Data sheet

Three-phase monitoring relay
CM-PBE

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



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

Approvals

- UL 508, CAN/CSA C22.2 No.14
- EAC
- CB scheme
- CCC
- RMRS

Marks

- CE
- C-Tick

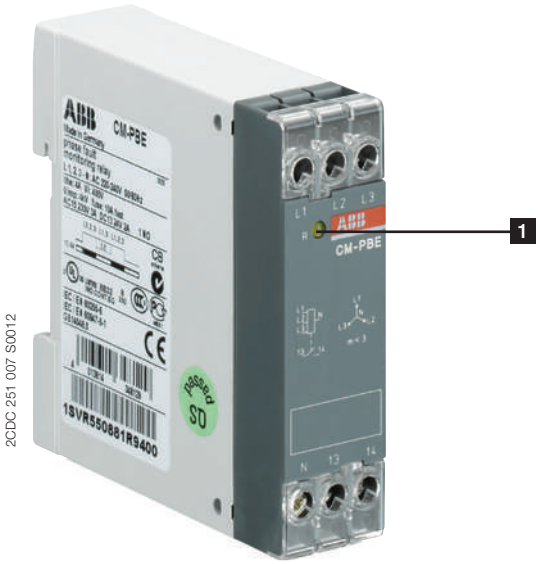
Order data

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

Operating controls



2CDC 251 007 S0012

1 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.

Indication of operational states

LEDs, status information and fault messages

Operational state	R: LED yellow
Output relay energized	⌐¬

Function descriptions / diagrams

Phase failure monitoring

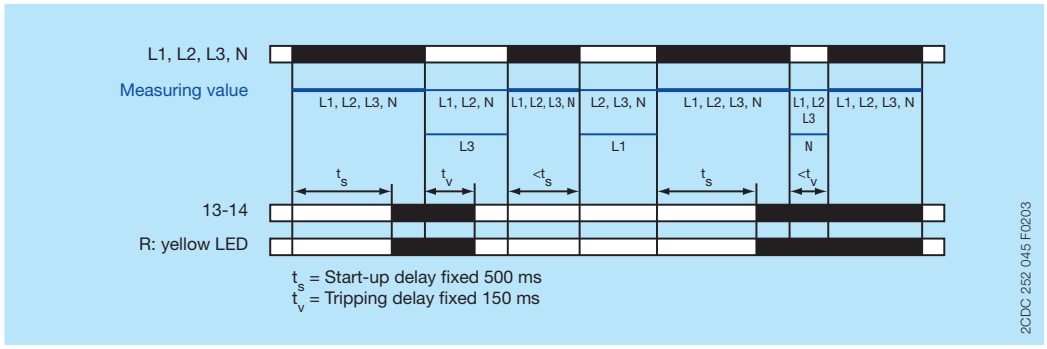
If all phases (and the neutral) are present, the output relay energizes after the fixed start-up delay t_s is complete.

If a phase failure occurs, the fixed tripping delay t_v starts. When timing is complete, the output relay de-energizes.

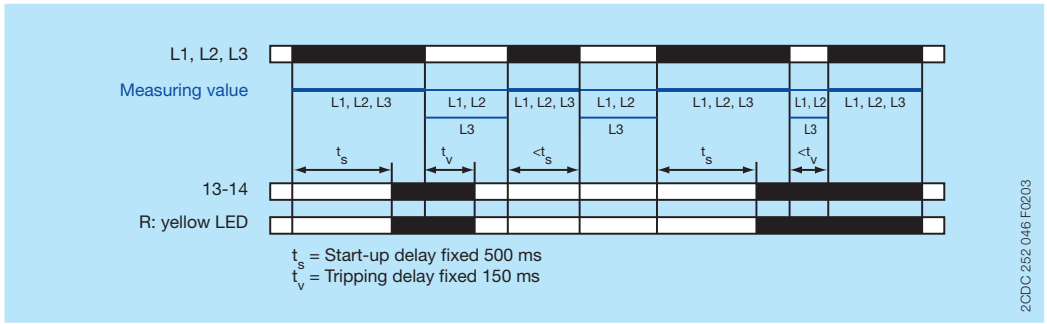
As soon as the voltage returns to the tolerance range, timing of t_s starts. When timing is complete, the output relay re-energizes automatically.

The LED R glows when the output relay is energized.

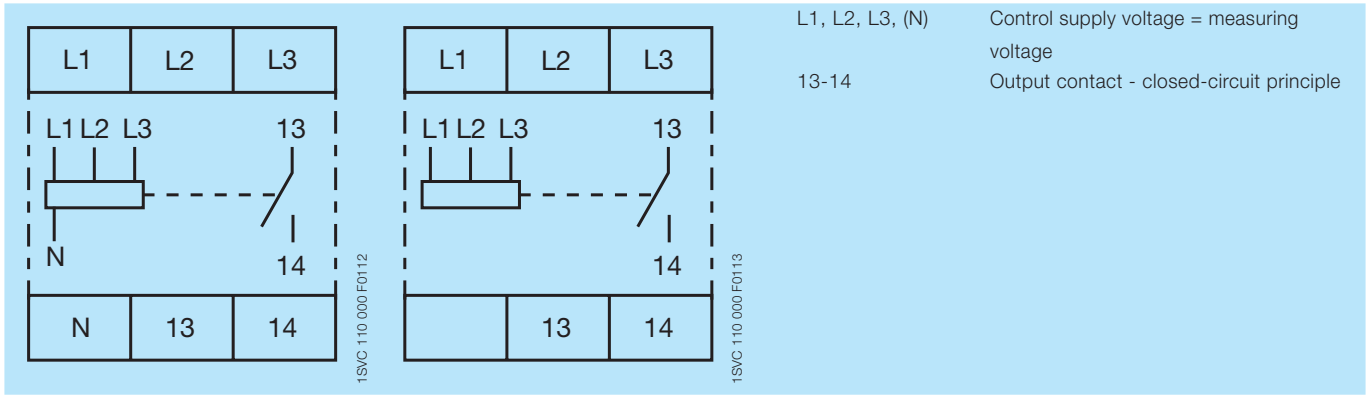
CM-PBE with neutral monitoring



CM-PBE without neutral monitoring



Electrical connection



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

Connection diagram CM-PBE with neutral monitoring

Connection diagram CM-PBE without neutral monitoring

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	

[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	■	■
	Interrupted neutral	■	-
Measuring ranges		3 x 380-440 V AC, 220-240 V AC	3 x 380-440 V AC
Thresholds	U_{min}	0.6 x U_n	
	U_{max}		
Hysteresis related to the threshold value		fixed 5 % (release value = 0.65 x U_n)	
Rated frequency of the measuring signal		50/60 Hz (-10...+10 %)	
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

Details see table ‚LEDs, status information and fault messages' on page 2 and ‚Function descriptions / diagrams' on page 3.

Output circuits

Kind of output	13-14	relay, 1 n/o contact
Operating principle		closed-circuit principle [2]
Contact material		AgCdO
Rated operational voltage U_e (IEC/EN 60947-1)		250 V
Minimum switching voltage / Minimum switching current		250 V DC, 250 V AC
Rated operational current I_e (IEC/EN 60947-5-1)	AC12 (resistive) at 230 V	4 A
	AC15 (inductive) at 230 V	3 A
	DC12 (resistive) at 24 V	4 A
	DC13 (inductive) at 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
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 (W x H x D)	product dimensions	22.5 x 78 x 78.5 mm (0.89 x 3.07 x 3.09 in)
	packaging dimensions	24 x 83 x 25 mm (0.94 x 3.27 x 0.98 in)
Weight	net weight	0.066 kg (0.146 lb)
	gross weight	0.078 kg (0.172 lb)
Mounting		DIN rail (IEC/EN 60715)
Mounting position		any
Degree of protection	housing	IP50
	terminals	IP20

Electrical connection

Wire size	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, cyclic (IEC 60068-2-30)		24 h cycle time, 55 °C, 93 % rel., 96 h
Operational reliability (IEC 68-2-6)		6 g
Mechanical resistance (IEC 68-2-6)		10 g

Isolation data

Rated insulation voltage U_i (VDE 0110, IEC/EN 60947-1)	supply circuit / measuring circuit / output circuit	400 V
Rated impulse withstand voltage U_{imp} (VDE 0110, IEC/EN 60664)	all isolated circuits	4 kV, 1.2/50 µs
Test voltage between all isolated circuits (routine test)		2.5 kV, 50 Hz, 1 min.
Pollution degree (VDE 0110, IEC/EN 60664, IEC/EN 60255-5)		3
Overvoltage category (VDE 0110, IEC/EN 60664, IEC/EN 60255-5)		III

Standards

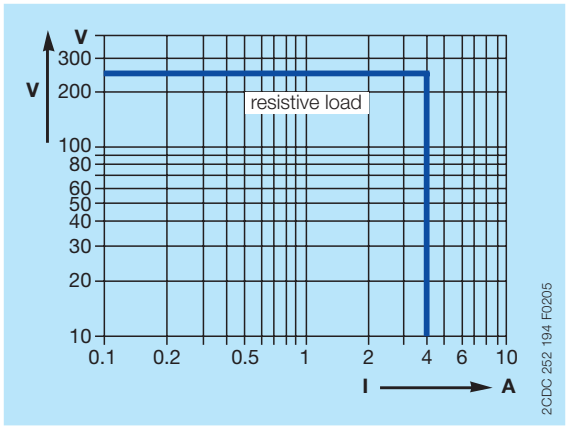
Product standard	IEC/EN 60255-6
Low Voltage Directive	2006/95/EC
EMC directive	2004/108/EC

Electromagnetic compatibility

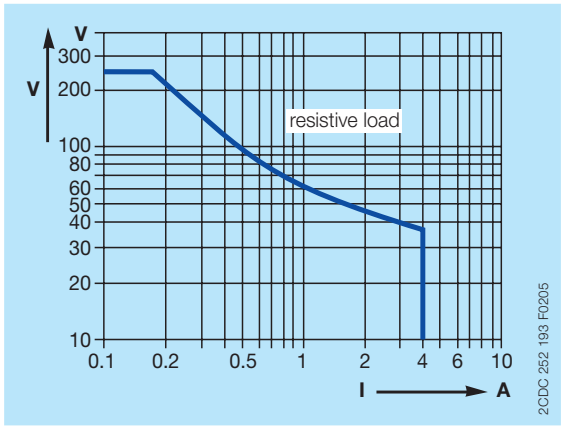
Interference immunity to		IEC/EN 61000-6-2
electrostatic discharge	IEC/EN 61000-4-2	Level 3 (6 kV / 8 kV)
radiated, radio-frequency, electromagnetic field	IEC/EN 61000-4-3	Level 3 (10 V/m)
electrical fast transient / burst	IEC/EN 61000-4-4	Level 3 (2 kV / 5 kHz)
surge	IEC/EN 61000-4-5	Level 4 (2 kV L-L)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

Technical diagrams

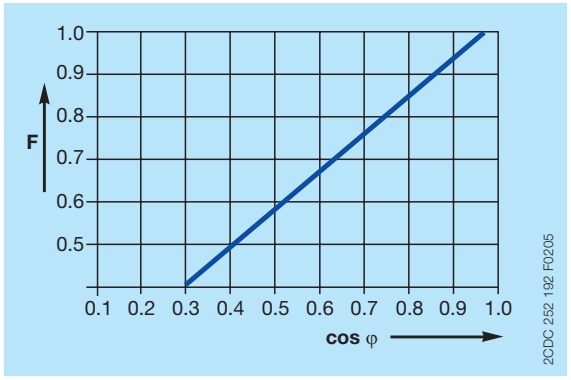
Load limit curves



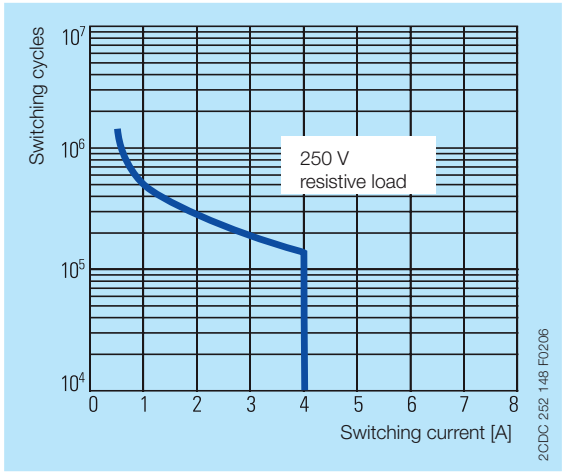
AC load (resistive)



DC load (resistive)



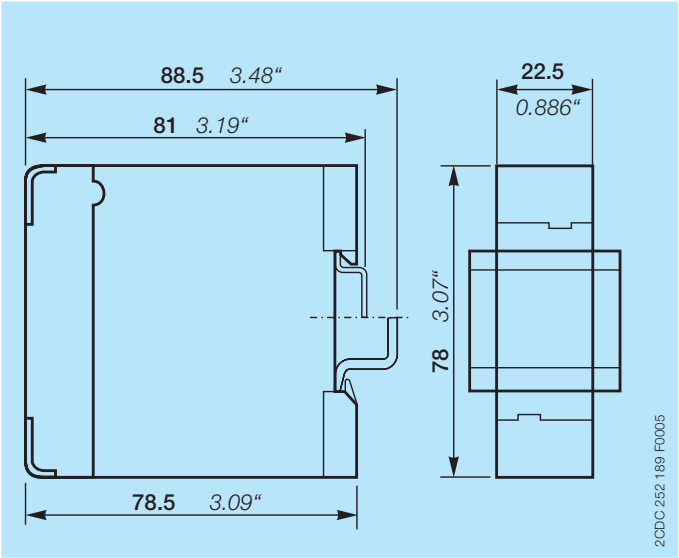
Derating factor F for inductive AC load



Contact lifetime

Dimensions

in **mm** and inches



Further documentation

Document title	Document type	Document number
Electronic products and relays	Technical catalogue	2CDC 110 004 C020x

You can find the documentation on the internet 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-PBx - Three Phase Monitors.

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