DATA SHEET

Three-phase monitoring relays
CM-PBE

The three-phase monitoring relay CM-PBE monitors the phase parameter phase failure in three-phase mains.

2CDC 251 007 S0012

Characteristics

- Monitoring of three-phase mains for phase failure
- 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-PBE	3 x 380-440 V AC, 220-240 V AC	yes	1SVR550881R9400
CM-PBE	3 x 380-440 V AC	no	1SVR550882R9500

Functions

Indication of operational states
R: yellow LED – Relay status

Application / Operating mode

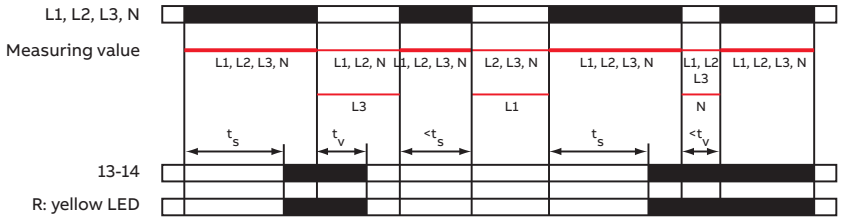
The CM-PBE is designed for use in three-phase mains for monitoring the phase parameter phase failure (U_{meas} < 60 % x U_n). The CM-PBE with neutral monitoring is also suitable for monitoring single phase mains. For this, all three external conductors (L1, L2, L3) have to be jumpered and connected as one single conductor.
The CM-PBE works according to the closed-circuit principle.

Function descriptions / diagrams

Phase failure monitoring

If all phases (and the neutral) are present, the output relay energizes after the fixed start-up delay t_s is complete.
If a phase failure occurs, the fixed tripping delay t_v starts. When timing is complete, the output relay de-energizes.
As soon as the voltage returns to the tolerance range, timing of t_s starts. When timing is complete, the output relay re-energizes automatically.
The LED R glows when the output relay is energized.

CM-PBE with neutral monitoring



t_s = Start-up delay fixed 500 ms
t_v = Tripping delay fixed 150 ms

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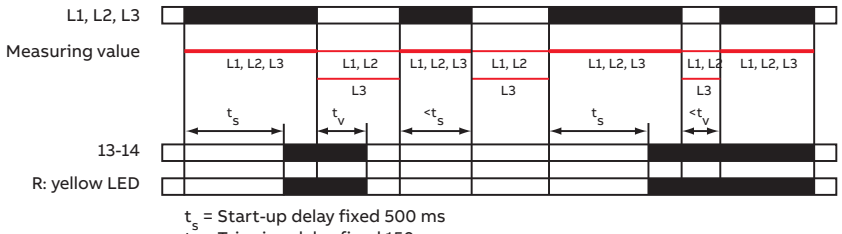
CM-PBE without neutral monitoring



t_s = Start-up delay fixed 500 ms
t_v = Tripping delay fixed 150 ms

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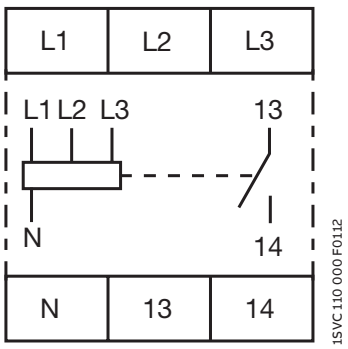
Electrical connection



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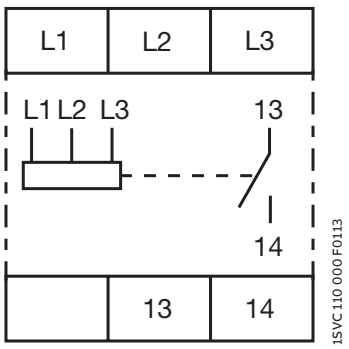
Connection diagram CM-PBE
with neutral monitoring



1SVC 110 000 F0113

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Connection diagram CM-PBE
without neutral monitoring

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

Technical data

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

Input circuits

Type	**CM-PBE** [1]	**CM-PBE**
Supply circuit = measuring circuit	**L1, L2, L3, N**	**L1, L2, L3**
Rated control supply voltage U_s = measuring voltage	3 x 380-440 V AC, 220-240 V AC	3 x 380-440 V AC
Rated control supply voltage U_s tolerance	-15...+15 %	
Rated frequency	50/60 Hz	

Measuring circuit		**L1, L2, L3, N**	**L1, L2, L3**
Monitoring functions	Phase failure	■	
	Phase sequence	■	-
Measuring ranges		3 x 380-440 V AC, 220-240 V AC	3 x 380-440 V AC
Threshold value for phase failure	U_{min}	0.6 x U_n	
Hysteresis related to the threshold value		fixed 5 % (release value = 0.65 x U_n)	
Response time		40 ms	

Timing circuit	
Start-up delay t_s	fixed 500 ms (±20 %)
Tripping delay t_v	fixed 150 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 c/o (SPDT) contact
Operating principle		closed-circuit principle [1]
Contact material		AgNi alloy, Cd free
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 voltage U_e and 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 cycle		100 %
Dimensions		see 'Dimensional drawings'
Weight	net	0.066 kg (0.146 lb)
	gross	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

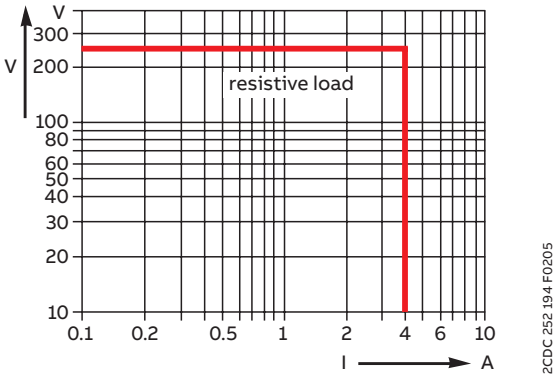
Standards	IEC/EN 60947-5-1, EN 50178
Low Voltage Directive	2014/35/EU
EMC Directive	2014/30/EU
RoHS Directive	2011/65/EU

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



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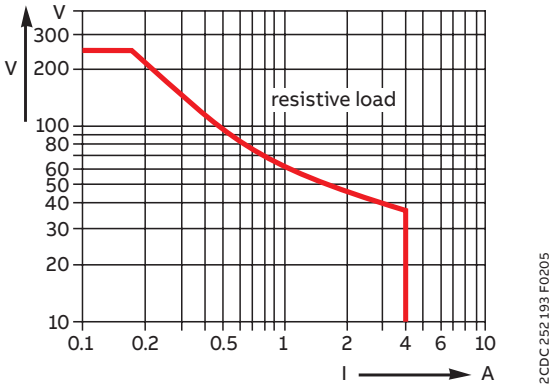
AC load (resistive)



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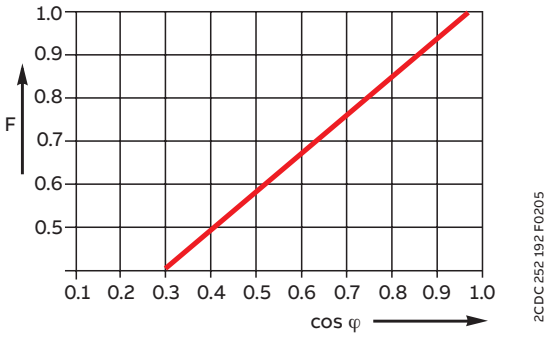
DC load (resistive)



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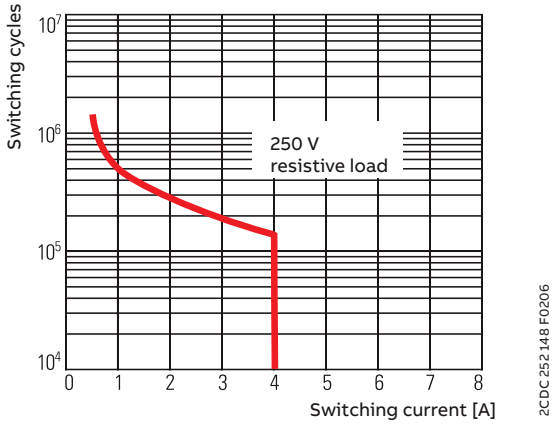
Derating factor F for inductive AC load



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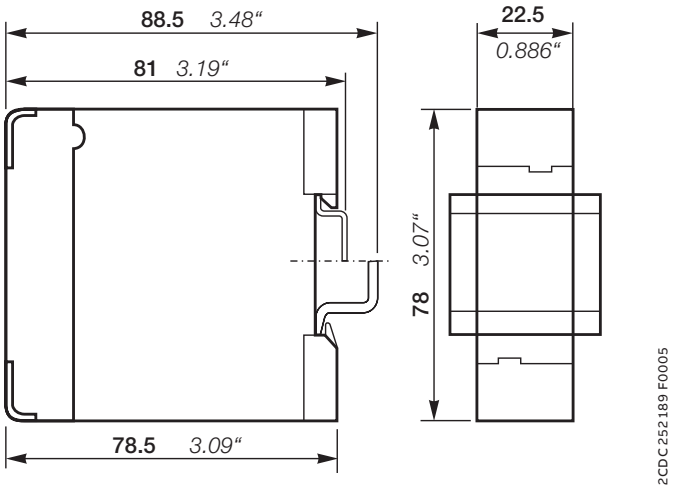
Contact lifetime

Dimensional drawings

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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