



TeSys D contactors for capacitor switching

Why compensate for reactive energy?

- 1- To reduce your electricity bills by eliminating charges for excess reactive energy consumed. This consumption is generated by various types of load: transformers, motors, air-conditioning units, ballasts, etc.
- 2- To improve the quality of the energy provided by certain mains supplies.

How to compensate for reactive energy?

By using capacitor-based power factor correction equipment.

How does this impact power switching?

Capacitor switching is accompanied by transient phenomena resulting from the capacitor load, which generate very high transient currents. TeSys D contactors for capacitor switching are specially designed to commute and limit such current peaks at energizing.



Benefits

Opt for energy savings and quality

- Reduce your electricity bills
- Control the quality of your energy

Opt for simplicity: no more calculations needed

- Contactor rated in kVAR
- Sized to absorb current peaks
- Optimized number of sales references
- Common accessories with the TeSys D contactor range

Opt for efficiency

- 300,000 switching operations guaranteed
- Shorter installation time
- Smaller overall size due to the compact design of TeSys D contactors

Characteristics

The impedance of any electrical circuit has both an inductive and a resistive component. Capacitors, together with such circuits, form oscillatory circuits which can, when switched on, give rise to high transient currents ($> 180 I_n$) at high frequencies (about 15 kHz).

As a general rule, the peak current at energizing is lower when:

- Mains inductances are high
- Line transformer ratings are low
- The transformer short-circuit voltage is high
- The ratio between the sum of the ratings of the capacitors already switched into the circuit and that of the capacitors to be switched in is small (for multiple-step capacitor banks).

In practice, the current peak is often incompatible with the characteristics of standard-technology contactors.

It is therefore necessary:

- Either to limit this current peak by increasing the inductance of the mains supply by inserting choke inductors and by calculating the size of the standard contactor to be used.
- Or to use special contactors (early make poles, high pressure at the poles, contact materials, etc.).

TeSys LC1 D•K contactors have been specially designed for switching 3-phase, single- or multiple-step capacitor banks. They are compliant with the IEC 60947-4-1 standard, according to AC-6b utilization category, and are UL, CSA and CCC certified.

These products provide a ready-to-use solution.

Selection guide

Contactors	LC1D	F	K	B7
Operating power as per IEC 60947-4-1	13 kVAR	F		
	16 kVAR	G		
AC-6b at 400V, 50/60Hz, T<60°C	20 kVAR	L		
	25 kVAR	M		
	30 kVAR	P		
	40 kVAR	T		
	63 kVAR	W*		
Capacitor switching			K	
AC Coil voltage, 50/60Hz	24V			B7
	48V			E7
	110V			F7
	120V			G7
	220V			M7
	230V			P7
	240V			U7
	380V			Q7
	400V			V7
	415V			N7
	440V			R7



TeSys LC1DFK
TeSys LC1DGK



TeSys LC1DPK
TeSys LC1DTK

* Complete suffix in this case being WK12**

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TeSys contactors

For switching 3-phase capacitor banks, used for power factor correction, Direct connection without choke inductors

Special contactors

Special contactors **LC1 D●K** are designed for switching 3-phase, single or multiple-step capacitor banks. The contactors conform to standard IEC 60947-4-1 according to the AC-6b category of use and are UL, CSA and CCC certified.

Contactors applications

Specification

Contactors fitted with a block of early make poles and damping resistors (external resistive wires), limiting the value of the current on closing to 60 In max. This current limitation increases the life of all the components of the installation, in particular that of the fuses and capacitors.

The design of the add-on block ensures safety and long life of the installation.

Operating conditions

There is no need to use choke inductors for either single or multiple-step capacitor banks.

Short-circuit protection must be provided by gI type fuses rated at 1.7...2 In.

Maximum operational power

The power values given in the selection table below are for the following operating conditions:

Prospective peak current at switch-on	LC1 D●K	200 In
Maximum operating rate	LC1 DFK, DGK, DLK, DMK	240 operating cycles/hour
	LC1 DPK, DTK, DWK	100 operating cycles/hour
Electrical durability at nominal load	All contactor ratings	400 V 300 000 operating cycles
		690 V 200 000 operating cycles



LC1 DFK●.



LC1 DPK●.

Operational power ⁽¹⁾ according to IEC 60947-4-1, AC-6b 50/60 Hz, $\theta \leq 60^\circ\text{C}$				Instantaneous auxiliary contacts		Tightening torque of power terminals	Basic reference, to be completed by adding the voltage code ⁽²⁾	Weight
230 V	400 V	440 V	690 V	N/O	N/C	N.m		kg
kVAR	kVAR	kVAR	kVAR					
7	13	13	21	1	2	1.7	LC1 DFK●●	0.530
9	16	17	27	1	2	1.7	LC1 DGK●●	0.530
11	20	21	33	1	2	2.5	LC1 DLK●●	0.570
14	25	27	42	1	2	2.5	LC1 DMK●●	0.570
17	30	32	50	1	2	5	LC1 DPK●●	1.070
22	40	43	67	1	2	5	LC1 DTK●●	1.070
35	63	67	104	1	2	9	LC1 DWK12●●	1.650

Switching of multiple-step capacitor banks (with equal or different power ratings)

The correct contactor for each step is selected from the above table, according to the power rating of the step to be switched.

Example: 50 kVAR 3-step capacitor bank. Temperature: 40 °C and U = 400 V or 440 V. One 25 kVAR step: contactor LC1 DMK, one 15 kVAR step: contactor LC1 DGK, and one 10 kVAR step: contactor LC1 DFK.

⁽¹⁾ Operational power of the contactor according to the scheme on the page opposite.

⁽²⁾ Standard control circuit voltages (the delivery time is variable, please consult your Regional Sales Office):

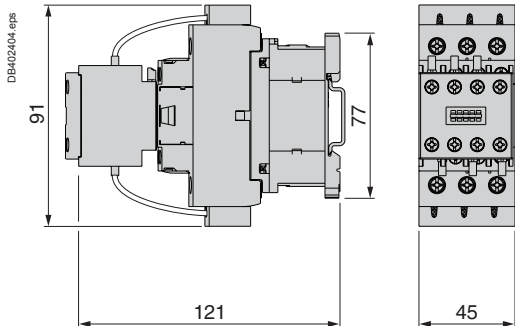
Volts	24	48	110	120	220	230	240	380	400	415	440
50/60 Hz	B7	E7	F7	G7	M7	P7	U7	Q7	V7	N7	R7

TeSys contactors

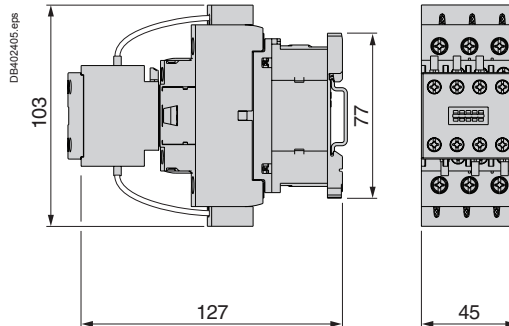
For switching 3-phase capacitor banks,
used for power factor correction

Dimensions

LC1 DFK, DGK



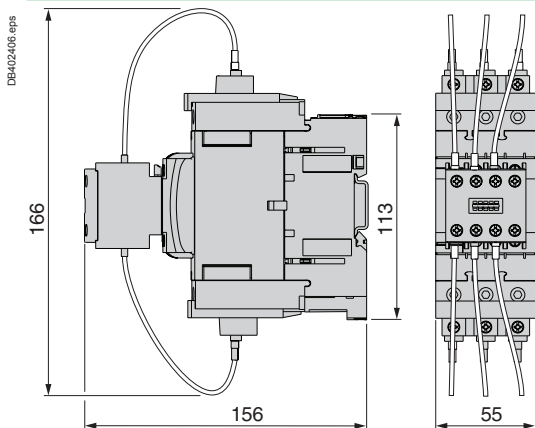
LC1 DLK, DMK



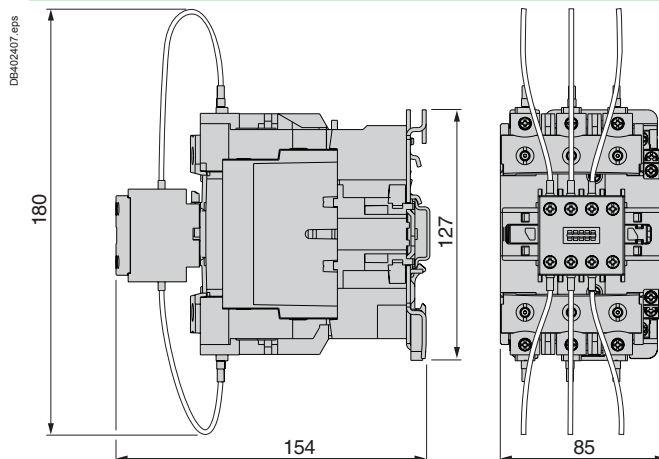
LC1	Type of fixing	
DFK	LC1 D18	See pages 5/94 and 5/95
DGK	LC1 D18	See pages 5/94 and 5/95

LC1	Type of fixing	
DLK	LC1 D25	See pages 5/94 and 5/95
DMK	LC1 D32	See pages 5/94 and 5/95

LC1 DPK, DTK



LC1 DWK

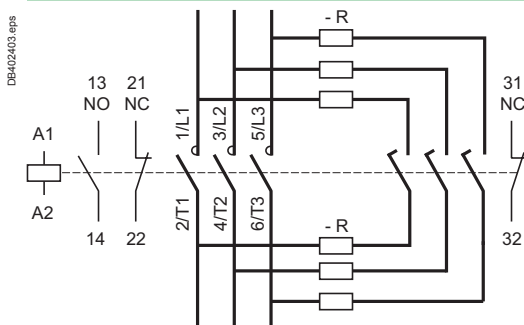


LC1	Type of fixing	
DPK	LC1 D40A	See pages 5/94 and 5/95
DTK	LC1 D65A	See pages 5/94 and 5/95

LC1	Type of fixing	
DWK	LC1 D80	See pages 5/94 and 5/95

Schemes

LC1 D•K



R = Pre-wired resistor connections.