



Film Capacitors – Power Factor Correction

SquareCap_ EPCOS Heavy Duty Long Life (EHDLL)

Series/Type:
Ordering code: B32459L
Date: 2019-05-03
Version: 11.0

Construction

- Dielectric: Polypropylene film
- Semi dry; high viscosity PU resin; non-PCB
- Container type/finish: MS sheet metal / powder coated grey colour

Features

- Three phase
- Self-healing technology
- Naturally air cooled or forced
- Over pressure disconnector
- Discharge resistor

Typical applications

- For Power Factor Correction

Terminals

- Stud terminals with ceramic bushing

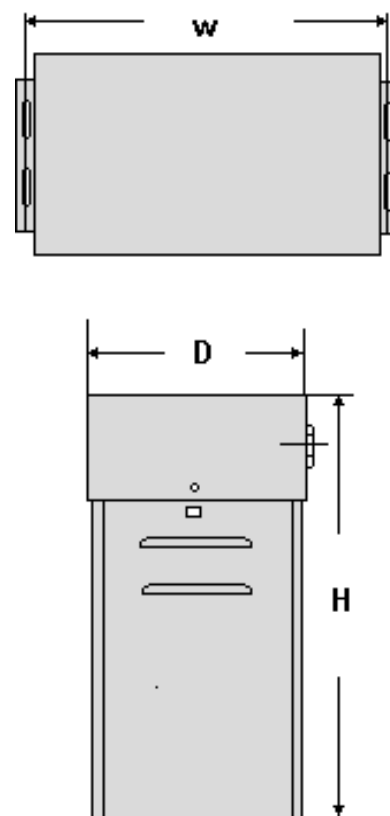
Mounting parts

- Mounting plates at bottom

Technical data and specifications

Characteristics	
Rated capacitance C_R	As per table
Tolerance	0 /+10%
Connection	D (Delta)
Rated voltage	As per table
Rated frequency f_R	50 Hz
Output	As per table
Rated current I_R	As per table
$\tan \delta_0$ (dielectric)	$\leq 0.2 \text{ W / kvar}$

Maximum ratings	
V_{\max} (up to 8 h daily)	$(V_R+10\% V_R) \text{ V AC}$
V_{\max} (up to 1 min)	$(V_R+30\% V_R) \text{ V AC}$
I_{\max}	$1.5 \cdot I_R \text{ (A)}$
I_P	$250 \cdot I_R \text{ (A)}$


Dimensional drawing


Test data	
V_{TT}	$2.15 \cdot V_r$, AC, for 2 s
V_{TC}	3600 V AC; for 2 s
* Losses (single phase cell)	≤ 0.5 W / kvar
* Without discharge resistor	

Climatic category / -10/D	
T_{min}	-10 °C
T_{max}	+55 °C
Storage temperature	-10 °C to 85 °C
Hotspot temperature	85 °C
Rel. humidity	av. < 95%
Maximum altitude	4000 m

Mean life expectancy	
t_{LD}	Up to 125000 hours
Max. 5000 switching per year to IEC 60831	

Design data	
Dimensions (H x W x D)	As per table
Impregnation	Biodegradable soft resin
Fixing	Mounting plates
Mounting position	Vertical position. See "Maintenance and Installation Manual" for further details.

Safety	
Mechanical safety	Overpressure disconnecter
Max. short circuit current	AFC: 10 kA
Discharge resistor time	≤ 1 min (50 V)

Reference Standards	
IS: 13340/41 (ISI mark applicable for 400 V, 415 V & 440 V up to 50 kvar)	

Ordering codes:

Volts V	Power kvar	Capacitance µF	Rated Current A	Dimension (mm)			Ordering code
				H	W	D	
415	1	6.3	1.4	170	125	45	B32459L4001A011
	2	12.5	2.8	170	125	45	B32459L4002A011
	3	19	4.2	240	185	60	B32459L4003A011
	4	25	5.6	240	185	60	B32459L4004A011
	5	31	7.0	240	185	60	B32459L4005A011
	7	46.5	10.4	300	240	80	B32459L4007A011
	7.5	49.5	10.4	300	240	80	B32459L4007A511
	10	62	13.9	300	240	80	B32459L4010A011
	12.5	77	17.4	300	240	80	B32459L4012A511
	15	92	20.9	300	240	80	B32459L4015A011
	20	124	27.8	300	240	160	B32459L4020A011
	25	154	34.8	300	240	160	B32459L4025A011
	30	185	41.7	300	240	160	B32459L4030A011
	40	248	55.6	350	240	320	B32459L4040A011
50	308	69.6	350	240	320	B32459L4050A011	
440	1	5.5	1.3	170	125	45	B32459L5001A011
	2	11	2.6	170	125	45	B32459L5002A011
	3	16.5	3.9	240	185	60	B32459L5003A011
	4	22	5.2	240	185	60	B32459L5004A011
	5	27.5	6.6	240	185	60	B32459L5005A011
	6	33	7.9	300	240	80	B32459L5006A011
	7	38.5	9.2	300	240	80	B32459L5007A011
	7.5	41.5	9.8	300	240	80	B32459L5007A511
	8	44	10.5	300	240	80	B32459L5008A011
	9	50	11.8	300	240	80	B32459L5009A011
	10	55	13.1	300	240	80	B32459L5010A011
	12	67.5	15.8	300	240	80	B32459L5012A011
	12.5	69	16.4	300	240	80	B32459L5012A511
	15	82.5	19.7	300	240	80	B32459L5015A011
	20	110	26.2	300	240	160	B32459L5020A011
	25	138	32.8	300	240	160	B32459L5025A011
	30	165	39.4	300	240	160	B32459L5030A011
	40	220	52.5	350	240	320	B32459L5040A011
50	274	65.6	350	240	320	B32459L5050A011	
60	330	78.7	350	240	320	B32459L5060A011	

Volts V	Power kvar	Capacitance µF	Rated Current A	Dimension (mm)			Ordering code
				H	W	D	
480	1	5	1.2	170	125	45	B32459L8001A061
	2	9.5	2.4	170	125	45	B32459L8002A061
	4	18.5	4.8	240	185	60	B32459L8004A061
	5	23	6.0	240	185	60	B32459L8005A061
	5.5	25.3	6.6	215	185	60	B32459L8005A561
	6	28	7.2	300	240	80	B32459L8006A061
	7.5	34.5	9.0	300	240	80	B32459L8007A561
	8	37.5	9.6	300	240	80	B32459L8008A061
	8.3	38.2	10.0	300	240	80	B32459L8008A361
	9	41.5	10.8	300	240	80	B32459L8009A061
	10	46.5	12.0	300	240	80	B32459L8010A061
	11.1	51.1	13.4	300	240	80	B32459L8011A161
	12	55.5	14.4	300	240	80	B32459L8012A061
	12.5	58	14.4	300	240	80	B32459L8012A561
	13.8	63.6	16.6	300	240	80	B32459L8013A861
	14.5	67.5	17.4	300	240	80	B32459L8014A561
	15	69	18.0	300	240	80	B32459L8015A061
	16.6	76.4	20.0	300	240	160	B32459L8016A661
	18	83	21.7	300	240	160	B32459L8018A061
	20	93	24.1	300	240	160	B32459L8020A061
22.1	101.7	26.6	300	240	160	B32459L8022A161	
25	116	30.1	300	240	160	B32459L8025A061	
27.7	127.5	33.3	300	240	160	B32459L8027A761	
29	135	34.9	300	240	160	B32459L8029A061	
50	232	60.1	350	240	320	B32459L8050A061	
55	254	66.16	350	240	320	B32459L8055A061	

Volts V	Power kvar	Capacitance µF	Rated Current A	Dimension (mm)			Ordering code
				H	W	D	
525	6.6	25.4	7.3	300	240	80	B32459L6006A611
	9.9	38.1	11.0	300	240	80	B32459L6009A911
	10	38.5	11.0	300	240	80	B32459L0010A011
	12.5	48	13.7	300	240	80	B32459L0012A511
	13.2	50.8	14.5	300	240	80	B32459L6013A211
	15	58	16.5	300	240	80	B32459L0015A011
	16.6	63.9	18.3	300	240	160	B32459L6016A611
	19.9	76.6	22.0	300	240	160	B32459L6019A911
	20	77	22.0	300	240	160	B32459L0020A011
	25	96	27.5	300	240	160	B32459L0025A011
	26.5	102.0	29.1	300	240	160	B32459L6026A511
	30	116	33.0	300	240	160	B32459L0030A011
	33.1	127.4	36.4	300	240	160	B32459L6033A111
600	50	192	55.0	350	240	320	B32459L0050A011
	25	74	24.1	300	240	160	B32459L7025A 11

Display of ordering codes for TDK Electronics products

The ordering code for one and the same product can be represented differently in data sheets, data books, other publications, on the company website, or in order-related documents such as shipping notes, order confirmations and product labels. **The varying representations of the ordering codes are due to different processes employed and do not affect the specifications of the respective products.** Detailed information can be found on the Internet under www.tdk-electronics.tdk.com/orderingcodes.

Cautions and warnings

- In case of dents or any other mechanical damage, capacitors must not be used at all.
- This applies also in cases of oil leakages.
- 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 basic cell.
- 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. SquareCap-capacitors have a pre-mounted ceramic discharge module;. 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.
2. The maximum allowed fault current of 10000 A in accordance with UL 810 standard must be assured by the application.
3. Stress parameters of the capacitor must be within the IS 13340 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

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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 are avoided.

Grounding

The bolt of the capacitor top cover 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.

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 TDK PFC Square Cap Product Profile.

Important notes

The following applies to all products named in this publication:

1. Some parts of this publication contain **statements about the suitability of our products for certain areas of application**. These statements are based on our knowledge of typical requirements that are often placed on our products in the areas of application concerned. We nevertheless expressly point out **that such statements cannot be regarded as binding statements about the suitability of our products for a particular customer application**. As a rule we are either unfamiliar with individual customer applications or less familiar with them than the customers themselves. For these reasons, it is always ultimately incumbent on the customer to check and decide whether a product with the properties described in the product specification is suitable for use in a particular customer application.
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3. **The warnings, cautions and product-specific notes must be observed.**
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Important notes

8. The trade names EPCOS, CeraCharge, CeraDiode, CeraLink, CeraPad, CeraPlas, CSMP, CTVS, DeltaCap, DigiSiMic, ExoCore, FilterCap, FormFit, LeaXield, MiniBlue, MiniCell, MKD, MKK, MotorCap, PCC, PhaseCap, PhaseCube, PhaseMod, PhiCap, PowerHap, PQSine, PQvar, SIFERRIT, SIFI, SIKOREL, SilverCap, SIMDAD, SiMic, SIMID, SineFormer, SIOV, ThermoFuse, WindCap are **trademarks registered or pending** in Europe and in other countries. Further information will be found on the Internet at www.tdk-electronics.tdk.com/trademarks.

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