Data sheet

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.

2CDC 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

2CDC 251 006 S0012

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.

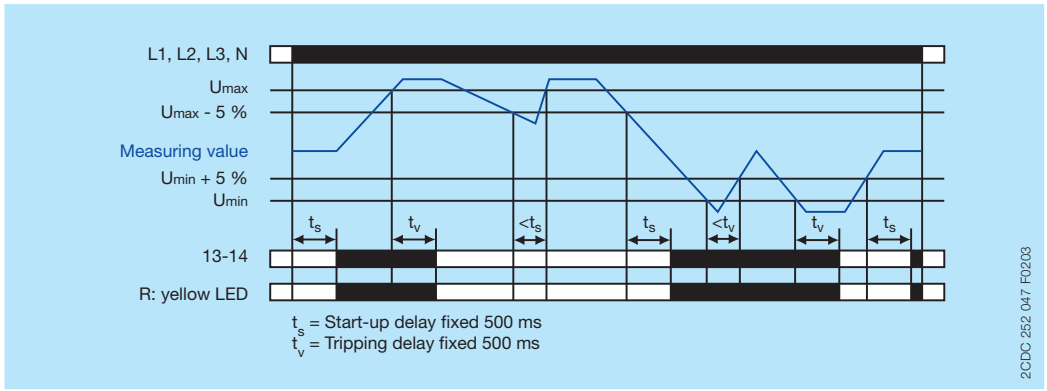
Over- and undervoltage monitoring

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.

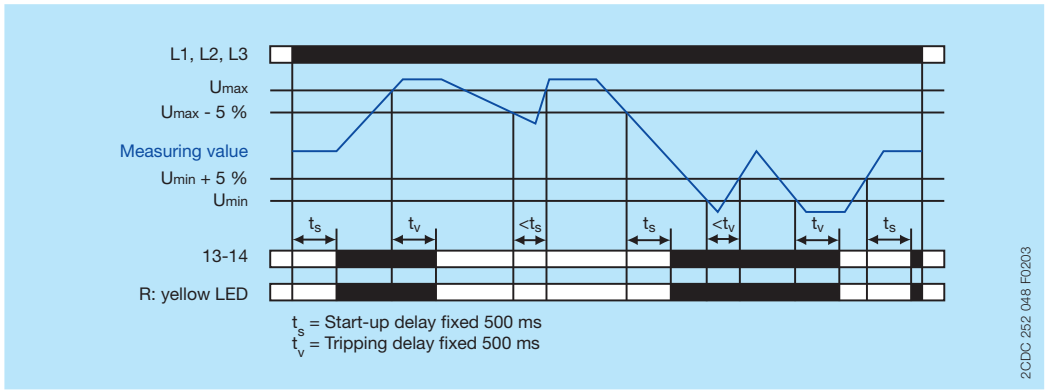
If the voltage to be monitored exceeds or falls below the fixed threshold value, the output relay de-energizes after the fixed tripping delay t_V is complete and the LED R turns off.

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.

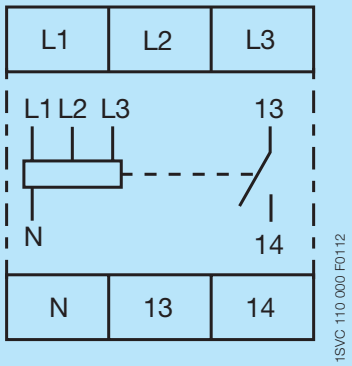
CM-PVE with neutral monitoring



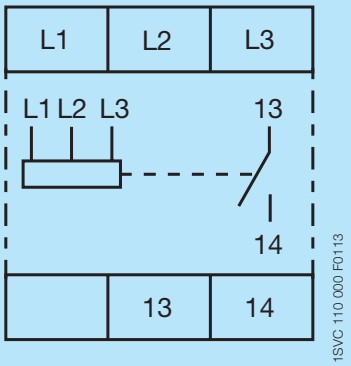
CM-PVE without neutral monitoring



Electrical connection



Connection diagram CM-PVE with neutral monitoring



Connection diagram CM-PVE without neutral monitoring

L1, L2, L3, (N)	Control supply voltage = measuring voltage
13-14	Output contact - closed-circuit principle

Technical data

Data at T_a = 25 °C and rated values, unless otherwise indicated

Input circuits

Type	CM-PVE [1]	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 %)	

[1] 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		$\Delta U \leq 0.06$ % / °C	

Timing circuit	
Start-up delay T_s	fixed 500 ms (±20 %)
Tripping delay T_v	at over-/undervoltage fixed 500 ms (±20 %)

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 [2]
Rated operational voltage U_e		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_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 pilot duty; general purpose 250 V, 4 A, cos phi 0.75
	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

[2] 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 mm² (2 x 18-16 AWG)
	fine-strand without wire end ferrule	2 x 1-1.5 mm² (2 x 18-16 AWG)
	rigid	2 x 0.75-1.5 mm² (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_i	between all isolated circuits	400 V
Rated impulse withstand voltage U_{imp}	between all isolated circuits	4 kV, 1.2/50 µs
Pollution degree		3
Overvoltage category		III

Standards / Directives

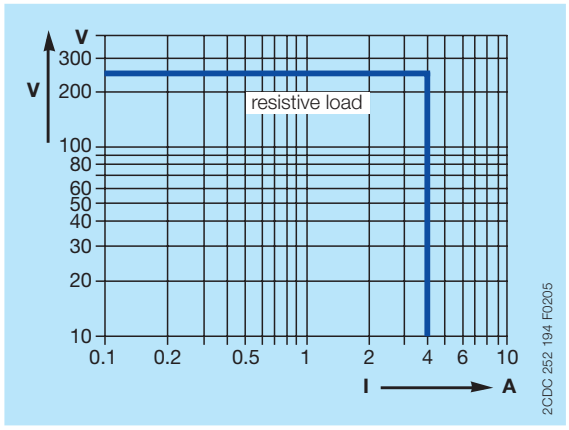
Standards	IEC/EN 60947-5-1, EN 50178
Low Voltage Directive	2014/35/EU
EMC Directive	2014/30/EU
RoHS Directive	2011/65/EU

Electromagnetic compatibility

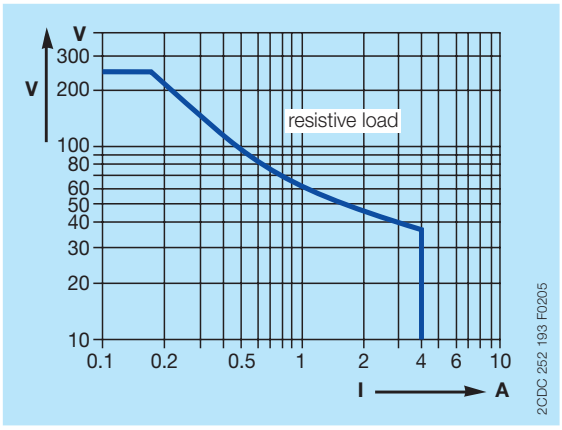
Interference immunity to		IEC/EN 61000-6-2
electrostatic discharge	IEC/EN 61000-4-2	Level 3 (6 kV / 8 kV)
radiated, radio-frequency, electromagnetic field	IEC/EN 61000-4-3	Level 3 (10 V/m)
electrical fast transient / burst	IEC/EN 61000-4-4	Level 3 (2 kV / 5 kHz)
surge	IEC/EN 61000-4-5	Level 4 (2 kV L-L)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

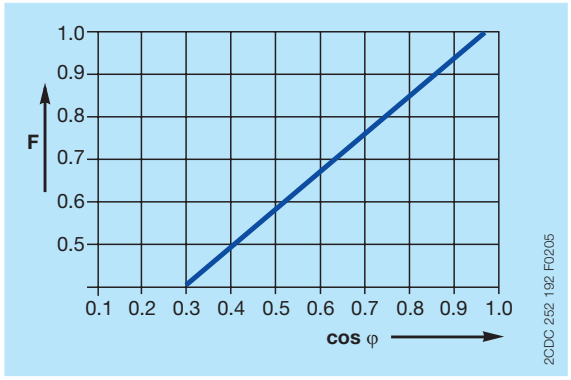
Load limit curves



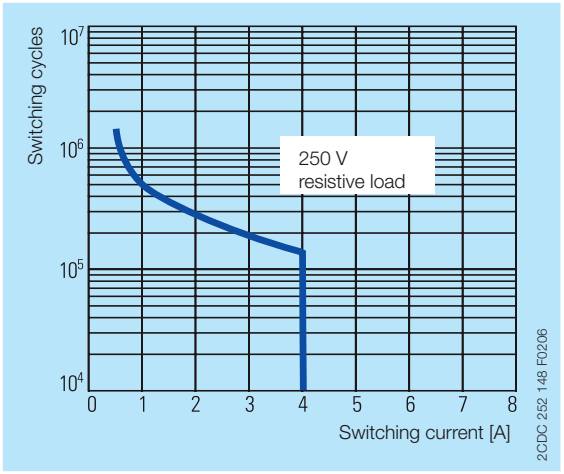
AC load (resistive)



DC load (resistive)



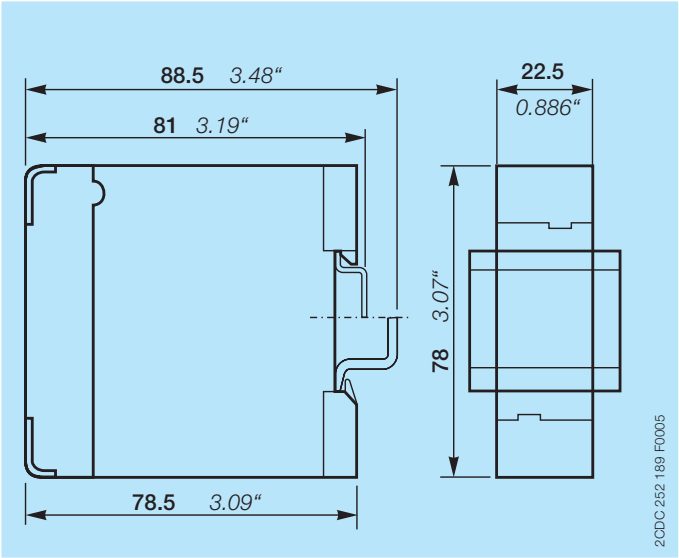
Derating factor F for inductive AC load



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
-> 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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