



Film Capacitors – Power Factor Correction

PoleCap (1 to 8 kvar - Dry Type)

Series/Type: MKK
Ordering code: B25671L*
Date: 2018-06-22
Version: 2

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Construction

- Dielectric: Polypropylene film
- Gas Impregnated / dry type
- Stack construction
- Wave cut
- Extruded round aluminum can with stud
- Provided with discharge resistors
- Overpressure disconnecter

Features

- Three phase, delta connected
- Self-healing technology
- Naturally air cooled (or forced air cooling)
- Outdoor mounting

Typical applications

- For Pole mounted Power Factor Correction application

Terminals

- Isolated IP 54 protected with flexible cable

Mounting parts

- Threaded stud at bottom of can
- (max. torque = 10 Nm for M12)



Technical data and specifications

Characteristics	
Rated capacitance (C_R)	As specified in table on page 6
Tolerance	-5/+10%
Connection	D (Delta)
Rated voltage (V_R)	440 V_{rms}
Rated frequency (f_R)	50 Hz
Power (Q)	As specified in table on page 6
Rated current (I_R)	As specified in table on page 6
Dielectric losses	≤ 0.2 W / kvar

Maximum ratings	
Maximum permissible voltage (V_{max})	$V_R + 10\%$ (up to 8 h daily) $V_R + 15\%$ (up to 30 min daily) $V_R + 20\%$ (up to 5 min daily) $V_R + 30\%$ (up to 1 min daily)
Maximum permissible current (I_{max})	Up to $1.3 \cdot I_R$ (A) including combined effects of harmonics, overvoltage's and capacitance tolerance
Maximum inrush current (I_S)	$300 \cdot I_R$ (A)

Test data	
Voltage test between terminals (V_{TT})	$2.15 \cdot V_R$, V AC, 2s
Voltage test between terminals and container (V_{TC})	3600 V AC / 50 Hz, 2 s
* Total losses (rated voltage and frequency)	≤ 0.5 W / kvar
* Without discharge resistor & cable	

Climatic category -10/D	
Minimum operating temperature (T_{min})	-10 °C
Maximum operating temperature (T_{max})	+55 °C
Storage temperature	-40 °C to 85 °C
Maximum hotspot temperature	85 °C
Relative humidity	Max. 95%
Maximum altitude	4000 m above sea level

Mean life expectancy	
t_{LD}	Up to 130000 hours (temperature class -10/D) ; $\theta_{HS} \leq 70$ °C
Max. 7500 switching per year	

Design data	
Dimensions (D x H)	As specified in table on page 5
Impregnation	Non PCB, dry, inert gas
Fixing	Threaded bolt M12
Mounting position	Vertical upright / horizontal position

Terminals

Protection degree	IP 54
Max. torque	10 Nm

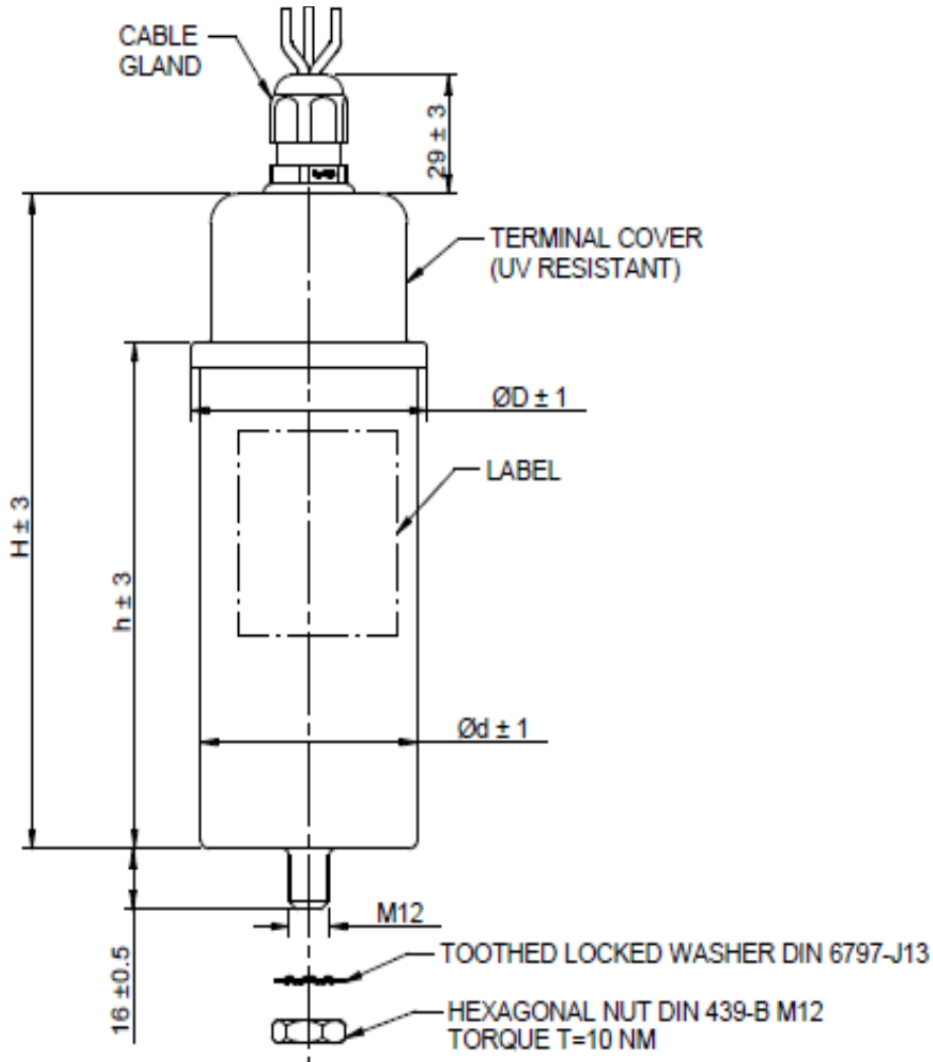
Safety

Mechanical safety	Overpressure disconnecter
Max. short circuit current	AFC: 10 kA
Discharge resistor time	≤ 1 min (up to 50 V dc residual voltage)

Reference Standards

IS 13340 (2012) / IEC 60831 (2002), IEC60831–1/2.

Dimensional drawings



Ordering code

Ordering code	Rated capacitance C_R μF	Rated voltage V_R V	Output & Rated current at 50Hz I_R		Output & Rated current at 60Hz I_R		Dimensions (D × H) mm	Cable Cross-section & length
			kvar	A	kvar	A		
B25671L4012P040	3 x 5.5	440	1.0	1.3	1.2	1.6	68.8 x 174	1 Sq.mm/1.5 m
B25671L4022P040	3 x 11.0	440	2.0	2.6	2.4	3.1	68.8 x 174	1.5 Sq.mm/1.5 m
B25671L4032P040	3 x 16.4	440	3.0	3.9	3.6	4.7	68.8 x 174	2.5 Sqmm/1.5 m
B25671L4042P040	3 x 21.9	440	4.0	5.2	4.8	6.3	68.8 x 196	2.5 Sq.mm/1.5 m
B25671L4052P040	3 x 27.4	440	5.0	6.6	6.0	7.9	68.8 x 196	2.5 Sq.mm/1.5 m
B25671L4062P040	3 x 32.9	440	6.0	7.9	7.2	9.4	68.8 x 234	2.5 Sq.mm/1.5 m
B25671L4072P040	3 x 38.4	440	7.0	9.2	8.4	11.0	68.8 x 234	2.5 Sq.mm/1.5 m
B25671L4082P040	3 x 43.8	440	8.0	10.5	9.6	12.6	68.8 x 252	2.5 Sq.mm/1.5 m

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Cautions and warnings

- In case of dents of more than 1 mm depth or any other mechanical damage, capacitors must not be used at all.
- To ensure the full functionality of the overpressure disconnecter, elastic elements must not be hindered and a minimum space of 12 mm has to be kept above each capacitor.
- Do not handle the capacitor before it is discharged.
- Resonance cases must be avoided by appropriate application design in any case.
- Handle capacitors carefully, because they may still be charged even after disconnection due to faulty discharging devices.
- Protect the capacitor properly against over current and short circuit.
- Failure to follow cautions may result worst case, in premature failures, bursting and fire.

Discharging

Capacitors must be discharged to a maximum of 10% of rated voltage before they are switched in again. This prevents an electric impulse discharge in the application, influences the capacitor's service life and protects against electric shock. The capacitor must be discharged to 50 V or less within 1 minute. There must be not any switch, fuse or any other disconnecting device in the circuit between the power capacitor and the discharging device. PhiCap-capacitors have a pre-mounted ceramic discharge module; alternatively discharge reactors are available from EPCOS. Discharge and short circuit capacitor before handling!

Service life expectancy

Electrical components do not have an unlimited service life expectancy; this applies to self-healing capacitors too. The maximum service life expectancy may vary depending on the application the capacitor is used in.

Safety

Electrical or mechanical misapplication of capacitors may be hazardous. Personal injury or property damage may result from bursting of the capacitor or from expulsion of oil or melted material due to mechanical disruption of the capacitor.

- Ensure good, effective grounding for capacitor enclosures.
- Provide means of disconnecting and insulating a faulty component/bank.
- The terminals of capacitors, connected bus bars and cables as well as other devices may also be energized.
- Follow good engineering practice.

Thermal load/over-temperature

After installation of the capacitor it is necessary to verify that maximum hot-spot temperature is not exceeded at extreme service conditions.

Overpressure disconnecter

To ensure full functionality of an overpressure disconnecter, the following must be observed:

1. The elastic elements must not be hindered, i.e.
 - Connecting lines must be flexible leads (cables).
 - There must be sufficient space (min. 12 mm) for expansion above the connections. This will enable a longitudinal extension of the can to secure the overpressure disconnecter work.
 - Folding beads must not be retained by clamps.
2. Stress parameters of the capacitor must be within the IEC60831 specification.

Overcurrent and short circuit protection

- Use HRC fuses or MCCBs for short circuit protection. Short circuit protection and connecting cables should be selected so that 1.5 times the rated capacitor current can be permanently handled.
- HRC fuses do not protect a capacitor against overload – they are only for short circuit protection.
- The HRC fuse rating should be 1.6 to 1.8 times rated capacitor current.
- Do not use HRC fuses to switch capacitors (risk of arcing).
- Use thermal magnetic over current relays for overload protection.

Resonance cases

Resonance cases must be avoided by appropriate application design in any case. Maximum total RMS capacitor current (incl. fundamental harmonic current) specified in technical data must not be exceeded.

Re-switching vs. phase-opposition

In case of voltage interruption, a sufficient discharge time has to be ensured to avoid phase-opposition and resulting high inrush currents.

Vibration resistance

The resistance to vibration of capacitors corresponds to IEC 68, part 2–6.

Max. test conditions:

Test duration	6 h*
Frequency range 1	10 ... 55 Hz*
Displacement amplitude	0.75 mm*

*corresponding to max. 98.1 m/s or 10 g

These figures apply to the capacitor alone. Because the fixing and the terminals may influence the vibration properties, it is necessary to check stability when a capacitor is built in and exposed to vibration. Irrespective of this, you are advised not to locate capacitors where vibration amplitude reaches the maximum in strongly vibrating equipment.

Mechanical protection

The capacitor has to be installed in a way that mechanical damages and dents in the aluminum can be avoided.

Grounding

The threaded bottom stud of the capacitor has to be used for grounding. In case grounding is done via metal chassis that the capacitor is mounted to, the layer of varnish beneath the washer and nut should be removed. The maximum tightening torque is 4Nm for M8 & 10 Nm for M12 stud.

Maintenance

- Check tightness of the connections/terminals periodically.
- Take current reading twice a year and compare with nominal current. Use a harmonic analyser or true effective RMS-meter.
- In case of current above the nominal current check your application for modifications.
- If a significant increase in the amount of non-linear loads has been detected, then a consultant has to be called in for a harmonic study.
- In case of the presence of harmonics installation of a de-tuned capacitor bank (reactors) must be considered.
- Check the temperature of capacitors directly after operation for a longer period, but make sure that the capacitors have been switched off. In case of excessive temperature of individual capacitors, it is recommended to replace these capacitors, as this should be an indication for loss factor increase, which is a sign for reaching end of life.

Storage and operating conditions

Do not use or store capacitors in corrosive atmosphere, especially where chloride gas, sulfide gas, acid, alkali, salt or the like are present. In dusty environments regular maintenance and cleaning especially of the terminals is required to avoid conductive path between phases and/or phases and ground.

Note

For detailed information about PFC capacitors and cautions, refer to the latest version of EPCOS PFC Product Profile.

Important notes

The following applies to all products named in this publication:

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Important notes

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Release 2018-06