

# Three-phase monitoring relay

## CM-PBE

### Data sheet








CM-PBE

① R: yellow LED - relay status



#### Features

- Monitoring of three-phase mains for phase failure
- Device with possibility of neutral monitoring available
- Device with suitability for monitoring single-phase mains available
- Powered by the measuring circuit
- 1 n/o contact
- 1 LED for status indication

#### Approvals

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

#### Marks

-  CE
-  C-Tick

#### Order data

Type	Rated control supply voltage = measuring voltage	Neutral monitoring	Order code
CM-PBE	3x380-440 V AC, 220-240 V AC	yes	1SVR 550 881 R9400
CM-PBE	3x380-440 V AC	no	1SVR 550 882 R9500

#### Application

The CM-PBE are used to monitor supply voltages for phase failure ( $U_{meas} < 60 \% \times U_N$ ).

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.

#### Operating mode

Signalling is made by means of the front-face LED.

#### LED

Function	R: yellow LED
Output contact closed	┌───┐

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#### 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

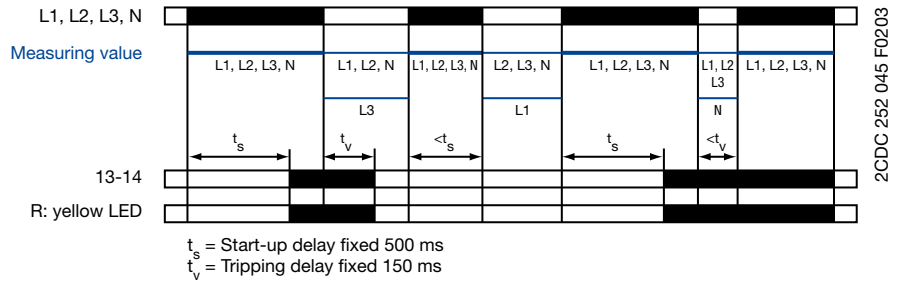
If all phases (and the neutral) are present, the output relay energizes after the fixed start-up delay  $t_s$  is complete.

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

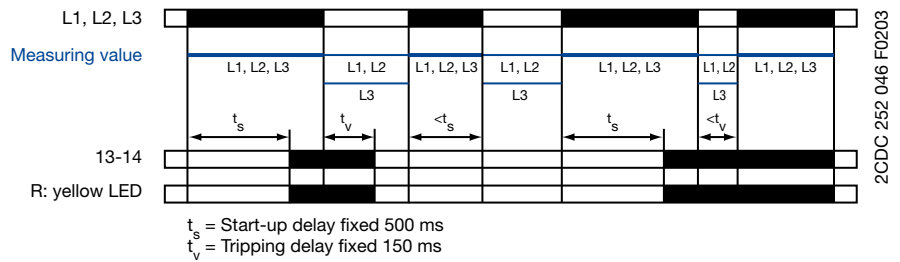
As soon as the voltage returns to the tolerance range, timing of  $t_s$  starts. When timing is complete, the output relay re-energizes automatically.

The LED R glows when the output relay is energized.

#### CM-PBE with neutral monitoring



#### CM-PBE without neutral monitoring

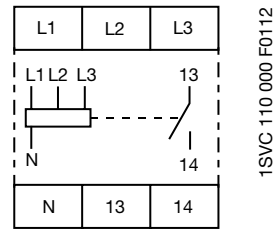


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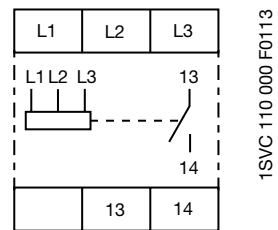
### Data sheet

#### Connection diagrams



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

#### CM-PBE with neutral monitoring



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

#### CM-PBE without neutral monitoring

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Type		CM-PBE <sup>1)</sup>	CM-PBE
<b>Supply circuit = measuring circuit</b>		<b>L1-L2-L3-N</b>	<b>L1-L2-L3</b>
Rated control supply voltage $U_s$ = measuring voltage		3x380-440 V AC, 220-240 V AC	3x380-440 V AC
Power consumption			
Rated control supply voltage $U_s$ tolerance			-15...+15 %
Rated frequency			50/60 Hz
Duty time			100 %
<b>Measuring circuit</b>		<b>L1-L2-L3-N</b>	<b>L1-L2-L3</b>
Monitoring functions	phase failure	■	■
	neutral	■	-
Measuring ranges		3x380-440 V AC, 220-240 V AC	3x380-440 V AC
Thresholds	$U_{min}$ $U_{max}$		$0.6 \times U_N$
Hysteresis related to the threshold value			fixed 5 % (release value = $0.65 \times U_N$ )
Measuring voltage frequency			50/60 Hz (-10 %...+10 %)
Response time			40 ms
Measuring error within rated control supply voltage tolerance			
Measuring error within temperature range			
<b>Timing circuit</b>			
Start-up delay $t_s$			fixed 500 ms ( $\pm 20$ %)
Tripping $t_v$			fixed 150 ms ( $\pm 20$ %)
<b>Indication of operational states</b>			
Relay status	R: yellow LED		┌ Output relay energized
<b>Output circuits</b>			<b>13-14</b>
Kind of output			1 n/o contact
Operating principle <sup>2)</sup>			closed-circuit principle
Contact material			AgCdO
Rated voltage (VDE 0110, IEC 60947-1)			250 V
Minimum switching voltage / Minimum switching current			- / -
Maximum switching voltage			250 V AC, 250 V DC
Rated operational current (IEC 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
Mechanical lifetime			$30 \times 10^6$ switching cycles
Electrical lifetime (AC12, 230 V, 4 A)			$0.1 \times 10^6$ switching cycles
Short-circuit proof, max. fuse rating	n/c contact		10 A fast-acting
	n/o contact		10 A fast-acting
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
<b>General data</b>			
Dimensions (W x H x D)			22.5 x 78 x 78.5 mm (0.89 x 3.07 x 3.09 inch)
Mounting position			any
Degree of protection	enclosure / terminals		IP50 / IP20
Mounting			DIN rail (EN 50022)
<b>Electrical connection</b>			
Wire size	fine-strand with wire end ferrule		$2 \times 0.75-1.5 \text{ mm}^2$ (2 x 18-16 AWG)
	fine-strand without wire end ferrule		$2 \times 1-1.5 \text{ mm}^2$ (2 x 18-16 AWG)
	rigid		$2 \times 0.75-1.5 \text{ mm}^2$ (2 x 18-16 AWG)
Stripping length			10 mm (0.39 inch)
Tightening torque			0.6-0.8 mm
<b>Environmental data</b>			
Ambient temperature range	operation / storage		-20...+60 °C / -40...+85 °C
Environmental testing (IEC 68-2-30)			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

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Type	CM-PBE <sup>1)</sup>	CM-PBE
<b>Isolation data</b>		
Rated insulation volt. between supply, measuring and output circuits (VDE 0110, IEC 60947-1)	400 V	
Rated impulse withstand voltage $U_{imp}$ between all isolated circuits (VDE 0110, IEC 664)	4 kV / 1.2 - 50 $\mu$ s	
Test voltage between all isolated circuits	2.5 kV, 50 Hz, 1 min.	
Pollution category (VDE 0110, IEC 664, IEC 255-5)	3	
Overvoltage category (VDE 0110, IEC 664, IEC 255-5)	III	
<b>Standards</b>		
Product standard	IEC 255-6, EN 60255-6	
Low Voltage Directive	2006/95/EC	
EMC Directive	2004/108/EC	
<b>Electromagnetic compatibility</b>		
Interference emission	EN 61000-6-2	
electrostatic discharge (ESD) IEC/EN 61000-4-2	Level 3 - 6 kV/ 8 kV	
electromagnetic field (HF radiation resistance) IEC/EN 61000-4-3	Level 3 - 10 V/m	
fast transients (Burst) IEC/EN 61000-4-4	Level 3 - 2 kV / 5 kHz	
powerful impulses (Surge) IEC 1000-4-5, EN 61000-4-5	Level 4 - 2 kV-L	
HF line emission IEC 1000-4-6, EN 61000-4-6	Level 3 - 10 V	
Interference emission	EN 61000-6-4	

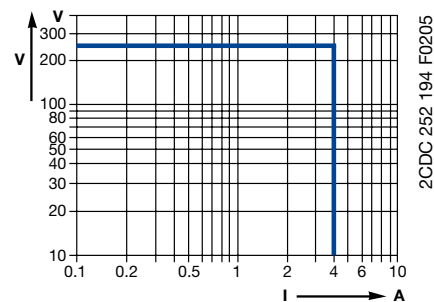
<sup>1)</sup> Device with neutral monitoring: The external conductor voltage towards the neutral conductor is measured.

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

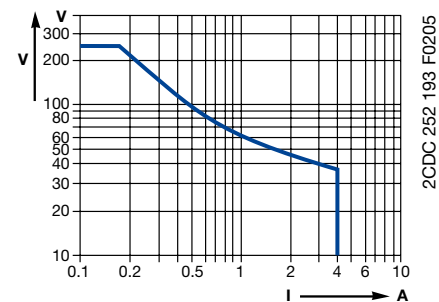
## Technical diagrams

### Load limit curves

#### AC load (resistive)

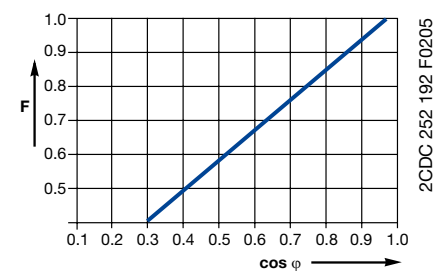


#### DC load (resistive)

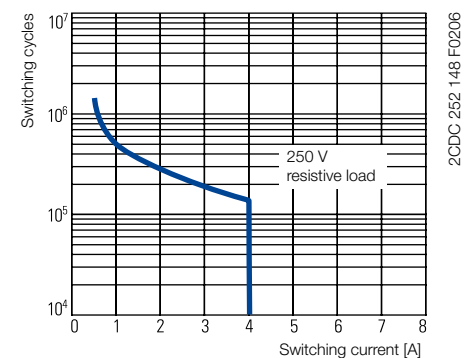


### Derating factor F

#### at inductive AC load



### Contact lifetime



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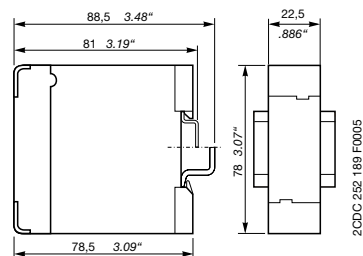
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#### Dimensions

in mm



#### Further documentation

Document title	Document type	Document number
Electronic Products and Relays	Technical catalogue	2CDC 110 004 C020x

You can find the documentation online at [www.abb.com/lowvoltage](http://www.abb.com/lowvoltage) → Control Products → ...



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