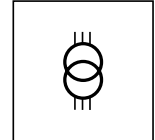


# TeSys contactors

## For switching the primaries of 3-phase LV/LV transformers



### Operating conditions

Maximum ambient temperature: 55 °C.

When a transformer is switched on, there is generally an initial current surge which reaches its peak value almost instantaneously and then decreases in a largely exponential manner to quickly reach its steady state value.

The value of this current depends on:

- the characteristics of the magnetic circuit and of the windings (cross sectional area of the core, rated inductance, number of turns, layout and size of the windings, ...)
- the performance of the magnetic laminations used,
- the magnetic state of the circuit and the instantaneous value of the a.c. mains voltage at the moment of switch-on.

The inrush current at the moment of switch-on can reach 20 to 40 times the rated current for the various kVA power ratings in the tables below. This value is independent of the "no-load" or "on-load" state of the transformer.

### Contactor selection

The peak magnetising current of the transformer must be lower than the values given in the tables below.

Maximum operating rate: 120 operating cycles/hour.

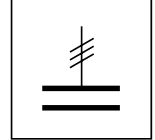
Contactor rating	A	LC1/	LC1/	LC1	LC1	LC1	LC1	LC1	LC1	LC1	LC1	LC1	LC1	LC1	LC1	LC1	
		LP1	LP1	D09	D12	D18	D25	D32	D38	D40	D50	D65	D80	D95	D115	D150	
Maximum permissible current peak at switch-on	A	160	225	350	350	420	630	770	770	1100	1250	1400	1550	1650	1800	2000	
Maximum operational power (1)	220 V 240 V	kVA	2	2.5	4	4	5	7	8.5	8.5	14	16	18	19.5	19.5	25	25
	380 V 400 V	kVA	3.5	5	7	7	8	12.5	15	15	24	27	31	34	34	50	50
	415 V 440 V	kVA	4	5.5	8	8	9	14	17	17	28	32	36	39	39	55	55
	500 V	kVA	5	7	9	9	11	16.5	20	20	32	36	40	45	45	65	65
	660 V 690 V	kVA	6	8.5	12	12	14	21.5	26.5	26.5	42	48	53	59	59	80	80
	1000 V	kVA	-	-	-	-	-	-	-	-	60	70	80	85	95	100	100

Contactor rating	A	LC1	LC1	LC1	LC1	LP1	LC1	LC1	LC1	LC1	LC1	LC1	LC1	LC1	
		F185	F225	F265	F330	F400	F500	F630	F780	F800	BL	BM	BP	BR	
Maximum permissible current peak at switch-on	A	2900	3300	3800	5000	6300	7700	9000	12000	11000	18000	18000	24000	30000	
Maximum operational power (1)	220 V 240 V	kVA	40	45	50	65	75	100	120	175	145	230	230	300	380
	380 V 400 V	kVA	75	80	90	120	130	170	200	280	245	400	400	530	660
	415 V 440 V	kVA	80	90	100	130	140	190	220	310	270	450	450	560	700
	500 V	kVA	95	100	110	140	170	225	260	350	315	480	480	600	750
	660 V 690 V	kVA	120	130	140	170	200	270	350	400	425	600	600	800	950
	1000 V	kVA	150	170	200	225	250	375	470	650	550	700	700	1000	1200

(1) Maximum operational power corresponding to a current peak at switch-on of 30 In.

# TeSys contactors

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



### Standard contactors

Capacitors, together with the circuits to which they are connected, form oscillatory circuits which can, at the moment of switch-on, give rise to high transient currents (> 180 I<sub>n</sub>) at high frequencies (1 to 15 kHz).

As a general rule, the peak current on energisation is lower when:

- the mains inductances are high,
- the 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 capacitor to be switched in is small (for multiple step capacitor banks).

In accordance with standards IEC 60070, NF C 54-100, VDE 0560, the switching contactor must be able to withstand a continuous current of 1.43 times the rated current of the capacitor bank step being switched.

The rated operational powers given in the tables below take this overload into account. Short-circuit protection is normally provided by gl type HPC fuses rated at 1.7 to 2 I<sub>n</sub>.

### Contactor applications

#### Operating conditions

Capacitors are directly switched. **The values of peak current at switch-on must not exceed the values indicated opposite.**

An inductor may be inserted in each of the three phases supplying the capacitors to reduce the peak current, if necessary.

Inductance values are determined according to the selected operating temperature.

#### Power factor correction by a single-step capacitor bank

The use of a choke inductor is unnecessary: the inductance of the mains supply is adequate to limit the peak to a value compatible with the contactor characteristics.

#### Power factor correction by a multiple-step capacitor bank

Select a special contactor as defined on page 24569/2.

**If a standard contactor is used, it is essential to insert a choke inductor in each of the three phases of each step.**

### Maximum operational power of contactors

#### Standard contactors

Maximum operating rate: 120 operating cycles/hour.

Electrical durability at maximum load: 100 000 operating cycles.

With choke inductors connected, where necessary.

Operational power at 50/60 Hz						Max. peak current	Contactor rating
θ ≤ 40 °C (1)			θ ≤ 55 °C (1)				
220/240 V	400/440 V	600/690 V	220/240 V	400/440 V	600/690 V	A	
kvAR	kvAR	kvAR	kvAR	kvAR	kvAR		
6	11	15	6	11	15	560	LC1 D09, D12
9	15	20	9	15	20	850	LC1 D18
11	20	25	11	20	25	1600	LC1 D25
14	25	30	14	25	30	1900	LC1 D32, D38
17	30	37	17	30	37	2160	LC1 D40
22	40	50	22	40	50	2160	LC1 D50
22	40	50	22	40	50	3040	LC1 D65
35	60	75	35	60	75	3040	LC1 D80, D95
50	90	125	38	75	80	3100	LC1 D115
60	110	135	40	85	90	3300	LC1 D150
70	125	160	50	100	100	3500	LC1 F185
80	140	190	60	110	110	4000	LC1 F225
90	160	225	75	125	125	5000	LC1 F265
100	190	275	85	140	165	6500	LC1 F330
125	220	300	100	160	200	8000	LC1 F400
180	300	400	125	220	300	10 000	LC1 F500
250	400	600	190	350	500	12 000	LC1 F630
250	400	600	190	350	500	14 200	LC1 F800
200	350	500	180	350	500	25 000	LC1 BL
300	550	650	250	500	600	25 000	LC1 BM
500	850	950	400	750	750	25 000	LC1 BP
600	1100	1300	500	1000	1000	25 000	LC1 BR

(1) Upper limit of temperature category conforming to IEC 60070.