Three-phase monitoring relay CM-PFE

Data sheet



① R: yellow LED - relay status

Features

- Monitoring of three-phase mains for phase sequence and phase failure
- Powered by the measuring circuit
- 1 c/o (SPDT) contact
- 1 LED for status indication

Approvals

^с UL 508, CAN/CSA C22.2 No.14

[™] GOST

CB scheme

© CCC

Marks

CE CE

C-Tick

Order data

| Туре | Rated control supply voltage = measuring voltage | Order code |
|--------|--|--------------------|
| | | |
| CM-PFE | 3x208-440 V AC | 1SVR 550 824 R9100 |

Application

The CM-PFE is used to monitor three-phase mains for incorrect phase sequence and phase failure.

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

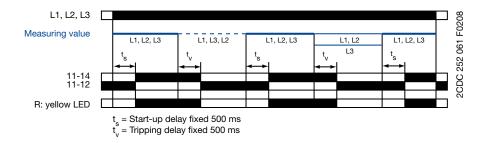
Function diagram legend

- Control supply voltage not applied / Output contact open / LED off
- Control supply voltage applied / Output contact closed / LED glowing

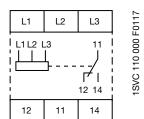
Phase sequence and phase failure monitoring

If all phases are present with the correct phase sequence, the output relay energizes after the fixed start-up delay $\mathbf{t_s}$ is complete.

If a phase failure or a phase sequence error occurs, the fixed tripping delay t_v starts. When timing is complete, the output relay de-energizes. The LED R glows when the output relay is energized. In case of motors which continue running with only two phases, the CM-PFE detects phase failure if the reverse fed voltage is less than 60 % of the originally applied voltage.



Connection diagram



L1, L2, L3 11-12/14 Control supply voltage = measuring voltage Output contact - closed-circuit principle

CM-PFE



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| Supply prioried = measuring circuit 1.1.2.1.3 Rated control supply voltage 3.208.440 V AC | Туре | CM-PFE | |
|---|---|--|--|
| Rated control supply voltage U = measuring voltage 3x08-440 V AC Approx. 15 V A Rated control supply voltage U tolerance 1-0.+10 % Rated frequency 50x60 Hz (-10.10 %) 100 % | | | |
| Power consumption | | - | |
| Rated requency S000 Hz (-10+10 % | | | |
| Rated frequency S0/60 Hz (-10+10 %) | | | |
| Duty time | 117 0 3 | | |
| Measuring structions | | · | |
| Measuring ranges | · | | |
| Phase sequence Pha | | - | |
| Measuring ranges | | | |
| Thresholds | | - | |
| Hysteresis related to the threshold value Hysteresis related to the threshold value S0.6 × U _N | Measuring ranges | | |
| Value Val | Threeholds | 110 V AU | |
| Hysteresis related to the threshold value Measuring vottage frequency 50/60 Hz | | 0.6 x U _N | |
| Measuring voltage frequency 50/60 Hz Response time 500 ms Measuring error within rated control supply voltage tolerance ≤ 0.5 % Measuring error within temperature range ≤ 0.06 % /* C Timing circuit fixed 500 ms Start-up delay t, fixed 500 ms fixed 500 ms Indication of operational states Indication of operational states Relay status R: yellow LED Output relay energized Output circuits 1 -0 (sPPIT) contact Kind of output 1 -0 (sPPIT) contact Contact material AQC40 Rated voltage (VIDE 0110, IEC 60947-1) 250 V Maximum switching voltage / Minimum switching current -7 - Maximum switching voltage / Minimum switching current -7 - Maximum switching voltage / Minimum switching current -7 - Maximum switching voltage / Minimum switching voltage 250 VAC, 250 V DC Rated operational current AC12 (resistive) 230 V 4 A McC16 (inductive) 230 V 3 A 4 A McC21 (resistive) 230 V 3 A 10 -1 x 10* switching cycles Electrical lifetime (AC12, 230 V, 4 A) | U _{max} | 17 | |
| Response time | • | | |
| Measuring error within rated control supply voltage tolerance ≤ 0.6 % /*C Measuring error within temperature range ≤ 0.06 % /*C Timing circuit fixed 500 ms Start-up delay t _s fixed 500 ms Indication of operational states Indication of operational states Relay status R: yellow LED Output circuits 1 c/o (SPDT) contact Coperating principle ** closed-circuit principle Contact material AgCdO Rated voltage (VIDE 0110, IEC 60947-1) 250 V Maximum switching voltage / Minimum switching ourrent - / - Maximum switching voltage / Minimum switching outlage 250 V AC, 250 V DC Rated object of control ourrent (IEC 60947-5-1) AC12 (resistive) 230 V 4 A AC15 (inductive) 230 V 3 A 4 A DC12 (resistive) 230 V 3 A 4 A Mechanical lifetime 30 x 10° switching cycles Electrical lifetime (AC12, 230 V, 4 A) 0.1 x 10° switching cycles Short-circuit proof, n/c contact n/c contact 10 A fast-acting AC rating Utilization category (Control Circuit Rating Code) B 300 6 A | | 50/60 Hz | |
| Measuring error within temperature range ≤ 0.06 % / °C Timing circuit | Response time | 500 ms | |
| Timing circuit Start-up delay t | Measuring error within rated control supply voltage tolerance | ≤ 0.5 % | |
| Start-up delay t | Measuring error within temperature range | ≤ 0.06 % / °C | |
| Tripping t, fixed 500 ms Indication of operational states Relay status R: yellow LED Toutput relay energized | Timing circuit | | |
| Indication of operational states Relay status R: yellow LED Output relay energized | Start-up delay t _s | fixed 500 ms | |
| Relay status | Tripping t, | fixed 500 ms | |
| Number Content | Indication of operational states | | |
| Turn | Relay status R: yellow LED | Output relay energized | |
| Note of output | Output circuits | | |
| Contact material | - | 1 c/o (SPDT) contact | |
| AgCdO | · | , , | |
| Rated voltage (VDE 0110, IEC 60947-1) | | · | |
| Minimum switching voltage Minimum switching current 250 V AC, 250 V DC | | | |
| Maximum switching voltage | | | |
| Rated operational current (IEC 60947-5-1) | | , | |
| AC15 (inductive) 230 V DC12 (resistive) 24 V 4 A | | , | |
| DC12 (resistive) 24 V | | | |
| DC13 (inductive) 24 V 2 A | | - | |
| Mechanical lifetime 30 x 10° switching cycles | , , | | |
| Electrical lifetime (AC12, 230 V, 4 A) | | | |
| Short-circuit proof, max. fuse rating | | <u> </u> | |
| max. fuse rating 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 General data 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 Mounting DIN rail (EN 50022) Electrical connection Wire size fine-strand with wire end ferrule 2 x 0.75-1.5 mm² (2 x 18-16 AWG) Wire size fine-strand without wire end ferrule 2 x 1-1.5 mm² (2 x 18-16 AWG) Stripping length 10 mm (0.39 inch) Tight of the properature range 0.6-0.8 mm Environmental data 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) | | | |
| AC rating (UL 508) | | Ÿ | |
| CUL 508 max. rated operational voltage max. continuous thermal current at B 300 5 A max. making/breaking apparent power at B 300 3600/360 VA | | <u> </u> | |
| max. continuous thermal current at B 300 5 A max. making/breaking apparent power at B 300 3600/360 VA General data 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) 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) fine-strand without wire end ferrule 2 x 0.75-1.5 mm² (2 x 18-16 AWG) Stripping length 10 mm (0.39 inch) Tightening torque 0.6-0.8 mm Environmental data 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 | | | |
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| Dimensions (W x H x D) Mounting position Degree of protection Mounting Degree of protection Mounting DIN rail (EN 50022) Electrical connection Wire size fine-strand with wire end ferrule fine-strand without wire end ferrule rigid 2 x 0.75-1.5 mm² (2 x 18-16 AWG) rigid 2 x 0.75-1.5 mm² (2 x 18-16 AWG) Stripping length Tightening torque Environmental data Ambient temperature range operation / storage Environmental testing (IEC 68-2-30) Operational reliability (IEC 68-2-6) DIN rail (EN 50022) 2 x 0.75-1.5 mm² (2 x 18-16 AWG) 2 x 0.75-1.5 mm² (2 x 18-16 AWG) 10 mm (0.39 inch) | 0 011 1 | 3600/360 VA | |
| Mounting position any Degree of protection enclosure / terminals Mounting DIN rail (EN 50022) 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 inch) Tightening torque 0.6-0.8 mm Environmental data -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 | | | |
| Degree of protection enclosure / terminals IP50 / IP20 | | | |
| DIN rail (EN 50022) Electrical connection | | | |
| 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 inch) Tightening torque 0.6-0.8 mm Environmental data -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 | - | | |
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| 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 inch) Tightening torque 0.6-0.8 mm Environmental data -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 | | | |
| rigid 2 x 0.75-1.5 mm² (2 x 18-16 AWG) Stripping length 10 mm (0.39 inch) Tightening torque 0.6-0.8 mm Environmental data -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 | | , | |
| Stripping length Tightening torque Environmental data Ambient temperature range Environmental testing (IEC 68-2-30) Operational reliability (IEC 68-2-6) Operational reliability (IEC 68-2-6) | fine-strand without wire end ferrule | | |
| Tightening torque 0.6-0.8 mm Environmental data Ambient temperature range operation / storage 24 h cycle time, 55 °C, 93 % rel., 96 h Operational reliability (IEC 68-2-6) 6 g | | 2 x 0.75-1.5 mm ² (2 x 18-16 AWG) | |
| Environmental data Ambient temperature range operation / storage | | 10 mm (0.39 inch) | |
| Ambient temperature range operation / storage | Tightening torque | 0.6-0.8 mm | |
| Environmental testing (IEC 68-2-30) 24 h cycle time, 55 °C, 93 % rel., 96 h Operational reliability (IEC 68-2-6) 6 g | Environmental data | | |
| Operational reliability (IEC 68-2-6) 6 g | Ambient temperature range operation / storage | -20+60 °C / -40+85 °C | |
| Operational reliability (IEC 68-2-6) 6 g | Environmental testing (IEC 68-2-30) | | |
| | | • | |
| | | 10 g | |



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Data sheet

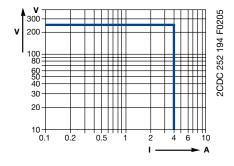
| Time | OM DEE | |
|--|------------------------|--|
| Туре | CM-PFE | |
| Isolation data | | |
| Rated insulation volt. between supply, measuring and output circuits (VDE 0110, IEC 60947-1) | 500 V | |
| Rated impulse withstand voltage U _{imp} between all isolated circuits (VDE 0110, IEC 664) | 4 kV / 1.2 - 50 μs | |
| 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 | |
| Standards | | |
| Product standard | IEC 255-6, EN 60255-6 | |
| Low Voltage Directive | 2006/95/EC | |
| EMC Directive | 2004/108/EC | |
| Electromagnetic compatibility | | |
| 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 kVL-L | |
| HF line emissission IEC 1000-4-6, EN 61000-4-6 | Level 3 - 10 V | |
| Interference emission | EN 61000-6-4 | |

¹⁾ Closed-circuit principle: Output relay is de-energized if the measured value exceeds/drops below the adjusted threshold.

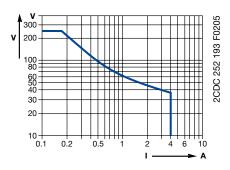
Technical diagrams

Load limit curves

AC load (resistive)

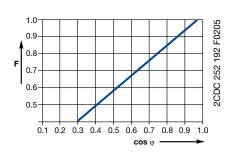


DC load (resistive)

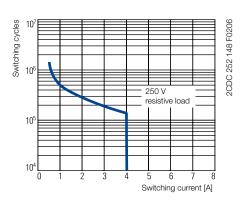


Derating factor F

at inductive AC load



Contact lifetime

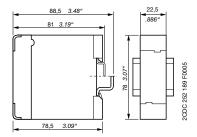




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Dimensions

in mm



Further documentation

| Document title | Document type | Document number |
|--------------------------------|---------------------|--------------------|
| | | |
| Electronic Products and Relays | Technical catalogue | 2CDC 110 004 C020x |
| CM-PAS, CM-PFE, CM-PSS, CM-PVS | Instruction manual | 1SVC 630 510 M0000 |

You can find the documentation online at www.abb.com/lowvoltage \rightarrow Control Products $\rightarrow ...$





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