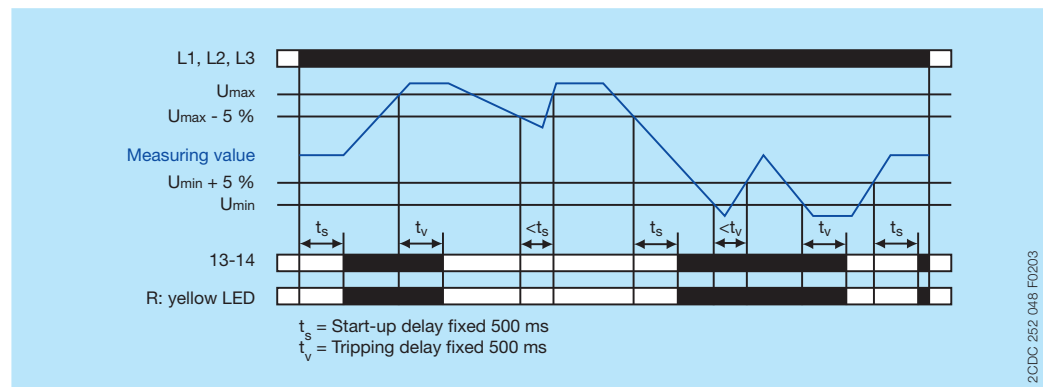
If the voltage to be monitored exceeds or falls below the fixed threshold value, the output relay de-energizes after the fixed tripping delay  $t_v$  is complete and the LED R turns off.

As soon as the voltage returns to the tolerance range, taking into account a fixed hysteresis of 5 %,  $t_s$  starts again. After  $t_s$  is complete, the output relay re-energizes automatically and the LED R glows.

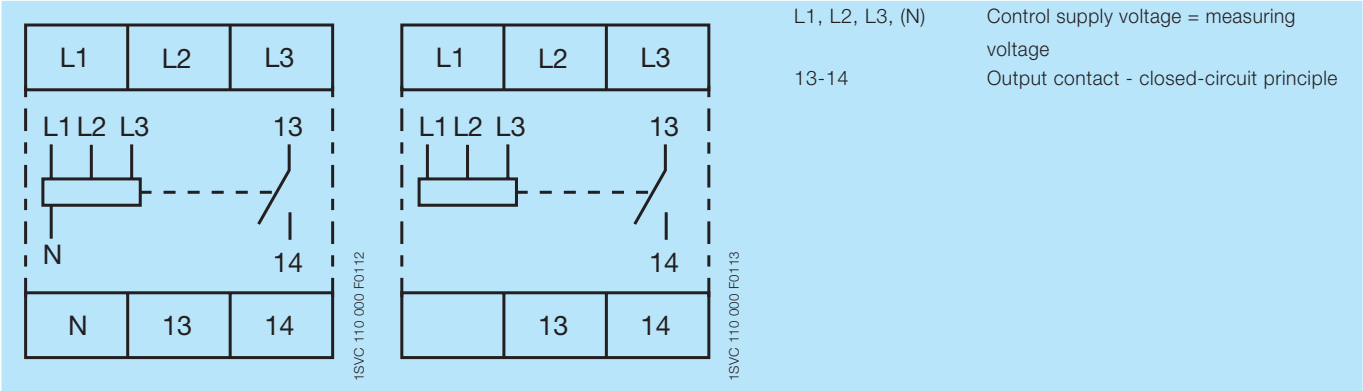
### CM-PVE with neutral monitoring



### CM-PVE without neutral monitoring



Electrical connection



Connection diagram CM-PVE with neutral monitoring

Connection diagram CM-PVE without neutral monitoring

## Technical data

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


### Input circuits

Type	CM-PVE <sup>1)</sup>	CM-PVE
Supply circuit = measuring circuit	L1, L2, L3, N	L1, L2, L3
Rated control supply voltage $U_s$ = measuring voltage	3 x 320-460 V AC, 185-265 V AC	3 x 320-460 V AC
Rated control supply voltage $U_s$ tolerance	-15...+10 %	
Rated frequency	50/60 Hz (-10...+10 %)	

<sup>1)</sup> Device with neutral monitoring: The external conductor voltage towards the neutral conductor is measured.

Measuring circuit	L1, L2, L3, N	L1, L2, L3
Monitoring functions		
Phase failure	■	■
Over- / undervoltage	■	■
Interrupted neutral	■	-
Measuring ranges	3 x 320-460 V AC, 185-265 V AC	3 x 320-460 V AC
Thresholds		
$U_{min}$	fixed 185 V / 320 V	fixed 320 V
$U_{max}$	fixed 265 V / 460 V	fixed 460 V
Hysteresis related to the threshold value	fixed 5 %	
Response time	80 ms	
Accuracy within the temperature range	$\Delta U \leq 0.06\text{ \% / °C}$	
Timing circuit		
Start-up delay $T_s$	fixed 500 ms ( $\pm 20\text{ \%}$ )	
Tripping delay $T_v$	at over-/undervoltage fixed 500 ms ( $\pm 20\text{ \%}$ )	

### User interface

Indication of operational states	
Relay status	R: yellow LED  output relay energized

### Output circuits

Kind of output	13-14	relay, 1 n/o contact
Operating principle		closed-circuit principle <sup>2)</sup>
Rated operational voltage $U_o$		250 V
Minimum switching voltage / Minimum switching current		24 V / 10 mA
Maximum switching voltage / Maximum switching current		see 'Load limit curves'
Rated operational current $I_o$		
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		B 300 pilot duty; general purpose 250 V, 4 A, $\cos\phi$ 0.75
(Control Circuit Rating Code)		
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 <sup>6</sup> switching cycles
Electrical lifetime	AC-12, 230 V, 4 A	0.1 x 10 <sup>6</sup> switching cycles
Maximum fuse rating to achieve	n/c contact	10 A fast-acting
short-circuit protection	n/o contact	10 A fast-acting

<sup>2)</sup> Closed-circuit principle: Output relay is de-energized if the measured value exceeds/drops below the adjusted threshold.

## General data

MTBF	on request		
Duty time	100 %		
Dimensions	see 'Dimensional drawings'		
Weight	net weight	1SVR 550 870 R9400	0.069 kg (0.152 lb)
		1SVR 550 871 R9500	0.066 kg (0.146 lb)
	gross weight	1SVR 550 870 R9400	0.080 kg (0.176 lb)
		1SVR 550 871 R9500	0.078 kg (0.172 lb)
Mounting	DIN rail (IEC/EN 60715), snap-on mounting without any tool		
Mounting position	any		
Degree of protection	housing	IP50	
	terminals	IP20	

## Electrical connection

Connecting capacity	fine-strand with wire end ferrule		2 x 0.75-1.5 mm <sup>2</sup> (2 x 18-16 AWG)
	fine-strand without wire end ferrule		2 x 1-1.5 mm <sup>2</sup> (2 x 18-16 AWG)
	rigid		2 x 0.75-1.5 mm <sup>2</sup> (2 x 18-16 AWG)
Stripping length	10 mm (0.39 in)		
Tightening torque	0.6 - 0.8 Nm (5.31 - 7.08 lb.in)		

## Environmental data

Ambient temperature ranges	operation	-20...+60 °C
	storage	-40...+85 °C
Damp heat	IEC/EN 60068-2-30	40 °C, 93 % RH, 4 days
Vibration withstand	IEC/EN 60068-2-6	10-57 Hz: 0.075 mm
		57-150 Hz: 1 g

## Isolation data

Rated insulation voltage U <sub>i</sub>	between all isolated circuits	400 V
Rated impulse withstand voltage U <sub>imp</sub>	between all isolated circuits	4 kV, 1.2/50 µs
Pollution degree		3
Overvoltage category		III

## Standards / Directives

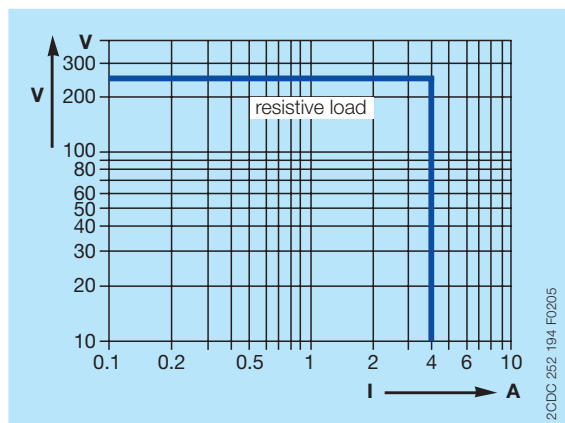
Standards	IEC/EN 60947-5-1, EN 50178
Low Voltage Directive	2014/35/EU
EMC Directive	2014/30/EU
RoHS Directive	2011/65/EU

## Electromagnetic compatibility

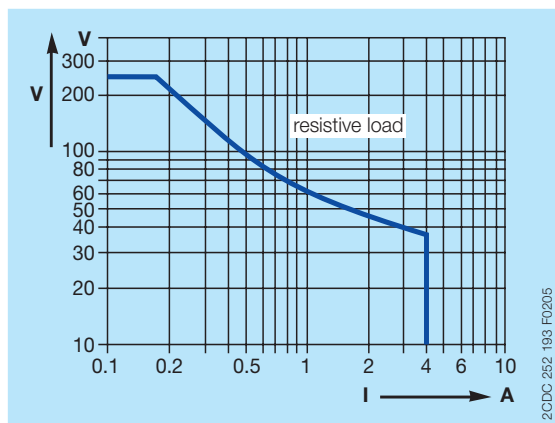
Interference immunity to		IEC/EN 61000-6-2
electrostatic discharge	IEC/EN 61000-4-2	Level 3 (6 kV / 8 kV)
radiated, radio-frequency, electromagnetic field	IEC/EN 61000-4-3	Level 3 (10 V/m)
electrical fast transient / burst	IEC/EN 61000-4-4	Level 3 (2 kV / 5 kHz)
surge	IEC/EN 61000-4-5	Level 4 (2 kV L-L)
conducted disturbances, induced by radio-frequency fields	IEC/EN 61000-4-6	Level 3 (10 V)
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

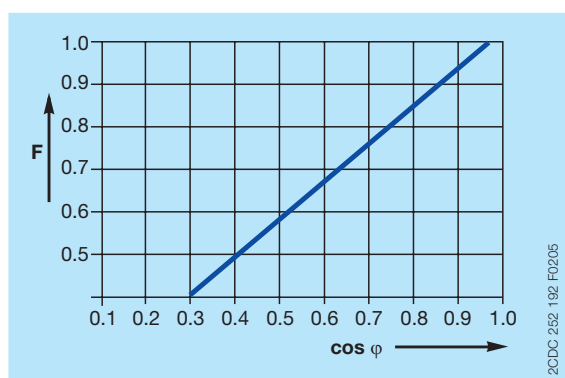
### Load limit curves



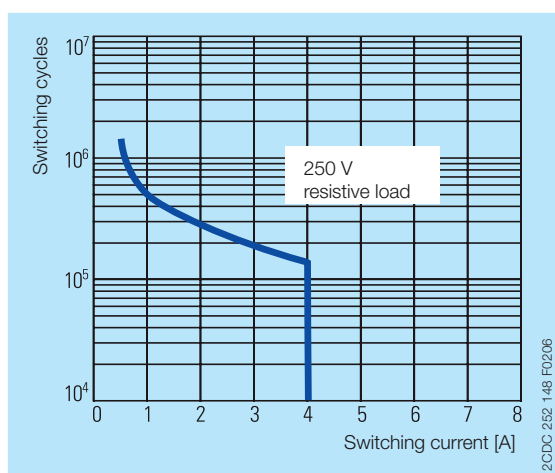
AC load (resistive)



DC load (resistive)



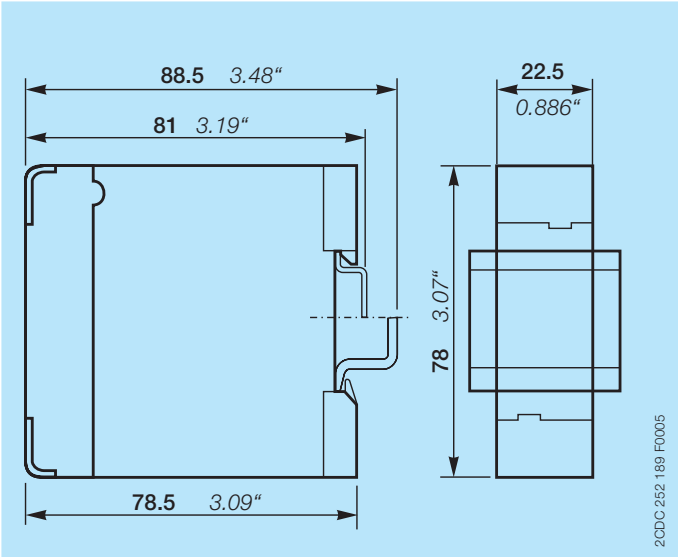
Derating factor  $F$  for inductive AC load



Contact lifetime

Dimensions

in mm and inches



Further documentation

Document title	Document type	Document number
Electronic relays and controls	Catalog	2CDC 110 004 C02xx

You can find the documentation on the internet at [www.abb.com/lowvoltage](http://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.



# Contact us

## **ABB STOTZ-KONTAKT GmbH**

P. O. Box 10 16 80  
69006 Heidelberg, Germany  
Phone: +49 (0) 6221 7 01-0  
Fax: +49 (0) 6221 7 01-13 25  
E-mail: [info.desto@de.abb.com](mailto:info.desto@de.abb.com)

You can find the address of your  
local sales organisation on the  
ABB home page  
<http://www.abb.com/contacts>  
-> Low Voltage Products and Systems

### **Note:**

We reserve the right to make technical changes or modify the contents of this document without prior notice. With regard to purchase orders, the agreed particulars shall prevail. ABB AG does not accept any responsibility whatsoever for potential errors or possible lack of information in this document.

We reserve all rights in this document and in the subject matter and illustrations contained therein. Any reproduction, disclosure to third parties or utilization of its contents – in whole or in parts – is forbidden without prior written consent of ABB AG.

Copyright© 2017 ABB  
All rights reserved