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Definitions

Altitude

The rarefied atmosphere at high altitude reduces the dielectric strength of the air and hence the rated operational voltage of the contactor. It also reduces the cooling effect of the air and hence the rated operational current of the contactor (unless the temperature drops at the same time).

No derating is necessary up to 3000 m.

Derating factors to be applied above this altitude for main pole operational voltage and current (a.c. supply) are as follows.

Altitude	3500 m	4000 m	4500 m	5000 m
Rated operational voltage	0,90	0,80	0,70	0,60
Rated operational current	0,92	0,90	0,88	0,86

Ambient air temperature

The temperature of the air surrounding the device, measured near to the device.

The operating characteristics are given :

- with no restriction for temperatures between - 5 and + 55 °C,
- with restrictions, if necessary, for temperatures between - 50 and + 70 °C.

Rated operational current (Ie)

This is defined taking into account the rated operational voltage, operating rate and duty, utilisation category and ambient temperature around the device.

Rated conventional thermal current (Ith) (1)

The current which a closed contactor can sustain for a minimum of 8 hours without its temperature rise exceeding the limits given in the standards.

Permissible short time rating

The current which a closed contactor can sustain for a short time after a period of no load, without dangerous overheating.

Rated operational voltage (Ue)

This is the voltage value which, in conjunction with the rated operational current, determines the use of the contactor or starter, and on which the corresponding tests and the utilisation category are based. For 3-phase circuits it is expressed as the voltage between phases. Apart from exceptional cases such as rotor short-circuiting, the rated operational voltage Ue is less than or equal to the rated insulation voltage Ui.

Rated control circuit voltage (Uc)

The rated value of the control circuit voltage, on which the operating characteristics are based. For a.c. applications, the values are given for a near sinusoidal wave form (less than 5% total harmonic distortion).

Rated insulation voltage (Ui)

This is the voltage value used to define the insulation characteristics of a device and referred to in dielectric tests determining leakage paths and creepage distances. As the specifications are not identical for all standards, the rated value given for each of them is not necessarily the same.

Rated impulse withstand voltage (Uiimp)

The peak value of a voltage surge which the device is able to withstand without breaking down.

Rated operational power (expressed in kW)

The rated power of the standard motor which can be switched by the contactor, at the stated operational voltage.

Rated breaking capacity (2)

This is the current value which the contactor can break in accordance with the breaking conditions specified in the IEC standard.

Rated making capacity (2)

This is the current value which the contactor can make in accordance with the making conditions specified in the IEC standard.

$$m = \frac{t}{T}$$

This is the ratio between the time the current flows (t) and the duration of the cycle (T).
Cycle duration: duration of current flow + time at zero current

Pole impedance

The impedance of one pole is the sum of the impedance of all the circuit components between the input terminal and the output terminal. The impedance comprises a resistive component (R) and an inductive component ($X = L\omega$). The total impedance therefore depends on the frequency and is normally given for 50 Hz. This average value is given for the pole at its rated operational current.

Electrical durability

This is the average number of on-load operating cycles which the main pole contacts can perform without maintenance. The electrical durability depends on the utilisation category, the rated operational current and the rated operational voltage.

Mechanical durability

This is the average number of no-load operating cycles (i.e. with zero current flow through the main poles) which the contactor can perform without mechanical failure.

(1) Conventional thermal current, in free air, conforming to IEC standards.

(2) For a.c. applications, the breaking and making capacities are expressed by the rms value of the symmetrical component of the short-circuit current. Taking into account the maximum asymmetry which may exist in the circuit, the contacts therefore have to withstand a peak asymmetrical current which may be twice the rms symmetrical component.

Note : these definitions are extracted from standard IEC 60947-1.

General

TeSys contactors

Definitions and comments

Contactor utilisation categories conforming to IEC 60947-4

The standard utilisation categories define the current values which the contactor must be able to make or break.

These values depend on:

- the type of load being switched : squirrel cage or slip ring motor, resistors,
- the conditions under which making or breaking takes place: motor stalled, starting or running, reversing, plugging.

a.c. applications

Category AC-1

This category applies to all types of a.c. load with a power factor equal to or greater than 0.95 ($\cos \phi \geq 0.95$).

Application examples: heating, distribution.

Category AC-2

This category applies to starting, plugging and inching of slip ring motors.

- On closing, the contactor makes the starting current, which is about 2.5 times the rated current of the motor.
- On opening, it must break the starting current, at a voltage less than or equal to the mains supply voltage.

Category AC-3

This category applies to squirrel cage motors with breaking during normal running of the motor.

- On closing, the contactor makes the starting current, which is about 5 to 7 times the rated current of the motor.
- On opening, it breaks the rated current drawn by the motor; at this point, the voltage at the contactor terminals is about 20% of the mains supply voltage. Breaking is light.

Application examples: all standard squirrel cage motors: lifts, escalators, conveyor belts, bucket elevators, compressors, pumps, mixers, air conditioning units, etc...

Category AC-4

This category covers applications with plugging and inching of squirrel cage and slip ring motors. The contactor closes at a current peak which may be as high as 5 or 7 times the rated motor current. On opening it breaks this same current at a voltage which is higher, the lower the motor speed. This voltage can be the same as the mains voltage. Breaking is severe

Application examples: printing machines, wire drawing machines, cranes and hoists, metallurgy industry.

d.c. applications

Category DC-1

This category applies to all types of d.c. load with a time constant (L/R) of less than or equal to 1 ms.

Category DC-3

This category applies to starting, counter-current braking and inching of shunt motors.

Time constant ≤ 2 ms.

- On closing, the contactor makes the starting current, which is about 2.5 times the rated motor current.
 - On opening, the contactor must be able to break 2.5 times the starting current at a voltage which is less than or equal to the mains voltage. The slower the motor speed, and therefore the lower its back e.m.f., the higher this voltage.
- Breaking is difficult.

Category DC-5

This category applies to starting, counter-current braking and inching of series wound motors. Time constant ≤ 7.5 ms.

On closing, the contactor makes a starting current peak which may be as high as 2.5 times the rated motor current. On opening, the contactor breaks this same current at a voltage which is higher, the lower the motor speed. This voltage can be the same as the mains voltage.

Breaking is severe.

Utilisation categories for auxiliary contacts & control relays conforming to IEC 60947-5

a.c. applications

Category AC-14 (1)

This category applies to the switching of electromagnetic loads whose power drawn with the electromagnet closed is less than 72 VA.

Application example: switching the operating coil of contactors and relays.

Category AC-15 (1)

This category applies to the switching of electromagnetic loads whose power drawn with the electromagnet closed is more than 72 VA.

Application example: switching the operating coil of contactors.

d.c. applications

Category DC-13 (2)

This category applies to the switching of electromagnetic loads for which the time taken to reach 95 % of the steady state current ($T = 0.95$) is equal to 6 times the power P drawn by the load (with $P \leq 50$ W).

Application example: switching the operating coil of contactors without economy resistor.

(1) Replaces category AC-11.

(2) Replaces category DC-13.

General

Technical information

Tests according to standard utilisation categories conforming to IEC 60947-4-1 and 5-1 based on rated operational current I_e and rated operational voltage U_e

Contactors

a.c. supply	Typical applications	Utilisation category	Electrical durability: making and breaking conditions			Occasional duty: making and breaking conditions					
			Making I	U	$\cos \phi$	Breaking I	U	$\cos \phi$	Making I	U	$\cos \phi$
Resistors, non inductive or slightly inductive loads	AC-1	I_e	U_e	0.95		I_e	U_e	0.95	1.5 I_e	1.05 U_e	0.8
Motors											
Slip ring motors: starting, breaking.	AC-2	2.5 I_e	U_e	0.65		2.5 I_e	U_e	0.65	4 I_e	1.05 U_e	0.65
Squirrel cage motors: starting, breaking whilst motor running.	AC-3	$I_e \leq (1)$	U_e	0.65	1 I_e	0.17 U_e	0.65		10 I_e	1.05 U_e	0.45
		$I_e > (2)$	U_e	0.35	1 I_e	0.17 U_e	0.35		10 I_e	1.05 U_e	0.35
Squirrel cage motors: starting, reversing, inching	AC-4	$I_e \leq (1)$	U_e	0.65	6 I_e	U_e	0.65		12 I_e	1.05 U_e	0.45
		$I_e > (2)$	U_e	0.35	6 I_e	U_e	0.35		12 I_e	1.05 U_e	0.35
d.c. supply											
Resistors, non inductive or slightly inductive loads	DC-1	I_e	U_e	1		I_e	U_e	1	1.5 I_e	1.05 U_e	1
Shunt wound motors: starting, reversing, inching	DC-3	2.5 I_e	U_e	2		2.5 I_e	U_e	2	4 I_e	1.05 U_e	2.5
Series wound motors: starting, reversing, inching	DC-5	2.5 I_e	U_e	7.5		2.5 I_e	U_e	7.5	4 I_e	1.05 U_e	15

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Control relays and auxiliary contacts

a.c. supply	Typical applications	Utilisation category	Electrical durability: making and breaking conditions			Occasional duty: making and breaking conditions					
			Making I	U	$\cos \phi$	Breaking I	U	$\cos \phi$	Making I	U	$\cos \phi$
Electromagnets	≤ 72 VA	AC-14	-	-	-	-	-	-	6 I_e	1.1 U_e	0.7
	> 72 VA	AC-15	10 I_e	U_e	0.7	I_e	U_e	0.4	10 I_e	1.1 U_e	0.3
d.c. supply											
Electromagnets	DC-13	I_e	U_e	6 P (3)		I_e	U_e	6 P (3)	1.1 I_e	1.1 U_e	6 P (3)

(1) $I_e \leq 17$ A for electrical durability, $I_e \leq 100$ A for occasional duty.

(2) $I_e > 17$ A for electrical durability, $I_e > 100$ A for occasional duty.

(3) The value 6 P (in watts) is based on practical observations and is considered to represent the majority of d.c. magnetic loads up to the maximum limit of $P = 50$ W i.e. $6P = 300$ ms = L/R.

Above this, the loads are made up of smaller loads in parallel. The value 300 ms is therefore a maximum limit whatever the value of current drawn.

Technical information

Current of asynchronous squirrel cage motors
at nominal load

3-phase 4-pole motors

Rated operational power (1)	Current values for power in kW			
	230 V	400 V	500 V	690 V
0.06	0.35	0.2	0.16	0.12
0.09	0.52	0.3	0.24	0.17
0.12	0.7	0.44	0.32	0.23
0.18	1	0.6	0.48	0.35
0.25	1.5	0.85	0.68	0.49
0.37	1.9	1.1	0.88	0.64
0.55	2.6	1.5	1.2	0.87
0.75	3.3	1.9	1.5	1.1
1.1	4.7	2.7	2.2	1.6
1.5	8.3	3.6	2.9	2.1
2.2	8.5	4.9	3.9	2.8
3	11.3	6.5	5.2	3.8
4	15	8.5	6.8	4.9
5.5	20	11.5	9.2	6.7
7.5	27	15.5	12.4	8.9
11	38	22	17.6	12.8
15	51	29	23	17
18.5	61	35	28	21
22	72	41	33	24
30	96	55	44	32
37	115	66	53	39
45	140	80	64	47
55	169	97	78	57
75	230	132	105	77
90	278	160	128	93
110	340	195	156	113
132	400	230	184	134
160	487	280	224	162
200	609	350	280	203
250	748	430	344	250
315	940	540	432	313
355	1061	610	488	354
400	1200	690	552	400
500	1478	850	680	493
560	1652	950	780	551
630	1844	1080	848	615
710	2070	1190	952	690
800	2340	1346	1076	780
900	2640	1518	1214	880
1000	2910	1673	1339	970

(1) Values conforming to standard IEC 60072-1 (at 50 Hz).

(2) Values conforming to standard UL 508 (at 60 Hz).

Note : These values are given as a guide. They may vary depending on the type of motor, its polarity and the manufacturer.

Current values for power in hp

Rated operational power (2)	Indicative rated operational current values at:						
	110 - 120 V	200 V	208 V	220 - 240 V	380 - 415 V	440 - 480 V	550 - 600 V
hp	A	A	A	A	A	A	A
1/2	4.4	2.5	2.4	2.2	1.3	1.1	0.9
3/4	6.4	3.7	3.5	3.2	1.8	1.6	1.3
1	8.4	4.8	4.6	4.2	2.3	2.1	1.7
1 1/2	12	6.9	6.6	6	3.3	3	2.4
2	13.6	7.8	7.5	6.8	4.3	3.4	2.7
3	19.2	11	10.6	9.8	6.1	4.8	3.9
5	30.4	17.5	16.7	15.2	9.7	7.6	6.1
7 1/2	44	25.3	24.2	22	14	11	9
10	56	32.2	30.8	28	18	14	11
15	84	48.3	46.2	42	27	21	17
20	108	62.1	59.4	54	34	27	22
25	136	78.2	74.8	68	44	34	27
30	160	92	88	80	51	40	32
40	208	120	114	104	66	52	41
50	260	150	143	130	83	65	52
60	-	177	169	154	103	77	62
75	-	221	211	192	128	96	77
100	-	285	273	248	165	124	99
125	-	359	343	312	208	156	125
150	-	414	396	360	240	180	144
200	-	552	528	480	320	240	192
250	-	-	-	604	403	302	242
300	-	-	-	722	482	361	289
350	-	-	-	828	580	414	336
400	-	-	-	954	636	477	382
450	-	-	-	1030	-	515	412
500	-	-	-	1180	786	590	472

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Applications

Equipment based on standard contactors

Equipment requiring low consumption contactors which can be switched directly from solid state outputs



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Rated operational current AC-3

6 A	6...16 A	9...150 A	115...800 A	750...1800 A	6...12 A	9...25 A
12 A	20 A	25...200 A	200...2100 A	800...2750 A	20 A	20...40 A

Rated operational voltage

690 V	690 V	690 V	1000 V	1000 V	690 V	690 V
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Number of poles

2 or 3	3 or 4	3 or 4	2, 3 or 4	1...4	3 or 4	3
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Contactor type references

LC1 SK LP1 SK	LC1 K LC7 K LP1 K	LC1 D	LC1 F	LC1 B	LP4 K	LC1 D
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Pages

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Equipment requiring magnetic latching contactors	Motors, resistive circuits, rotor short-circuiting devices, electro lifting magnets, hoisting, mines, ... motors, high operating rates. Variable composition bar mounted contactors.	Induction heating, heating of metal or of a metal part in a channel or crucible furnace by induction of a.c. currents. Contactors for induction heating applications.	Applications conforming to "NATO" specifications and references. Shockproof contactors
			
150...1800 A	80...1800 A	-	12...630 A
250...2750 A	80...2750 A	80...16 300 A	25...850 A
1000 V	~1000 V --- 440 or 1500 V	3000 V	690 V or 1000 V
1...4	1...6	1...8	3 or 4
CR1 F CR1 B	CV*	CE* CS*	LC1 D*G LP1 D*G LC1 FG***
5/250 to 5/259	5/226 and 5/227	Please consult your Regional Sales Office	

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Applications	Simple automation systems	
		
Rated operational current: Ie max AC-3 (Ue ≤ 440 V) Ie AC-1 (I) ≤ 40 °C	6 A 12 A	6 A -
Rated operational voltage	690 V	
Number of poles	2 or 3	3
Rated operational power in category AC-3	220/240 V 380/400 V 415/440 V 500 V 690/690 V 1000 V	1.1 kW 2.2 kW 2.2 kW - - -
Add-on auxiliary contact blocks	Front: Side: Front time delay: Front dust and damp protected:	Up to 2 N/C or N/O - - - Up to 4 N/C or N/O - 1 N/C -
Associated manual-auto thermal overload relays	Class 10 A Class 20 A	0.11...16 A -
Suppressor modules:	Varistor or diode	Varistor; diode + Zener diode or RC circuit
Contactor type references	LC1 SK LP1 SK	LC1 or LC7 K06 LP1 K06
Reversing contactor with mechanical interlock type references	- -	LC2 or LC8 K06 LP2 K06
Pages	Contactors Reversing contactors	5/34 and 5/35 -
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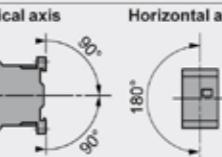
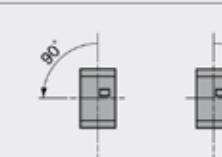
Characteristics

TeSys contactors

TeSys K contactors and reversing contactors

		
9 A	12 A	16 A
20 A	-	-
3 or 4		
2.2 kW	3 kW	3 kW
4 kW	5.5 kW	7.5 kW
4 kW	5.5 kW	7.5 kW
4 kW	4 kW	5.5 kW
4 kW	4 kW	4 kW
-	-	-
LC1 or LC7 K09	LC1 or LC7 K12	LC1 K16
LP1 K09	LP1 K12	-
LC2 or LC8 K09	LC2 or LC8 K12	LC2 K16
LP2 K09	LP2 K12	-

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Environment characteristics		
Conforming to standards		IEC 60947, NF C 63-110, VDE 0660, BS 5424
Product certifications		UL, CSA
Operating positions		  
Vertical axis	Without derating	Without derating
Horizontal axis	Without derating	Possible positions for LC• K only. Contactor pull-in voltage: 0.85 Uc
Connection	Min.	Max.
Screw clamp terminals	mm ² 1 x 1.5	mm ² 2 x 4
	mm ² Flexible conductor without cable end	mm ² 2 x 4
	mm ² Flexible conductor with cable end	mm ² 1 x 0.34 1 x 1.5 + 1 x 2.5
Spring terminals	mm ² Solid conductor	mm ² 1 x 1.5
	mm ² Flexible conductor without cable end	mm ² 1 x 1.5
Faston connectors	Clip	mm 2 x 2.8 or 1 x 6.35
	Solder pins for printed circuit board	4 mm x 35 microns
Tightening torque	Philips head n° 2 and Ø 6	N.m 0.8
Terminal referencing	Conforming to standards EN 5005 and EN 50012	
Rated insulation voltage (Ui)	V 690	Up to 5 contacts, depending on model
	V 750	
	V 690	
	V 600	
Rated impulse withstand voltage (Uiimp)	kV 8	
Protective treatment	Conforming to IEC 60068 (DIN 50016)	
Degree of protection	Conforming to VDE 0106	
Ambient air temperature around the device	Storage °C - 50... + 80	Protection against direct finger contact
	Operation °C - 25... + 50	
Maximum operating altitude	Without derating m 2000	
Vibration resistance 5... 300 Hz	Contactor open Contactor closed	2 gn 4 gn
Flame resistance	Conforming to UL 94 Conforming to NF F 16-101 and 16-102	
Shock resistance (1/2 sine wave, 11 ms)	Contactor open Contactor closed	On X axis: 6 gn On Y and Z axes: 10 gn On X axis: 10 gn On Y and Z axes: 15 gn
Safe separation of circuits	Conforming to VDE 0106 and IEC 60536	
	SELV (Safety Extra Low Voltage), up to 400 V	

Characteristics (continued)

TeSys contactors

TeSys K contactors and reversing contactors

Pole characteristics

Type	LC or LP*	K06	K09	K12	K16
Conventional thermal current (Ith)	For ambient temperature $\leq 50^\circ\text{C}$	A	20		
Rated operational frequency	Hz	50/60			
Frequency limits of the operational current	Hz	Up to 400			
Rated operational voltage (Ue)	V	690			
Rated making capacity	I rms conforming to NF C 63 110 and IEC 60947	A	110	110	144
Rated breaking capacity	I rms conforming to NF C 63 110 and IEC 60947	220/230 V	A	110	110
		380/400 V	A	110	—
		415 V	A	110	—
		440 V	A	110	110
		500 V	A	80	80
		660/690 V	A	70	70
Permissible short time rating	In free air for a time "t" from cold state ($0 \leq 50^\circ\text{C}$)	1 s	A	90	90
		5 s	A	85	85
		10 s	A	80	80
		30 s	A	60	60
		1 min	A	45	45
		3 min	A	40	40
		≥ 15 min	A	20	20
Short-circuit protection	gG fuse U ≤ 440 V (aM fuse, see page 6/12)	A	25		
Average impedance per pole	At Ith and 50 Hz	mΩ	3		
Use in category AC-1	Maximum rated operational current for a temperature $\leq 50^\circ\text{C}$	A	20		
resistive circuits, heating, lighting (Ue ≤ 440 V)	Maximum rated operational current for a temperature $\leq 70^\circ\text{C}$	A	16 for Ue only		
Rated operational current limits in relation to the on-load factor and operating frequency	On-load factor		90 %	60 %	30 %
	300 operating cycles/hour		13	15	18
	120 operating cycles/hour		15	18	19
	30 operating cycles/hour		19	20	20
Increase in rated operational current by paralleling of poles			Apply the following coefficients to the above currents; these coefficients take into account an often unbalanced distribution of current between the poles		
			2 poles in parallel: K = 1.60		
			3 poles in parallel: K = 2.25		
			4 poles in parallel: K = 2.80		
Use in category AC-3 squirrel cage motors	Operational power according to the voltage.	kW	0.37	0.55	—
Voltage 50 or 60 Hz	115V single-ph.	kW	0.75	1.1	—
	220V single-ph.	kW	1.5	2.2	3
	220/230V 3-ph.	kW	2.2	4	5.5
	380/415V 3-ph.	kW	3	4	5.5/4 (480)
	440/480V 3-ph.	kW	3	4	5.5/4 (480)
	500/600V 3-ph.	kW	3	4	4
	660/690V 3-ph.	kW	3	4	4
Maximum operating rate (in operating cycles/hour in relation to % of rated power)	Op. cycles/h		600	900	1200
	Power		100 %	75 %	50 %

Characteristics (continued)

TeSys contactors

TeSys K contactors and reversing contactors

Control circuit characteristics

Type	Rated control circuit voltage (Uc)	V	LC1 ~12...690 (1)	LC2 ~24...240 (1)	LC7 ~12...250 (1)	LC8 ~12...120	LP1 ~12...250 (1)	LP2 ~12...120	LP4 ~12...120	LP5 ~12...120
Control voltage limits ($\leq 50^\circ\text{C}$)	Operation		0.8...1.15 Uc (2)	0.85...1.1 Uc	0.8...1.15 Uc	0.7...1.30 Uc				
single voltage coil	Drop-out		≥ 0.20 Uc	≥ 0.10 Uc	≥ 0.10 Uc	≥ 0.10 Uc				
Average consumption at 20°C and at Uc	Inrush		30 VA	3 VA	3 W	1.8 W				
	Sealed		4.5 VA	3 VA	3 W	1.8 W				
Heat dissipation		W	1.3	3	3	1.8				
Operating time at 20°C and at Uc										
Between coil energisation and:	- opening of the N/C contacts	ms	5...15	25...35	25...35	25...35				
	- closing of the N/O contacts	ms	10...20	30...40	30...40	30...40				
Between coil de-energisation and:	- opening of the N/O contacts	ms	10...20	30	10	10...20				
	- closing of the N/C contacts	ms	15...25	40	15	15...25				
Maximum immunity to microbreaks		ms	2	2	2	2				
Maximum operating rate	In operating cycles per hour		3600	3600	3600	3600				
Mechanical durability at Uc	50/60 Hz coil		10	5	10	5	—	—	—	—
In millions of operating cycles	... coil		—	—	—	—	10	5	—	—
	Wide range coil, Low consumption		—	—	—	—	—	—	30	5

(1) For mains supplies with a high level of interference (voltage surge > 800 V), use a suppressor module LA4 KE1FC (50...129 V) or LA4 KE1UG (130...250 V), see page 5/24.

(2) LC1 K16: 0.85...1.15 Uc.

5

Characteristics (continued)

TeSys contactors

TeSys K contactors and reversing contactors

Auxiliary contact characteristics of contactors and instantaneous contact blocks

Number of auxiliary contacts	On LC• K or LP• K 3-pole	1
	On LA1 K	2 or 4
Rated operational voltage (Ue) Up to	V	690
Rated insulation voltage (Ui)	Conforming to BS 5424	V
	Conforming to IEC 60947	V
	Conforming to VDE 0110 group C	V
	Conforming to CSA C 22-2 n° 14	V
Conventional thermal current (Ith)	For ambient temperature ≤ 50 °C	A
Frequency of the operational current		Hz
Minimum switching capacity	U min (DIN 19 240)	V
	I min	mA
Short-circuit protection	Conforming to IEC 60947 and VDE 0660, gG fuse	A
Rated making capacity	Conforming to IEC 60947	A
Short-time rating	Permissible for	1 s
		A
	500 ms	A
	100 ms	A
Insulation resistance		MΩ
Non-overlap distance	LA1 K: linked contacts conforming to INRS, BIA and CNA specifications	mm
Operational power of contacts conforming to IEC 60947	a.c. supply, category AC-15 Electrical durability (valid for up to 3600 operating cycles/hour) on an inductive load such as the coil of an electromagnet: making current ($\cos \varphi 0.7$) = 10 times the power broken ($\cos \varphi 0.4$).	d.c. supply, category DC-13 Electrical durability (valid for up to 1200 operating cycles/hour) on an inductive load such as the coil of an electromagnet, without economy resistor, the time constant increasing with the load.
1 million operating cycles	V 24 48 110/127 230 400 440 690	
3 million operating cycles	VA 48 96 240 440 800 880 1200	
10 million operating cycles	VA 17 34 86 158 288 317 500	
Occasional making capacity	VA 7 14 36 66 120 132 200	
	VA 1000 2050 5000 10 000 14 000 13 000 9000	
	Power broken in VA	
	V 24 48 110 220 440 600	
	W 120 80 60 52 51 50	
	W 55 38 30 28 26 25	
	W 15 11 9 8 7 6	
	W 720 600 400 300 230 200	
	Power broken in W	

1 Breaking limit of contacts valid for:

- maximum of 50 operating cycles at 10 s intervals (power broken = making current $\times \cos \varphi 0.7$).

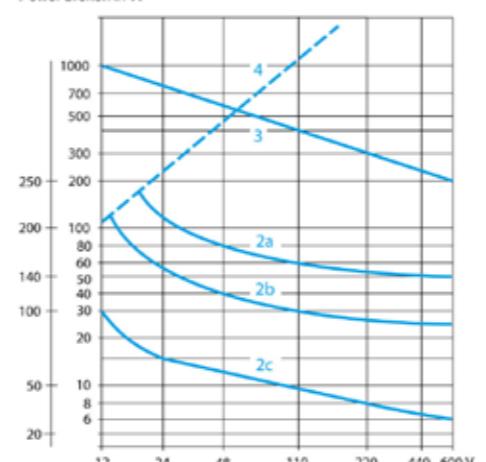
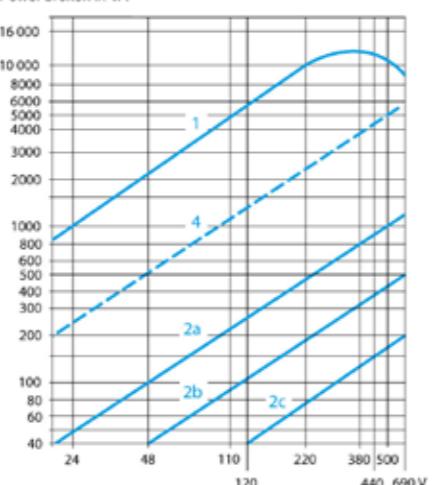
2 Electrical durability of contacts for:

- 1 million operating cycles (2a)
- 3 million operating cycles (2b)
- 10 million operating cycles (2c).

3 Breaking limit of contacts valid for:

- maximum of 20 operating cycles at 10 s intervals with current passing for 0.5 s per operating cycle.

4 Thermal limit.



References

TeSys contactors

Contactors for motor control,
6 to 16 A in category AC-3 and 6 to 12 A
in category AC-4
Control circuit: a.c.

Contactor selection according to utilisation category, see pages 5/194 to 5/197 and 5/200 to 5/203.
Mounting on 35 mm → rail or Ø 4 screw fixing.

Screws in the open 'ready-to-tighten' position.

Add-on auxiliary contact blocks and accessories, see pages 5/22 to 5/25.



5



5



LC7 K0910***

3-pole contactors for standard applications

Standard power ratings of 3-phase motors 50-60 Hz in category AC-3	Rated operational current in category AC-3	Instantaneous auxiliary contacts	Basic reference, to be completed by adding the voltage code (1) (2)	Weight
220 V 380 V 440/500 V up to	440 V	1	LC1 K0610***	
230 V 415 V 660/690 V		1	LC1 K06103***	

Screw clamp connections

1.5	2.2	3	6	1	—	LC1 K0610***	0.180
—	—	1	—	—	1	LC1 K0601***	0.180
2.2	4	4	9	1	—	LC1 K0910***	0.180
—	—	1	—	—	1	LC1 K0901***	0.180
3	5.5	4 (> 440)	12	1	—	LC1 K1210***	0.180
—	—	5.5 (440)	—	—	1	LC1 K1201***	0.180
4	7.5	4 (> 440)	16	1	—	LC1 K1610***	0.180
—	—	5.5 (440)	—	—	1	LC1 K1601***	0.180

Spring terminal connections

For 6 to 12 A ratings only, in the references selected above, insert a figure 3 before the voltage code.
Example: LC1 K0610*** becomes LC1 K06103***.

Faston connectors, 1 x 6.35 or 2 x 2.8

For 6 to 16 A ratings, in the references selected above, insert a figure 7 before the voltage code.
Example: LC1 K0610*** becomes LC1 K06107***.

Solder pins for printed circuit boards

For 6 to 16 A ratings, in the references selected above, insert a figure 5 before the voltage code.
Example: LC1 K0610*** becomes LC1 K06105***.

3-pole silent contactors

Recommended for use in areas sensitive to noise, high interference mains supplies, etc.
Coil with rectifier incorporated, suppressor fitted as standard.

Screw clamp connections

1.5	2.2	3	6	1	—	LC7 K0610***	0.225
—	—	1	—	—	1	LC7 K0601***	0.225
2.2	4	4	9	1	—	LC7 K0910***	0.225
—	—	1	—	—	1	LC7 K0901***	0.225

Faston connectors, 1 x 6.35 or 2 x 2.8

In the references selected above, insert a figure 7 before the voltage code.
Example: LC7 K0610*** becomes LC7 K06107***.

Solder pins for printed circuit boards

In the references selected above, insert a figure 5 before the voltage code.
Example: LC7 K0610*** becomes LC7 K06105***.

(1) Standard control circuit voltages (for other voltages, please consult your Regional Sales Office):

a.c. supply

Contactors LC1 K (0.8...1.1 Uc) (0.85...1.1 Uc)

Volts	12	20	24 (2)	36	42	48	110	115	120	127	200/208	220/230	230	230/240
50/60 Hz	J7	Z7	B7	C7	D7	E7	F7	G7	FCT7	L7	M7	P7	U7	
Volts	256	277	380/400	400	400/415	440	480	500	575	600	660/690			

Up to and including 240 V, coil with integral suppression device available: add 2 to the code required. Example: J72.

Contactors LC7 K (0.85...1.1 Uc)

Volts	24	42	48	110	115	220	230/240
50/60 Hz	B7	D7	E7	F7	FE7	M7	U7

(2) For mains supplies with a high level of interference (voltage surge > 800 V), use a suppressor module LA4 KE1FC (50...129 V) or LA4 KE1UG (130...250 V), see page 5/24

50/60 Hz B7 D7 E7 F7 FE7 M7 U7

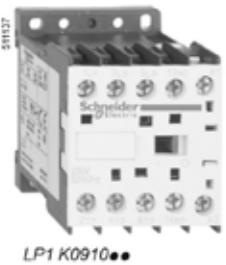
(3) For mains supplies with a high level of interference (voltage surge > 800 V), use a suppressor module LA4 KE1FC (50...129 V) or LA4 KE1UG (130...250 V), see page 5/24

50/60 Hz B7 D7 E7 F7 FE7 M7 U7

References

TeSys contactors

Contactors for motor control,
6 to 12 A in categories AC-3 and AC-4
Control circuit: d.c. or low consumption



LP1 K0910••



LP1 K09103••



LP1 K09107••



LP1 K09105••



LP4 K0910••

Selection :
pages 5/194 and 5/196

Contactor selection according to utilisation category, see pages 5/194 to 5/197 and 5/200 to 5/203.
Mounting on 35 mm ↗ rail or Ø 4 screw fixing.
Screws in the open 'ready-to-tighten' position.

Add-on auxiliary contact blocks and accessories, see pages 5/22 to 5/25

3-pole contactors, d.c. supply

Standard power ratings of 3-phase motors 50-60 Hz in category AC-3				Rated operational current in category AC-3 440 V up to	Instantaneous auxiliary contacts	Basic reference, to be completed by adding the voltage code (1) (2)	Weight
kW	kW	kW	A			kg	
220 V	380 V	440/500 V					
230 V	415 V	660/690 V					
1.5	2.2	3	6	1 –	LP1 K0610••	0.225	
				– 1	LP1 K0601••	0.225	
2.2	4	4	9	1 –	LP1 K0910••	0.225	
				– 1	LP1 K0901••	0.225	
3	5.5	4 (> 440)	12	1 –	LP1 K1210••	0.225	
		5.5 (440)		– 1	LP1 K1201••	0.225	

Spring terminal connections

In the references selected above, insert a figure 3 before the voltage code.
Example: LP1 K0610•• becomes LP1 K06103••.

Faston connectors, 1 x 6.35 or 2 x 2.8

In the references selected above, insert a figure 7 before the voltage code.
Example: LP1 K0610•• becomes LP1 K06107••.

Solder pins for printed circuit boards

In the references selected above, insert a figure 5 before the voltage code.
Example: LP1 K0610•• becomes LP1 K06105••.

3-pole low consumption contactors

Compatible with programmable controller outputs.
LED indicator incorporated (except models LP4 K****FW3 and LP4 K****GW3).
Wide range coil (0.7...1.30 Uc), suppressor fitted as standard, consumption 1.8 W.

Screw clamp connections

1.5	2.2	3	6	1 –	LP4 K0610••	0.235
				– 1	LP4 K0601••	0.235
2.2	4	4	9	1 –	LP4 K0910••	0.235
				– 1	LP4 K0901••	0.235
3	5.5	4 (> 440)	12	1 –	LP4 K1210••	0.235
		5.5 (440)		– 1	LP4 K1201••	0.235

Spring terminal connections

In the references selected above, insert a figure 3 before the voltage code.
Example: LP4 K0610•• becomes LP4 K06103••.

Faston connectors, 1 x 6.35 or 2 x 2.8

In the references selected above, insert a figure 7 before the voltage code.
Example: LP4 K0610•• becomes LP4 K06107••.

Solder pins for printed circuit boards

In the references selected above, insert a figure 5 before the voltage code.
Example: LP4 K0610•• becomes LP4 K06105••.

(1) Standard control circuit voltages (for other voltages, please consult your Regional Sales Office):

d.c. supply (contactors LP1 K: 0.8-1.15 Uc)

Volts	12	20	24 (2)	36	48	60	72	100	110	125	155	174	200	220	230	240	250
Code	JD	ZD	BD	CD	ED	ND	SD	KD	FD	GD	PD	QD	LD	MD	MPD	MUD	UD

Coil with integral suppression device available: add 3 to the code required. Example: JD3

Low consumption (contactors LP4 K: 0.7*130 Uc)

Volts	12	20	24	48	72	110	120
Code	JW3	ZW3	BW3	EW3	SW3	FW3	GW3

(2) For LP1 K only, when connecting an electronic sensor or timer in series with the contactor coil, select a 20 V coil (~ control circuit voltage code Z7, --- control circuit voltage code ZD) so as to compensate for the incurred voltage drop.

References

TeSys contactors

Contactors for control in category AC-1, 20 A
Control circuit: a.c.



LC1 K09004••



LC1 K09103••



LC1 K09107••



LC1 K09008••



LC1 K1201••



LC1 K1210••



LC1 K1204••

LC1 K1205••

LC1 K1206••

LC1 K1207••

LC1 K1208••

LC1 K1209••

LC1 K1210••

LC1 K1211••

LC1 K1212••

LC1 K1213••

LC1 K1214••

LC1 K1215••

LC1 K1216••

LC1 K1217••

LC1 K1218••

LC1 K1219••

LC1 K1220••

LC1 K1221••

LC1 K1222••

LC1 K1223••

LC1 K1224••

LC1 K1225••

LC1 K1226••

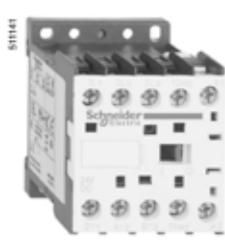
LC1 K1227••

LC1 K1228••

References

TeSys contactors

Contactors for control in category AC-1, 20 A
Control circuit: d.c. or low consumption



Contactor selection according to utilisation category, see pages 5/198 and 5/199.
Mounting on 35 mm rail or Ø 4 screw fixing.
Screws in the open "ready-to-tighten" position.
Add-on auxiliary contact blocks and accessories, see pages 5/22 to 5/25.

3 and 4-pole contactors, d.c. supply (1)

Non-inductive loads Category AC-1	Number of poles	Instantaneous auxiliary contacts	Basic reference, to be completed by adding the voltage code (2) (3)	Weight
A				kg
20	3	-	LP1 K0910•• or LP1 K1210••	0.225
	3	-	LP1 K0901•• or LP1 K1201••	0.225
	4	-	LP1 K09004•• or LP1 K12004••	0.225
	2	2	LP1 K09008••	0.225

Spring terminal connections

In the references selected above, insert a figure 3 before the voltage code.
Example: LP1 K0910•• becomes LP1 K09103••.

Faston connectors, 1 x 6.35 or 2 x 2.8

In the references selected above, insert a figure 7 before the voltage code.
Example: LP1 K0910•• becomes LP1 K09107••.

Solder pins for printed circuit boards

In the references selected above, insert a figure 5 before the voltage code.
Example: LP1 K0910•• becomes LP1 K09105••.

3 or 4-pole low consumption contactors (1)

Compatible with programmable controller outputs.
LED indicator incorporated (except models LP4 K••••FW3 and LP4 K••••GW3).
Wide range coil (0.7...1.30 Uc), suppressor fitted as standard, consumption 1.8 W.

Screw clamp connections

20	3	-	1	-	LP4 K0910••• or LP4 K1210•••	0.235
	3	-	-	1	LP4 K0901••• or LP4 K1201•••	0.235
	4	-	-	-	LP4 K09004••• or LP4 K12004•••	0.235
	2	2	-	-	LP4 K09008•••	0.235

Spring terminal connections

In the references selected above, insert a figure 3 before the voltage code.
Example: LP4 K0910•• becomes LP4 K09103••.

Faston connectors, 1 x 6.35 or 2 x 2.8

In the references selected above, insert a figure 7 before the voltage code.
Example: LP4 K0910•• becomes LP4 K09107••.

Solder pins for printed circuit boards

In the references selected above, insert a figure 5 before the voltage code.
Example: LP4 K0910•• becomes LP4 K09105••.

(1) Selection between 9 and 12 A ratings according to number of operating cycles, see AC-1 curve on page 5/198.

(2) Standard control circuit voltages (for other voltages, please consult your Regional Sales Office):

d.c. supply (contactors LP1 K: 0.8°1.15 Uc)

Volts ...	12	20	24 (3)	36	48	60	72	100	110	125	155	174	200	220	230	240	250
Code	JD	ZD	BD	CD	ED	ND	SD	KD	FD	GD	PD	QD	LD	MD	MPD	MUD	UD

Coil with integral suppression device available: add 3 to the code required. Example: JD3.

Low consumption (contactors LP4 K: 0.7°130 Uc)

Volts ...	12	20	24	48	72	110	120
Code	JW3	ZW3	BW3	EW3	SW3	FW3	GW3

(3) For LP1 K only, when connecting an electronic sensor or timer in series with the contactor coil, select a 20 V coil (~ control circuit voltage code Z7, --- control circuit voltage code ZD) so as to compensate for the incurred voltage drop.

Selection :
pages 5/198 and 5/199

Characteristics :
pages 5/10 to 5/13

Dimensions :
page 5/26

Schemes :
page 5/27

References

TeSys contactors

Reversing contactors for motor control, 6 to 16 A in category AC-3 and 6 to 12 A in category AC-4
Control circuit: a.c.

Reversing contactor selection according to utilisation category, see pages 5/194 to 5/197 and 5/200 to 5/203. Integral mechanical interlock.

It is essential to link the contacts of the electrical interlock.

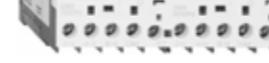
Pre-wired power circuit connections as standard on screw clamp versions.

Mounting on 35 mm rail or Ø 4 screw fixing. Screws in the open "ready-to-tighten" position.

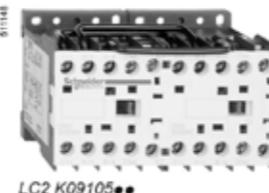
Add-on auxiliary contact blocks and accessories, see pages 5/22 to 5/25.

3-pole reversing contactors for standard applications

Standard power ratings of 3-phase motors 50/60 Hz in category AC-3	Rated operational current in category AC-3 440V up to	Instan- taneous auxiliary contacts per contactor	Basic reference, to be completed by adding the voltage code (1) (2)	Weight
220 V 380 V 440/500 V 230 V 415 V 660/690 V				



LC2 K0910••



LC2 K09105••

Spring terminal connections

For 6 to 12 A ratings only, in the references selected above, insert a figure 3 before the voltage code.
Example: LC2 K0610•• becomes LC2 K06103••.

Faston connectors, 1 x 6.35 or 2 x 2.8

For 6 to 16 A ratings, in the references selected above, insert a figure 7 before the voltage code.
Example: LC2 K0610•• becomes LC2 K06107••.

Solder pins for printed circuit boards

For 6 to 16 A ratings, in the references selected above, insert a figure 5 before the voltage code.
Example: LC2 K0610•• becomes LC2 K06105••.

3-pole silent reversing contactors

Recommended for use in areas sensitive to noise, high interference mains supplies, etc.
Coil with rectifier incorporated, suppressor fitted as standard.

Screw clamp connections	1.5	2.2	3	6	1	-	LC8 K0610••	0.480
					-	1	LC8 K0601••	0.480
					1	-	LC8 K0910••	0.480
					-	1	LC8 K0901••	0.480
	3	5.5	4 (> 440) 5.5 (440)	12	1	-	LC8 K1210••	0.480
					-	1	LC8 K1201••	0.480
	4	7.5	4 (> 440) 5.5 (440)	16	1	-	LC8 K1610••	0.480
					-	1	LC8 K1601••	0.480

Faston connectors, 1 x 6.35 or 2 x 2.8

In the references selected above, insert a figure 7 before the voltage code.
Example: LC8 K0610•• becomes LC8 K06107••.

Solder pins for printed circuit boards

In the references selected above, insert a figure 5 before the voltage code.

Example: LC8 K0610•• becomes LC8 K06105••.

(1) Standard control circuit voltages (for other voltages, please consult your Regional Sales Office):

a.c. supply

Reversing contactors LC2 K (0.8...1.15 Uc) (0.85...1.1 Uc)

Volts	12	20	24 (2)	36	42	48	110	115	120	127	200/208	220/230	230/240	
50/60 Hz	J7	Z7	B7	C7	D7	E7	F7	FE7	G7	FC7	L7	M7	P7	U7
Volts	2													

References

TeSys contactors

Reversing contactors for motor control, 6 to 12 A
in categories AC-3 and AC-4
Control circuit: d.c. or low consumption

Reversing contactor selection according to utilisation category, see pages 5/194 to 5/197 and 5/200 to 5/203.
Integral mechanical interlock.

It is essential to link the contacts of the electrical interlock.

Pre-wired power circuit connections as standard on screw clamp versions.

Mounting on 35 mm \rightarrow rail or Ø 4 screw fixing.

Screws in the open "ready-to-tighten" position.

Add-on auxiliary contact blocks and accessories, see pages 5/22 to 5/25

3-pole reversing contactors, d.c. supply

Standard power ratings of 3-phase motors 50-60 Hz in category AC-3	Rated operational current in category AC-3 440V up to	Instan- taneous auxiliary contacts per contactor	Basic reference, to be completed by adding the voltage code (1) (2)	Weight
220 V	380 V	440/500 V		
230 V	415 V	660/690 V		
kW	kW	kW	A	kg
1.5	2.2	3	6	0.480
			1 –	LP2 K0610**
			– 1	LP2 K0601**
2.2	4	4	9	0.480
			1 –	LP2 K0910**
			– 1	LP2 K0901**
3	5.5	4 (> 440)	12	0.480
			1 –	LP2 K1210**
			– 1	LP2 K1201**
		5.5 (440)		0.480

Spring terminal connections

In the references selected above, insert a figure 3 before the voltage code.
Example: LP2 K0610** becomes LP2 K06103**.

Faston connectors, 1 x 6.35 or 2 x 2.8

In the references selected above, insert a figure 7 before the voltage code.
Example: LC2 K0610** becomes LC2 K06107**.

Solder pins for printed circuit boards

For 6 to 16 A ratings, in the references selected above, insert a figure 5 before the voltage code.
Example: LC2 K0610** becomes LC2 K06105**.

3-pole low consumption reversing contactors

Compatible with programmable controller outputs.
LED indicator incorporated (except models LP5-K****FW3 and LP5-K****GW3).
Wide range coil (0.7...1.30 Uc), suppressor fitted as standard, consumption 1.8 W.

Screw clamp connections

1.5	2.2	3	6	1 –	LP5 K0610**	0.490
				– 1	LP5 K0601**	0.490
2.2	4	4	9	1 –	LP5 K0910**	0.490
				– 1	LP5 K0901**	0.490
3	5.5	4 (> 440)	12	1 –	LP5 K1210**	0.490
		5.5 (440)		– 1	LP5 K1201**	0.490

Spring terminal connections

In the references selected above, insert a figure 3 before the voltage code.
Example: LP5 K0610** becomes LP5 K06103**.

Faston connectors, 1 x 6.35 or 2 x 2.8

In the references selected above, insert a figure 7 before the voltage code.
Example: LP5 K0610** becomes LP5 K06107**.

Solder pins for printed circuit boards

In the references selected above, insert a figure 5 before the voltage code.
Example: LP5 K0610** becomes LP5 K06105**.

(1) Standard control circuit voltages (for other voltages, please consult your Regional Sales Office):

d.c. supply

Reversing contactors LP2 K (0.8...1.15 Uc)

Volts	12	20	24 (3)	36	48	72	100	110	125	155	174	200	220	230	240	250	
Code	JD	ZD	BD	CD	ED	ND	SD	KD	FD	GD	PD	QD	LD	MD	MPD	MUD	UD

Coil with integral suppression device available: add 3 to the code required. Example: JD3.

Low consumption

Reversing contactors LP5 K (0.7...1.30 Uc)

Volts	12	20	24	48	72	110	120
Code	JW3	ZW3	BW3	EW3	SW3	FW3	GW3

(2) For LP2 K only, when connecting an electronic sensor or timer in series with the contactor coil, select a 20 V coil (\sim control circuit voltage code Z7, \perp control circuit voltage code ZD) so as to compensate for the incurred voltage drop.

References

TeSys contactors

Reversing contactors for control
in category AC-1, 20 A
Control circuit: a.c.

Warning: reversing contactors LC2 K0910** and LC2 K0901** are pre-wired for reverse motor operation as standard.
Reversing contactor selection according to utilisation category, see pages 5/198 and 5/199.

Integral mechanical interlock.

It is essential to link the contacts of the electrical interlock.

Mounting on 35 mm \rightarrow rail or Ø 4 screw fixing.

Screws in the open "ready-to-tighten" position.

Add-on auxiliary contact blocks and accessories, see pages 5/22 to 5/25



5

5

3 or 4-pole reversing contactors for standard applications (1)

Non-inductive loads Category AC-1 Maximum current at 0 \leq 50 °C	Number of poles	Instantaneous auxiliary contacts per contactor	Basic reference, to be completed by adding the voltage code (2) (3)	Weight
	3	–	1 –	LC2 K0910**
	3	–	– 1	LC2 K1210**
	4	–	– –	LC2 K0904**
	4	–	– –	LC2 K1204**

Spring terminal connections

In the references selected above, insert a figure 3 before the voltage code.
Example: LC2 K0910** becomes LC2 K09103**.

Faston connectors, 1 x 6.35 or 2 x 2.8

In the references selected above, insert a figure 7 before the voltage code.
Example: LC2 K0910** becomes LC2 K09107**.

Solder pins for printed circuit boards

In the references selected above, insert a figure 5 before the voltage code.
Example: LC2 K0910** becomes LC2 K09105**.

3 or 4-pole silent reversing contactors (1)

Recommended for use in areas sensitive to noise, high interference mains supplies, etc.
Coil with rectifier incorporated, suppressor fitted as standard.

Screw clamp connections

20	3 –	1 –	LC8 K0910**	0.480
	3 –	– 1	LC8 K0901**	0.480
	4 –	– –	LC8 K0904**	0.470
	4 –	– –	LC8 K1204**	0.470

Faston connectors, 1 x 6.35 or 2 x 2.8

In the references selected above, insert a figure 7 before the voltage code.
Example: LC8 K0910** becomes LC8 K09107**.

Solder pins for printed circuit boards

In the references selected above, insert a figure 5 before the voltage code.
Example: LC8 K0910** becomes LC8 K09105**.

(1) Selection between 9 and 12 A ratings according to number of operating cycles, see AC-1 curve on page 5/198.

(2) Standard control circuit voltages (for other voltages, please consult your Regional Sales Office):

a.c. supply

Reversing contactors LC2 K (0.8...1.15 Uc) (0.85...1.1 Uc)

Volts	12	20	24 (3)	36	42	48	72	110	115	120	127	200/208	220/230	230	230/240
50/60 Hz	J7														

TeSys contactors

Reversing contactors for control
in category AC-1, 20 A
Control circuit: d.c. or low consumption

Warning: reversing contactors LP2 K0910** and LP2 K0901** are pre-wired for reverse motor operation as standard.
Reversing contactor selection according to utilisation category, see pages 5/198 and 5/199.

Integral mechanical interlock.

It is essential to link the contacts of the electrical interlock.

Mounting on 35 mm — rail or Ø 4 screw fixing.

Screws in the open "ready-to-tighten" position.

Add-on auxiliary contact blocks and accessories, see pages 5/22 to 5/25.

3 or 4-pole reversing contactors, d.c. supply (1)

Non-inductive loads Category AC-1 Maximum current at $\theta \leq 50^\circ\text{C}$	Number of poles	Instantaneous auxiliary contacts per contactor	Basic reference, to be completed by adding the voltage code (2) (3)	Weight	
20	3	—	LP2 K0910**	0.480	
	3	—	—	or LP2 K1210**	0.480
	3	—	1	LP2 K0901**	0.480
	4	—	—	or LP2 K1201**	0.480
			LP2 K0904**	0.480	
			or LP2 K12004**	0.480	

Spring terminal connections

In the references selected above, insert a figure 3 before the voltage code.
Example: LP2 K0910** becomes LP2 K09103**.

Faston connectors, 1 x 6.35 or 2 x 2.8

In the references selected above, insert a figure 7 before the voltage code.
Example: LP2 K0910** becomes LP2 K09107**.

Solder pins for printed circuit boards

In the references selected above, insert a figure 5 before the voltage code.
Example: LP2 K0910** becomes LP2 K09105**.

3 or 4-pole low consumption reversing contactors (1)

Compatible with programmable controller outputs.

LED indicator incorporated (except models LP5 K****FW3 and LP5 K****GW3).
Wide range coil (0.7...1.30 Uc), suppressor fitted as standard, consumption 1.8 W.

Screw clamp connections

20	3	—	1	—	LP5 K0910***	0.490
	3	—	—	1	or LP5 K1210***	0.490
	3	—	—	—	LP5 K0901***	0.490
	4	—	—	—	or LP5 K1201***	0.490
					LP5 K0904***	0.490
					or LP5 K12004***	0.490

Spring terminal connections

In the references selected above, insert a figure 3 before the voltage code.
Example: LP5 K0910** becomes LP5 K09103**.

Faston connectors, 1 x 6.35 or 2 x 2.8

In the references selected above, insert a figure 7 before the voltage code.
Example: LP5 K0910** becomes LP5 K09107**.

Solder pins for printed circuit boards

In the references selected above, insert a figure 5 before the voltage code.
Example: LP5 K0910** becomes LP5 K09105**.

(1) Selection between 9 and 12 A ratings according to number of operating cycles, see AC-1 curve on page 5/198.

(2) Standard control circuit voltages (for other voltages, please consult your Regional Sales Office):

d.c. supply (reversing contactors LP2 K: 0.8...1.15 Uc)

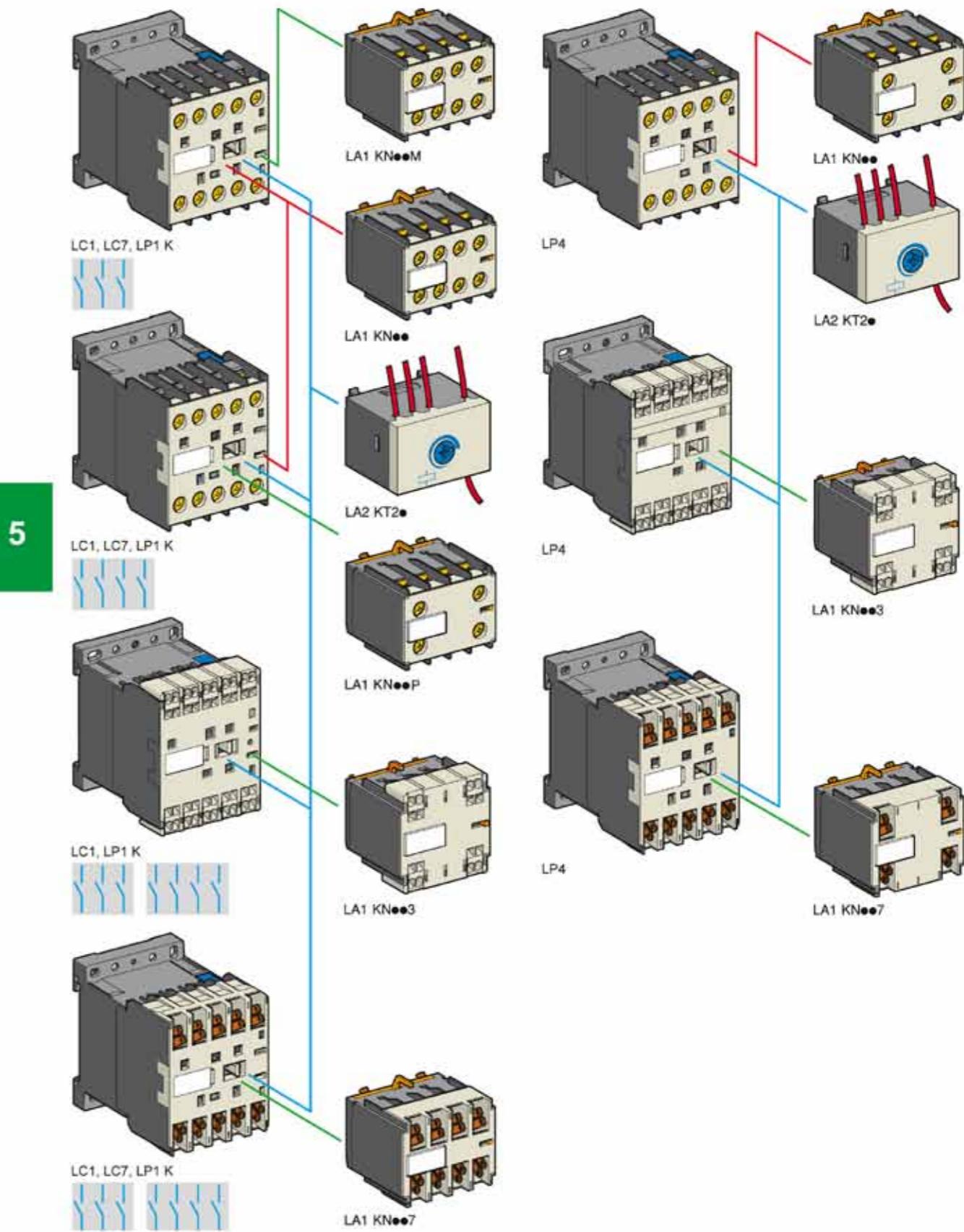
Volts ...	12	20	24 (3)	36	48	60	72	100	110	125	155	174	200	220	230	240	250
Code	JD	ZD	BD	CD	ED	ND	SD	KD	FD	GD	PD	QD	LD	MD	MPD	MUD	UD

Coil with integral suppression device available: add 3 to the code required. Example: JD3.

Low consumption (reversing contactors LP5 K: 0.7...130 Uc)

Volts ...	12	20	24	48	72	110	120
Code	JW3	ZW3	BW3	EW3	SW3	FW3	GW3

(3) For LP2 K only, when connecting an electronic sensor or timer in series with the contactor coil, select a 20 V coil (~ control circuit voltage code Z7, --- control circuit voltage code ZD) so as to compensate for the incurred voltage drop.



TeSys contactors

TeSys K contactors and reversing contactors
Auxiliary contact blocks

Instantaneous auxiliary contact blocks				
Recommended for standard applications. Clip-on front mounting, 1 block per contactor				
Connection	For use on contactors	Composition	Reference	Weight
				kg
Screw clamp terminals	All products with screw clamp terminals	2	LA1 KN20	0.045
		—	LA1 KN02	0.045
		1	LA1 KN11	0.045
	All products with screw clamp terminals except low consumption	4	LA1 KN40	0.045
		3	LA1 KN31	0.045
		2	LA1 KN22	0.045
		1	LA1 KN13	0.045
		—	LA1 KN04	0.045
Spring terminals	All products with spring terminals	2	LA1 KN203	0.045
		—	LA1 KN023	0.045
		1	LA1 KN113	0.045
	All products with spring terminals except low consumption	4	LA1 KN403	0.045
		3	LA1 KN313	0.045
		2	LA1 KN223	0.045
		1	LA1 KN133	0.045
		—	LA1 KN043	0.045
Faston connectors, 1 x 6.35 or 2 x 2.8	All products with Faston connectors	2	LA1 KN207	0.045
		—	LA1 KN027	0.045
		1	LA1 KN117	0.045
	All products with Faston connectors except low consumption	4	LA1 KN407	0.045
		3	LA1 KN317	0.045
		2	LA1 KN227	0.045
		1	LA1 KN137	0.045
		—	LA1 KN047	0.045
With terminal referencing to standard EN 50012. Clip-on front mounting, 1 block per contactor				
Screw clamp terminals with referencing conforming to standard EN 50012	All 3-pole + N/O products with screw clamp terminals except LP4 and LP5 K12	—	LA1 KN02M	0.045
		1	LA1 KN11M	0.045
	All 3-pole + N/O products with screw clamp terminals except LP4 or LP5 K06, K09 and K12	3	LA1 KN31M	0.045
		2	LA1 KN22M	0.045
		1	LA1 KN13M	0.045
	All 4-pole products with screw clamp terminals except LP4 or LP5 K12	1	LA1 KN11P	0.045
	All 4-pole products with screw clamp terminals except LP4 or LP5 K09 and K12	2	LA1 KN22P	0.045

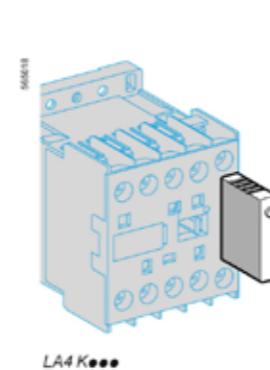
Electronic time delay auxiliary contact blocks

Relay output with common point changeover contact, \sim or \equiv 240 V, 2 A maximum.
Control voltage 0.85...1.1 Uc.
Maximum switching capacity 250 VA or 150 W.
Operating temperature -10...+60 °C.
Reset time: 1.5 s during the time delay period, 0.5 s after the time delay period.

Clip-on front mounting, 1 block per contactor				
Voltage	Type	Timing range	Composition	Reference
\sim or \equiv 24...48	On-delay	1...30	1	LA2 KT2E
\sim 110...240	On-delay	1...30	1	LA2 KT2U

TeSys contactors

TeSys K contactors and reversing contactors
Suppressor modules incorporating LED indicator



References

Mounting and connection	Type	For voltages	Sold in lots of	Unit reference	Weight
Clip-on fixing on the front of contactors LC1 and LP1, with locating device. No tools required.	Varistor (1)	\sim and \equiv 12...24 V	5	LA4 KE1B	0.010
		\sim and \equiv 32...48 V	5	LA4 KE1E	0.010
		\sim and \equiv 50...129 V	5	LA4 KE1FC	0.010
		\sim and \equiv 130...250 V	5	LA4 KE1UG	0.010
	Diode + Zener diode (2)	\equiv 12...24 V	5	LA4 KC1B	0.010
		\equiv 32...48 V	5	LA4 KC1E	0.010
	RC (3)	\sim 110...250 V	5	LA4 KA1U	0.010

(1) Protection provided by limiting the transient voltage to 2 Uc max.

Maximum reduction of transient voltage peaks.

Slight increase in drop-out time (1.1 to 1.5 times the normal time).

(2) No overvoltage or oscillating frequency.

Polarised component.

Slight increase in drop-out time (1.1 to 1.5 times the normal time).

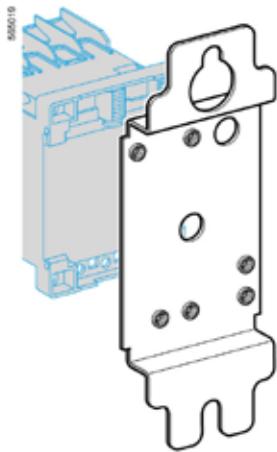
(3) Protection by limiting the transient voltage to 3 Uc max. and limitation of the oscillating frequency.

Slight increase in drop-out time (1.2 to 2 times the normal time).

References

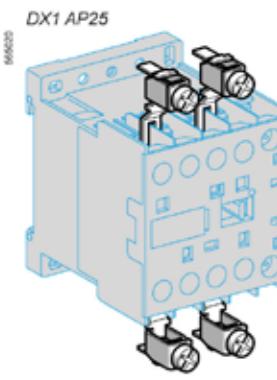
TeSys contactors

TeSys K contactors and reversing contactors
Accessories



Mounting and marking accessories

Description	Application	Sold in lots of	Unit reference	Weight kg
Mounting plates (1)	For fixing on 1 rail	Clip-on	1 LA9 D973	0.025
	For fixing on 2 rails 110/120 mm fixing centres	10 DX1 AP25		0.065
Marker holder	Clip-on	Onto front of contactor	100 LA9 D90	0.001
Clip-in markers	4 maximum per contactor	Strips of 10 identical numbers 0...9	25 AB1 P• (2)	0.002
		Strips of 10 identical letters A...Z	25 AB1 G• (2)	0.002



Connection accessories

Description	Application	Sold in lots of	Unit preference	Weight kg
Paralleling links	For 2 poles	With screw clamps	4 LA9 E01	0.010
	For 4 poles	With screw clamps	2 LA9 E02	0.015
Set of 6 power connections	For 3-pole reversing contactors for motor control	100 LA9 K0969		0.010
Set of 4 power connections	For 4-pole changeover contactor pairs	For contactors with screw clamp terminals	100 LA9 K0970	0.010

(1) Order 1 mounting plate for fixing a contactor and 2 mounting plates for fixing a reversing contactor.
(2) Complete the reference by replacing the dot with the required character.

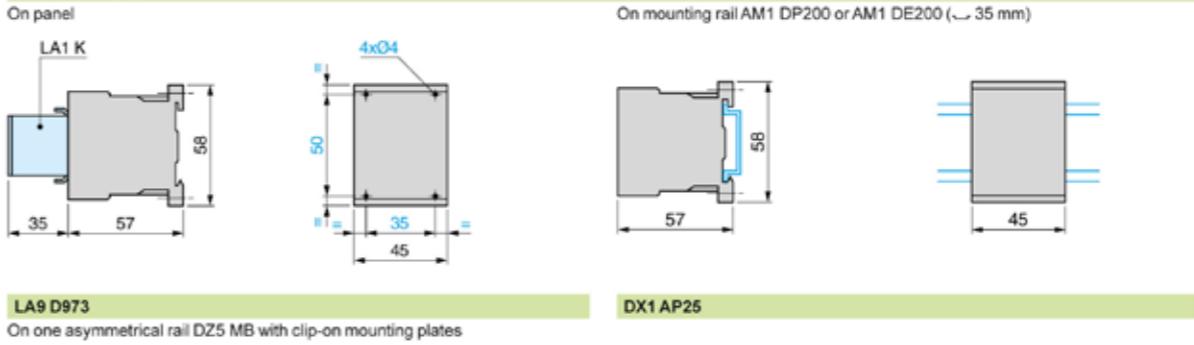
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Dimensions, mounting

TeSys contactors

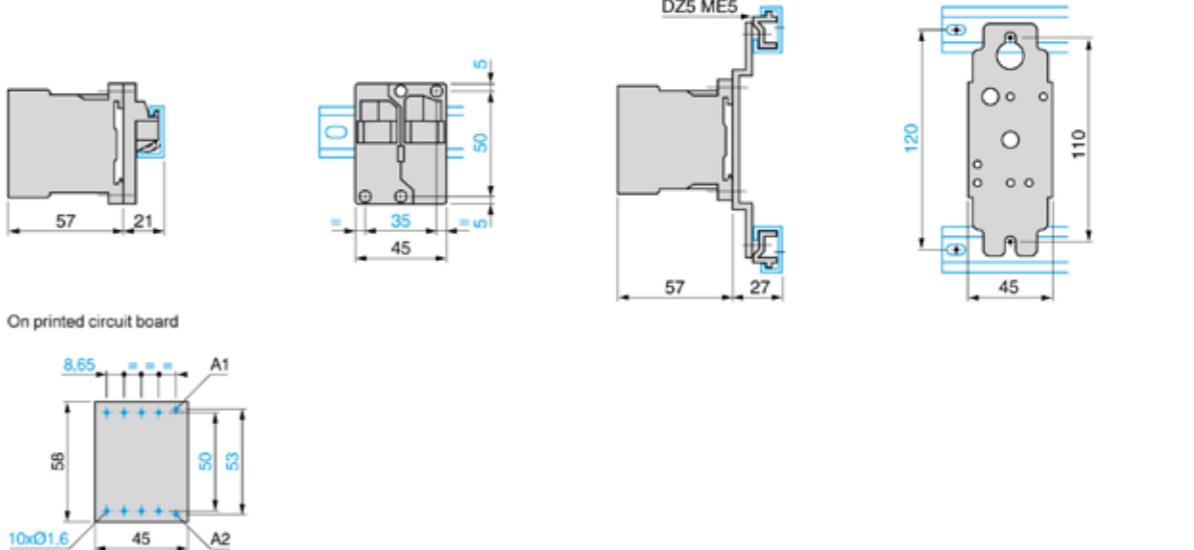
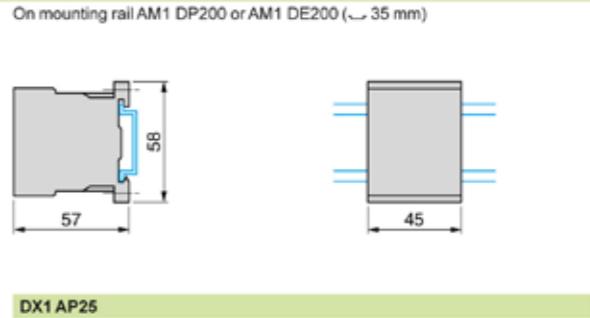
TeSys K contactors

Contactors LC1 K, LC7 K, LP1 K, LP4 K

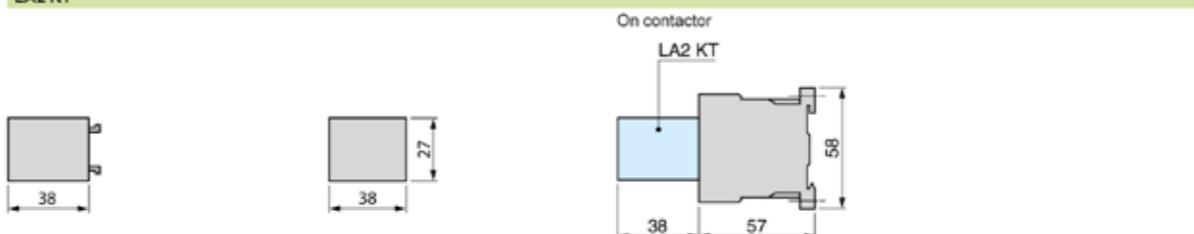


LA9 D973

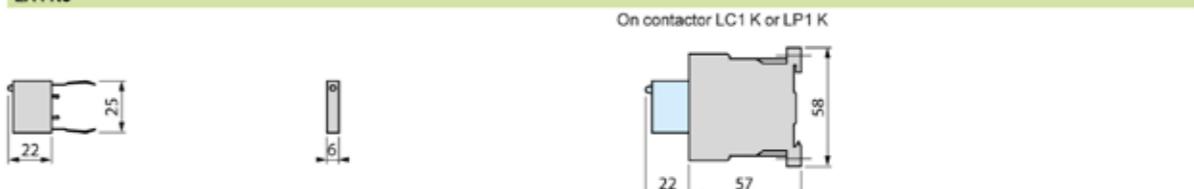
On one asymmetrical rail DZ5 MB with clip-on mounting plates



Electronic time delay contact blocks LA2 KT

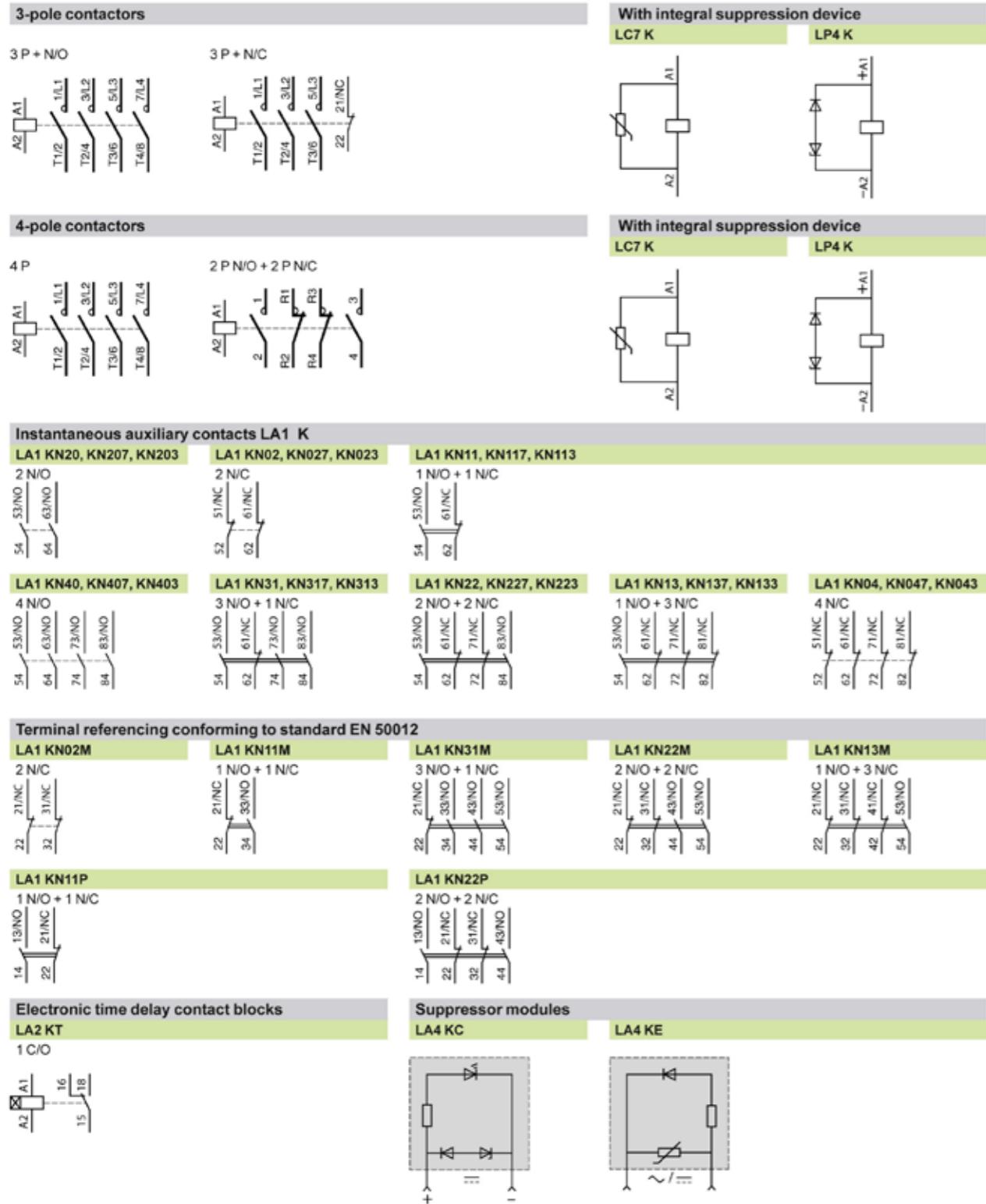


Suppressor modules LA4 K•



TeSys contactors

TeSys K reversing contactors

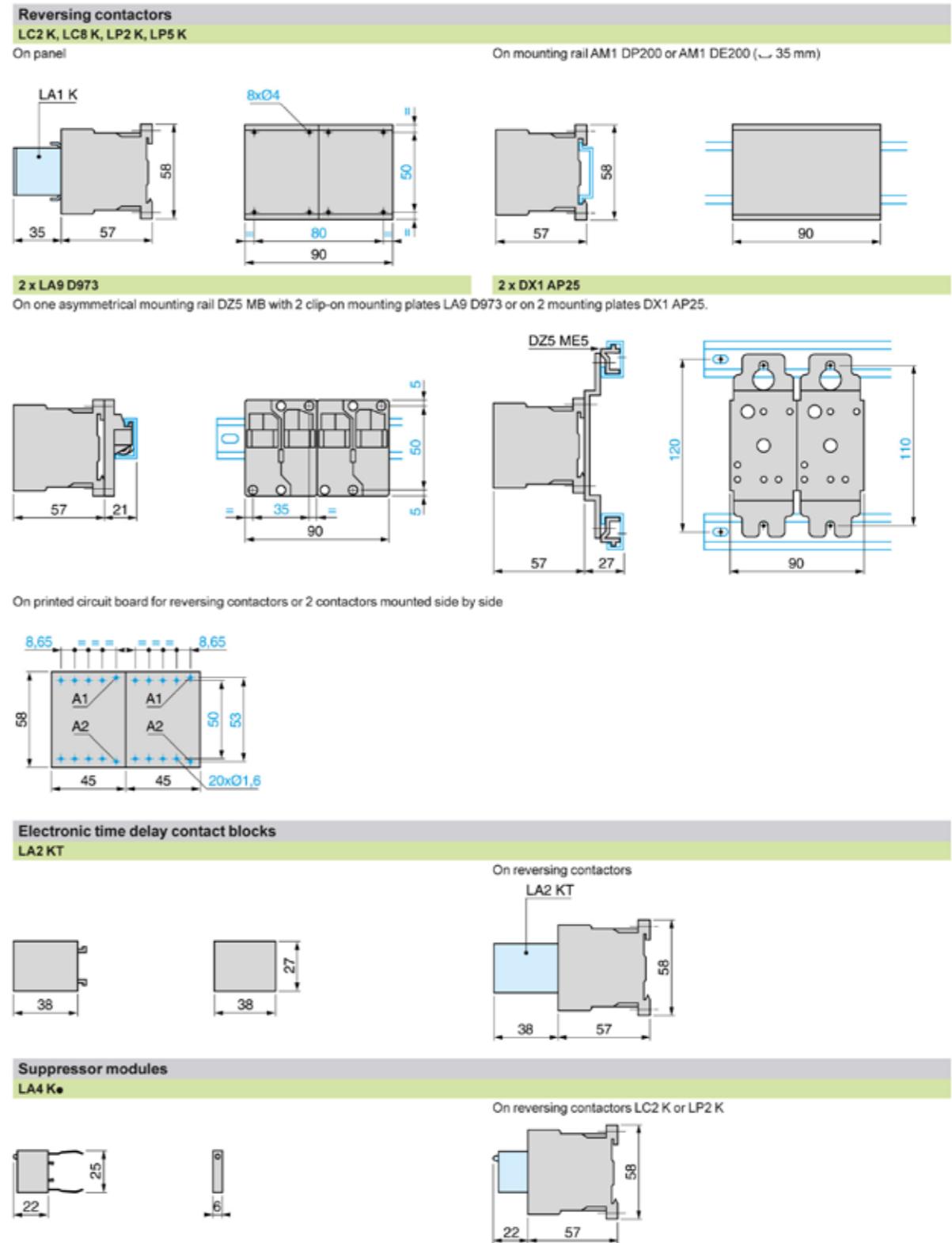


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Dimensions, mounting

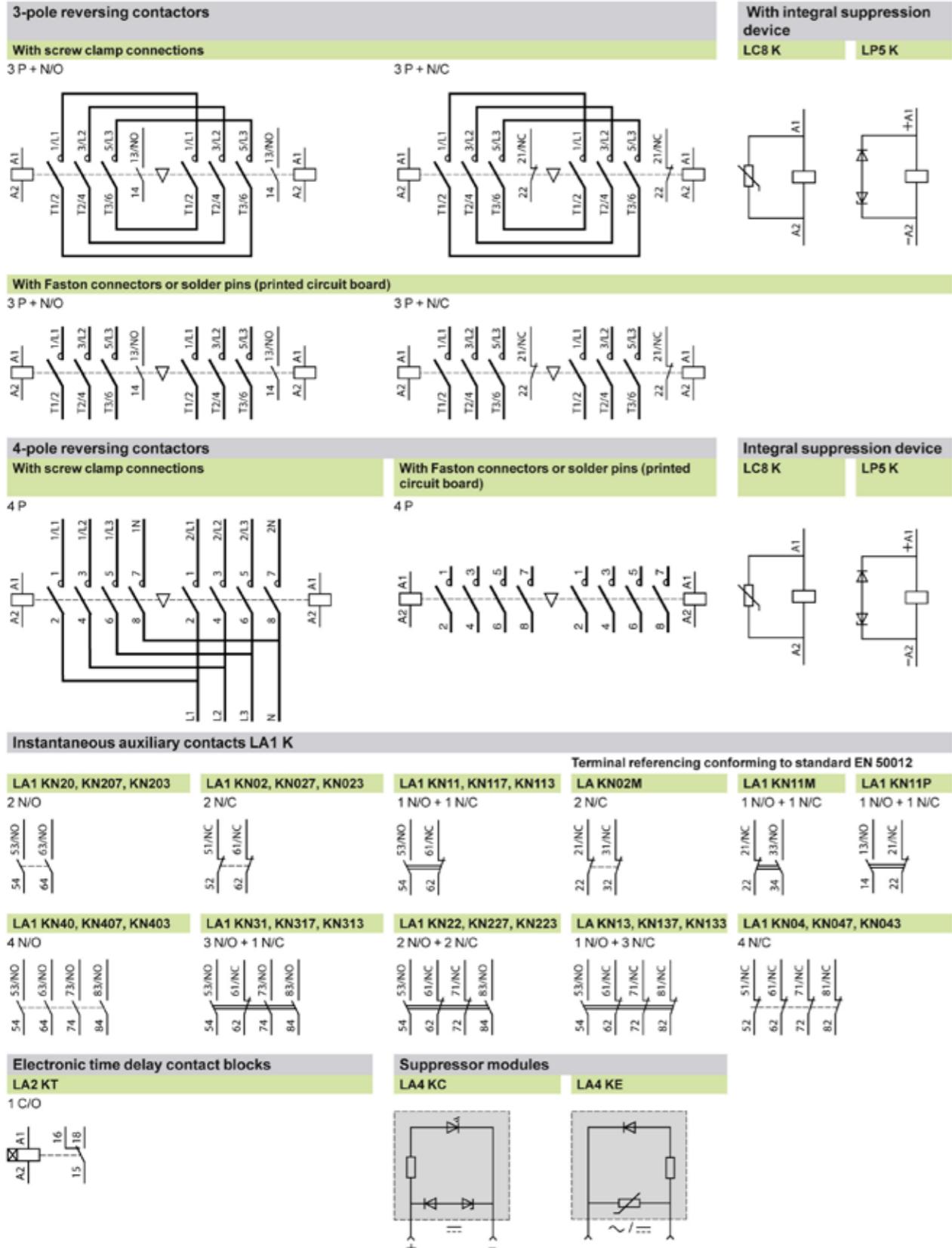
TeSys contactors

TeSys K reversing contactors



TeSys contactors

TeSys K reversing contactors



Characteristics:
pages 5/10 to 5/13

References:
pages 5/18 to 5/21

Dimensions:
page 5/28

Characteristics

TeSys contactors

Mini-contactors TeSys LC1 SK and LP1 SK

Environment

Rated insulation voltage (Ui)	Conforming to 60947, VDE 0110 gr C, BS 5424, CSA 22-2 n° 14, UL 508	V	690
Conforming to standards	IEC 60947, NF C 63-110, VDE 0660, BS 5424		
Approvals	UL, CSA		
Protective treatment	Conforming to IEC 60068 (DIN 50015)	"TC" (Klimafest, Climateproof)	
Degree of protection	Conforming to VDE 0106	Protection against direct finger contact	
Ambient air temperature around the device	Storage	°C	-50...+70
	Operation	°C	-20...+50
Maximum operating altitude	Without derating	m	2000
Operating position		Vertical axis	22° 5'
		Horizontal axis	180°
		Without derating	Without derating
Cabling, screw clamp terminals		Min	Max
Solid conductor	mm²	1 x 1.5 or 2 x 1.5	1 x 6 or 2 x 4
Flexible cable without cable end	mm²	1 x 0.5 or 2 x 0.35	1 x 6 or 2 x 2.5
Flexible cable with cable end	mm²	1 x 0.35 or 2 x 0.35	1 x 6 or 2 x 1.5
Tightening torque	N.m	0.8	
Terminal referencing		Conforming to standards En 50005	

References:
pages 5/34 and 5/35

Dimensions:
page 5/36

Schemes:
page 5/37

Characteristics (continued)

TeSys contactors

Mini-contactors TeSys LC1 SK and LP1 SK

Pole characteristics

Conventional thermal current (I _{th})	For ambient temperature ≤ 55 °C	A	12
Rated operational frequency	Hz	50/60	
Frequency limits of the operational current	Hz	Up to 400	
Rated operational voltage (U _e)	V	690	
Rated making capacity	I _{rms} conforming to NF C 63-110 and IEC 60947	A	66
Rated breaking capacity (for U _e ≤ 400 V)	Conforming to NF C 63-110 and IEC 60947 (I _{rms})	A	52
Short time rating	In free air for a time "t" from cold state (t ≤ 55 °C)	A	50
Short-circuit protection	gl fuse U ≤ 440 V	A	16
Average impedance per pole	At I _{th} and 50 Hz	mΩ	4
Maximum rated operational current			
For a temperature ≤ 55 °C	AC-3 (1) (U _e ≤ 400 V)	A	6
	AC-1	A	12
Utilisation in category AC-1 resistive circuits, heating, lighting (U _e ≤ 440 V)	Increase in operational current by paralleling of poles	A	20

Auxiliary contact characteristics of add-on blocks

Rated operational voltage (U _e)	Up to	V	690
Rated insulation voltage (U _i)	Conforming to IEC 60947, BS 5424, VDE 0110 group C, CSA C 22-2 n° 14	V	690
Conventional thermal current (I _{th})	For ambient temperature ≤ 55 °C	A	10
Frequency of operational current		Hz	Up to 400
Short-circuit protection	Conforming to IEC 60947 and VDE 0660, gl fuse	A	10

Operational power of contacts conforming to IEC 60947

	a.c. supply, category AC-15						d.c. supply, category DC-13						
Electrical durability (valid up to 3600 operating cycles per hour) on an inductive load such as the coil of an electromagnet: making current ($\cos \phi = 0.7$) = 10 times the breaking current ($\cos \phi = 0.4$).													
			110/	220/	380/								
	V	24	48	127	230	400	440	V	24	48	110	220	
1 million operating cycles	VA	48	96	240	440	800	880	W	120	80	60	52	51
3 million operating cycles	VA	17	34	86	158	288	317	W	55	38	30	28	26
10 million operating cycles	VA	7	14	36	66	120	132	W	15	11	9	8	7
Occasional making capacity	VA	1000	2050	5000	10000	14000	13000	W	720	600	400	300	230

(1) For LC1 contactors.

Characteristics (continued)

TeSys contactors

Mini-contactors TeSys LC1 SK and LP1 SK

Control circuit characteristics

Type	LC1 SK06	LP1 SK06
Rated control circuit voltage (U _c)	V ~ 24...400	V ≈ 12...72
Control voltage limits (0 ≤ 55 °C)	For operation For drop-out	0.85...1.1 U _c ≥ 0.20 U _c
Average coil consumption at 20 °C and at U _c	Inrush Sealed	16 VA 4.2 VA
Heat dissipation		1.4 W 2.2 W
Operating time at 20 °C and at U _c	Between coil energisation and opening of the N/C contacts Between coil de-energisation and closing of the N/O contacts	ms 8...16 ms 7...14
Maximum operating rate	In operating cycles per hour	1200
Mechanical durability at U _c	50/60 Hz coil In millions of operating cycles	10 —
	... coil	— 10

**Contactor selection guide
according to required
electrical durability**

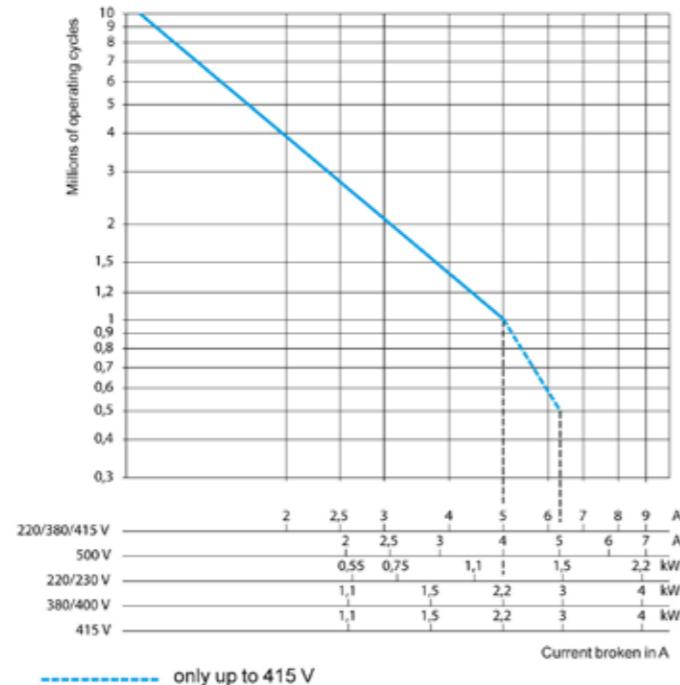
TeSys contactors

Mini-contactors TeSys LC1 SK and LP1 SK

Use in category AC-3 ($U_e \leq 440$ V)

Control of 3-phase asynchronous squirrel cage motors with breaking whilst running.

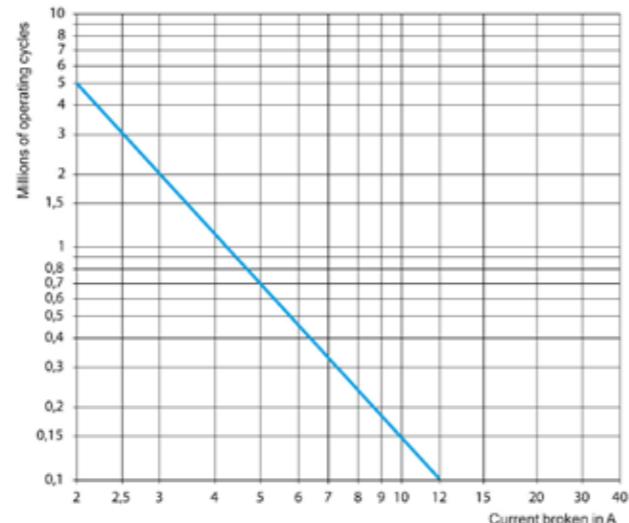
The current broken (I_c) in category AC-3 is equal to the rated operational current (I_e) of the motor.



Use in category AC-1 ($U_e \leq 440$ V)

Control of resistive circuits ($\cos \phi \geq 0.95$).

The current broken (I_c) in category AC-1 is equal to the current (I_e) normally drawn by the load.



5

References

- Width of contactor 27 mm.
- Mounting on 35 mm rail.
- Screw clamp terminals.



LC1 SK06



5

LA1 SK10

TeSys contactors

Mini-contactors TeSys LC1 SK and LP1 SK

Mini-contactors for motor in category AC-3

Standard power ratings of 3-phase motors 50/60 Hz in category AC-3 (1)	Rated operational voltage in AC-3 up to 400 V	Number of poles	Instantaneous auxiliary contacts	Basic reference. Complete with code indicating control circuit voltage (2)	Weight kg
220 V 380 V 660 V 230 V 415 V 690 V					
kW kW kW A					
1.1 2.2 2.2 6					
	2	—	—	LC1 SK0600**	0.132

Mini-contactors for motor in category AC-1

Non inductive loads maximum current ($I \leq 55^{\circ}\text{C}$) utilisation category AC-1	Control circuit supply	Number of poles	Instantaneous auxiliary contacts	Basic reference. Complete with code indicating control circuit voltage (2)	Weight kg
A					
12	a.c. d.c.	2	—	LC1 SK0600**	0.132
		2	—	LP1 SK0600**	0.132

Add-on block with 1 power pole (for 3-phase circuits)

For use on contactor	Number of poles	Instantaneous auxiliary contacts	Reference	Weight kg
LC1 SK06 clip-on front mounting	1	1	—	LA1 SK10 0.022
	1	—	1	LA1 SK01 0.022

Note : Auxiliary contact blocks and coil suppressor module, see next page.

(1) For use in AC-3 category and 3-phase circuits, an LA1 SK** auxiliary contact block should be ordered separately for mounting on the contactor.

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

Mini-contactors LC1 SK	24	48	110	120	220	230	240	380	400
Code	B7	E7	F7	G7	M7	P7	U7	Q7	V7
Mini-contactors LP1 SK	12	24	36	48	72				
Code	JD	BD	CD	ED	SD				

References



TeSys contactors

Mini-contactors TeSys LC1 SK and LP1 SK
Instantaneous auxiliary contacts and coil suppressor modules

Instantaneous auxiliary contact blocks

Clip-on front mounting

For use on contactor	Maximum number of blocks per contactor	Composition	Reference	Weight
LC1 SK06	1	2 -	LA1 SK20	0.022
	-	2	LA1 SK02	0.022
	1	1	LA1 SK11	0.022

Coil suppressor modules

Clip-on fixing and electrical connection on right-hand side, without use of tools

For use on contactors	Type	For voltages	Sold in lots of	Unit reference	Weight
LC1 SK06 and LP1 SK06	Varistor (1)	~ and --- 24 V...48 V	10	LA4 SKE1E	0.003
		~ and --- 110 V...250 V	10	LA4 SKE1U	0.003
	Diode (2)	--- 24 V...250 V	10	LA4 SKC1U	0.003

(1) Protection provided by limiting the transient voltage to $2 U_c$ max. Maximum reduction of transient voltage peaks. Slight increase in drop-out time (1.1 to 1.5 times the normal time).

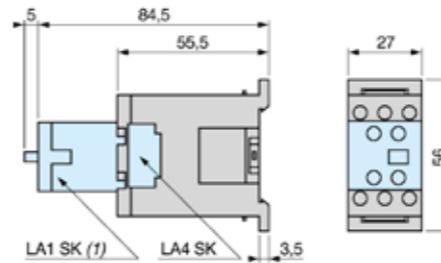
(2) No overvoltage or oscillating frequency.
Slight increase in drop-out time (1.1 to 1.5 times the normal time).

5

Dimensions, mounting

Dimensions

Mini-contactors LC1 and LP1 SK06

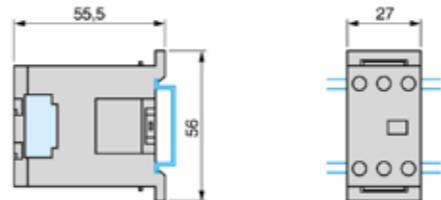


(1) Only on LC1 SK06.

Mounting

Mini-contactors LC1 and LP1 SK06

On mounting rail AM1 DP200 or AM1 DE200 (~ 35 mm)



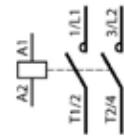
Schemes

TeSys contactors

Mini-contactors TeSys LC1 SK and LP1 SK

Schemes

2-pole mini-contactors
LC1 and LP1 SK06



Add-on power pole block

1 pole + 1 "N/O" aux. 1 pole + 1 "N/C" aux.
LA1 SK10 LA1 SK01



Instantaneous auxiliary contacts

2 "N/O" 2 "N/C" 1 "N/O" + 1 "N/C"



5

Characteristics

TeSys contactors

Mini-contactors TeSys LC1 SKGC,
for use in modular panels

Environment

Rated insulation voltage (Ui)	Conforming to IEC 60947, VDE 0110 gr C, BS 5424, CSA 22-2 n° 14, UL 508	V	690
Conforming to standards			IEC 60947, NF C 63-110, VDE 0660, BS 5424
Product certifications			UL, CSA
Protective treatment			"TC" (Klimafest, Climateproof)
Degree of protection			Conforming to VDE 0106 Protection against direct finger contact
Ambient air temperature around the device			
Storage	°C	- 50...+ 70	
Operation	°C	- 20...+ 50	
Maximum operating altitude	m	Without derating	2000
Operating position			
Vertical axis			Without derating
Horizontal axis			Without derating
Cabling, connectors			
Solid conductor	mm²	1 x 1.5 or 2 x 1.5	1 x 6 or 2 x 4
Flexible cable without cable end	mm²	1 x 0.5 or 2 x 0.35	1 x 6 or 2 x 2.5
Flexible cable with cable end	mm²	1 x 0.35 or 2 x 0.35	1 x 6 or 2 x 1.5
Tightening torque	N.m	Pozidriv n° 1 head	0.8
Terminal referencing			Conforming to standards En 50005

Characteristics (continued)

TeSys contactors

Mini-contactors TeSys LC1 SKGC,
for use in modular panels

Pole characteristics

		LC1 SKGC2	LC1 SKGC3 and LC1 SKGC4
Mini-contactor type	For ambient temperature $\leq 55^{\circ}\text{C}$	A	20
Conventional thermal current (I_{th})			20
Rated operational frequency	Hz	50/60	
Frequency limit of the operational current	Hz	up to 400	
Rated operational voltage (U_e)	V	690	
Rated making capacity	I_{rms} conforming to NF C 63-110 and IEC 60947	A	50
Rated breaking capacity (for $U_e \leq 400$ V)	Conforming to NF C 63-110 and IEC 60947 (I_{rms})	A	40
Permissible short time rating	In free air for a time "t" from cold state ($q \leq 55^{\circ}\text{C}$)	A	40
Short-circuit protection	gl fuse $U \leq 440$ V	A	20
Average impedance per pole	At I_{th} and 50 Hz	$\text{m}\Omega$	4
Maximum rated operational current	For temperature $\leq 55^{\circ}\text{C}$ AC-3 ($U_e \leq 400$ V)	A	5
	AC-1	A	20
Use in category AC-1 resistive circuits, heating, lighting ($U_e \leq 440$ V)	Increase in rated operational current by paralleling of 2 poles	A	32
			32

Auxiliary contact characteristics of mini-contactors

Rated operational voltage (U_e)	Up to	V	690
Rated insulation voltage (U_i)	Conforming to IEC 60947, BS 5424, VDE 0110 group C, CSA C 22-2 n° 14	V	690
Conventional thermal current (I_{th})	For ambient temperature $\leq 55^{\circ}\text{C}$	A	10
Frequency of the operational current	Hz	Up to 400	
Short-circuit protection	Conforming to IEC 60947 and VDE 0660, gl fuse	A	10

Operational power of contacts conforming to IEC 60947
a.c. supply, category AC-15
Electrical durability (valid for up to 3600 operating cycles/hour) on an inductive load such as the coil of an electromagnet: making current ($\cos \varphi = 0.7$) = 10 times the power broken ($\cos \varphi = 0.4$).

	V	24	48	110/ 127	220/ 230	380/ 400	440	V	24	48	110	220	440
1 million operating cycles	VA	48	96	240	440	800	880	W	120	80	60	52	51
3 million operating cycles	VA	17	34	86	158	288	317	W	55	38	30	28	26
10 million operating cycles	VA	7	14	36	66	120	132	W	15	11	9	8	7
Occasional making capacity	VA	1000	2050	5000	10000	14000	13000	W	720	600	400	300	230

Characteristics (continued)

TeSys contactors

Mini-contactors TeSys LC1 SKGC,
for use in modular panels

Control circuit characteristics

Mini-contactor type	V	LC1 SKGC2	LC1 SKGC3 and LC1 SKGC4
Rated control circuit voltage (U_c)		$\sim 24 \dots 400$	
Control voltage limits ($\theta \leq 55^{\circ}\text{C}$)			
Operation		0.85 ... 1.1 U_c	
For drop-out		$\geq 0.20 U_c$	
Average coil consumption at 20 °C and at U_c			
Inrush	VA	16	23
Sealed	VA	4.2	4.9
Heat dissipation	W	1.4	1.5
Operating time at 20 °C and at U_c			
Between coil energisation and opening of the N/C contacts	ms	8 ... 16	
	ms	7 ... 14	
Between coil de-energisation and opening of the N/O contacts	ms	6 ... 8	
	ms	8 ... 10	
Maximum operating rate	In operating cycles per hour	1200	
Mechanical durability at U_c	50/60 Hz coil in millions of operating cycles	10	

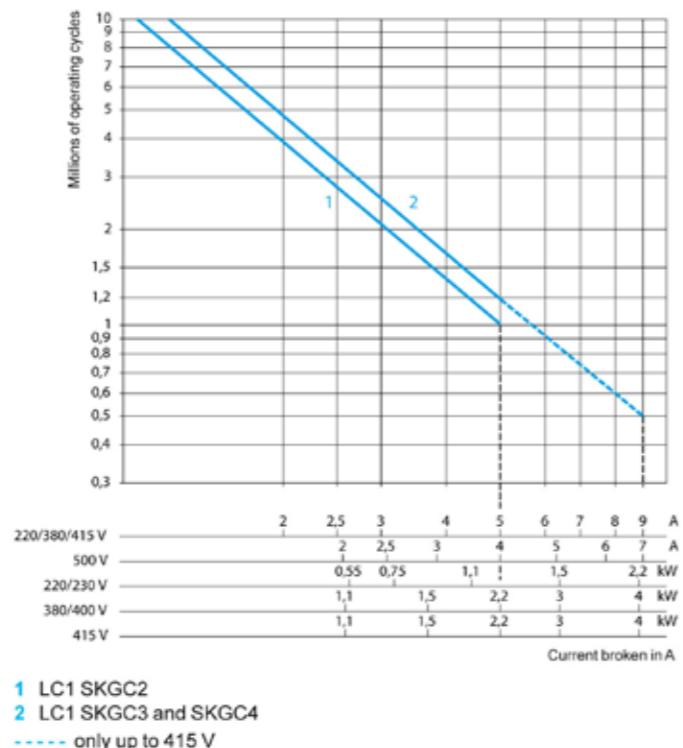
Contactor selection according to required electrical durability

TeSys contactors

Mini-contactors TeSys LC1 SKGC, for use in modular panels

Use in category AC-3 ($U_e \leq 440$ V)

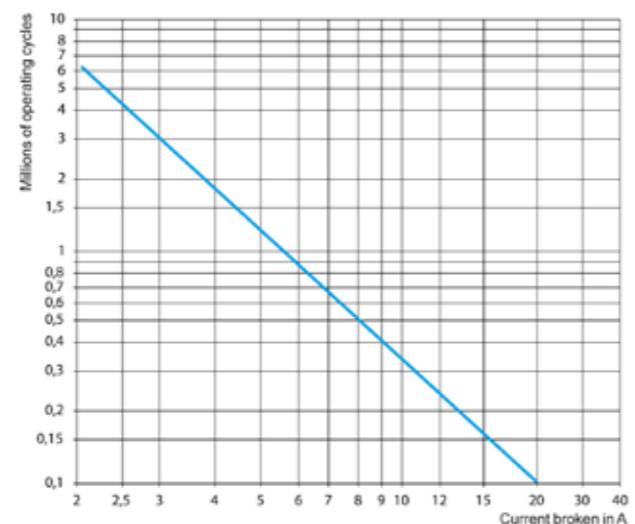
Control of 3-phase asynchronous squirrel cage motors with breaking whilst running.
The current broken (I_c) in category AC-3 is equal to the rated operational current of the motor.



5

Use in category AC-1 ($U_e \leq 440$ V)

Control of resistive circuits ($\cos \phi \geq 0.95$).
The current broken (I_c) in category AC-1 is equal to the current (I_e) normally drawn by the load.



References

TeSys contactors

Mini-contactors TeSys LC1 SKGC, for use in modular panels

- Mounting on 35 mm rail or fixing by four Ø 4 screws, except for LC1 SKGC200.
- Connection by connectors.
- Mini-contactor fitted with transparent, sealable protective cover to prevent front face access.



LC1 SKGC200

Mini-contactors, width 27 mm

Standard power ratings of 3-phase motors 50/60 Hz in category AC-3			Rated operational current in AC-3 up to 400 V	Non inductive loads category AC-1 maximum current $0 \leq 50^{\circ}\text{C}$	No. of poles	Basic reference, to be completed by adding the voltage code (1)	Weight
kW	kW	kW	A	A			kg
-	-	-	5	20	2	-	-

LC1 SKGC200** 0.132



LC1 SKGC400

Mini-contactors, width 45 mm

Standard power ratings of 3-phase motors 50/60 Hz in category AC-3			Rated operational current in AC-3 up to 400 V	Non inductive loads category AC-1 maximum current $0 \leq 50^{\circ}\text{C}$	No. of poles	Basic reference, to be completed by adding the voltage code (1)	Weight
kW	kW	kW	A	A			kg
1.1	4	4	9	20	3	1	-
					3	-	1
					4	-	-

LC1 SKGC310** 0.175

LC1 SKGC301** 0.175

LC1 SKGC400** 0.175

(1) Standard control circuit voltages (for other voltages, please consult your Regional Sales Office)

Volts ~ 50/60 Hz	24	48	110	120	220	230	240	380	400
Code	B7	E7	F7	G7	M7	P7	U7	Q7	V7

References

TeSys contactors

Mini-contactors TeSys LC1 SKGC,
for use in modular panels
Suppressor modules



Suppressor modules

Connection without need for tools by clipping onto right-hand side of contactor

For use on contactors	Type	For voltages	Sold in lots of	Unit reference	Weight kg
LC1 SKGC	Varistor (1)	~ and ≈ 24...48 V	10	LA4 SKE1E	0.003
		~ and ≈ 110...250 V	10	LA4 SKE1U	0.003
Diode (2)		≈ 24...250 V	10	LA4 SKC1U	0.003

(1) Protection provided by limiting the transient voltage to 2 Uc max.

Maximum reduction of transient voltage peaks.

Slight increase in drop-out time (1.1 to 1.5 times the normal time).

(2) No overvoltage or oscillating frequency.

Slight increase in drop-out time (1.1 to 1.5 times the normal time).

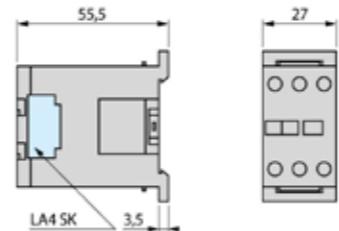
Dimensions, mounting

TeSys contactors

Mini-contactors TeSys LC1 SKGC,
for use in modular panels

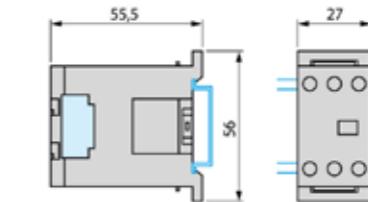
Dimensions

Mini-contactors LC1 SKGC2



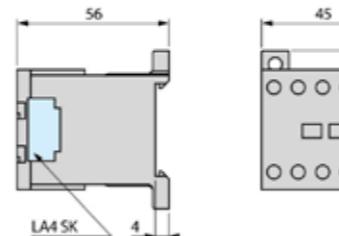
Mounting

On mounting rail AM1 DP200 or AM1 DE200 (≈ 35 mm)



Dimensions

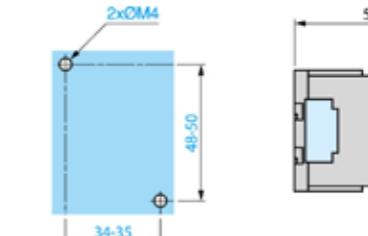
Mini-contactors LC1 SKGC3 and SKGC4



Mounting

On panel

On mounting rail AM1 DP200 or AM1 DE200 (≈ 35 mm)



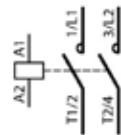
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Schemes

TeSys contactors

Mini-contactors TeSys LC1 SKGC,
for use in modular panels

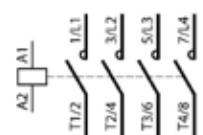
2-pole mini-contactors LC1 SKGC2



3-pole mini-contactors LC1 SKGC301



4-pole mini-contactors LC1 SKGC400



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Selection guide

TeSys contactors

TeSys D contactors

Applications

All types of control system



Rated operational current	$I_{e \max} AC-3 (U_e \leq 440 V)$	9 A	12 A	18 A	25 A	32 A	38 A
	$I_{e AC-1 (0 \leq 60^\circ C)}$	20/25 A	25/32 A	25/40 A	50 A		

Rated operational voltage	690 V on \sim and \equiv						
---------------------------	------------------------------	--	--	--	--	--	--

Number of poles	3 or 4	3 or 4	3 or 4	3 or 4	3		
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Rated operational power in AC-3	220/240 V	3 kW	4 kW	5.5 kW	7.5 kW	9 kW
	380/400 V	5.5 kW	7.5 kW	11 kW	15 kW	18.5 kW
	415/440 V	4 kW	5.5 kW	9 kW	15 kW	18.5 kW
	500 V	5.5 kW	7.5 kW	10 kW	15 kW	18.5 kW
	660/890 V	5.5 kW	7.5 kW	10 kW	15 kW	18.5 kW
	1000 V	-	-	-	-	-

Auxiliary contacts	1 N/C and 1 N/O instantaneous incorporated in the contactors, with add-on blocks common to the whole range comprising up to 4 N/C or N/O instantaneous, up to 1 N/O + 1 N/C time delay and up to 2 N/O or 2 N/C protected contacts and 2 screen continuity terminals.						
--------------------	---	--	--	--	--	--	--

Thermal overload relays manual-auto compatible	Class 10 A	0.10...10 A	0.10...13 A	0.10...18 A	0.10...32 A	0.10...38 A	0.10...38 A
	Class 20	2.5...10 A	2.5...13 A	2.5...18 A	2.5...32 A		

Suppressor modules (\sim and low consumption contactors are fitted with a built-in bidirectional peak limiting diode suppressor as standard)	Varistor	•	•	•	•	•	•
	Diode	-	-	-	-	-	-
	RC circuit	•	•	•	•	•	•
	Bidirectional peak limiting diode	•	•	•	•	•	•

Interfaces	Relay output	•	•	•	•	•	•
	Relay interface with manual override switch	•	•	•	•	•	•
	Solid state	•	•	•	•	•	•

Contactor type references	\sim or \equiv 3 pole	LC1 D09	LC1 D12	LC1 D18	LC1 D25	LC1 D32	LC1 D38
	\sim 4 pole	LC1 DT20/	LC1 DT25/	LC1 DT32/	LC1 DT40/	-	-
	\equiv 4 pole	LC1 D098	LC1 D128	LC1 D188	LC1 D258	-	-

Reversing contactor type references	\sim 3 pole	LC2 D09	LC2 D12	LC2 D18	LC2 D25	LC2 D32	LC2 D38
	\sim 4 pole	LC2 D09	LC2 D12	LC2 D18	LC2 D25	LC2 D32	LC2 D38
	\equiv 4 pole	LC2 DT20	LC2 DT25	LC2 DT32	LC2 DT40	-	-
	\equiv 4 pole	LC2 DT20	LC2 DT25	LC2 DT32	LC2 DT40	-	-

Pages	Contactors	5/62 to 5/67					
		5/72 to 5/75					



40 A	50 A	65 A	80 A	95 A	115 A	150 A
60 A	80 A		125 A		200 A	
690 V ~ or ∙∙∙				1000 V on ~ supply, 690 V on ∙∙∙ supply		
3	4	3	3	4	3	4
3	4	3	3	4	3	3
11 kW	15 kW	18.5 kW	22 kW	25 kW	30 kW	40 kW
18.5 kW	22 kW	30 kW	37 kW	45 kW	55 kW	75 kW
22 kW	25/30 kW	37 kW	45 kW	45 kW	59 kW	80 kW
22 kW	30 kW	37 kW	55 kW	55 kW	75 kW	90 kW
30 kW	33 kW	37 kW	45 kW	45 kW	80 kW	100 kW
—	—	—	45 kW	45 kW	75 kW	90 kW
1 N/C and 1 N/O instantaneous incorporated in the contactors, with add-on blocks common to the whole range comprising up to 4 N/C or N/O instantaneous, up to 1 N/O + 1 N/C time delay and up to 2 N/O or 2 N/C protected contacts and 2 screen continuity terminals.						
13...40 A	13...50 A	13...65 A	17...104 A	17...104 A	60...150 A	60...150 A
13...40 A	13...50 A	13...65 A	17...80 A		60...150 A	60...150 A
•	•	•	•	•	•	—
•	•	•	•	•	•	—
•	•	•	•	•	•	—
•	•	•	•	•	•	•
•	•	•	•	•	•	—
LC1 D40A	LC1 D50A	LC1 D65A	LC1 D80	LC1 D95	LC1 D115	LC1 D150
LC1 DT60A	—	LC1 DT80A	LC1 D80	—	LC1 D115	—
LC1 DT60A	—	LC1 DT80A	LC1 D80	—	LC1 D115	—
LC2 D40A	LC2 D50A	LC2 D65A	LC2 D80	LC2 D95	LC2 D115	LC2 D150
LC2 D40A	LC2 D50A	LC2 D65A	—	—	—	—
—	—	—	LC2 D80	—	LC2 D115	—
—	—	—	—	—	—	—
5/62 to 5/67						
5/72 to 5/75						

5

Applications	Automation systems		
Rated operational current	le max AC-3 ($U_e \leq 440$ V) le AC-1 ($i \leq 60$ °C)	9 A 20/25 A	12 A 20/25 A
Rated operational voltage	690 V		
Number of poles			3 or 4
Rated operational power in AC-3	220/240 V 380/400 V 415/440 V 500 V 660/690 V	2.2 kW 4 kW 4 kW 5.5 kW 5.5 kW	3 kW 5.5 kW 5.5 kW 7.5 kW 7.5 kW
Coil consumption	2.4 W (100 mA - 24 V)		
Operating ranges	0.7...1.25 U_c		
Operating time at 20 °C and at U_c	Closing Opening	70 ms 25 ms	
Auxiliary contact block modules	1 N/C and 1 N/O instantaneous contacts incorporated in the contactors, with add-on blocks common to the whole range, comprising up to 2 N/C or 2 N/O instantaneous standard contacts		
Interference suppression	Built-in suppression as standard, by bi-directional peak limiting diode		
Contactor type	3-pole 4-pole	LC1 D09 LC1 DT20/D098	LC1 D12 LC1 DT25/D128
Reversing contactor type	3-pole 4-pole	LC2 D09 LC2 DT20	LC2 D12 LC2 DT25
Pages	Contactors Reversing contactors	5/62 to 5/67 5/72 to 5/75	

(1) With low consumption kit **LA4 DBL** (see page 5/63).
 (2) With 2 low consumption kits **LA4 DBL** (see page 5/63).

Characteristics

TeSys contactors

TeSys D contactors

Technical characteristics					
					
25 A	32 A	38 A	40 A	50 A	65 A
25/40 A	50 A	50 A	60 A	-	80 A
690 V		690 V			
3 or 4	3	3	3	3	3
5.5 kW	7.5 kW	9 kW	11 kW	15 kW	18.5 kW
11 kW	15 kW	18.5 kW	18.5 kW	22 kW	30 kW
11 kW	15 kW	18.5 kW	22 kW	25/30 kW	37 kW
15 kW	18.5 kW	18.5 kW	22 kW	30 kW	37 kW
15 kW	18.5 kW	18.5 kW	30 kW	33 kW	37 kW
2.4 W (100 mA - 24 V)		0.6 W (25 mA - 24 V) for relay LA4 DFB + the power consumed by the contactor coil			
0.7...1.25 Uc		-	-	-	
70 ms	-	-	-	-	
25 ms	-	-	-	-	
1 N/C and 1 N/O instantaneous contacts incorporated in the contactors, with add-on blocks common to the whole range, comprising up to 2 N/C or 2 N/O instantaneous standard contacts					
Built-in suppression as standard, by bi-directional peak limiting diode					
LC1 D25	LC1 D32	LC1 D38	LC1 D40A (1)	LC1 D50A (1)	LC1 D65A (1)
LC1 DT40/D258			-	-	-
LC2 D25	LC2 D32	LC2 D38	LC2 D40A (2)	LC2 D50A (2)	LC2 D65A (2)
LC2 DT40					
5/62 to 5/67					
5/72 to 5/75					

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Contactor type	LC1		D09...D18 DT20 and DT25	D25...D38 DT32 and DT40	D40A...D65A DT60A and DT80A	D80...D95	D115 and D150
Environment							
Rated insulation voltage (Ui)	Conforming to IEC 60947-4-1, overvoltage category III, degree of pollution: 3	V	690				1000
	Conforming to UL, CSA	V	600				
Rated impulse withstand voltage (Uimp)	Conforming to IEC 60947	kV	6				8
Conforming to standards							IEC/EN 60947-4-1, IEC/EN 60947-5-1, UL 508, CSA C22.2 n°14.
Product certifications							UL, CSA (1), CCC, GOST GL, DNV, RINA, BV, LROS (pending for contactors LC1 D40A to D65A)
Degree of protection (2) (front face only)	Conforming to VDE 0106 and IEC 60529						
Power circuit connections							Protection against direct finger contact IP 2X
Coil connection							Protection against direct finger contact IP 2X
Protective treatment	Conforming to IEC 60068-2-30						"TH"
Ambient air temperature around the device	Storage	°C	- 60...+ 80				
	Operation	°C	- 5...+ 60				
	Permissible	°C	- 40...+ 70, for operation at Uc				
Maximum operating altitude	Without derating	m	3000				
Operating positions (3)	Without derating in the following positions						
		~ / ---	30°	30°			
		~	180°	90°	90°		
		---	180°	180°			
	Positions that are not permissible						For --- contactors LC1 D09 to LC1 D65A.
							
Flame resistance	Conforming to UL 94						V1
	Conforming to IEC 60695-2-1	°C	850				
Shock resistance (4) 1/2 sine wave = 11 ms	Contactor open		10 gn	8 gn	10 gn	8 gn	6 gn
	Contactor closed		15 gn	15 gn	15 gn	10 gn	15 gn
Vibration resistance (4) 5...300 Hz	Contactor open		2 gn				
	Contactor closed		4 gn	4 gn	4 gn	3 gn	4 gn

(1) Contactor LC1 D95 with d.c. coil is not UL/CSA certified.

(2) Protection provided for the cabling c.s.a.'s indicated on the next page and for connection by cable.

(3) When mounting on a vertical rail, use a stop.

(4) Without modifying the contact states, in the most unfavourable direction (coil energised at Ue).

Characteristics (continued)

TeSys contactors

TeSys D contactors

(1) BTR screws: hexagon socket head. In accordance with local electrical wiring regulations, a size 4 insulated Allen key must be used (reference LAD ALLEN4, see page 5/85).

(2) If cable ends are used, choose the next size down (example: for 2.5 mm^2 , use 1.5 mm^2) and square crimp the cable ends using a special tool.

Characteristics (continued)

TeSys contactors

Contactor type	LC1	D09 (3P)	DT20 D098	D12 (3P)	DT25 D128	D18 (3P)	DT32 D188	D25 (3P)	DT40 D258
Pole characteristics									
Rated operational current (Ie) (Ue ≤ 440 V)	In AC-3, 0 ≤ 60 °C In AC-1, 0 ≤ 60 °C	A A	9 25 (1)	12 20	12 25 (1)	18 32 (1)	25 32	25 40 (1)	25 40
Rated operational voltage (Ue)	Up to	V	690		690		690		690
Frequency limits	Of the operational current	Hz	25...400		25...400		25...400		25...400
Conventional thermal current (Ith)	0 ≤ 60 °C	A	25 (1)	20	25 (1)	25	32 (1)	32	40 (1)
Rated making capacity (440 V)	Conforming to IEC 60947	A	250		250		300		450
Rated breaking capacity (440 V)	Conforming to IEC 60947	A	250		250		300		450
Permissible short time rating	For 1 s	A	210		210		240		380
No current flowing for preceding 15 minutes with 0 ≤ 40 °C	For 10 s	A	105		105		145		240
	For 1 min	A	61		61		84		120
	For 10 min	A	30		30		40		50
	Without thermal overload relay, gG fuse	type 1 type 2	A A	25 20	40 25	50 35	63 40		
Fuse protection against short-circuits (U ≤ 690 V)	With thermal overload relay	A	See pages 6/20 to 6/22, for aM or gG fuse ratings corresponding to the associated thermal overload relay						
Average impedance per pole	At Ith and 50 Hz	mΩ	2.5		2.5		2.5		2
Power dissipation per pole for the above operational currents	AC-3	W	0.20		0.36		0.8		1.25
	AC-1	W	1.56		1.56		2.5		3.2
Control circuit characteristics, a.c. supply									
Rated control circuit voltage (Uc)	50/60 Hz	V	12...690						
Control voltage limits									
50 or 60 Hz coils	Operation		–						
	Drop-out		–						
50/60 Hz coils	Operation		0.8...1.1 Uc on 50 Hz and 0.85...1.1 Uc on 60 Hz at 60 °C						
	Drop-out		0.3...0.6 Uc at 60 °C						
Average consumption at 20 °C and at Uc	~ 50 Hz	Inrush	50 Hz coil	VA	–				
			Cos φ		0.75				
			50/60 Hz coil	VA	70				
		Sealed	50 Hz coil	VA	–				
			Cos φ		0.3				
	~ 60 Hz	Inrush	50/60 Hz coil	VA	7				
			60 Hz coil	VA	–				
			Cos φ		0.75				
			50/60 Hz coil	VA	70				
		Sealed	60 Hz coil	VA	–				
Heat dissipation	50/60 Hz	Cos φ		0.3					
		50/60 Hz coil	VA	7.5					
Operating time (2)	Closing "C"	ms	12...22						
	Opening "O"	ms	4...19						
Mechanical durability in millions of operating cycles	50 or 60 Hz coil		–						
	50/60 Hz coil on 50 Hz		15						
Maximum operating rate at ambient temperature ≤ 60 °C	In operating cycles per hour		3600						

(1) Versions with spring terminal connections:
 16 A for LC1 D093 and LC1 D123 (20 A possible with 2 x 2.5 mm² in parallel),
 25 A for LC1 D183 to LC1 D323 (32 A possible for LC1 D183 connected with 2 x 4 mm² cables in parallel; 40 A possible for LC1 D253 and LC1 D323 connected with 2 x 4 mm² cables in parallel).

(2) The closing time "C" is measured from the moment the coil supply is switched on to closure of the main poles. The opening time "O" is measured from the

moment the coil supply is switched off to the moment the main poles separate.

Characteristics (continued)

TeSys contactors

TeSys D contactors

D32	D38	D40A	DT60A	D50A	D65A	DT80A	D80	D95	D115	D150
32	38	40	—	50	65	—	80	95	115	150
50 (1)	50	60	60	80	80	80	125	125	200	200
650	690	690	690	690	690	690	1000	1000	1000	1000
25...400	25...400	25...400	25...400	25...400	25...400	25...400	25...400	25...400	25...400	25...400
50	50	60	60	80	80	80	125	125	200	200
550	550	800	800	900	1000	1000	1100	1100	1260	1660
550	550	800	800	900	1000	1000	1100	1100	1100	1400
430	430	720	720	810	900	900	990	1100	1100	1400
260	310	320	320	400	520	520	640	800	950	1200
138	150	165	165	208	260	260	320	400	550	580
60	60	72	72	84	110	110	135	135	250	250
63	63	80	80	100	125	125	200	200	250	315
63	63	80	80	100	125	125	160	160	200	250
See pages 6/20 to 6/22 for aM or gG fuse ratings corresponding to the associated thermal overload relay										
2	2	1.5	1.6	1.5	1.5	1.6	0.8	0.8	0.6	0.6
2	3	2.4	—	3.7	6.3	—	5.1	7.2	7.9	13.5
5	5	5.4	5.8	9.6	9.6	10.2	12.5	12.5	24	24
12...690	12...690						24...500			
—	—						0.85...1.1 Uc at 55 °C			
—	—						0.3...0.6 Uc at 55 °C	0.3...0.5 Uc at 55 °C		
0.8...1.1 Uc on 50 Hz and 0.85...1.1 Uc on 60 Hz at 60 °C	0.8...1.1 Uc on 50 Hz and 0.85...1.1 Uc on 60 Hz at 60 °C						0.8...1.1 Uc on 50 Hz and 0.85...1.1 Uc on 60 Hz at 55 °C	0.8...1.15 Uc on 50/60 Hz at 55 °C		
0.3...0.6 Uc at 60 °C	0.3...0.6 Uc at 60 °C						0.3...0.6 Uc at 55 °C	0.3...0.5 Uc at 55 °C		
—	—						200	300	—	
0.75	0.75						0.75	0.8	0.9	
70	160						245	280...350	280...350	
—	—						20	22	—	
0.3	0.3						0.3	0.3	0.9	
7	15						26	2...18	2...18	
—	—						220	300	—	
0.75	0.75						0.75	0.8	0.9	
70	140						245	280...350	280...350	
—	—						22	22	—	
0.3	0.3						0.3	0.3	0.9	
7.5	13						26	2...18	2...18	
2...3	4...5						6...10	3...8	3...4.5	
12...22	12...26	12...26	12...26	12...26	12...26	20...35	20...35	20...50	20...35	
4...19	4...19	4...19	4...19	4...19	4...19	6...20	6...20	6...20	40...75	
—	—	—	—	—	—	10	10	8	—	
15	6	6	6	6	6	4	4	8	8	
3600	3600	3600	3600	3600	3600	3600	3600	2400	1200	

5

Contactor type	d.c. control circuit characteristics		LC1 D09...D38 LC1 DT20...DT40	LC1 D40A...D65A LC1 DT60A and DT80A	LC1 or LP1 D80 LC1 D95	LC1 D115 and LC1 D150
Rated control circuit voltage (Uc)	—	V	12...440	12...440	24...440	
Rated insulation voltage	Conforming to IEC 60947-1	V	690			
	Conforming to UL, CSA	V	600			
Control voltage limits	Operation Wide range coil Drop-out	Standard coil at 60 °C 0.7...1.25 Uc at 60 °C 0.1...0.25 Uc at 60 °C	0.7...1.25 Uc at 55 °C 0.75...1.2 Uc at 55 °C 0.1...0.3 Uc at 55 °C	0.75...1.25 Uc at 55 °C 0.75...1.2 Uc at 55 °C 0.15...0.4 Uc at 55 °C	0.85...1.1 Uc at 55 °C 0.15...0.4 Uc at 55 °C	0.75...1.2 Uc at 55 °C
Average consumption at 20 °C and at Uc	—	Inrush Sealed	W 5.4	W 19	22	270...365
Operating time (1) average at Uc	Closing Opening	"C" "O"	ms 63 ± 15 %	ms 50 ± 15 %	95...130	20...35
<i>Note: The arcing time depends on the circuit switched by the poles. For all normal 3-phase applications, the arcing time is less than 10 ms. The load is isolated from the supply after a time equal to the sum of the opening time and the arcing time.</i>						
Time constant (L/R)		ms	28	34	75	25
Mechanical durability at Uc	In millions of operating cycles		30	10	10	8
Maximum operating rate at ambient temperature ≤ 60 °C	In operating cycles per hour		3600	3600	3600	1200
Low consumption control circuit characteristics						
Rated insulation voltage	Conforming to IEC 60947-1	V	690	—		
	Conforming to UL, CSA	V	600	—		
Maximum voltage	Of the control circuit on ...	V	250	—		
Average consumption d.c. at 20 °C and at Uc	Wide range coil (0.7...1.25 Uc)	Inrush Sealed	W 2.4	W 2.4	—	
Operating time (1) at Uc and at 20 °C	Closing Opening	"C" "O"	ms 77 ± 15 %	ms 25 ± 20 %	—	
(1) The operating times depend on the type of contactor electromagnet and its control mode. The closing time "C" is measured from the moment the coil supply is switched on to initial contact of the main poles. The opening time "O" is measured from the moment the coil supply is switched off to the moment the main poles separate						
Voltage limits (0 ≤ 60 °C) of the control circuit	Operation Drop-out		0.8 to 1.25 Uc 0.1...0.3 Uc	—		
Time constant (L/R)		ms	40	—		
Mechanical durability	In millions of operating cycles		30	—		
Maximum operating rate at ambient temperature ≤ 60 °C	In operating cycles per hour		3600	—		

(1) The operating times depend on the type of contactor electromagnet and its control mode.
The closing time "C" is measured from the moment the coil supply is switched on to initial contact of the main poles.
The opening time "O" is measured from the moment the coil supply is switched off to the moment the main poles separate

Characteristics (continued)

TeSys contactors

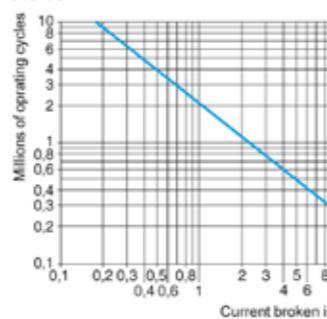
TeSys D contactors

Characteristics of auxiliary contacts incorporated in the contactor

Mechanically linked contacts	Conforming to IEC 60947-5-1		Each contactor has 2 N/O and N/C contacts mechanically linked on the same movable contact holder
Mirror contact	Conforming to IEC 60947-4-1		The N/C contact on each contactor represents the state of the power contacts and can be connected to a PREVENTA safety module
Rated operational voltage (Ue)	Up to	V	690
Rated insulation voltage (Ui)	Conforming to IEC 60947-1	V	690
	Conforming to UL, CSA	V	600
Conventional thermal current (Ith)	For ambient temperature $\leq 60^{\circ}\text{C}$	A	10
Frequency of the operational current		Hz	25...400
Minimum switching capacity $\lambda = 10^{-6}$	U min I min	V mA	17 5
Short-circuit protection	Conforming to IEC 60947-5-1		gG fuse: 10 A
Rated making capacity	Conforming to IEC 60947-5-1, I rms	A	~ 140 , $\equiv 250$
Short-time rating	Permissible for	1 s 500 ms 100 ms	A 100 120 140
Insulation resistance		MΩ	> 10
Non-overlap time	Guaranteed between N/C and N/O contacts	ms	1.5 (on energisation and on de-energisation)
Operational power of contacts conforming to IEC 60947-5-1	a.c. supply, categories AC-14 and AC-15 Electrical durability (valid for up to 3600 operating cycles/hour) on an inductive load such as the coil of an electromagnet: making current ($\cos \phi = 0.7$) = 10 times the power broken ($\cos \phi = 0.4$).		d.c. supply, category DC-13 Electrical durability (valid for up to 1200 operating cycles/hour) on an inductive load such as the coil of an electromagnet, without economy resistor, the time constant increasing with the load.

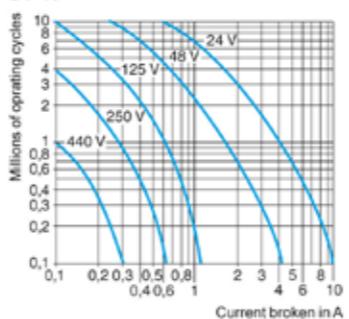
V	24	48	115	230	400	440	600
VA	60	120	280	560	960	1050	1440
VA	16	32	80	160	280	300	420
VA	4	8	20	40	70	80	100

AC-15



V	24	48	125	250	440
W	96	76	76	76	44
W	48	38	38	32	—
W	14	12	12	—	—

DC-13



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Characteristics

TeSys contactors

Auxiliary contact blocks without dust and damp protected contacts for TeSys D contactors

Contact block type	LAD N or LAD C	LAD T and LAD S	LAD R	LAD 8
Environment				
Conforming to standards				IEC 60947-5-1, NF C 63-140, VDE 0660, BS 4794, EN 60947-5-1
Product certifications				UL, CSA
Protective treatment	Conforming to IEC 60068			"TH"
Degree of protection	Conforming to VDE 0106			Protection against direct finger contact IP 2X
Ambient air temperature around the device	Storage Operation	°C °C	-60...+80 -5...+60	
Permissible for operation at Uc		°C	-40...+70	
Maximum operating altitude	Without derating	m	3000	
Connection by cable	Phillips N° 2 and Ø 6 mm Flexible or solid cable with or without cable end	mm²	Min: 1 x 1; max: 2 x 2.5	
Spring terminal connections	Flexible or solid cable without cable end	mm²	Max: 2 x 2.5	
Instantaneous and time delay contact characteristics				
Number of contacts		1, 2 or 4	2	2
Rated operational voltage (Ue)	Up to	V	690	
Rated insulation voltage (Ui)	Conforming to IEC 60947-5-1 Conforming to UL, CSA	V	690 600	
Conventional thermal current (Ith)	For ambient temperature $\leq 60^{\circ}\text{C}$	A	10	
Frequency of the operational current		Hz	25...400	
Minimum switching capacity	U min I min	V mA	17 5	
Short-circuit protection	Conforming to IEC 60947-5-1 and VDE 0860. gG fuse	A	10	
Rated making capacity	Conforming to IEC 60947-5-1	I rms	A	~ 140 , $\equiv 250$
Short-time rating	Permissible for	1 s 500 ms 100 ms	A	100 120 140
Insulation resistance		MΩ	> 10	
Non-overlap time	Guaranteed between N/C and N/O contacts	ms	1.5 (on energisation and on de-energisation)	
Overlap time	Guaranteed between N/C and N/O contacts on LAD C22	ms	1.5	—
Time delay (LADT, R and S contact blocks)	Ambient air temperature for operation Accuracy only valid for setting range indicated on the front face	°C	— -40...+70	-40...+70
Repeat accuracy		—	$\pm 2\%$	$\pm 2\%$
Drift up to 0.5 million operating cycles		—	+15 %	+15 %
Drift depending on ambient air temperature		—	0.25 % per °C	0.25 % per °C
Mechanical durability	In millions of operating cycles	30	5	5
Operational power of contacts				See page 5/58

Characteristics (continued)

TeSys contactors

Auxiliary contact blocks with dust and damp protected contacts for TeSys D contactors

Contact block type	LA1 DX	LA1 DZ	Protected	Non protected	LA1 DY
Environment					
Conforming to standards					
		IEC60947-5-1, VDE0660			
Product certifications		UL, CSA			
Protective treatment	Conforming to IEC 60068	"TH"			
Degree of protection	Conforming to VDE 0106	Protection against direct finger contact IP 2X			
Ambient air temperature	Storage and operation	°C	-25...+70		
Cabling	Phillips N° 2 and Ø 6 mm Flexible or solid conductor with or without cable end	mm²	Min: 1 x 1; max: 2 x 2.5		
Number of contacts		2	2	2	2
Contact characteristics					
Rated operational voltage (Ue)	Up to	V	50	50	690
Rated insulation voltage (Ui)	Conforming to IEC 60947-5-1	V	250	250	690
	Conforming to UL, CSA	V	-	-	250
Conventional thermal current (Ith)	For ambient temperature ≤ 40 °C	A	-	-	10
Maximum operational current (Ie)		mA	500	500	-
Frequency of the operational current		Hz	-	-	25...400
Minimum switching capacity	U min	V	3	3	3
	I min	mA	0.3	0.3	0.3
Short-circuit protection	Conforming to IEC 60947-1 gG fuse	A	-	-	10
Rated making capacity	Conforming to IEC 60947-1	I rms	A	-	~140; ...; 250
Short-time rating	Permissible for	1 s	A	-	100
	500 ms	A	-	-	120
	100 ms	A	-	-	140
Insulation resistance	MΩ	> 10	> 10	> 10	> 10
Mechanical durability	In millions of operating cycles		5	5	30
Materials and technology used for dust and damp protected contacts		Silver - Single break	Silver - Single break	-	Gold - Single break with crossed bars

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Characteristics (continued)

TeSys contactors

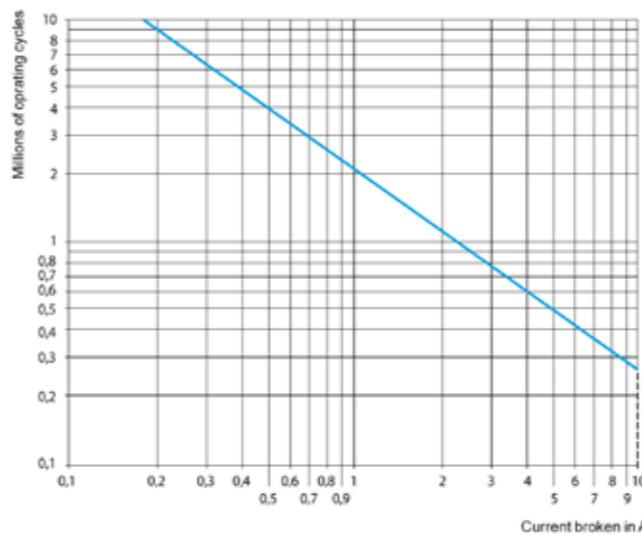
Auxiliary contact blocks with dust and damp protected contacts for TeSys D contactors

Rated operational power of contacts (conforming to IEC 60947-5-1)

a.c. supply, categories AC-14 and AC-15

Electrical durability (valid for up to 3600 operating cycles/hour) on an inductive load such as the coil of an electromagnet: making current ($\cos \phi = 0.7$) = 10 times the power broken ($\cos \phi = 0.4$).

	V	24	48	115	230	400	440	600
1 million operating cycles	VA	60	120	280	560	960	1050	1440
3 million operating cycles	VA	16	32	80	160	280	300	420
10 million operating cycles	VA	4	8	20	40	70	80	100

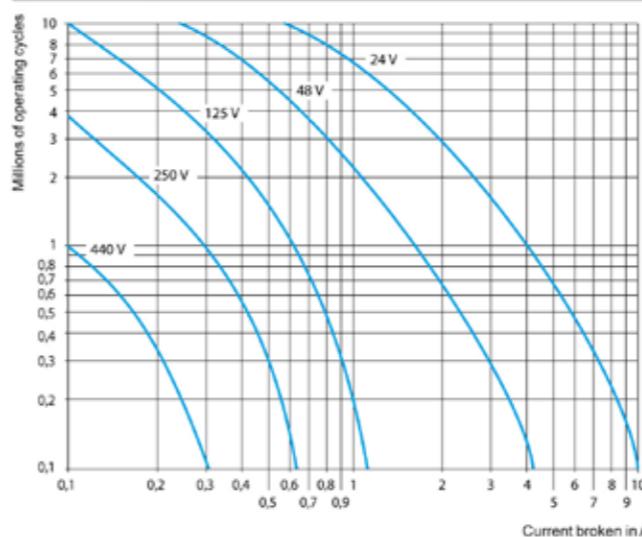


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d.c. supply, category DC-13

Electrical durability (valid for up to 1200 operating cycles/hour) on an inductive load such as the coil of an electromagnet, without economy resistor, the time constant increasing with the load.

	V	24	48	125	250	440
1 million operating cycles	W	120	90	75	68	61
3 million operating cycles	W	70	50	38	33	28
10 million operating cycles	W	25	18	14	12	10



Characteristics

TeSys contactors

Control modules, coil suppressor modules and mechanical latch blocks for TeSys D contactors

Environment							
Conforming to standards		IEC 60947-5-1					
Product certifications							
Protective treatment							
Degree of protection							
Ambient air temperature around the device							
Storage		°C					
Operation		°C					
Permissible for operation at Uc		°C					
Suppressor modules							
Module type		LA4 DA, LAD 4RC, LAD 4RC3					
Type of protection		RC circuit					
Rated control circuit voltage (Uc)		V					
Maximum peak voltage		~ 24...415					
Natural RC frequency		~ or ≈ 24...440					
24/48 V		Hz					
50/127 V		Hz					
110/240 V		Hz					
380/415 V		Hz					
Mechanical latch blocks (1)							
Mechanical latch block type		LAD 6K10					
For use on contactor		LC1 D09...D65A DT20...DT80A					
Product certifications							
UL, CSA		UL, CSA					
Rated insulation voltage		Conforming to IEC 60947-5-1					
V		V					
Rated control circuit voltage		~ 50/60 Hz and ...					
~ 50/60 Hz and ...		V					
Power required		For unlatching					
~		VA					
---		W					
Maximum operating rate		In operating cycles/hour					
1200		1200					
On-load factor		10 %					
Mechanical durability at Uc		In millions of operating cycles					
0.5		0.5					

(1) Unlatching can be manually operated or electrically controlled (pulsed).
The LA6 DK or LAD 6K latch coil and the LC1 D operating coil must not be energised simultaneously.
The duration of the LA6 DK or LAD 6K and LC1 D control signals must be ≥ 100 ms.

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Characteristics

TeSys contactors

Electronic serial timer module for TeSys D contactors

Module type		LA4 DT (On-delay)			
Environment					
Conforming to standards		IEC 60255-5			
Product certifications		UL, CSA			
Protective treatment		Conforming to IEC 60068			
Degree of protection		Conforming to VDE 0106			
Ambient air temperature around the device		Protection against direct finger contact IP 2X			
Storage		°C			
Operation		°C			
For operation at Uc		°C			
Rated insulation voltage (Ui)		Conforming to IEC 60947-1			
V		V			
Cabling		Philips n° 2 and Ø 6 mm Flexible or solid conductor with or without cable end			
Control circuit characteristics					
Built-in protection		Of the input			
		By varistor			
Contactor coil suppression		By varistor			
Rated control circuit voltage (Uc)		V			
~ or ≈ 24...250		~ or ≈ 24...250			
Permissible variation		0.8...1.1 Uc			
Type of control		By mechanical contact only			
Timing characteristics					
Timing ranges		s			
0.1...2; 1.5...30; 25...500		0.1...2; 1.5...30; 25...500			
Repeat accuracy		0...40 °C			
± 3 % (10 ms minimum)		± 3 % (10 ms minimum)			
Reset time		During time delay period			
ms		150			
After time delay period		ms			
50					
Immunity to microbreaks		During time delay period			
ms		10			
After time delay period		ms			
2					
Minimum control pulse duration		ms			
—					
Time delay signalling		By LED			
		Illuminates during time delay period			
Switching characteristics (solid state type)					
Maximum power dissipated		W			
2					
Leakage current		mA			
< 5					
Residual voltage		V			
3.3					
Overvoltage protection		3 kV; 0.5 joule			
Electrical durability		In millions of operating cycles			
30					
Function diagram					
Electronic on-delay timer LA4 DT					

Characteristics

TeSys contactors

Interface modules for TeSys D contactors

Environment

Conforming to standards		IEC 60255-5	
Product certifications		UL, CSA	
Protective treatment	Conforming to IEC 60068	'TH'	
Degree of protection	Conforming to VDE 0106	Protection against direct finger contact IP 2X	
Ambient air temperature around the device	Storage	°C	-40...+80
	Operation	°C	-25...+55
	Permissible for operation at Uc	°C	-25...+70
Other characteristics			
Module type	LA4 DFB With relay	LA4 DWB Solid state	
Conventional thermal current (Ith)	For ambient temperature ≤ 50 °C	A	8
Rated insulation voltage	Conforming to IEC 60947-5-1	V	250
Rated operational voltage	Conforming to IEC 60947-5-1	V	250
Indication of input state		By integral LED which illuminates when the contactor coil is energised	
Input signals	Control voltage (E1-E2)	V	... 24
	Permissible variation	V	17...30
	Current consumption at 20 °C	mA	25
			8.5 for 5 V 15 for 24 V
	State "0" guaranteed for U	V	< 2.4
	I	mA	< 2
	State "1" guaranteed for U	V	17
			5
Built-in protection	Against reversed polarity		By diode
	Of the input		By diode
Electrical durability at 220 A/240 V	In millions of operating cycles		10
			20
Maximum immunity to microbreaks	ms	4	1
Power dissipated	At 20 °C	W	0.6
			0.4
Direct mounting on contactor	With coil	~ 24...250 V	LC1 D80...D150
		~ 100...250 V	—
		~ 380...415 V	LC1 D80...D115
Mounting with cabling adapter LAD 4BB	With coil	~ 24...250 V	LC1 D09...D38, LC1 DT20...DT40
		~ 380...415 V	—
Mounting with cabling adapter LAD 4BB3	With coil	~ 24...250 V	LC1 D40A...D65A
		~ 380...415 V	LC1 D40A...D65A
Total operating time at Uc (of the contactor)		The operating times depend on the type of contactor electromagnet and its control mode. The closing time "C" is measured from the moment the coil supply is switched on to initial contact of the main poles. The opening time "O" is measured from the moment the coil supply is switched off to the moment the main poles separate.	
		LC1 D09...D38, LC1 DT20...DT40	LC1 D40A...D65A
	With LA4 DFB	"C"	ms
			20...30
		"O"	ms
			16...24
Cabling	Phillips N° 2 and Ø 6 mm Flexible or solid cable with or without cable end	mm²	Min: 1 x 1; max: 2 x 2.5

References :
page 5/83

Dimensions :
pages 5/92 and 5/93

Schemes :
pages 5/96 and 5/97

References

TeSys contactors

TeSys D contactors for motor control up to 75 kW at 400 V, in category AC-3
For connection by screw clamp terminals and lugs



3-pole contactors

Standard power ratings of 3-phase motors 50-60 Hz in category AC-3 (0 ≤ 60 °C)										Rated operational current in AC-3 440 V up to	Instantaneous auxiliary contacts	Basic reference, to be completed by adding the control voltage code (2)	Weight (3)
220 V	380 V	415 V	440 V	500 V	660 V	1000 V							
230 V	400 V				690 V								
kW	kW	kW	kW	kW	kW	kW	A						kg
2.2	4	4	4	5.5	5.5	—	9	1	1	LC1 D09**			0.320
3	5.5	5.5	5.5	7.5	7.5	—	12	1	1	LC1 D12**			0.325
4	7.5	9	9	10	10	—	18	1	1	LC1 D18**			0.330
5.5	11	11	11	15	15	—	25	1	1	LC1 D25**			0.370
7.5	15	15	15	18.5	18.5	—	32	1	1	LC1 D32**			0.375
9	18.5	18.5	18.5	18.5	18.5	—	38	1	1	LC1 D38**			0.380
Power connections by EverLink® BTR screw connectors (4) and control by spring terminals													
11	18.5	22	22	22	30	—	40	1	1	LC1 D40A** (5)			0.850
15	22	25	30	30	33	—	50	1	1	LC1 D50A** (5)			0.855
18.5	30	37	37	37	37	—	65	1	1	LC1 D65A** (5)			0.860
Connection by screw clamp terminals or connectors													
22	37	45	45	55	45	45	80	1	1	LC1 D80**			1.590
25	45	45	45	55	45	45	95	1	1	LC1 D95**			1.610
30	55	59	59	75	80	65	115	1	1	LC1 D115**			2.500
40	75	80	80	90	100	75	150	1	1	LC1 D150**			2.500
Connection by lugs or bars													
In the references selected above, insert a figure 6 before the voltage code. Example: LC1 D09** becomes LC1 D096**.													

(1) LC1 D09 to D15A: clip-on mounting on 35 mm ↗ rail AM1 DP or screw fixing. LC1 D80 to D95 ~: clip-on mounting on 35 mm ↗ rail AM1 DP or 75 mm ↗ rail AM1 DL or screw fixing. LC1 D80 to D95 -: clip-on mounting on 75 mm ↗ rail AM1 DL or screw fixing. LC1 D115 and D150: clip-on mounting on 2 x 35 mm ↗ rails AM1 DP or screw fixing. (2) Standard control circuit voltages (for other voltages, please consult your Regional Sales Office):													
a.c. supply													
Volts	24	42	48	110	115	220	230	240	380	400	415	440	500
LC1 D09...D150 (D115 and D150 coils with built-in suppression as standard, by bi-directional peak limiting diode).	B7	D7	E7	F7	FE7	M7	P7	U7	Q7	V7	N7	R7	S7
d.c. supply													
Volts	12	24	36	48	60	72	110	125	220	250	440		
LC1 D09...D65A (coils with integral suppression device fitted as standard)	JD	BD	CD	ED	ND	SD	FD	GD	MD	UD	RD		
U 0.75...1.25 Uc													
LC1 D80...D95													
U 0.85...1.1 Uc	JD	BD	CD	ED	ND	SD	FD	GD	MD	UD	RD		
U 0.75...1.2 Uc	JW	BW	CW	EW	—	SW	FW	—	MW	—	—		
LC1 D115 and D150 (coils with integral suppression device fitted as standard)													
U 0.75...1.2 Uc	—	BD	—	ED	ND	SD	FD	GD	MD	UD	RD		
Low consumption													
Volts =	5	12	20	24	48	110	220	250					
LC1 D09...D38 (coils with integral suppression device fitted as standard)	AL	JL	ZL	BL	EL	FL	ML	UL					
U 0.8...1.25 Uc													
For other voltages between 5 and 690 V, see pages 5/86 to 5/91.													
(3) The weights indicated are for contactors with a.c. control circuit. For d.c. or low consumption control circuit, add 0.160 kg from LC1 D09 to D38, 0.075 kg from LC1 D40A to D65A and 1 kg for LC1 D80 and D95.													
(4) BTR screws: hexagon socket head. In accordance with local electrical wiring regulations, a size 4 insulated Allen key must be used (reference LAD ALLEN4, see page 5/85).													
(5) For low consumption kit LA4 DBL (see page 5/83).													

Selection : pages 5/194 to 5/225	Characteristics : pages 5/50 to 5/55	Dimensions : pages 5/

References (continued)



TeSys contactors

TeSys D, 3-pole contactors

For control in category AC-1, 25 to 200 A

3-pole contactors for connection by Faston connectors

These contactors are fitted with Faston connectors: 2 x 6.35 mm on the power poles and 1 x 6.35 mm on the coil terminals. For contactors LC1 D09 and LC1 D12 only, in the references selected from the previous page, insert a figure 9 before the voltage code. Example: LC1 D09** becomes LC1 D099**.

3-pole contactors

Non inductive loads maximum current ($0 \leq 60^{\circ}\text{C}$) utilisation category AC-1	Number of poles	Instantaneous auxiliary contacts	Basic reference, to be completed by adding the control voltage code (1)	Weight (3)
			Fixing (2)	
A				
				kg
Connection by spring terminals				
16	3	1 1	LC1 D093** (4) or LC1 D123** (4)	0.320 0.325
25	3	1 1	LC1 D183** (5) or LC1 D253** (6) or LC1 D323** (6)	0.335 0.325 0.325
Power connections by EverLink® BTR screw connectors (7) and control by spring terminals				
60	3	1 1	LC1 D40A3** (9)	0.850
80	3	1 1	LC1 D50A3** (8) (9) or LC1 D65A3** (8) (9)	0.855 0.860

Separate components

Auxiliary contact blocks and add-on modules: see pages 5/78 to 5/85.

(1) Standard control circuit voltages (for other voltages, please consult your Regional Sales Office):

a.c. supply	Volts	24	42	48	110	115	220	230	240	380	400	415	440	500
LC1 D09...D65A														
50/60 Hz		B7	D7	E7	F7	FE7	M7	P7	U7	Q7	V7	N7	R7	S7
d.c. supply	Volts	12	24	36	48	60	72	110	125	220	250	440		
LC1 D09...D65A (coils with integral suppression device fitted as standard)														
U 0.75...1.25 Uc		JD	BD	CD	ED	ND	SD	FD	GD	MD	UD	RD		
Low consumption	Volts ...	5	12	20	24	48	110	220	250					
LC1 D09...D38 (coils with integral suppression device fitted as standard)														
U 0.8...1.25 Uc		AL	JL	ZL	BL	EL	FL	ML	UL					

For other voltages between 5 and 690 V, see pages 5/86 to 5/91.

(2) LC1 D09 to D65A: clip-on mounting on 35 mm $\sqcup\sqcup$ rail AM1 DP or screw fixing.

(3) The weights indicated are for contactors with a.c. control circuit. For d.c. or low consumption control circuit, add 0.160 kg from LC1 D09 to D38 and 0.075 kg from LC1 D40A to D65A.

(4) 20 A with 2 x 2.5 mm² cables connected in parallel.

(5) 32 A with 2 x 4 mm² cables connected in parallel.

(6) 40 A with 2 x 4 mm² cables connected in parallel.

(7) BTR screws: hexagon socket head. In accordance with local electrical wiring regulations, a size 4 insulated Allen key must be used (reference LAD ALLEN4, see page 5/85).

(8) Selection according to the number of operating cycles, see AC-1 curve, page 5/198.

(9) For low consumption kit LA4 DBL (see page 5/83).



LC1 D65A3**

5

References (continued)



LC1 DT20**

TeSys contactors

TeSys D, 4-pole contactors

For control in category AC-1, 25 to 200 A

4-pole contactors for connection by Faston connectors

Non inductive loads maximum current ($0 \leq 60^{\circ}\text{C}$) utilisation category AC-1	Number of poles	Instantaneous auxiliary contacts	Basic reference, to be completed by adding the control voltage code (1)	Weight (3)
			Fixing (2)	kg

A Connection by screw clamp terminals

20	4	-	1 1	LC1 DT20**
25	4	-	1 1	LC1 DT25**
Connection by EverLink® BTR screw connectors				
60	4	-	1 1	LC1 DT60A**
80	4	-	1 1	LC1 DT80A**

Connection by screw clamp terminals or connectors

60	2	2	-	-	LC1 D40008**
80	2	2	-	-	LC1 D65008**
Connection by screw clamp terminals or connectors					
125	4	-	-	-	LC1 D80004**
200	4	-	-	-	LC1 D115004**



LC1 D65008**

4-pole contactors for connection by lugs or bars

In the references selected above, insert a figure 6 before the voltage code.
Example: LC1 DT20** becomes LC1 DT206**.

(1) Standard control circuit voltages (for other voltages, please consult your Regional Sales Office):

a.c. supply	Volts	24	42	48	110	115	220	230	240	380	400	415	440	500
LC1 D09...D150 and LC1 DT20...DT80A (coils D115 and D150 fitted with integral suppression device as standard)														
50/60 Hz		B7	D7	E7	F7	FE7	M7	P7	U7	Q7	V7	N7	R7	-
LC1 D80...D115	Volts	12	24	36	48	60	72	110	125	220	250	440		
50 Hz		B5	D5	E5	F5	FE5	M5	P5	U5	Q5	V5	N5	R5	S5
60 Hz		B6	-	E6	F6	-	M6	-	U6	Q6	-	-	R6	-
d.c. supply	Volts	12	24	36	48	60	72	110	125	220	250	440		
LC1 D09...D65A and LC1 DT20...DT80A (coils with integral suppression device fitted as standard)														
U 0.7...1.25 Uc		JD	BD	CD	ED	ND	SD	FD	GD	MD	UD	RD		
LC1 or LP1 D80	U 0.85...1.1 Uc	JD	BD	CD	ED	ND	SD	FD	GD	MD	UD	RD		
LC1 or LP1 D80	U 0.75...1.2 Uc	JW	BW	CW	EW	-	SW	FW	-	MW	-	-		
LC1 D115 (coils with integral suppression device fitted as standard)	U 0.75...1.2 Uc	-	BD	-	ED	ND	SD	FD	GD	MD	UD	RD		
Low consumption	Volts ...	5	12	20	24	48	110	220	250					

LC1 D09...D38 and LC1 DT20...DT40 (coils with integral suppression device fitted as standard)

U 0.8...1.25 Uc

AL JL ZL BL EL FL ML UL

For other voltages between 5 and 690 V, see pages 5/86 to 5/91.
(2) LC1 D09 to D38 and LC1 DT20 to DT80A: clip-on mounting on 35 mm $\sqcup\sqcup$ rail AM1 DP or screw fixing.
LC1 D80 ~: clip-on mounting on 35 mm $\sqcup\sqcup$ rail AM1 DP or 75 mm $\sqcup\sqcup$ rail AM1 DL or screw fixing.
LC1 or LP1 D80 ~: clip-on mounting on 75 mm $\sqcup\sqcup$ rail AM1 DL or screw fixing.
LC1 D115 and D150: clip-on mounting on 2 x 35 mm $\sqcup\sqcup$ rails AM1 DP or screw fixing.
(3) The weights indicated are for contactors with a.c. control circuit. For d.c. or low consumption control circuit, add 0.160 kg from LC1 D09 to D38, 0.075 kg from LC1 DT60A and D80A and 1 kg for LC1 D80.

Selection :

Characteristics :

Dimensions :

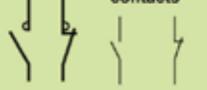
Schemes

References (continued)

TeSys contactors

TeSys D, 4-pole contactors

For control in category AC-1, 25 to 200 A

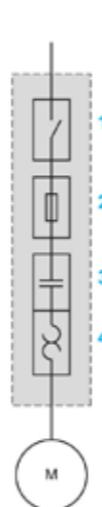
4-pole contactors					Basic reference, to be completed by adding the voltage code (1)	Weight (3)							
Non inductive loads maximum current ($\leq 60^{\circ}\text{C}$) utilisation category AC-1	Number of poles	Instan- taneous auxiliary contacts	Fixing (2)										
													
A													
Connection by spring terminals													
20	4	—	1	1	LC1 DT203**	0.380							
	2	2	1	1	LC1 D0983**	0.380							
25	4	—	1	1	LC1 DT253**	0.380							
	2	2	1	1	LC1 D1283**	0.380							
32	4	—	1	1	LC1 DT323**	0.425							
	2	2	1	1	LC1 D1883**	0.425							
40	4	—	1	1	LC1 DT403**	0.425							
	2	2	1	1	LC1 D2583**	0.425							
Connection by by EverLink®, BTR screw connectors and control circuit by spring terminals													
60	4	—	1	1	LC1 DT60A3**	1.090							
80	4	—	1	1	LC1 DT80A3**	1.150							
Separate components													
Auxiliary contact blocks and add-on modules: see pages 5/78 to 5/85.													
(1) Standard control circuit voltages (for other voltages, please consult your Regional Sales Office):													
a.c. supply													
Volts	24	42	48	110	115	220	230	240	380	400	415	440	500
LC1 D09...D25 and LC1 DT20...DT80A (coils with integral suppression device fitted as standard)	B7	D7	E7	F7	FE7	M7	P7	U7	Q7	V7	N7	R7	—
50/60 Hz													
d.c. supply													
Volts	12	24	36	48	60	72	110	125	220	250	440		
LC1 D09...D25 and LC1 DT20...DT80A (coils with integral suppression device fitted as standard)													
U 0.7...1.25 Uc	JD	BD	CD	ED	ND	SD	FD	GD	MD	UD	RD		
Low consumption													
Volts ...	5	12	20	24	48	110	220	250					
LC1 D09...D25 and LC1 DT20...DT40 (coils with integral suppression device fitted as standard)	AL	JL	ZL	BL	EL	FL	ML	UL					
U 0.8...1.25 Uc													
For other voltages between 5 and 690 V, see pages 5/86 to 5/91.													
(2) LC1 D09 to D38 and LC1 DT20 to DT80A: clip-on mounting on 35 mm L rail AM1DP or screw fixing.													
(3) The weights indicated are for contactors with a.c. control circuit. For d.c. or low consumption control circuit, add 0.160 kg from LC1 D09 to D38, 0.075 kg for LC1 DT60A and DT80A.													

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Presentation

TeSys contactors

for the North American market,
conforming to UL and CSA



- 1 Motor Disconnect (Disconnect switch)
- 2 Motor Branch Circuit Protection (Short-circuit protection)
- 3 Motor Controller (Contactor)
- 4 Motor Overload Protection (Thermal overload relay)

Starters for the North American market

In recent years, the North American market has started to harmonise UL, CSA and ANCE standards, as well as the industrial installation codes provided by national regulations (NEC for the United States, CEC for Canada and MEC for Mexico). (1)

Major improvements, carried out by the Canena (2) are aimed at harmonising product requirements based on IEC (3) standards.

However, the North American codes use specific terminology for defining the functions of a starter.

These functions can be fulfilled by standard IEC products, accompanied by appropriate certifications.

Combination Starters

Combination Starters are the most common type of packaged motor starter. They are called "Combination" because of their structure and their combined functions.

The figure opposite shows the four combined functions that constitute a complete motor starter circuit, defined as a "Motor branch circuit" by the NEC (US National Electric Code) in article 430. Standard UL508 currently gives different types of combination starter that meet the requirements of a "Motor branch circuit".

Type E, called "self-protected combination starter", covers all these functions and can be controlled manually (thermal-magnetic circuit-breaker) or remotely (starter-controller). Type E starters withstand faults within their declared nominal rating without sustaining damage, after which they can be put back into service. In addition, they can withstand more severe short-circuit and durability performance tests without welding or excessive wear of the contact tips.

Type F, called "Combination motor starter", consists of a type E manual starter (thermal-magnetic circuit-breaker) combined with a contactor. These starters are evaluated by means of basic short-circuit tests, but are not considered as "self-protected".

For this combination, the type E starter must be marked "Combination Motor Controller when used with ...", followed by the reference of the load side contactor.

(1) UL: Underwriters Laboratories, CSA: Canadian Standards Association, ACNE: Association of Standardization and Certification, NEC: National Electric Code, CEC: Canadian Electrical Code, MEC: Mexican Electrical Code.

(2) Canena: Council for Harmonization of Electrotechnical Standardization of North America.

(3) IEC: International Electrotechnical Commission.

TeSys contactors

for the North American market,
conforming to UL and CSA

Control panels

To help users properly coordinate their motor control equipment with their distribution system in the event of a fault, article 409 of the 2005 NEC requires panel builders to list the short-circuit withstand rating of their motor control panels.

According to standard UL508A, manufacturers must use the short-circuit withstand value of the lowest rated device as the nominal withstand rating of the panel, unless the devices have been tested together for a higher coordinated rating.

The minimum "short-circuit current rating" (SCCR), on motor control components for horsepower ratings of 50 hp or below is 5 000 A.

Using a **type E** or **type F** combination starter eliminates the coordination problems of using individual components for the "motor branch circuit protection", "motor controller" and "motor overload protection" functions.

The panel builder uses the declared short-circuit current rating for the combination starter. This value is generally higher than 5 000 A.

This makes it easier to list the short-circuit current ratings and to check the compatibility of a UL508A motor control panel within a given distribution system.

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TeSys contactors

for the North American market,
conforming to UL and CSA

Group protection

Article 430.53 of the NEC allows a single short-circuit protection device to be used for more than one motor circuit if the components used are marked and listed for such use.

Components suitable for use in group protection, known as "**motor group installations**", can be marked in one of the following two ways:

Case n° 1

The contactor and the motor overload relay are both listed as suitable for group installation.

An inverse time circuit-breaker can be used as the short-circuit protection device if it is also listed as suitable for group installation.

The panel builder must therefore make sure that the short-circuit protection device selected (fuses or inverse time circuit-breaker) does not exceed the value allowed by article 430.40 for the smallest overload relay used in the circuit.

Once these conditions have been met, the panel builder can reduce the size of the conductor connecting the short-circuit protection device to the individual motor contactor/overload relay, to one third of the size of the upstream circuit conductor supplying the protection device.

The panel builder must limit the length of the motor starter conductor (connecting the short-circuit protection device to the motor contactor/overload relay) to a maximum of 7.6 m (25 feet).

Case n° 2

The motor contactor and overload relay are listed as suitable for "**tap conductor protection**" in group installations.

This category allows the panel designer to reduce the size of the conductor connecting the short-circuit protection device to the individual motor contactor/overload relay, to one tenth of the size of the upstream circuit conductor supplying the protection device.

The designer must limit the length of this conductor to a maximum of 3.05 m (10 feet).

In both cases, the supply circuits must not be less than 125 % of the connected motor FLA (Full Load Amps) rating.

For panel builders, using **type F** combination starters in group installations simplifies group motor considerations.
Each starter is a fully coordinated motor branch circuit.

The panel builder follows the same NEC requirements for sizing the supply conductors as those required for single motor branch circuits.

The size of the supply conductors can be reduced in accordance with the specifications of article 430.28.

This allows the same flexibility in conductor sizing as that offered in article 430.53 (D), without a requirement to check the short-circuit protection rating marked on the components and the overload relay limit.

A UL508A panel does not need a short-circuit protection device when each motor starter installed is a **type F**.

The upstream short-circuit protection device supplying the starter protects the panel. The panel builder only has to consider the panel/enclosure disconnect requirements specified by the NEC or local codes.

Reference



TeSys contactors

for the North American market,
conforming to UL and CSA standards, 20 to 200 A

Contactors

Standard power ratings of motors 50/60 Hz		Size	Associated cable type	Continuous current	Type of contactor required Basic reference, to be completed (1)
Single-phase	3-phase				
1 Ø	3 Ø		75 °C-Cu		Fixing, connection (2)
115 V 230 V 240 V	200 V 208 V 240 V	230 V 460 V 480 V	575 V 600 V		
HP	HP	HP	HP	HP	A

Connection by screw clamp terminals

0.5	1	2	2	5	7.5	00	AWG10	20	LC1 D09**
1	2	3	3	7.5	10	0	AWG10	25	LC1 D12**
1	3	5	5	10	15	0	AWG8	32	LC1 D18**
2	3	5	7.5	15	20	1	AWG6	40	LC1 D25**
2	5	7.5	10	20	30	1	AWG6	50	LC1 D32**

Power connections by EverLink® BTR screw connectors (4) and control by spring terminals

3	5	10	10	30	30	2	AWG3	60	LC1 D40A**
3	7.5	15	15	40	40	2	AWG3	70	LC1 D50A**
5	10	20	20	40	50	2	AWG3	80	LC1 D65A**

Connection by screw clamp terminals or connectors

7.5	15	20	25	60	60	2	AWG2	110	LC1 D80**
7.5	15	20	25	60	60	2	AWG2	110	LC1 D95**
-	-	30	40	75	100	3	AWG2/0	175	LC1 D115**
-	-	40	50	100	125	4	AWG3/0	200	LC1 D150**

Applications with High-Fault Short-Circuit ratings

For contactors LC1 D40A to LC1 D65A, the High-Fault Short-Circuit ratings are 50 kA at 480 V and 25 kA at 600 V.
If these contactors are used, stick the LAD UL1 warning sticker on the enclosure door.

Description	Language	Sold in lots of	Reference
Warning sticker	English, Spanish, French	10	LAD UL1

Application example

For a 15 HP-230 V motor Select a contactor type LC1 D50A.

Information: the contactor rating selected corresponds to "size 2", the associated cable is type AWG3 75 °C-Cu.

(1) Standard control circuit voltages (for other voltages, please consult your Regional Sales Office):

a.c. supply

Volts	24	42	48	110	115	220	230	240	380	400	415	440	500
LC1 D09...D150 (D115 and D150 coils with integral suppression device fitted as standard)	B7	D7	E7	F7	FE7	M7	P7	U7	Q7	V7	N7	R7	S7

LC1 D80...D115

50 Hz	B5	D5	E5	F5	FE5	M5	P5	U5	Q5	V5	N5	R5	S5
60 Hz	B6	-	E6	F6	-	M6	-	U6	Q6	-	-	R6	-

d.c. supply

Volts	12	24	36	48	60	72	110	125	220	250	440
LC1 D09...D65A (coils with integral suppression device fitted as standard)	JD	BD	CD	ED	ND	SD	FD	GD	MD	UD	RD

LC1 D09...D38 (coils with integral suppression device fitted as standard)

U 0.7...1.25 Uc	JD	BD	CD	ED	ND	SD	FD	GD	MD	UD	RD
U 0.75...1.2 Uc	JW	BW	CW	EW	-	SW	FW	-	MW	-	-

LC1 D115 and D150 (coils with integral suppression device fitted as standard)

U 0.75...1.2 Uc	-	BD	-	ED	ND	SD	FD	GD	MD	UD	RD		
Low consumption	5	12	20	24	48	110	220	250					

LC1 D09...D65A (coils with integral suppression device fitted as standard)

U 0.7...1.25 Uc	AL	JL	ZL	BL	EL	FL	ML	UL					
(2) LC1 D09 to D65A: clip-on mounting on 35 mm L rail AM1 DP or screw fixing.													

LC1 D80 and LC1 D95: clip-on mounting on 35 mm L rail AM1 DP or 75 mm L rail AM1 DL or screw fixing.

LC1 D115 and D150: clip-on mounting on 2 x 35 mm L rails AM1 DP or screw fixing.

References

TeSys contactors

TeSys D, 3-pole reversing contactors for motor control up to 75 kW at 400 V, in category AC-3
Horizontally mounted, pre-assembled



3-pole reversing contactors for connection by screw clamp terminals

Pre-wired power connections.



Standard power ratings of 3-phase motors 50-60 Hz in category AC-3 (t ≤ 60 °C)		Rated operational current in AC-3 440 V up to	Instantaneous auxiliary contacts per contactor	Contactors supplied with coil Basic reference, to be completed by adding the control voltage code (2)	Weight (3)
220 V 380 V 415 V 440 V 500 V 660 V 1000 V	230 V 400 V 690 V				
kW	kW	kW	kW	kW	kW
2.2	4	4	4	5.5	5.5
3	5.5	5.5	5.5	7.5	7.5
4	7.5	9	9	10	10
5.5	11	11	11	15	15
7.5	15	15	15	18.5	18.5
9	18.5	18.5	18.5	18.5	18.5
11	18.5	22	22	30	30
15	22	25	30	33	33
18.5	30	37	37</		

References

TeSys contactors

TeSys D, 3-pole reversing contactors for motor control up to 15 kW at 400 V, in category AC-3
Horizontally mounted, pre-assembled



3-pole reversing contactors, for connection by spring terminals

Pre-wired power connections.

Mechanical interlock without electrical interlocking.

Standard power ratings of 3-phase motors 50-60 Hz in category AC-3 ($\theta \leq 60^\circ\text{C}$)		Rated operational current in AC-3 up to 440 V	Instantaneous auxiliary contacts per contactor	Contactor supplied with coil Basic reference, to be completed by adding the voltage code (2)	Weight (3)
				Fixing (1)	
220 V	380 V	415 V	440 V	500 V	660 V
230 V	400 V			690 V	
kW	kW	kW	kW	kW	A
2.2	4	4	5.5	5.5	9
3	5.5	5.5	7.5	7.5	12
4	7.5	9	9	10	10
5.5	11	11	15	15	25
7.5	15	15	15	18.5	18.5
				32 (4)	
				1	1
				LC2 D323**	0.797
For connection by spring terminals					
2.2	4	4	5.5	5.5	9
3	5.5	5.5	7.5	7.5	12
4	7.5	9	9	10	10
5.5	11	11	15	15	25
7.5	15	15	15	18.5	18.5
				32 (4)	
				1	1
				LC2 D323**	0.797
Power connection by EverLink®, BTR screw connectors (5) and control by spring terminals					
11	18.5	22	22	30	40
15	22	25	30	30	33
18.5	30	37	37	37	65
				1	1
				LC2 D65A3** (6)	1.890
For connection by Faston connectors					
All power connections are to be made by the customer.					
These contactors are fitted with Faston connectors: 2 x 6.35 mm on the power poles and 1 x 6.35 mm on the coil terminals.					
For reversing contactors LC2 D09 and LC2 D12 only, in the references selected above, replace the figure 3 before the voltage code with a figure 9.					
Example: LC2 D093** becomes LC2 D099**.					

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Component parts

Auxiliary contact blocks and add-on modules: see pages 5/78 to 5/85.

(1) LC2 D09 to D32: clip-on mounting on 35 mm \square rail AM1 DP or screw fixing.
(2) Standard control circuit voltages (for other voltages, please consult your Regional Sales Office):

a.c. supply	Volts	24	42	48	110	115	220	230	240	380	400	415	440	500
LC2 D09...D65A														
50/60 Hz		B7	D7	E7	F7	FE7	M7	P7	U7	Q7	V7	N7	R7	S7
d.c. supply	Volts	12	24	36	48	60	72	110	125	220	250	440		

LC2 D09...D65A (coils with integral suppression device fitted as standard)

U 0.75...1.25 Uc JD BD CD ED ND SD FD GD MD UD RD

Low consumption

Volts ... 5 12 20 24 48 110 220 250

LC2 D09...D38 (coils with integral suppression device fitted as standard)

U 0.8...1.25 Uc AL JL ZL BL EL FL ML UL

For other voltages between 5 and 690 V, see pages 5/86 to 5/91.

(3) The weights indicated are for reversing contactors with a.c. control circuit. For d.c. or low consumption control circuit, add 0.330 kg for LC2 D09 to D38, 0.150 kg for LC1 D40A to D65A.

(4) Must be wired with 2 x 4 mm² cables in parallel on the upstream side. On the downstream side, outgoing terminal block LAD 331 may be used (Quickfit technology, see page 1/197). When wired with a single cable, the product is limited to 25 A (11 kW/400 V motors).

(5) BTR screws: hexagon socket head. In accordance with local electrical wiring regulations, a size 4 insulated Allen key must be used (reference LAD ALLEN4, see page 5/85).

(6) For low consumption kit LA4 DBL (see page 5/83).

References

TeSys contactors

TeSys D, 4-pole changeover contactor pairs for control in category AC-1, 20 to 200 A



Pre-assembled. Pre-wired power connections.

For connection by screw clamp terminals or connectors

LC2 DT20 to LC2 DT40: mechanical interlock without electrical interlocking.

LC2 D80004: order separately 2 auxiliary contact blocks LAD N•1 to obtain electrical interlocking between the 2 contactors (see page 5/79). For electrical interlocking incorporated in the mechanical interlock, please consult your Regional Sales Office.

LC2 D115004: mechanical interlock with integral, pre-wired electrical interlocking.

Utilisation category AC-1 Non-inductive loads	Instantaneous auxiliary contacts per contactor	Contactor supplied with coil	Weight
		Basic reference, to be completed by adding the voltage code (1)	
		Fixing (2)	

A	kg
20	0.730
25	0.730
32	0.850
40	0.850
125	3.200
200	7.400

For connection by lugs or bars

20	1	1	LC2 DT206**	0.730
25	1	1	LC2 DT256**	0.730
32	1	1	LC2 DT326**	0.850
40	1	1	LC2 DT406**	0.850

For customer assembly.

For connection by screw clamp terminals or connectors

60 1 1 LC1 DT60A** (3)

80 1 1 LC1 DT80A** (3)

For connection by lugs or bars

60 1 1 LC1 DT60A6** (3)

80 1 1 LC1 DT80A6** (3)

Accessories

Auxiliary contact blocks and add-on modules: see pages 5/78 to 5/85.

(1) See note (1) on next page.

(2) LC2 DT20 to LC2 DT80: clip-on mounting on 35 mm \square rail AM1 DP or screw fixing.

LC2 D80: clip-on mounting on 35 mm \square rail AM1 DP or 75 mm \square rail AM1 DL or screw fixing.

LC2 D115: clip-on mounting on 2 x 35 mm \square rails AM1 DP or screw fixing.

(3) For these operational currents, order 2 identical contactors and a mechanical interlock LAD 4CM (see page 5/76).

Note: when assembling changeover contactor pairs, it is good practice to incorporate a 50 ms time delay.

References

TeSys contactors

TeSys D, 4-pole changeover contactor pairs
for control in category AC-1, 20 A

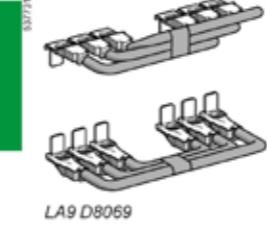
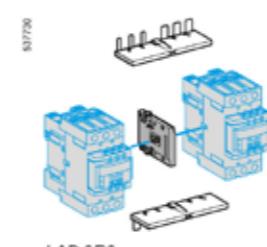
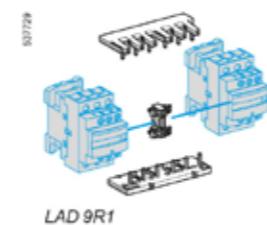
Pre-assembled. Pre-wired power connections.															
For connection by spring terminals.															
Utilisation category AC-1	Instantaneous auxiliary contacts per contactor		Contactors supplied with coil		Weight										
Non-inductive loads			Basic reference, to be completed by adding the control voltage code (1)												
Maximum rated operational current ($\theta \leq 60^{\circ}\text{C}$)			Fixing (2)												
A															
20	1	1	LC2 DT203**		0.760										
For customer assembly.															
Power connection by EverLink®, BTR screw connectors (3) and control by spring terminals															
60	1	1	LC1 DT60A3** (4)		-										
80	1	1	LC1 DT80A3** (4)		-										
Separate components															
Auxiliary contact blocks and add-on modules: see pages 5/78 to 5/85.															
(1) Standard control circuit voltages (for other voltages, please consult your Regional Sales Office):															
a.c. supply															
Volts	24	42	48	110	115	220	230	240	380	400	415	440	500		
LC2 DT20...DT40, LC1 DT60...DT80	B7	D7	E7	F7	FE7	M7	P7	U7	Q7	V7	N7	R7	-		
50/60 Hz															
LC2 D80004...D115004															
50 Hz	B5	D5	E5	F5	FE5	M5	P5	U5	Q5	V5	N5	R5	S5		
60 Hz	B6	-	E6	F6	-	M6	-	U6	Q6	-	-	R6	-		
d.c. supply															
Volts	12	24	36	48	60	72	110	125	220	250	440				
LC2 DT20...DT40, LC1 DT60...DT80 (coils with integral suppression device fitted as standard)	JD	BD	CD	ED	ND	SD	FD	GD	MD	UD	RD				
Low consumption															
Volts ::	5	12	20	24	48	110	220	250							
LC2 DT20...DT40 (coils with integral suppression device fitted as standard)	AL	JL	ZL	BL	EL	FL	ML	UL							
For other voltages between 5 and 690 V, see pages 5/86 to 5/91															
(2) Clip-on mounting on 35 mm T rail AM1 DP or screw fixing.															
(3) BTR screws: hexagon socket head. In accordance with local electrical wiring regulations, a size 4 insulated Allen key must be used (reference LAD ALLEN4, see page 5/85).															
(4) For these operational currents, order 2 identical contactors and a mechanical interlock LAD 4CM (see page 5/76).															

5

References

TeSys contactors

Component parts for assembling reversing contactors for motor control, low-speed/high-speed starters and star-delta starters



For 3-pole reversing contactors for motor control

Contactors with screw clamp terminals or connectors. Horizontally mounted, assembled by customer

Description	For contactors (1) (2 identical contactors)	Reference	Weight kg
Kits for assembly of reversing contactors			
Kit comprising:	LC1 D09 to D38	LAD 9R1V	0.045
■ a mechanical interlock LAD 9V2 with electrical interlocking LAD 9V1.			
■ a set of power connections LAD 9V5 (parallel) and LAD 9V6 (reversing)			
Kit comprising:	LC1 D09 to D38	LAD 9R1	0.045
■ a mechanical interlock LAD 9V2 without electrical interlocking			
■ a set of power connections LAD 9V5 (parallel) and LAD 9V6 (reversing)			
Kit comprising:	LC1 D40A to D65A	LAD 9R3	0.170
■ a mechanical interlock LAD 4CM.			
■ a set of power connections LA9 D65A69.			

Mechanical interlocks

Mechanical interlock with integral electrical interlocking	LC1 D80 and D95 (~)	LAD 4D002	0.170
	LC1 D80 and D95 (---)	LAD 4D002	0.170
	LC1 D115 and D150	LAD 4D11502	0.290

Mechanical interlock without integral electrical interlocking

LC1 D09 to D38	LAD 9V2	0.040
LC1 D40A to D65A	LAD 4CM	0.040
LC1 D80 and D95 (~)	LA9 D50978	0.170
LC1 D80 and D95 (---)	LA9 D80978	0.170

Sets of power connections

Comprising:	LC1 D09 to D38 with screw clamp terminals or connectors	LAD 9V5 + LAD 9V6	-
■ a set of parallel bars,	LC1 D09...D32 with spring terminal connections	LAD 9V12 + LAD 9V13 (2)	-
■ a set of reverser bars.	LC1 D40A to D65A	LA9 D65A69	0.130
	LC1 D80 and D95 (~)	LA9 D8069	0.490
	LC1 D80 and D95 (---)	LA9 D8069	0.490
	LC1 D115 and D150	LA9 D11569	1.450

For low-speed/high-speed starter

Description	For contactors with connection type	Reference	Weight kg
Connection kit enabling reversing of low and high speed directions using a reversing contactor and a 2NO + 2NC main pole contactor			
Screw clamps or connectors	LAD 9PVG	0.016	
Power connection module with spring terminal connections	LAD 3PVG	0.034	
Outgoing terminal block with spring terminal connections	LAD 3PVG10	0.034	

For star-delta starter

Description	For contactors	Reference	Weight kg
Mounting kit comprising:			
■ 1 time delay contact block LAD			

TeSys contactors

Component parts for assembling
changeover contactor pairs

For 4-pole changeover contactor pairs (3-phase distribution + neutral)

Contactors with screw clamp terminals or connectors. Horizontally mounted, assembled by customer.

Description	For contactors (1) (2 identical contactors)	Reference	Weight kg
Kits for assembly of changeover contactor pairs			
Kit comprising: ■ a mechanical interlock LAD 9V2 with electrical interlocking LAD 9V1, ■ a set of power connections (changeover) LAD 9V7.	LC1 DT20 to DT40 with screw clamps or connectors	LAD T9R1V	0.045
Kit comprising: ■ a mechanical interlock LAD 9V2 without electrical interlocking, ■ a set of power connections (changeover) LAD 9V7.	LC1 DT20 to DT40 with screw clamps or connectors	LAD T9R1	0.045
Mechanical interlocks			
With integral electrical interlocking	LC1 D80004 LA9 D4002 LP1 D80004 LA9 D8002 LC1 D115004 LA9 D11502	0.170 0.170 0.280	
Without integral electrical interlocking	LC1 DT20 to DT40 with screw clamps or connectors LC1 DT203 to DT403 with spring terminals LC1 DT60A and DT80A LC1 D80004 LA9 D50978 LP1 D80004 LA9 D80978	LAD 9V2 (2) 0.040 LAD 9V2 (2) 0.040 LAD 4CM 0.040 LA9 D50978 0.155 LA9 D80978 0.180	
Sets of power connections			
Comprising a set of parallel bars	LC1 DT60A and DT80A LC1 D80004 LA9 D65A70 ▲ LP1 D80004 LA9 D8070 LC1 D115004 LA9 D11570 LC1 DT203 to DT403 with spring terminals LC1 D80004 LA9 D8070 (2) LP1 D80004 LA9 D8070 (2)	0.150 0.280 0.280 1.100 0.100 - -	

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For 3-pole changeover contactor pairs

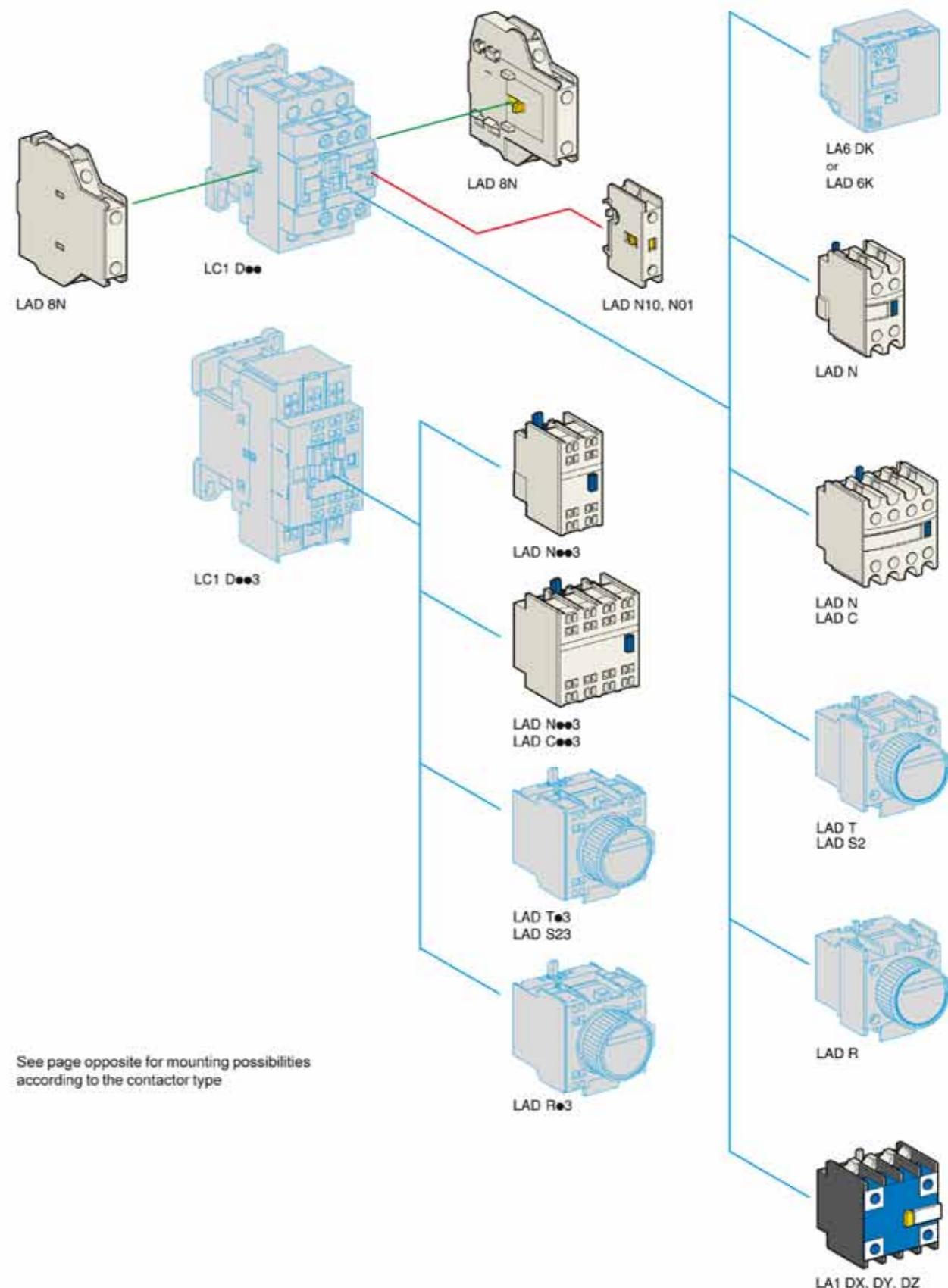
Contactors with screw clamp terminals or connectors. Horizontally mounted, assembled by customer.

Description	For contactors (1) (2 identical contactors)	Reference	Weight kg
Mechanical interlocks			
Without integral electrical interlocking	LC1 D40A...D65A	LAD 9R3S	0.105
With integral electrical interlocking	LC1 D115 and D150	LA9 D11502	0.280
Sets of power connections			
Comprising a set of parallel bars,	LC1 D115 and D150	LA9 D11571	0.960

5

(1) To order the 2 contactors: see pages 5/65 and 5/72.

(2) Order 2 contact blocks LAD N•1 to build the electrical interlock, see page 5/79.



▲ Available 1st quarter 2010.

TeSys contactors

TeSys D contactors and reversing contactors
Instantaneous auxiliary contact blocks

Instantaneous auxiliary contact blocks for connection by screw clamp terminals

For use in normal operating environments

In order to mount an LAD 8N on an LC1 D80 to D95, a set of shims must be ordered separately, see page 5/85

Clip-on mounting (1)	Number of contacts per block	Composition	Reference	Weight
Front	1		LAD N10	0.020
			LAD N01	0.020
			LAD N11	0.030
			LAD N20	0.030
			LAD N02	0.030
			LAD N22	0.050
			LAD N13	0.050
			LAD N40	0.050
			LAD N04	0.050
			LAD N31	0.050
4 incl. 1 N/O & 1 N/C make before break			LAD C22	0.050
Side	2		LAD 8N11	0.030
			LAD 8N20	0.030
			LAD 8N02	0.030
For terminal referencing conforming to EN 50012				
Front on 3P contactors and 4P contactors 20 to 80 A	2		LAD N11G	0.030
Front on 4P contactors 125 to 200 A	4		LAD N22G	0.050
Front on 4P contactors 125 to 200 A	2		LAD N11P	0.030
Front on 4P contactors 125 to 200 A	4		LAD N22P	0.050
With dust and damp protected contacts, for use in particularly harsh industrial environments				
Front	2		LA1 DX20	0.040
			LA1 DX11	0.040
	2		LA1 DX02	0.040
	4		LA1 DY20 (2)	0.040
			LA1 DZ40	0.050
			LA1 DZ31	0.060

Instantaneous auxiliary contact blocks for connection by lugs

This type of connection is not possible for blocks with 1 contact or blocks with dust and damp protected contacts. For all other instantaneous auxiliary contact blocks, add the figure 6 to the end of the references selected above.

Example: LAD N11 becomes LAD N116.

Instantaneous auxiliary contact blocks for connection by spring terminals

This type of connection is not possible for LAD 8, LAD N with 1 contact or blocks with dust and damp protected contacts. For all other contact blocks, add the figure 3 to the end of the references selected above.

Example: LAD N11 becomes LAD N113.

Instantaneous auxiliary contact blocks for connection by Faston connectors

This type of connection is not possible for LAD 8, LAD N with 1 contact or blocks with dust and damp protected contacts. For all other contact blocks, add the figure 9 to the end of the references selected above.

Example: LAD N11 becomes LAD N119.

(1) Maximum number of auxiliary contacts that can be fitted:

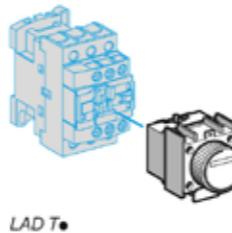
Contactors	Instantaneous auxiliary contacts			Time delay Front mounted
	Type	Number of poles and size	Side mounted	
				1 contact
~	3P	LC1 D09...D38	1 on LH side	and -
		LC1 D40A...D65A	1 on LH or 1 on RH side	and -
		LC1 D80 and D95 (50/60 Hz)	1 on each side	or 2
		LC1 D80 and D95 (50 or 60 Hz)	1 on each side	and 2
		LC1 D115 and D150	1 on LH side	and -
	4P	LC1 DT20...DT40	1 on LH side	and -
		LC1 DT60A and DT80A	1 on LH or 1 on RH side	and -
		LC1 D40008, D65008 and D80	1 on each side	or 1
		LC1 D115	1 on each side	and 1
	3P	LC1 D09...D38	-	-
		LC1 D40A...D65A	-	-
		LC1 D80 and D95	-	1
		LC1 D115 and D150	1 on LH side	and -
	4P	LC1 DT20...DT40	-	-
		LC1 DT60A and DT80A	-	-
		LC1 D40008, D65008 and D80	-	2
		LC1 D115	1 on each side	-
BC (3)	3P	LC1 D09...D38	-	1
	4P	LC1 DT20...DT40	-	1

(2) Device fitted with 4 earth screen continuity terminals.

(3) LC: low consumption.

TeSys contactors

TeSys D contactors and reversing contactors
Time delay auxiliary contact blocks
Mechanical latch blocks



Time delay auxiliary contact blocks for connection by screw clamp terminals

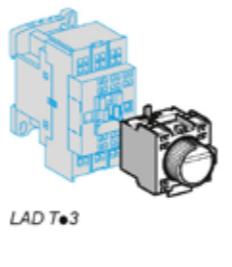
Maximum number of auxiliary contact blocks that can be fitted per contactor, see page 5/79.

Sealing cover to be ordered separately, see page 5/85.

LAD T0 and LAD R0: with extended scale from 0.1 to 0.6 s.

LAD S2: with switching time of 40 ms ± 15 ms between opening of the N/C contact and closing of the N/O contact.

Clip-on mounting	Number of contacts	Time delay	Reference	Weight
		Type	Setting range	kg
Front	1 N/O + 1 N/C	On-delay	0.1...3 s	LAD T0
			0.1...30 s	LAD T2
			10...180 s	LAD T4
			1...30 s	LAD S2
		Off-delay	0.1...3 s	LAD R0
			0.1...30 s	LAD R2
			10...180 s	LAD R4



Time delay auxiliary contact blocks for connection by lugs

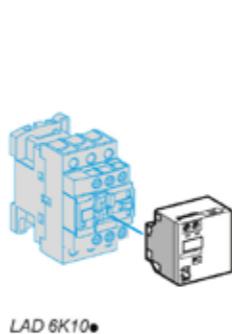
Add the figure 6 to the end of the references selected above. Example: LAD T0 becomes LAD T06.

Time delay auxiliary contact blocks for connection by spring terminals

Add the figure 3 to the end of the references selected above. Example: LAD T0 becomes LAD T03.

Time delay auxiliary contact blocks for connection by Faston connectors

Add the figure 9 to the end of the references selected above. Example: LAD T0 becomes LAD T09.



Mechanical latch blocks (1)

Clip-on mounting	Unlatching control	For use on contactor	Basic reference, to be completed by adding the control voltage code (2)	Weight
Front	Manual or electric	LC1 D09...D38 (~ or ::-) LC1 DT20...DT40 (~ or ::-)	LAD 6K10•	0.070
		LC1 D40A...D65A (3 P ~ or ::-) LC1 DT60A and DT80A (4 P ~ or ::-)	LAD 6K10•	0.070
		LC1 D80...D150 (3 P ~) LC1 D80 and D115 (3 P ::-) LC1 D80 (4 P ~) LC1 D80 and D115 (4 P ~) LP1 D80 and LC1 D115 (4 P ::-)	LA6 DK20•	0.090

(1) The mechanical latch block must not be powered up at the same time as the contactor.

The duration of the control signal for the mechanical latch block and the contactor should be:

≥ 100 ms for a contactor operating on an a.c. supply,

≥ 250 ms for a contactor operating on a d.c. supply.

Maximum impulse duration for the LAD 6K10• mechanical latch block: 10 seconds.

(2) Standard control circuit voltages (for other voltages, please consult your Regional Sales Office).

Volts 50/60 Hz, ::-	24	32/36	42/48	60/72	100	110/127	220/240	256/277	380/415
Code	B	C	E	EN	K	F	M	U	Q

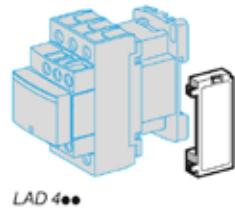
Characteristics:
pages 5/56 to 5/58

Dimensions:
pages 5/92 to 5/95

Schemes:
pages 5/96 and 5/97

TeSys contactors

TeSys D contactors and reversing contactors
Suppressor modules

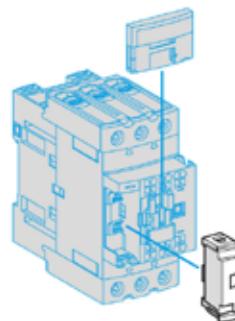


LAD 4**

RC circuits (Resistor-Capacitor)

Effective protection for circuits highly sensitive to "high frequency" interference. For use only in cases where the voltage is virtually sinusoidal, i.e. less than 5% total harmonic distortion. Voltage limited to 3 Uc max. and oscillating frequency limited to 400 Hz max. Slight increase in drop-out time (1.2 to 2 times the normal time).

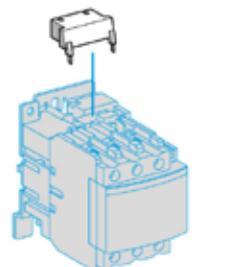
Mounting	For use with contactor (1)	Reference	Weight
	Type		kg
	V ~	V ...	
Clip-on side mounting (3)	D09...D38 (3P) DT20...DT40	24...48 LAD 4RCE 50...127 LAD 4RCG 110...250 LAD 4RCU	0.012 0.012 0.012
Clip-on front mounting (3)	D40A...D65A (3P) DT60A...DT80A (4P)	24...48 LAD 4RC3E 50...127 LAD 4RC3G 110...240 LAD 4RC3U 380...415 LAD 4RC3N	0.020 0.020 0.020 0.040
Screw fixing (4)	D80...D150 (3P) D40...D115 (4P)	24...48 LA4 DA2E 50...127 LA4 DA2G 110...240 LA4 DA2U 380...415 LA4 DA2N	0.018 0.018 0.018 0.018

LAD 4RC3*, LAD 4V3*,
LAD 4D3U, LAD 4T3*

Varistors (peak limiting)

Protection provided by limiting the transient voltage to 2 Uc max. Maximum reduction of transient voltage peaks.
Slight increase in drop-out time (1.1 to 1.5 times the normal time).

Clip-on side mounting (3)	D09...D38 (3P) DT20...DT40	24...48 LAD 4VE 50...127 LAD 4VG 110...250 LAD 4VU	0.012 0.012 0.012
Clip-on front mounting (3)	D40A...D65A (3P) DT60A...DT80A (4P)	24...48 LA4 V3E 50...127 LA4 V3G 110...250 LA4 V3U	0.020 0.020 0.020
Screw fixing (4)	D80...D115 (3P) D80...D115 (4P)	24...48 LA4 DE2E 50...127 LA4 DE2G 110...250 LA4 DE2U	0.018 0.018 0.018
	D80...D95 (3P) D80 (4P)	- 24...48 LA4 DE3E - 50...127 LA4 DE3G - 110...250 LA4 DE3U	0.018 0.018 0.018

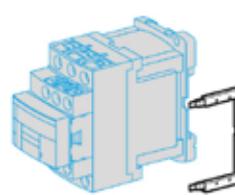


LAD 4**

Flywheel diodes

No overvoltage or oscillating frequency. Increase in drop-out time (6 to 10 times the normal time).
Polarised component.

Clip-on side mounting (5)	D09...D38 (3P), DT20...DT40	- 24...250 LAD 4DDL	0.012
Clip-on front mounting (5)	D40A...D65A (3P), DT60A...DT80A (4P)	- 24...250 LAD 4D3U	0.020
Screw fixing (4)	D80 and D95 (3P), D40...D80 (4P)	- 24...250 LA4 DC3U	0.018



LAD 4DDL or LAD 4T•DL

Bidirectional peak limiting diodes

Protection provided by limiting the transient voltage to 2 Uc max.
Maximum reduction of transient voltage peaks.

Clip-on side mounting (3) (5)	D09...D38 (3P) DT20...DT40 (4P) (2)	24 LAD 4TB - 24 LAD 4TBDL 72 LAD 4TS - 72 LAD 4TSDL - 125 LAD 4TGDL - 250 LAD 4TUDL - 600 LAD 4TXDL	0.012 0.012 0.012 0.012 0.012 0.012 0.012
Clip-on front mounting (3)	D40A...D65A (3P) DT60A...DT80A (4P) (2)	12...24 12...24 LAD 4T3B 25...72 25...72 LAD 4T3S 73...125 73...125 LAD 4T3G 126...250 126...250 LAD 4T3U 251...440 251...440 LAD 4T3R	0.020 0.020 0.020 0.020 0.020
Screw fixing (4)	D80...D95 (3P) D40...D80 (4P)	12...24 12...24 LA4 DB2B 25...72 25...72 LA4 DB2S - 24 LA4 DB3B - 72 LA4 DB3S	0.018 0.018 0.018 0.018

(1) For satisfactory protection, a suppressor module must be fitted across the coil of each contactor.

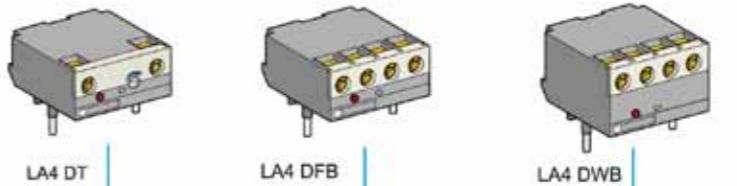
(2) From D09 to D65A and from LC1 DT20 to DT80A, d.c. and low consumption 3-pole contactors are fitted with a built-in bidirectional peak limiting diode suppressor as standard. This bidirectional peak limiting diode is removable and can therefore be replaced by the user. (See reference above). If a d.c. or low consumption contactor is used without suppression, the standard suppressor should be replaced with a blanking plug (reference **LAD 9DL3** for LC1 D40A to D65A and LC1 DT60A to DT80A; reference **LAD 9DL3** for LC1 D40A to D65A and LC1 DT60A to DT80A).

(3) Clipping-on makes the electrical connection. The overall size of the contactor remains unchanged.

(4) Mounting at the top of the contactor on coil terminals A1 and A2.

(5) In order to install these accessories, the existing suppression device must first be removed.

5

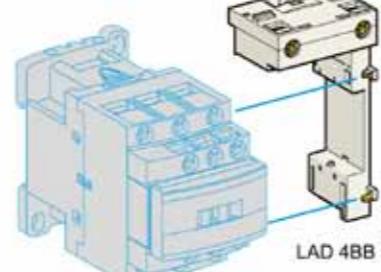


LA4 DT

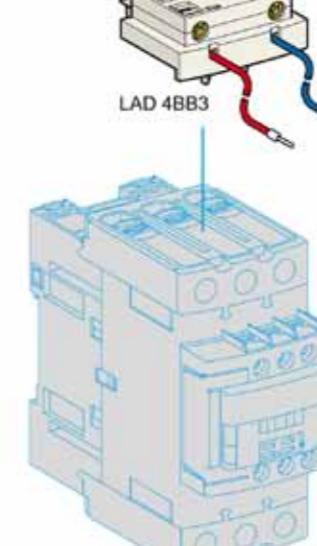
LA4 DFB

LA4 DWB

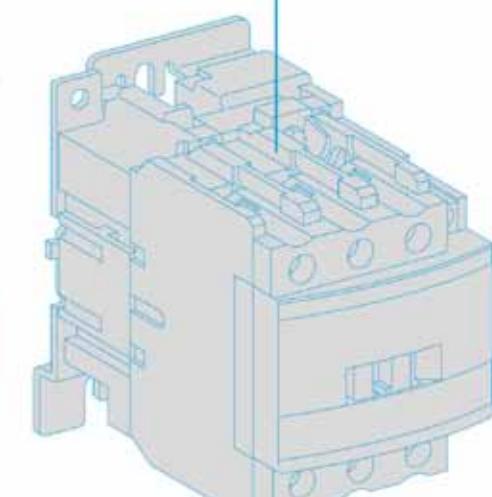
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LC1 D09...D38



LC1 D40A...D65A



LC1 D80...D95

See page opposite for mounting possibilities
according to the contactor type

TeSys contactorsTeSys D contactors and reversing contactors
Accessories**Electronic serial timer modules (1)**

- 3-pole contactors LC1 D09 to D38:
mounted using adapter LAD 4BB, to be ordered separately, see below.
- 3-pole contactors LC1 D40A to D65A:
mounted using adapter LAD 4BB3, to be ordered separately, see below.
- 3-pole contactors LC1 D80 to D150 and 4-pole contactors LC1 D40 to D115:
mounted directly across terminals A1 and A2 of the contactor.

On-delay type

Operational voltage ~	Time delay	Reference	Weight kg
24...250 V LC1 D09...D65A (3P)	100...250 V	LA4 DT0U	0.040
	0.1...2 s	LA4 DT2U	0.040
	1.5...30 s	LA4 DT4U	0.040

Interface modules

- 3-pole contactors LC1 D09 to D38: mounted using adapter LAD 4BB, to be ordered separately, see below.
- 3-pole contactors LC1 D40A to D65A: mounted using adapter LAD 4BB3, to be ordered separately, see below.

Relay interface

Operational voltage ~	Supply voltage E1-E2 (…)	Reference	Weight kg
24...250 V LC1 D09...D150 (3P)	24 V	LA4 DFB	0.050

Relay interface with "AUTO-I" manual override switch (output forced "ON"), solid state type

Operational voltage ~	Supply voltage E1-E2 (…)	Reference	Weight kg
24...250 V LC1 D09...D65A (3P)	100...250 V LC1 D80...D115 (3P)	LA4 DWB	0.045

Low consumption kit

For use on contactors	Composition	Reference	Weight kg
LC1 D40A...D65A (3P) (2)	Kit comprising: ■ a retrofit coil LAD 4BB3. ■ a relay interface module LA4 DFB.	LA4 DBL	0.077

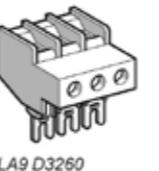
Retrofit: coil for 3-pole contactor

For adapting existing wiring to a new product		Reference	Weight kg	
LC1 D09...D38	Without coil suppression	LAD 4BB	0.019	
	With coil suppression	~ 24...48 V ~ 50...127 V ~ 110...250 V	LAD 4BBVE LAD 4BBVG LAD 4BBVU	0.014
LC1 D40A...D65A	Without coil suppression	LAD 4BB3	0.027	

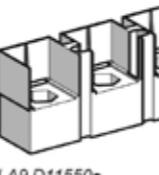
(1) For 24 V operation, the contactor must be fitted with a 21 V coil (code Z). See pages 5/86 to 5/91.

(2) The kit is compatible with a coil voltage of ~ 24 V to ~ 250 V (B7 to U7) and ~ 24 V to ~ 250 V (BD to UD).

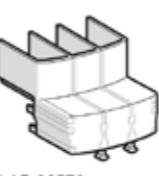
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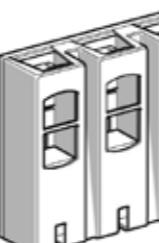
LA9 D3260



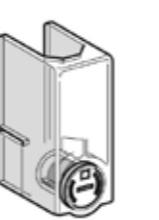
LA9 D11550•



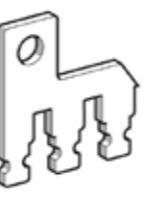
LAD 96570



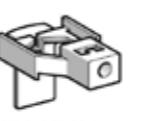
LA9 D11560•



LA9 D11570•



LA9 D80962



LA9 D11567



Staggered coil connection



Control circuit take-off from main pole



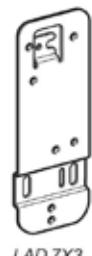
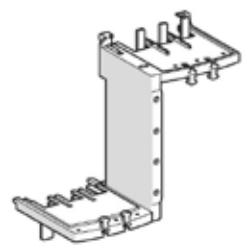
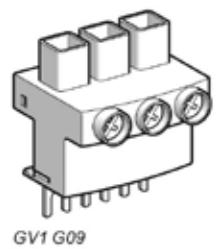
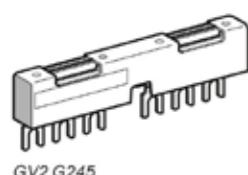
Spreaders

for increasing the pole pitch to 45 mm

(1) For 3-pole contactors: 1 set of 6 covers, for 4-pole contactors: 1 set of 8 covers.
(2) Separate connecting bar for connecting 2 poles in parallel.**References (continued)****TeSys contactors**TeSys D contactors and reversing contactors
Accessories**Accessories for main pole and control connections**

Description	For use with contactors LC1	Sold in lots of	Unit reference	Weight kg
Connectors for cable, size (1 connector)	~ 4-pole 10 mm ²	DT20, DT25	DT20, DT25	1 LAD 92560 0.030
	3-pole 25 mm ²	D09...D38	D09...D38	1 LA9 D3260 0.040
EverLink® terminal block	3-pole	D40A...D65A	D40A...D65A	1 LAD 96560 0.087
Connectors for cables (2 connectors)	3-pole 120 mm ²	D115, D150	D115, D150	1 LA9 D115603 0.560
	4-pole 120 mm ²	D115	D115	1 LA9 D115604 0.740
Connectors for lug type terminals (2 connectors)	3-pole	D1156, D1506	D1156, D1506	1 LA9 D115503 0.300
	4-pole	D1156	D1156	1 LA9 D115504 0.360
Protective covers for connectors for lug type terminals	3-pole	D40A6...D65A6	D40A6...D65A6	1 LAD 96570 0.021
		D1156, D1506	D1156, D1506	1 LA9 D115703 (1) 0.250
	4-pole	D60A6...D80A6	D60A6...D80A6	1 LAD 96580 0.027
		D1156, D1506	D1156, D1506	1 LA9 D115704 0.300
IP 20 covers for lug type terminals (for mounting with circuit-breakers GV3 P●●6 and GV3 L●●6)	3 poles	D40A6...D65A6	D40A6...D65A6	1 LAD 96575 0.010
Links for parallel connection of	2 poles	D09...D38	D09...D38	10 LA9 D2561 0.060
		DT20, DT25 (4P)	DT20, DT25 (4P)	10 LA9 D1261 0.012
		DT32, DT40 (4P)	DT32, DT40 (4P)	10 LAD 96061 0.060
		D40A...D65A	D40A...D65A	1 LAD 9P32 0.021
		D80, D95	D80	2 LA9 D80961 0.060
	3 poles	D09...D38	D09...D38	10 LAD 9P3 (2) 0.005
		D40A...D65A	D40A...D65A	1 LAD 9P33 0.021
		D80, D95	D80, D95	1 LA9 D80962 0.080
	4 poles	DT20, DT25	DT20, DT25	2 LA9 D1263 0.024
		D80, D95	D80	2 LA9 D80963 0.100
Staggered coil connection	-	D80	D80	10 LA9 D09966 0.006
Control circuit take-off from main pole		D80, D95	D80, D95	10 LA9 D8067 0.010
		D115, D150	D115, D150	10 LA9 D11567 0.014
Spreaders		D115, D150	D115, D150	3 GV7 AC03 0.180

References (continued)



TeSys contactors

TeSys D contactors and reversing contactors
Accessories

Sets of contacts and arc chambers

Description	For contactor	Reference	Weight kg
Sets of contacts	3-pole	LC1 D115	0.260
		LA5 D1158031	
Arc chambers	4-pole	LC1 D115004	0.330
	3-pole	LC1 D115	0.395
		LA5 D11550	
4-pole	LC1 D1150	LA5 D15050	0.395
		LC1 D115004	0.470

Power connection accessories

Description	For supply to one or more GV2 G busbar sets	Reference	Weight kg
Terminal block		GV1 G09	0.040
Set of 63 A busbars for parallelling of contactors	2 contactors LC1 D09...D18 or D25...D38	GV2 G245	0.036
	4 contactors LC1 D09...D18 or D25...D38	GV2 G445	0.077
Set of 115 A busbars for parallelling of contactors	2 contactors LC1 D40A...D65A	GV3 G264	0.150
	3 contactors LC1 D40A...D65A	GV3 G364 (1)	0.250
Set of S-shape busbars	For circuit-breakers GV3 P** and GV3 L** and contactors LC1 D40A...D65A	GV3 S	0.111

Protection accessories

Description	Use	Sold in lots of	Reference	Weight kg
Miniature control circuit fuse holder	5 x 20 with 4 A-250 V fuse	1	LA9 D941	0.025
Sealing cover	For LAD T, LAD R	1	LA9 D901	0.005
Safety cover preventing access to the moving contact carrier	LC1 D09...D65A and DT20...DT80A	1	LAD 9ET1	0.026
	LC1 D80 and D95	1	LAD 9ET3	0.004
	LC1 D115 and D150	1	LAD 9ET4	0.004

Marking accessories

Description	Use	Sold in lots of	Unit reference	Weight kg
Sheet of 64 blank legends, self-adhesive, 8 x 33 mm (2)	Contactors (except 4P) LC1 D80...D115, LAD N (4 contacts), LA6 DK	10	LAD 21	0.020
Sheet of 112 blank legends, self-adhesive, 8 x 12 mm (2)	LAD N (2 contacts), LAD T, LAD R, LRD	10	LAD 22	0.020
Sheet of 64 blank legends for marking using plotter or 8 x 33 mm engraver	Contactors (except 4P) LC1 D80.., D115, LAD (4 contacts), LA6 DK	10	LAD 23	0.050
Sheet of 440 blank legends for marking using plotter or 8 x 12 mm engraver	All products	35	LAD 24	0.200
Marker holder snap-in, 8 x 22 mm	4-pole contactors, LC1 D80.., D115, LA6 DK	100	LA9 D92	0.001
Marker holder snap-in, 8 x 18 mm	LC1 D09...D65A, LC1 DT20...DT80A, 100 LAD N (4 contacts), LAD T, LAD R	100	LAD 90	0.001
Bag of 300 blank legends self-adhesive, 7 x 21 mm	On holder LA9 D92	1	LA9 D93	0.001
"SIS Label" labelling software supplied on CD-Rom	Multi-language version: English, French, German, Italian, Spanish	1	XBY 2U	0.100

Mounting accessories

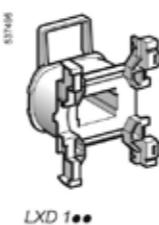
Retrofit plate for screw fixing	For replacement of LC1 D40 to D65 with LC1 D40A to D65A	1	LAD 7X3	0.150
Mounting plate	For replacement of LC1 F115 or F150 with LC1 D115 or D150	1	LA9 D730	0.360
Set of shims	For fitting side mounting blocks LAD 8N on LC1 D80 and D95	1	LA9 D511	0.020
Size 4 Allen key, insulated, 1000 V	For use on contactors LC1 D40A to LC1 D150	5	LAD ALLEN4	0.026

(1) With this set of busbars, any one contactor can be supplied directly by its EverLink® double cage power terminal block.

The other two contactors are supplied by the busbar set. The 115 A limitation is therefore applied to these two contactors. Example: 1 LC1 D65A supplied directly + 1 contactor LC1 D65A and 1 contactor LC1 D50A supplied via the busbar set = 115 A. This combination is compatible with busbar set GV3 G364.

(2) These legends are for sticking onto the safety cover of the contactors or add-on block, if fitted.

References



5

TeSys contactors

a.c. coils
for TeSys D, 3 or 4-pole contactors

For ~ contactors LC1 D09...D38 and LC1 DT20...DT40

Specifications

Average consumption at 20 °C:
- inrush ($\cos \phi = 0.75$) 70 VA,
- sealed ($\cos \phi = 0.3$) 50 Hz: 7 VA, 60 Hz: 7.5 VA
Operating range ($0 \leq \theta \leq 60^{\circ}\text{C}$): 50 Hz: 0.8...1.1 Uc, 60 Hz: 0.85...1.1 Uc.

Control circuit voltage Uc	Average resistance at 20 °C ± 10 %	Inductance of closed circuit H	Reference (1)	Weight kg
V	Ω	H		
12	1.33	0.05	LXD 1J7	0.070
21 (2)	4.17	0.17	LXD 1Z7	0.070
24	5.37	0.22	LXD 1B7	0.070
32	10.1	0.39	LXD 1C7	0.070
36	12.8	0.49	LXD 1CC7	0.070
42	17	0.67	LXD 1D7	0.070
48	21.7	0.87	LXD 1E7	0.070
60	34.6	1.4	LXD 1EE7	0.070
100	100.4	3.8	LXD 1K7	0.070
110	124.1	4.6	LXD 1F7	0.070
115	129.8	5	LXD 1FE7	0.070
120	150.6	5.4	LXD 1G7	0.070
127	158.5	6.1	LXD 1FC7	0.070
200	410.7	15	LXD 1L7	0.070
208	430.4	16	LXD 1LE7	0.070
220	515.4	18	LXD 1M7 (3)	0.070
230	538.6	20	LXD 1P7	0.070
240	562.3	22	LXD 1U7	0.070
277	800.7	29	LXD 1W7	0.070
380	1551	55	LXD 1Q7 (4)	0.070
400	1633	60	LXD 1V7	0.070
415	1694	65	LXD 1N7	0.070
440	1993	73	LXD 1R7	0.070
480	2398	87	LXD 1T7	0.070
500	2499	95	LXD 1S7	0.070
575	3294	125	LXD 1SC7	0.070
600	3810	136	LXD 1X7	0.070
660	4656	165	LXD 1YC7	0.070
690	5020	180	LXD 1Y7	0.070

(1) The last 2 digits in the reference represent the voltage code.

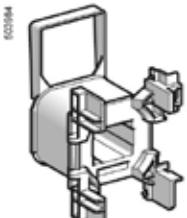
(2) Voltage for special coils fitted in contactors with serial timer modules, with 24 V supply.

(3) Suitable for use on 230 V / 50 Hz. In this case, apply a coefficient of 0.6 to the mechanical durability of the contactor (see pages 5/52 and 5/53).

(4) Suitable for use on 400 V / 50 Hz. In this case, apply a coefficient of 0.6 to the mechanical durability of the contactor (see pages 5/52 and 5/53).

TeSys contactors

a.c. coils
for TeSys D, 3 or 4-pole contactors



LXD 3**

For ~ contactors LC1 D40A...D65A, LC1 DT60A and LC1 DT80A

Specifications

Average consumption at 20 °C:

- inrush ($\cos \varphi = 0.75$) 160 VA.

- sealed ($\cos \varphi = 0.3$) 50 Hz: 15 VA, 60 Hz: 15 VA

Operating range ($0 \leq 60^{\circ}\text{C}$): 50 Hz: 0.8...1.1 Uc, 60 Hz: 0.85...1.1 Uc.

Control circuit voltage Uc	Average resistance at 20 °C ± 10%	Inductance of closed circuit	Reference (1)	Weight
V	Ω	H		kg
12	0.49	0.03	LXD 3J5 (2)	0.070
24	1.98	0.12	LXD 3B7	0.070
32	3.76	0.22	LXD 3C7	0.070
42	6.18	0.37	LXD 3D7	0.070
48	7.97	0.48	LXD 3E7	0.070
100	37.63	2.07	LXD 3K7	0.070
110	42.28	2.50	LXD 3F7	0.070
115	48.76	2.74	LXD 3FE7	0.070
120	37.63	2.07	LXD 3G7	0.070
127	60.29	3.34	LXD 3FC7	0.070
200	149	8.27	LXD 3L7	0.070
208	105	6.22	LXD 3LE7	0.070
220	182	10	LXD 3M7 (3)	0.070
230	192	10.9	LXD 3P7	0.070
240	202	11.9	LXD 3U7	0.070
277	193	11	LXD 3W7	0.070
380	512	29.9	LXD 3Q7 (4)	0.070
400	607	33.1	LXD 3V7	0.070
415	635	35.6	LXD 3N7	0.070
440	682	40.1	LXD 3R7	0.070
480	607	33.1	LXD 3T7	0.070
500	878	51.7	LXD 3S7	0.070
575	1238	68.4	LXD 3SC7	0.070
600	1304	74.5	LXD 3X7	0.070
660	1593	90.1	LXD 3YC7	0.070
690	1683	98.5	LXD 3Y7	0.070

(1) The last 2 digits in the reference represent the voltage code.

(2) This coil can only be used on 50 Hz.

(3) Suitable for use on 230 V / 50 Hz. In this case, apply a coefficient of 0.6 to the mechanical durability of the contactor (see pages 5/52 and 5/53).

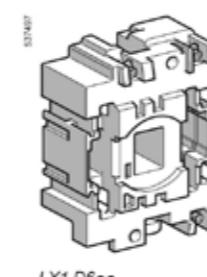
(4) Suitable for use on 400 V / 50 Hz. In this case, apply a coefficient of 0.6 to the mechanical durability of the contactor (see pages 5/52 and 5/53).

5

References (continued)

TeSys contactors

a.c. coils
for TeSys D, 3 or 4-pole contactors



LX1 D6**

For 3 or 4-pole contactors LC1D40, D50, D65, D80, D95

Specifications

Average consumption at 20 °C:

- inrush ($\cos \varphi = 0.75$) 50 Hz: 200 VA, 60 Hz: 220 VA.

- sealed ($\cos \varphi = 0.3$) 50 Hz: 20 VA, 60 Hz: 22 VA

Operating range ($0 \leq 55^{\circ}\text{C}$): 0.85...1.1 Uc.

Control circuit voltage Uc	Average resistance at 20 °C ± 10 %	Inductance of closed circuit	Reference (1)	Average resistance at 20 °C ± 10 %	Inductance of closed circuit	Reference (1)	Weight
V	Ω	H		Ω	H		kg
24	1.4	0.09	LX1 D6B5	1.05	0.06	LX1 D6B6	0.280
32	2.6	0.16	LX1 D6C5	—	—	—	0.280
42	4.4	0.27	LX1 D6D5	—	—	—	0.280
48	5.5	0.35	LX1 D6E5	4.2	0.23	LX1 D6E6	0.280
110	31	1.9	LX1 D6F5	22	1.2	LX1 D6F6	0.280
115	31	1.9	LX1 D6FE5	—	—	—	0.280
120	—	—	—	28	1.5	LX1 D6G6	0.280
127	41	2.4	LX1 D6G5	—	—	—	0.280
208	—	—	—	86	4.3	LX1 D6L6	0.280
220	—	—	—	98	4.8	LX1 D6M6	0.280
220/230	127	7.5	LX1 D6M5	—	—	—	0.280
230	133	8.1	LX1 D6P5	—	—	—	0.280
240	152	8.7	LX1 D6U5	120	5.7	LX1 D6U6	0.280
256	166	10	LX1 D6W5	—	—	—	0.280
277	—	—	—	157	8	LX1 D6W6	0.280
380	—	—	—	300	14	LX1 D6Q6	0.280
380/400	381	22	LX1 D6Q5	—	—	—	0.280
400	411	25	LX1 D6V5	—	—	—	0.280
415	463	26	LX1 D6N5	—	—	—	0.280
440	513	30	LX1 D6R5	392	19	LX1 D6R6	0.280
480	—	—	—	480	23	LX1 D6T6	0.280
500	668	38	LX1 D6S5	—	—	—	0.280
575	—	—	—	675	33	LX1 D6S6	0.280
600	—	—	—	775	36	LX1 D6X6	0.280
660	1220	67	LX1 D6Y5	—	—	—	0.280

Specifications

Average consumption at 20 °C:

- inrush ($\cos \varphi = 0.75$) 50/60 Hz: 245 VA at 50 Hz,

- sealed ($\cos \varphi = 0.3$) 50/60 Hz: 26 VA at 50 Hz.

Operating range ($0 \leq 55^{\circ}\text{C}$): 0.85...1.1 Uc.

Control circuit voltage Uc	50/60 Hz
V	Ω
24	—
42	—
48	—
110	—
115	—
120	—
220/230 (2)	—
230	—
230/240 (3)	—
380/400 (4)	—
400	—
415	—
440	—
122	0.08
3.5	0.25
5	0.32
26	1.7
115	—
120	—
220/230 (2)	—
230	—
230/240 (3)	—
380/400 (4)	—
400	—
415	—
440	—
410	27

(1) The last 2 digits in the reference represent the voltage code.

(2) For use on 230 V / 50 Hz, apply a coefficient of 0.6 to the mechanical durability of the contactor, see pages 5/52 and 5/53. This coil can be used on 240 V at 60 Hz.

(3) This coil can be used on 220/240 V at 50 Hz and on 240 V only at 60 Hz.

(4) For use on 400 V / 50 Hz, apply a coefficient of 0.6 to the mechanical durability of the contactor, see pages 5/52 and 5/53.

References (continued)

5/1702

LX1 D8**

TeSys contactors

a.c. coils

for TeSys D, 3 or 4-pole contactors

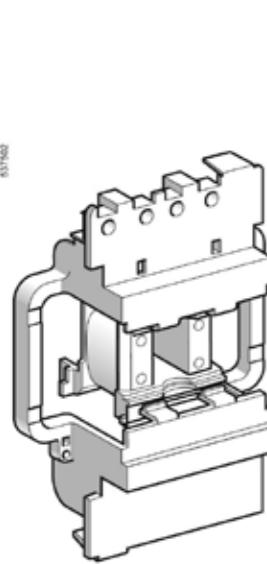
For 3 or 4-pole contactors LC1 D115

Specifications

Average consumption at 20 °C:

- inrush ($\cos \varphi = 0.8$) 50 or 60 Hz: 300 VA,
- sealed ($\cos \varphi = 0.3$) 50 or 60 Hz: 22 VA

Operating range ($0 \leq 55^{\circ}\text{C}$): 0.85...1.1 Uc.



Control circuit voltage Uc	Average resistance at 20°C ± 10 %	Inductance of closed circuit	Reference (1)	Average resistance at 20°C ± 10 %	Inductance of closed circuit	Reference (1)	Weight
V	Ω	H		Ω	H		kg
50 Hz							
24	1.24	0.09	LX1 D8B5	0.87	0.07	LX1 D8B6	0.260
32	2.14	0.17	LX1 D8C5	—	—	—	0.260
42	3.91	0.28	LX1 D8D5	—	—	—	0.260
48	4.51	0.36	LX1 D8E5	3.91	0.28	LX1 D8E6	0.260
110	26.53	2.00	LX1 D8F5	19.97	1.45	LX1 D8F6	0.260
115	26.53	2.00	LX1 D8FE5	—	—	—	0.260
120	—	—	—	24.02	1.70	LX1 D8G6	0.260
127	32.75	2.44	LX1 D8FC5	—	—	—	0.260
208	—	—	—	67.92	5.06	LX1 DBL6	0.260
220	104.77	7.65	LX1 D8M5	79.61	5.69	LX1 D8M6	0.260
230	104.77	8.29	LX1 D8P5	—	—	—	0.260
240	125.25	8.89	LX1 D8U5	97.04	6.75	LX1 D8W6	0.260
277	—	—	—	125.75	8.89	LX1 D8W6	0.260
380	338.51	22.26	LX1 D8Q5	243.07	17.04	LX1 D8Q6	0.260
400	368.43	25.55	LX1 D8V5	—	—	—	0.260
415	368.43	27.65	LX1 D8N5	—	—	—	0.260
440	441.56	30.34	LX1 D8R5	338.51	22.26	LX1 D8R6	0.260
480	—	—	—	368.43	25.55	LX1 D8T6	0.260
500	566.62	38.12	LX1 D8S5	—	—	—	0.260

For 3 or 4-pole contactors LC1 D115, LC1 D150

Specifications

Average consumption at 20 °C:

- inrush: $\cos \varphi = 0.9$ - 280 to 350 VA,
- sealed: $\cos \varphi = 0.9$ - 2 to 18 VA.

Operating range ($0 \leq 55^{\circ}\text{C}$): 0.8...1.15 Uc.

Coils with integral suppression device fitted as standard, class B.

Control circuit voltage Uc	Average resistance at 20°C ± 10 %	Inductance of closed circuit	Reference (1)	Average resistance at 20°C ± 10 %	Inductance of closed circuit	Reference (1)	Weight
V	Ω	H		Ω	H		kg
50/60 Hz							
24	—	—	—	147	3.03	LX1 D8B7	0.290
32	—	—	—	301	8.28	LX1 D8C7	0.290
42	—	—	—	498	13.32	LX1 D8D7	0.290
48	—	—	—	1061	24.19	LX1 D8E7	0.290
110	—	—	—	4377	109.69	LX1 D8F7	0.290
115	—	—	—	4377	109.69	LX1 D8FE7	0.290
120	—	—	—	4377	109.69	LX1 D8G7	0.290
127	—	—	—	6586	152.65	LX1 D8FC7	0.290
208	—	—	—	10 895	260.15	LX1 D8LE7	0.290
220	—	—	—	9895	210.72	LX1 D8M7	0.290
230	—	—	—	9895	210.72	LX1 D8P7	0.290
240	—	—	—	9895	210.72	LX1 D8U7	0.290
277	—	—	—	21 988	533.17	LX1 D8UE7	0.290
380	—	—	—	21 011	482.42	LX1 D8C7	0.290
400	—	—	—	21 011	482.42	LX1 D8V7	0.290
415	—	—	—	21 011	482.42	LX1 D8N7	0.290
440	—	—	—	21 501	507.47	LX1 D8R7	0.290
480	—	—	—	32 249	938.41	LX1 D8T7	0.290
500	—	—	—	32 249	938.41	LX1 D8S7	0.290

(1) The last 2 digits in the reference represent the voltage code.

References

TeSys contactors

TeSys contactors

d.c. coils

for TeSys D, 3 or 4-pole contactors

For 3-pole contactors LC1 D80 or 4-pole contactors LP1 D80

Specifications

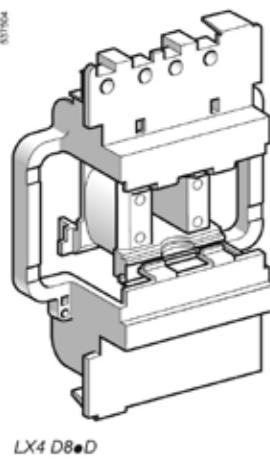
Average consumption: 22 W.

Operating range: 0.85...1.1 Uc.

Control circuit voltage Uc	Average resistance at 20 °C ± 10 %	Inductance of closed circuit	Reference (1)	Weight
V	Ω	H		kg
12	6.6	0.46	LX4 D7JD	0.680
24	27	1.89	LX4 D7BD	0.680
36	57	4	LX4 D7CD	0.680
48	107	7.5	LX4 D7ED	0.680
60	170	11.9	LX4 D7ND	0.680
72	230	16.1	LX4 D7SD	0.680
110	564	39.5	LX4 D7FD	0.680
125	718	50.3	LX4 D7GD	0.680
220	2215	155	LX4 D7MD	0.680
250	2850	200	LX4 D7UD	0.680
440	9195	640	LX4 D7RD	0.680

(1) The last 2 digits in the reference represent the voltage code.

References



LX4 D8-D

TeSys contactors

d.c. coils

for TeSys D, 3 or 4-pole contactors

For contactors LC1 D115, D150

Specifications

Consumption: inrush 270 to 365 W, sealed 2.4 to 5.1 W.

Operating range: 0.75...1.2 Uc.

Coils with integral suppression device fitted as standard, class B.

Control circuit voltage Uc	Average resistance at 20 °C ± 10 %	Inductance of closed circuit	Reference (1)	Weight
24	147	3.03	LX4 D8BD	0.300
48	1061	24.19	LX4 D8ED	0.300
60	1673	38.44	LX4 D8ND	0.300
72	2500	56.27	LX4 D8SD	0.300
110	4377	109.69	LX4 D8FD	0.300
125	6586	152.65	LX4 D8GD	0.300
220	9895	210.72	LX4 D8MD	0.300
250	18 022	345.40	LX4 D8UD	0.300
440	21 501	684.66	LX4 D8RD	0.300

For 3-pole contactors LC1 D80 or 4-pole contactors LP1 D80

Specifications

Wide range coils for specific applications

Average consumption: 23 W.

Operating range: 0.75 to 1.2 Uc.

Coils with "TH" treatment as standard.

Control circuit voltage Uc	Average resistance at 20 °C ± 10 %	Inductance of closed circuit	Reference (1)	Weight
12	6.2	0.49	LX4 D7JW	0.680
24	23.5	1.75	LX4 D7BW	0.680
36	51.9	4.18	LX4 D7CW	0.680
48	94.2	7	LX4 D7EW	0.680
72	204	15.7	LX4 D7SW	0.680
110	483	36	LX4 D7FW	0.680
220	1922	144	LX4 D7MW	0.680

(1) The last 2 digits in the reference represent the voltage code.

5

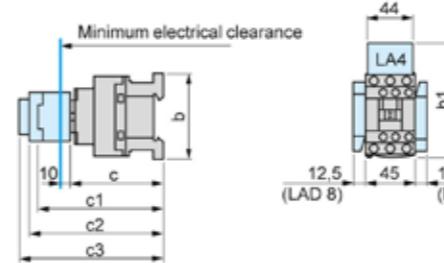
Dimensions

TeSys contactors

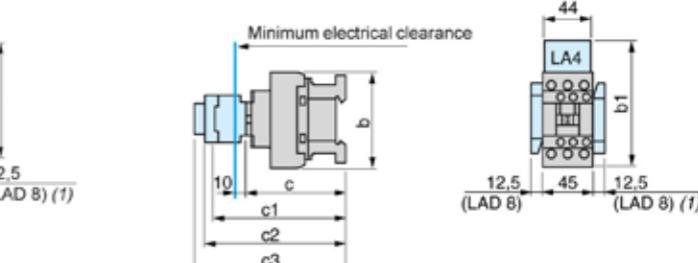
TeSys D contactors

Control circuit: a.c.

LC1 D09...D18 (3-pole)



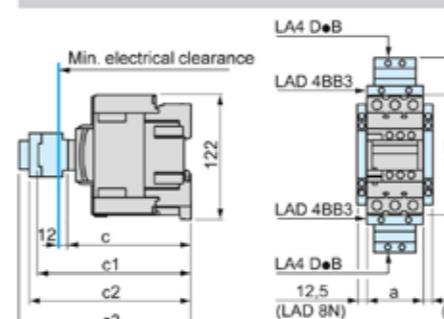
LC1 D25...D38 (3-pole), LC1 DT20...DT40 (4-pole)



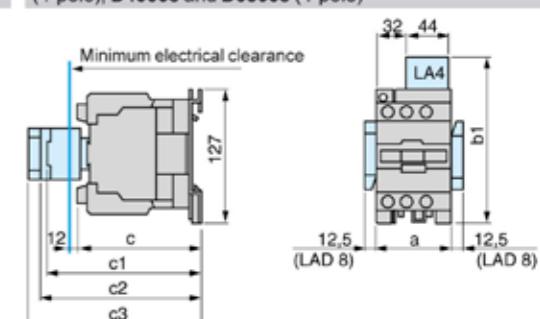
LC1	D09...D18	D093...D123	D099...D129	D25...	D183...D323	D098, D128, DT20 and DT25	DT203 and DT253	DT32 and DT40	D188, D258, DT323 and DT403
b without add-on blocks	77	99	80	85	99	85	99	91	105
b1 with LAD 4BB	94	107	95,5	98	107	98	—	—	—
with LA4 D•2	110 (1)	123 (1)	111,5 (1)	114 (1)	123 (1)	114	—	—	—
with LA4 DF, DT	119 (1)	132 (1)	120,5 (1)	123 (1)	132 (1)	129	—	—	—
with LA4 DW, DL	126 (1)	139 (1)	127,5 (1)	130 (1)	139 (1)	190	—	—	—
c without cover or add-on blocks	84	84	84	90	90	90	90	97	97
with cover, without add-on blocks	86	86	86	92	92	92	92	99	99
c1 with LAD N or C (2 or 4 contacts)	117	117	117	123	123	123	123	131	131
c2 with LAD 6K10, LAD 6K10	129	129	129	135	135	135	135	143	143
c3 with LAD T, R, S	137	137	137	143	143	143	143	151	151
with LAD T, R, S and sealing cover	141	141	141	147	147	147	147	155	155

(1) Including LAD 4BB.

LC1 D40A...D65A (3-pole), LC1 DT60A...DT80A (4-pole)

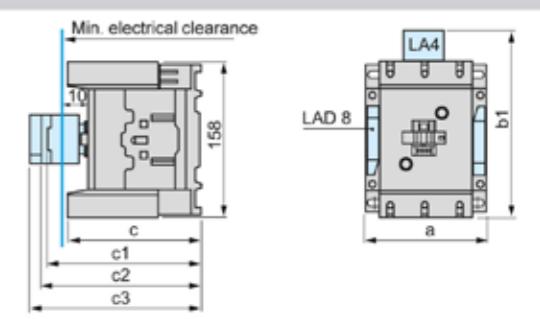
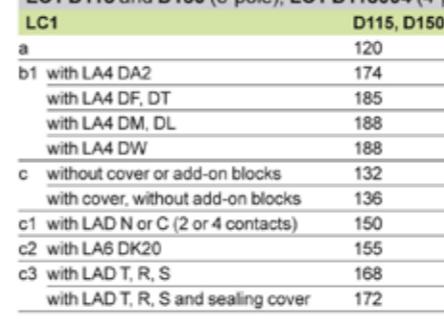


LC1 D80 and D95 (3-pole), LC1 D80004 and D80008 (4-pole), D40008 and D65008 (4-pole)



LC1	D40A...D65A	DT60A...DT80A	D40008	D80	D95, D65008	D80004	D80008
a	55	70	85	85	85	96	96
b1 with LA4 D•2	—	—	135	135	135	135	135
with LA4 DB3 or LAD 4BB3	136	—	—	135	—	—	—
with LA4 DF, DT	157	—	142	142	142	142	142
with LA4 DM, DW, DL	166	—	150	150	150	150	150
c without cover or add-on blocks	118	118	125	125	125	125	140
with cover, without add-on blocks	120	120	—	130	130	—	—
c1 with LAD N (1 contact)	—	—	139	150	150	150	150
with LAD N or C (2 or 4 contacts)	150	150	147	158	158	158	158
c2 with LAD 6K10 or LAD DK	163	163	159	170	170	170	170
c3 with LAD T, R, S	171	171	167	178	178	178	178
with LAD T, R, S and sealing cover	175	175	171	182	182	182	182

LC1 D115 and D150 (3-pole), LC1 D115004 (4-pole)



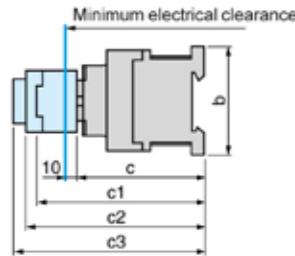
Dimensions

TeSys contactors

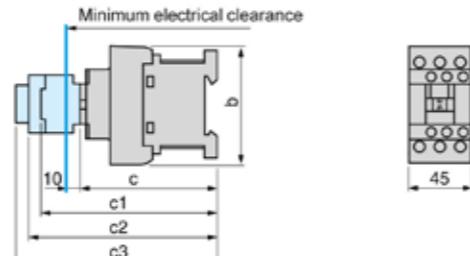
TeSys D contactors

Control circuit: d.c. or low consumption

LC1 D09...D18 (3-pole)



LC1 D25...D38 (3-pole)



LC1 D09...D18 D093...D123 D099...D129 D25...D38 D183...D323

LC1	D09...D18	D093...D123	D099...D129	D25...D38	D183...D323
b	77	99	80	85	99
c without cover or add-on blocks	93	93	93	99	99
c with cover, without add-on blocks	95	95	95	101	101
c1 with LAD N or C (2 or 4 contacts)	126	126	126	132	132
c2 with LA6 DK10	138	138	138	144	144
c3 with LAD T, R, S	146	146	146	152	152
with LAD T, R, S and sealing cover	150	150	150	156	156

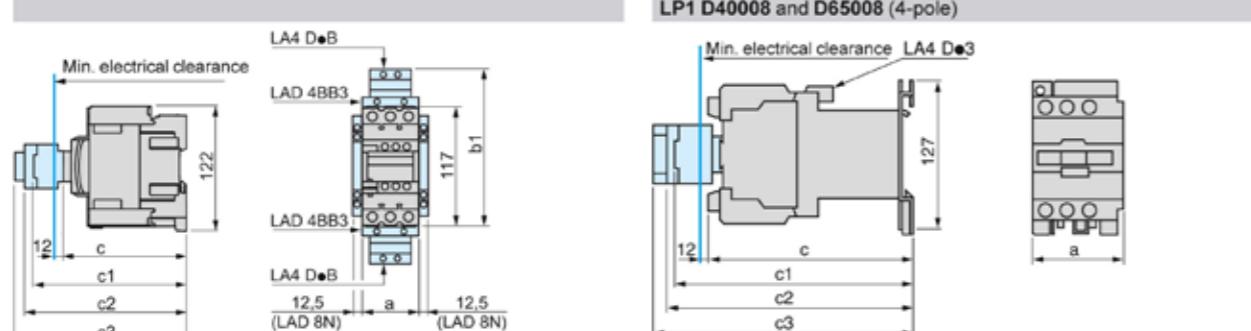
LC1 DT20...DT40 (4-pole)



LC1 DT20 and DT25 D098 and D128 DT203 and DT253 D0983 and D1283 DT32 and DT40 D1883...D2583 DT323 and DT403 D1883 and D2583

LC1	DT20 and DT25 D098 and D128	DT203 and DT253 D0983 and D1283	DT32 and DT40 D1883...D2583	DT323 and DT403 D1883 and D2583
b	85	99	91	105
c with cover	99	99	107	107
c1 with LAD N or C (2 or 4 contacts)	123	123	131	131
c2 with LA6 DK10	135	135	143	143
c3 with LAD T, R, S	143	143	151	151
with LAD T, R, S and sealing cover	147	147	155	155

LC1 D40A...D65A (3-pole), LC1 DT60A...DT80A (4-pole)



LC1 D40A LC1 ... D65A LC1 DT60A...DT80A LP1 D40008 and D65008 LP1 D80004 LP1 D80008

a	55	70	85	85	96	96
b1 with LAD 4BB3	136	136	—	—	—	—
with LA4 DF, DT	157	157	—	—	—	—
c without cover or add-on blocks	118	118	182	181	181	196
with cover, without add-on blocks	120	120	—	186	—	—
c1 with LAD N (1 contact)	—	—	196	204	204	204
with LAD N or C (2 or 4 contacts)	150	150	202	210	210	210
c2 with LA6 DK10	163	163	213	221	221	221
c3 with LAD T, R, S	171	171	221	229	229	229
with LAD T, R, S and sealing cover	175	175	225	233	233	233

LC1 D115*** and LC1 D150*** with *** coil: see page 5/92

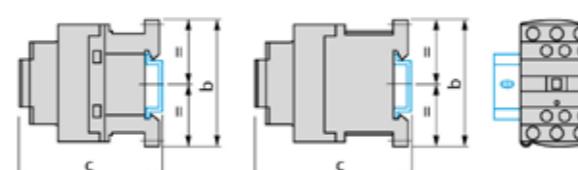
Mounting

TeSys contactors

TeSys D contactors

LC1 D09...D38, DT20...DT40

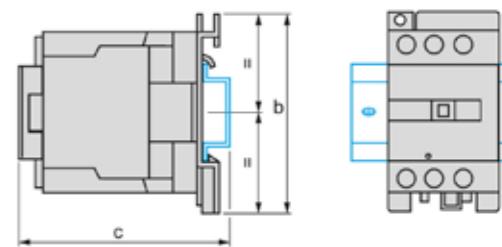
On mounting rail AM1 DP200, DR200 or AM1 DE200 (width 35 mm)



LC1 D40A...D65A, LC1 DT60A and DT80A, LC1 D80 and D95, LC1 D40008 and D65008

On mounting rail AM1 DL200 or DL201 (width 75 mm)

On mounting rail AM1 ED*** or AM1 DE200 (width 35 mm)



Control circuit: a.c.

LC1 D09... D18 D25... D38 DT20 and DT25 DT32 and DT40

LC1	D09... D18	D25... D38	DT20 and DT25	DT32 and DT40
b	77	85	85	100
c (AM1 DP200 or DR200) (1)	88	94	94	109
c (AM1 DE200) (1)	96	102	102	117

Control circuit: d.c.

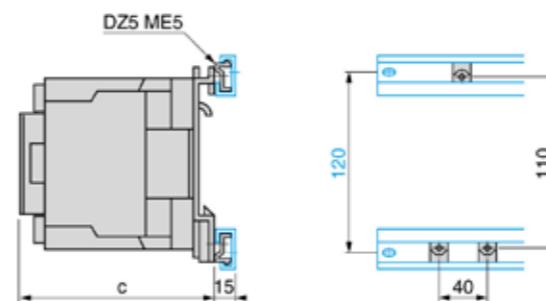
LC1 D09... D18 D25... D38 DT20 and DT25 DT32 and DT40

LC1	D09... D18	D25... D38	DT20 and DT25	DT32 and DT40
b	77	85	94	109
c (AM1 DP200 or DR200) (1)	97	103	103	118
c (AM1 DE200) (1)	105	110	111	1236

(1) with safety cover.

LC1 D80 and D95, LP1 D80

On 2 mounting rails DZ5 MB on 120 mm centres



Control circuit: a.c.

LC1 D80 and D95

c with cover

130

Control circuit: d.c.

LC1 D80 and D95

c with cover

186

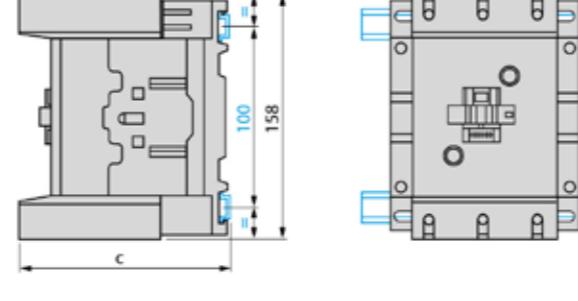
LP1 D80

c

181

LC1 D115, D150

On 2 mounting rails DZ5 MB on 120 mm centres



Control circuit: a.c. or d.c.

LC1 D115 and D150 D1156 and D1506

c (AM1 DP200 or DR200)

134,5

117,5

c (AM1 DE200 or ED***)

142,5

125,5

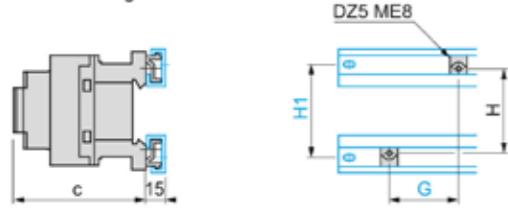
Mounting (continued)

TeSys contactors

TeSys D contactors

LC1 D09...D38 and LC1 DT20...DT40

On 2 mounting rails D25 MB

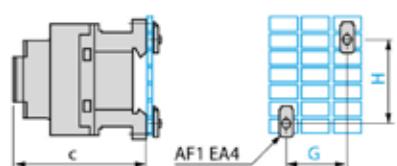


	a.c.	d.c.	a.c.	d.c.
LC1	D09...D18	D25...D38	D09...D18	D25...D38
c with cover	86	92	95	101
G	35	35	35	35
H	60	60	70	70
H1	70	70	70	70

	DT20 and DT25	DT32 and DT40	DT20 and DT25	DT32 and DT40
c	92	100	101	109
G	35	35	35	35
H	60	60	70	70
H1	70	70	70	70

LC1 D09...D38 and LC1 DT20...DT40

On pre-slotted mounting plate AM1 PA, PB, PC



Control circuit:

	a.c.	d.c.	a.c.	d.c.
LC1	D09...D18	D25...D38	D09...D18	D25...D38
c with cover	86	92	95	101
G	35	35	35	35
H	60/70	60/70	70	70

LC1 D09...D38, LC1 DT20...DT40

Panel mounted



Control circuit:

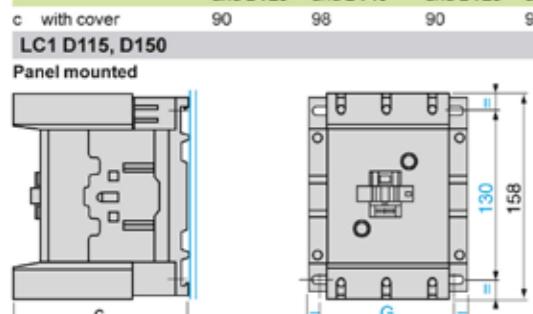
	a.c.	d.c.	a.c.	d.c.
LC1	D09...D18	D25...D38	D09...D18	D25...D38
c with cover	86	92	95	101
G	35	35	35	35
H	60	60	70	70

4-pole contactors

	DT20 and DT25	DT32 and DT40	DT20 and DT25	DT32 and DT40
c	90	98	90	98
G	35	35	35	35
H	60	60	70	70

LC1 D115, D150

Panel mounted



Selection:
pages 5/194 to 5/225

Characteristics:
pages 5/50 to 5/55

References:
pages 5/62 to 5/67

	D115	D1156	D150	D1506
c	132	115	132	115
G (3-pole)	96/110	96/110	96/110	96/110
G (4-pole)	130/144	130/144	-	-

Schneider
Electric

Schemes

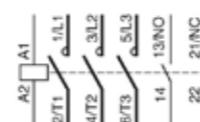
TeSys contactors

TeSys D contactors

Contactors

3-pole contactors (References: pages 5/62 to 5/65)

LC1 D09 to D150

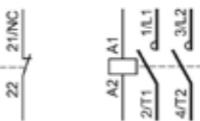


4-pole contactors (References: pages 5/66 and 5/67)

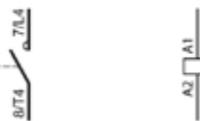
LC1 DT20 to DT80A



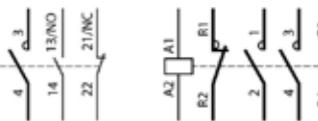
LC1 D115004



LC1 D098 to D258



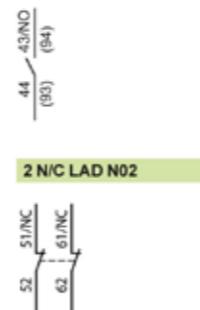
LC1 and LP1 D40008 to D80008



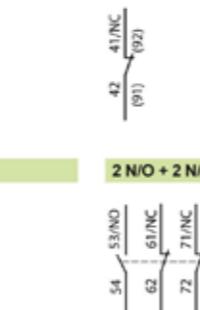
Front mounting add-on contact blocks

Instantaneous auxiliary contacts (References: page 5/79)

1 N/O LAD N10 (1)



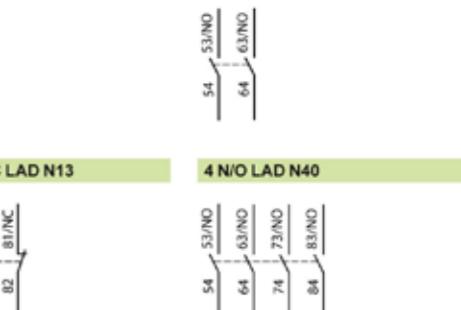
1 N/C LAD N01 (1)



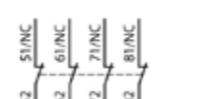
1 N/O + 1 N/C LAD N11



2 N/O LAD N20



2 N/C LAD N02



2 N/O + 2 N/C LAD N22



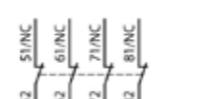
1 N/O + 3 N/C LAD N13



4 N/O LAD N40



4 N/C LAD N04



2 N/O + 2 N/C including 1 N/O + 1 N/C make before break LAD C22



3 N/O + 1 N/C LAD N31



Instantaneous auxiliary contacts conforming to standard EN 50012 (References: page 5/79)

1 N/O + 1 N/C LAD N11G



1 N/O + 2 N/C LAD N22G



2 N/O + 2 N/C LAD N22P



3 N/O + 1 N/C LAD N31G



3 N/O + 1 N/C LAD N31P



Schemes (continued)

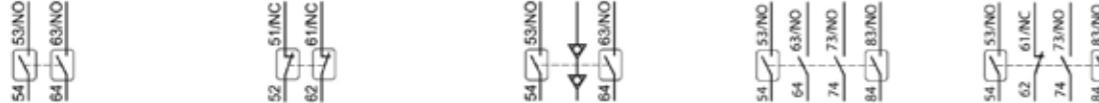
TeSys contactors

TeSys D contactors

Front mounting add-on contact blocks

Dust and damp protected instantaneous auxiliary contacts (References: page 5/79)

2 N/O (24-50 V) LA1 DX20	2 N/C (24-50 V) LA1 DX02	2 N/O (5-24 V) LA1 DY20	2 N/O protected (24-50 V) 2 N/O standard LA1 DZ40	2 N/O protected (24-50 V) + 1 N/O + 1 N/C standard LA1 DZ31
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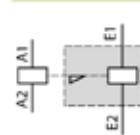
Time delay auxiliary contacts (References: page 5/80)

On-delay 1 N/O + 1 N/C LADT Off-delay 1 N/O + 1 N/C LADR On-delay 1 N/C + 1 N/O break before make LAD S



Mechanical latch blocks (References: page 5/80)

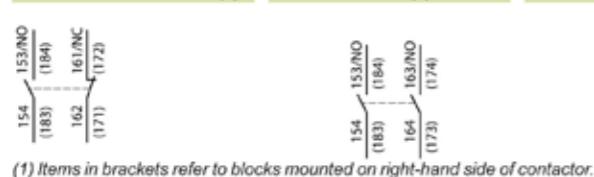
LAD 6K10 and LA6 DK20



Side mounting add-on contact blocks

Instantaneous auxiliary contacts (References: page 5/79)

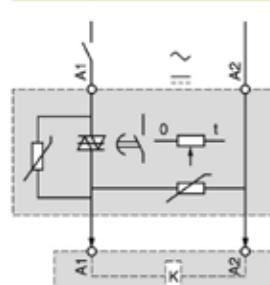
1 N/O + 1 N/C LAD 8N11 (1)	2 N/O LAD 8N20 (1)	2 N/O LAD 8N02 (1)
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(1) Items in brackets refer to blocks mounted on right-hand side of contactor.

Electronic serial timer modules

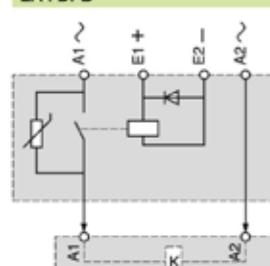
On-delay LA4 DTU



Interface modules

Relay output

LA4 DFB



References: page 5/63.

Selection:
pages 5/194 to 5/225

Characteristics:
pages 5/50 to 5/55

References:
pages 5/62 to 5/83

Dimensions:
pages 5/92 to 5/95

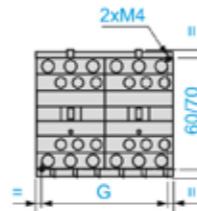
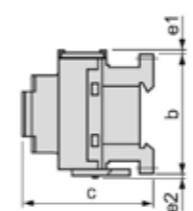
Dimensions

TeSys contactors

TeSys D reversing contactors

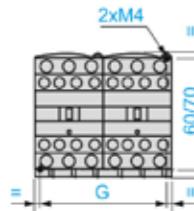
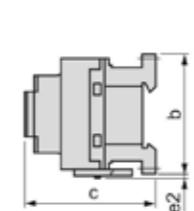
LC2 D09 to D38

2 x LC1 D09 to D38



LC2 DT20 to DT40

2 x LC1 DT20 to DT40



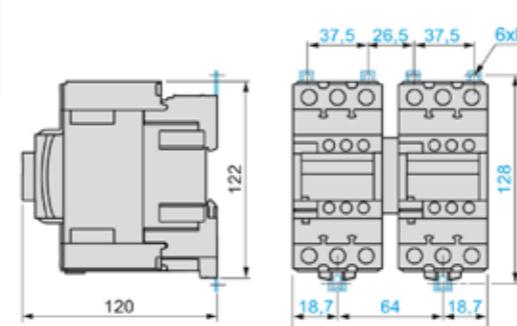
	a	b	c (1)	e1	e2	G
D09 to D18 ~	90	77	86	4	1.5	80
D093 to D123 ~	90	99	86	—	—	80
D09 to D18 ::	90	77	95	4	1.5	80
D093 to D123 ::	90	99	95	—	—	80
D25 to D38 ~	90	85	92	9	5	80
D183 to D383 ~	90	99	92	—	—	80
D25 to D32 ::	90	85	101	9	5	80
D183 to D383 ::	90	99	101	—	—	80

e1 and e2: including cabling.

(1) With safety cover, without add-on block.

LC2 D40A to D65A

2 x LC1 D40A to D65A



Selection:
pages 5/194 to 5/225

Characteristics:
pages 5/50 to 5/55

References:
pages 5/100 and 5/101

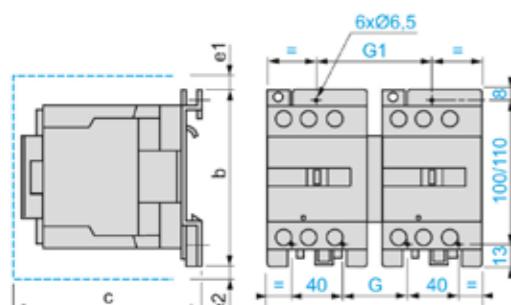
Dimensions (continued)

TeSys contactors

TeSys D reversing contactors

LC2 D80 and D95

2 x LC1 D80 and D95 ~



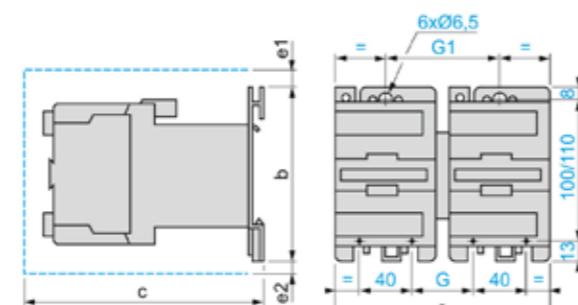
LC2 or 2 x LC1

D80 and D95 ~

D80004 ~

c, e1 and e2: including cabling.

2 x LC1 D80 and D95 ~



2 x LC1

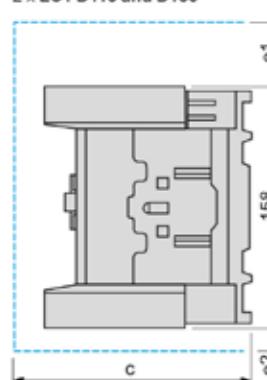
D80 and D95

D80004

c, e1 and e2: including cabling.

LC2 D115 and D150

2 x LC1 D115 and D150

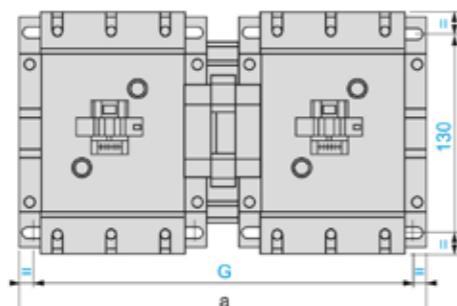


LC2 or 2 x LC1

D115 and D150

D115004

c, e1 and e2: including cabling.



5

Schemes

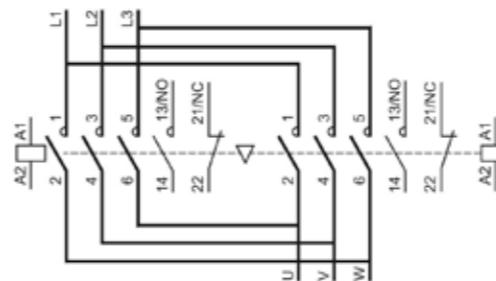
TeSys contactors

TeSys D reversing contactors

Reversing contactors for motor control

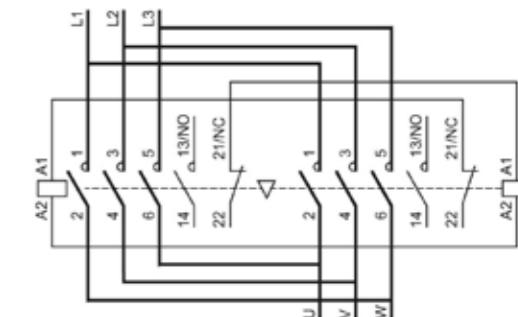
LC2 D09...D150

Horizontally mounted



LAD 9R1V

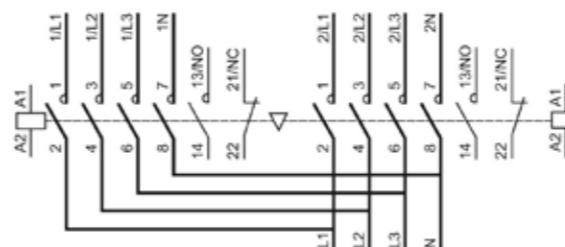
With integral electrical interlocking



Changeover contactor pairs

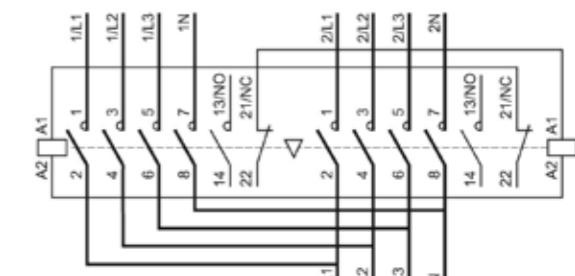
LC2 DT20...DT40

Horizontally mounted



LAD T9R1V

With integral electrical interlocking



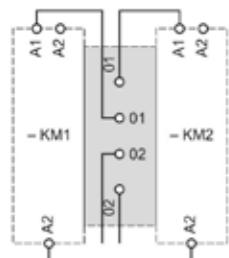
Schemes (continued)

TeSys contactors

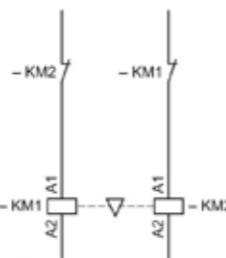
TeSys D reversing contactors

Electrical interlocking of reversing contactors fitted with:

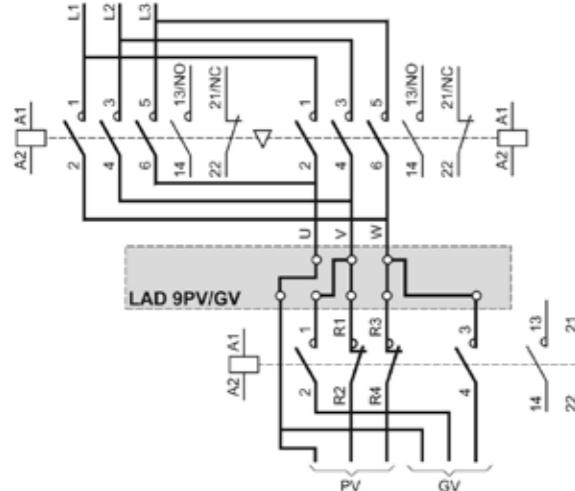
Mechanical interlock with integral electrical contacts
LA9 D4002, LA9 D8002 and LA9 D11502



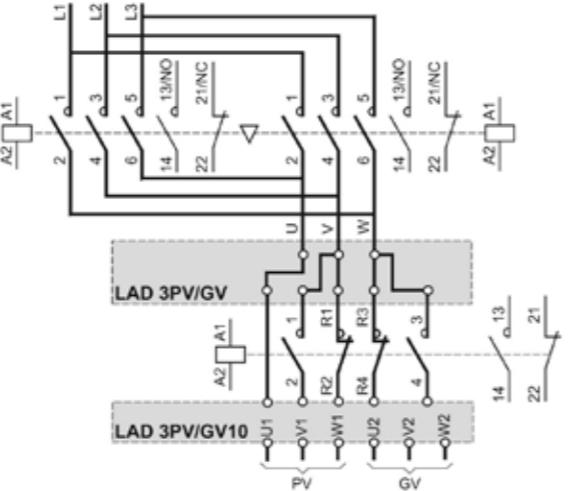
Mechanical interlock without integral electrical contacts
LAD 9V2, LAD 4CM, LA9 D50978 and LA9 D80978



Low speed-High speed cabling kit, screw clamp terminals



Low speed-High speed cabling kit, spring terminals



5

References

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; they conform to standards IEC 60070 and 60831, NFC 54-100, VDE 0560, UL and CSA.

Contactor applications

Specification

Contactors fitted with a block of early make poles and damping resistors, 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 patented design of the add-on block (n° 90 119-20) ensures safety and long life of the installation.

Operating conditions

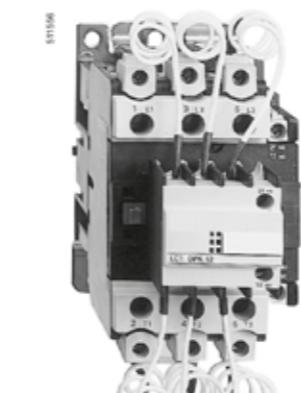
There is no need to use choke inductors for either single or multiple-step capacitor banks.

Short-circuit protection must be provided by gl 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, DPK	240 operating cycles/hour
Electrical durability at nominal load	LC1 DTK, DWK	100 operating cycles/hour
Operational power at 50/60 Hz (1) 0 ≤ 55 °C (2)	Instantaneous auxiliary contacts	Tightening torque on cable end
220 V 400 V 660 V	N/O	N.C.
240 V 440 V 690 V	1	1
kVAR	kVAR	N.m
6.7	12.5	18
		1 1 1.2
		— 2 1.2
8.5	16.7	24
		1 1 1.7
		— 2 1.7
10	20	30
		1 1 1.9
		— 2 1.9
15	25	36
		1 1 2.5
		— 2 2.5
20	33.3	48
		1 2 5
25	40	58
		1 2 5
40	60	92
		1 2 9
		LC1 DPK12••
		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: 50 °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) The average temperature over a 24-hour period, in accordance with standards IEC 60070 and 60831 is 45 °C.

(3) Standard control circuit voltages (for other voltages, please consult your Regional Sales Office):

Volts	24	42	48	110	115	220	230	240	380	400	415	440
50/60 Hz	B7	D7	E7	F7	FE7	M7	P7	U7	Q7	V7	N7	R7

For other voltages between 24 and 440 V, please consult your Regional Sales Office.

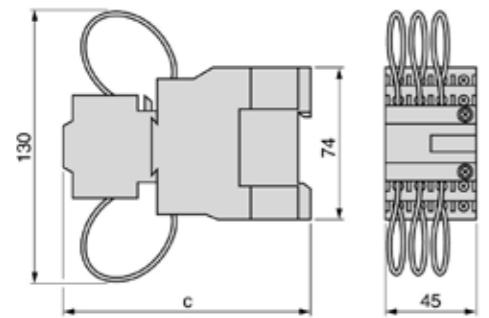
Dimensions, schemes

TeSys contactors

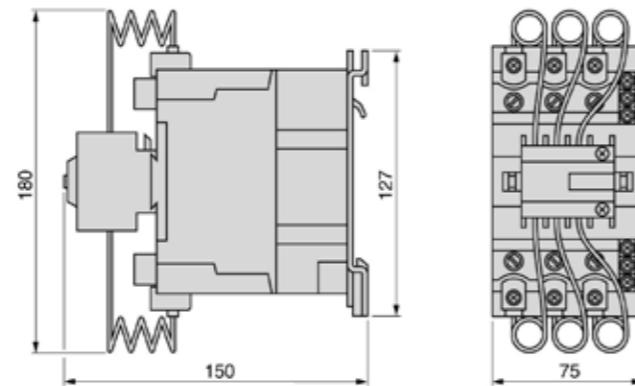
For switching 3-phase capacitor banks,
used for power factor correction

Dimensions

LC1 DFK, DGK



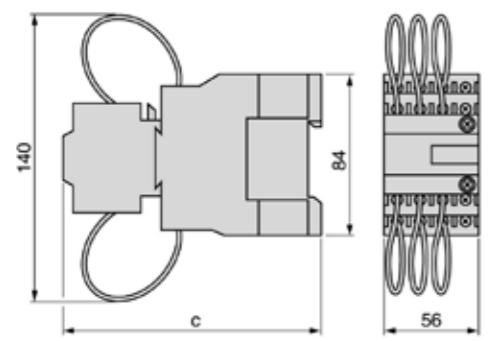
LC1 DPK, DTK



LC1 c Type of fixing

DFK 117 LC1 D12 See page 5/94
DGK 122 LC1 D18 See page 5/94

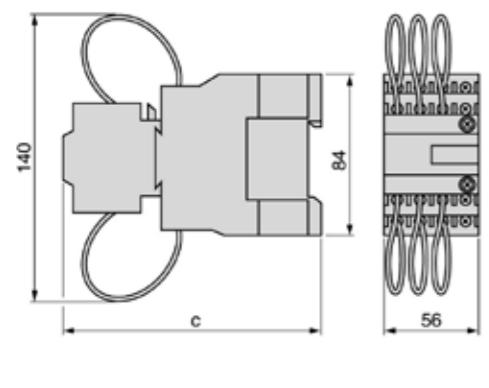
LC1 DLK, DMK



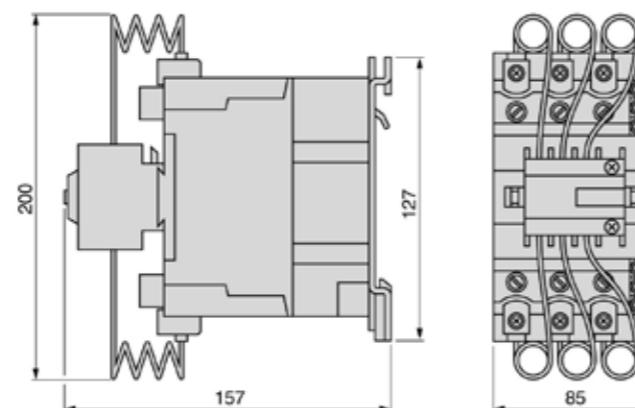
LC1 Type of fixing

DPK LC1 D40 See page 5/94
DTK LC1 D50 See page 5/94

LC1 DWK



LC1 DWK

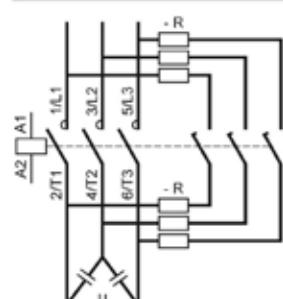


LC1 c Type of fixing

DLK 117 LC1 D25 See page 5/94
DMK 122 LC1 D32 See page 5/94

Schemes

LC1 D•K



LC1 Type of fixing

DWK LC1 D80 See page 5/94

Cabling (maximum permissible c.s.a.)

Contactor type LC1	DFK	DGK	DLK	DMK	DPK, DTK	DWK
Number of conductors	1	2	1	2	1	2
Flexible cable with cable end (mm²)	2.5	1.5	4	2.5	4	6
Solid cable with cable end (mm²)	4	4	6	6	16	25

References:
page 5/102

Selection guide

TeSys contactors

From 115 to 2750 A

Applications

Control of all types of motor for standard or severe duty applications
Control of resistive, inductive and capacitive circuits:
heating, lighting, cos φ rectification, transformers, normal-standby



Rated operational current	$I_{e \max} \text{ AC-3 } (U_e \leq 440 \text{ V})$	115 A	150 A	185 A	225 A	265 A	330 A
	$I_{e \max} \text{ AC-1 } (\theta \leq 40^\circ \text{ C})$	200 A	250 A	275 A	315 A	350 A	400 A

Rated operational voltage	1000 V					
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Number of poles	3 or 4					
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Rated operational power in category AC-3	220/240 V	30 kW	40 kW	55 kW	63 kW	75 kW	100 kW
	380/400 V	55 kW	75 kW	90 kW	110 kW	132 kW	160 kW
	415 V	59 kW	80 kW	100 kW	110 kW	140 kW	180 kW
	440 V	59 kW	80 kW	100 kW	110 kW	140 kW	200 kW
	500 V	75 kW	90 kW	110 kW	129 kW	160 kW	200 kW
	660/690 V	80 kW	100 kW	110 kW	129 kW	160 kW	220 kW
	1000 V	65 kW	65 kW	100 kW	100 kW	147 kW	160 kW

Add-on auxiliary contact blocks	Front mounting. Identical to those used on LC1 D contactors (contacts: instantaneous LA1 DN•, time delay LA2 DT or LA3 DR, dust and damp protected LA1 DX or DY or DZ)
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Associated thermal overload relays and controllers	Manual-auto	LR9 F
	Electronic	TeSys T

Interfaces	Specific	LA4 FWB
	Universal	With or without, depending on the control circuit

Contactor type	LC1 F115	LC1 F150	LC1 F185	LC1 F225	LC1 F265	LC1 F330
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Reversing contactor type	LC2 F115	LC2 F150	LC2 F185	LC2 F225	LC2 F265	For customer assembly
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Pages	Contactors	5/114 and 5/115	5/114 and 5/115
	Reversing contactors	5/116 and 5/117	5/118 to 5/121

Characteristics

TeSys contactors

TeSys F contactors (115 to 2100 A)

Control circuit: a.c. or d.c.

400 A	500 A	630 A	780 A	800 A	—	—	750 A	1000 A	1500 A	1800 A	
500 A	700 A	1000 A	1600 A	1000 A	1700 A	2100 A	800 A	1250 A	2000 A	2750 A	
1000 V	1000 V	1000 V	1000 V	1000 V	1000 V	1000 V	1000 V	1000 V	1000 V	1000 V	
2...3 or 4...	2...3 or 4...	2...3 or 4...	3 or 4	3	3	3	1 to 4	1 to 4	1 to 4	1 to 4	
110 kW	147 kW	200 kW	220 kW	250 kW	—	—	220 kW	280 kW	425 kW	500 kW	
200 kW	250 kW	335 kW	400 kW	450 kW	—	—	400 kW	500 kW	750 kW	900 kW	
220 kW	280 kW	375 kW	425 kW	450 kW	—	—	425 kW	530 kW	800 kW	900 kW	
250 kW	295 kW	400 kW	425 kW	450 kW	—	—	450 kW	560 kW	800 kW	900 kW	
257 kW	355 kW	400 kW	450 kW	450 kW	—	—	500 kW	600 kW	700 kW	900 kW	
280 kW	335 kW	450 kW	475 kW	475 kW	—	—	560 kW	670 kW	750 kW	900 kW	
185 kW	335 kW	450 kW	450 kW	450 kW	—	—	530 kW	530 kW	670 kW	750 kW	
Front mounting, identical to those used on LC1 D contactors (contacts: instantaneous LA1 DN••, time delay LA2 DT or LA3 DR, dust and damp protected LA1 DX or DY or DZ)						4 instantaneous contact compositions: 2 N/C + 2 N/O, 3 N/O + 1 N/C, 1 N/O + 3 N/C or 4 N/O					
LR9 F						LR9 F					
TeSys T						TeSys T					
LA4 FWB						—					
With or without, depending on the control circuit						—					
LC1 F400	LC1 F500	LC1 F630	LC1 F780	LC1 F800	LC1 F1700	LC1 F2100	LC1 BL	LC1 BM	LC1 BP	LC1 BR	
For customer assembly											
5/114 and 5/115						5/184 and 5/185					
5/118 to 5/117						5/186					

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5

Environment

Contactor type	Conforming to IEC 60947-4-1	V	LC1 F115	LC1 F150	LC1 F185
Rated insulation voltage (Ui)	Conforming to VDE 0110 gr C	V	1000	1000	1000
Rated impulse withstand voltage (Uimp)	Coil not connected to the power circuit	kV	8	8	8
Conforming to standards			EN 60947-1, EN 60947-4-1, IEC 60947-1, IEC 60947-4-1, JEM 1038		
Product certifications			CSA, UL, BV, GL, DNV, RINA, RMROS, LROS, CCC		
Degree of protection	Conforming to IEC 60529		IP 2X front face with shrouds LA9 F		
	Conforming to VDE 0106		Front face protected against direct finger contact with shrouds LA9 F		
Protective treatment	Standard version		"TH"		
Ambient air temperature around the device	Storage	°C	-60...+80		
	Operation	°C	-5...+55		
	Permissible at Uc (1)	°C	-40...+70		
Maximum operating altitude	Without derating	m	3000		
Operating positions	Without derating				
			(not to be used for LC1 F780, F1700 and F2100)		
With derating					
			Apply the following derating coefficients: 0.75 on the pull-in voltage, 0.9 on the drop-out voltage and 0.8 on the operational current in AC-1		
			Apply the following derating coefficients: 1.15 on the pull-in voltage, 1.1 on the drop-out voltage and 0.8 on the operational current in AC-1		
			In either case: neither the making and breaking capacities nor the electrical and mechanical durabilities can be assured.		
Not to be used					
Shock resistance (2) 1/2 sine wave = 11 ms	Contact open		9 gn	9 gn	7 gn
	Contact closed		15 gn	15 gn	15 gn
Vibration resistance (2) 5...300 Hz	Contact open		2 gn	2 gn	2 gn
	Contact closed		6 gn	6 gn	5 gn

(1) In these conditions, it is recommended that LX9 F coils be used for contactor sizes F115 to F225.

(2) In the least favourable direction, without change of contact state (coil at Uc). Where higher resistance to mechanical shock is required, select shock-proof contactors. Please consult your Regional Sales Office.

Characteristics (continued)

TeSys contactors

TeSys F contactors (115 to 2100 A)

Control circuit: a.c. or d.c.

LC1 F225	LC1 F265	LC1 F330	LC1 F400	LC1 F500	LC1 F630	LC1 F780	LC1 F800	LC1 F1700	LC1 F2100				
1000	1000	1000	1000	1000	1000	1000	1000	1000	1000				
1500	1500	1500	1500	1500	1500	1500	1500	1500	1500				
8	8	8	8	8	8	8	8	8	8				
EN 60947-1, EN 60947-4-1, IEC 60947-1, IEC 60947-4-1, JEM 1038													
CSA, UL, BV, GL, DNV, RINA, RMROS, LROS, CCC					UL, CSA, GL, LROS	UL, CSA, CCC (pending)							
IP 20 front face with shrouds LA9 F													
Front face protected against direct finger contact with shrouds LA9 F													
'TH'													
- 60...+ 80					- 60...+ 80	- 60...+ 80							
- 5...+ 55					- 5...+ 55	- 5...+ 40							
- 40...+ 70					- 5...+ 55	- 40...+ 60							
3000													
(not to be used for LC1 F780, F1700 and F2100)													
Apply the following derating coefficients: 0.75 on the pull-in voltage, 0.9 on the drop-out voltage and 0.8 on the operational current in AC-1.													
Apply the following derating coefficients: 1.15 on the pull-in voltage, 1.1 on the drop-out voltage and 0.8 on the operational current in AC-1.													
In either case: neither the making and breaking capacities nor the electrical and mechanical durabilities can be assured													
Not to be used													
7 gn	6 gn	6 gn	6 gn	9 gn	6 gn	5 gn	6 gn	6 gn	6 gn				
15 gn	15 gn	15 gn	15 gn	15 gn	15 gn	15 gn	15 gn	15 gn	15 gn				
2 gn	2 gn	2 gn	1.5 gn	2 gn	2 gn	2.5 gn	2 gn	2 gn	2 gn				
5 gn	5 gn	5 gn	5 gn	4 gn	4 gn	5.5 gn	4 gn	4 gn	4 gn				

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Pole characteristics

Contactor type		LC1 F115	LC1 F150	LC1 F185
Number of poles		3 or 4	3 or 4	3 or 4
Rated operational current (Ie)(Ue ≤ 440 V)	In AC-3, 0 ≤ 55 °C In AC-1, 0 ≤ 40 °C	A A	115 200	150 250
Rated operational voltage (Ue)	Up to	V	1000	1000
Frequency limits	Of the operational current (1)	Hz	16 ^{2/3} ...200	16 ^{2/3} ...200
Conventional thermal current	0 ≤ 40 °C	A	200	250
Rated making capacity	I rms conforming to IEC 60947-4-1	A	Making current: 10 x I in AC-3 or 12 x I in AC-4	
Rated breaking capacity	I rms conforming to IEC 60947-4-1	A	Making and breaking current: 8 x I in AC-3 or 10 x I in AC-4	
Maximum permissible current	For 10 s	A	1100	1200
	No current flowing for previous 60 minutes, at 0 ≤ 40 °C	A	640	700
	For 1 min	A	520	600
	For 3 min	A	400	450
	For 10 min	A	320	350
Short-circuit protection by fuses U ≤ 440 V	Motor circuit (type aM) With thermal overload relay (type gG) gG fuses	A A A	125 200 250	160 200 315
Average impedance per pole	At 1th and 50 Hz	mΩ	0.37	0.35
Power dissipation per pole for the above operational currents	AC-3 AC-1	W W	5 15	8 22
Connection			Maximum c.s.a.	
	Bar	Number of bars	2	2
	Bar	mm	20 x 3	25 x 3
	Cable with lug	mm ²	95	120
	Cable with connector	mm ²	95	120
	Bolt diameter	mm	Ø 6	Ø 8
Tightening torque	Power circuit connections	N.m	10	18
			18	18

(1) Sine wave without interference. Above these values, please consult your Regional Sales Office.

(2) With set of right-angled connectors LA9 F2100 (see page 5/125).

(3) Paralleling of poles must be carried out only in accordance with the fuse manufacturer's recommendations.

Characteristics

TeSys contactors

TeSys F contactors (115 to 2100 A)

Control circuit: a.c.

LC1 F225	LC1 F265	LC1 F330	LC1 F400	LC1 F500	LC1 F630	LC1 F780	LC1 F800	LC1 F1700	LC1 F2100
3 or 4	3 or 4	3 or 4	2, 3 or 4	2, 3 or 4	2, 3 or 4	3 or 4	3	3	3
225	265	330	400	500	630	780	800	—	—
315	350	400	500	700	1000	1250	1600	1000	1700 (2)
1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
16 ²⁰ ...200	16 ²⁰ ...200	16 ²⁰ ...200	16 ²⁰ ...200	16 ²⁰ ...200	16 ²⁰ ...200	16 ²⁰ ...200	16 ²⁰ ...200	16 ²⁰ ...200	16 ²⁰ ...200
315	350	400	500	700	1000	1250	1600	1000	1700 (2)
Making current: 10 x I in AC-3 or 12 x I in AC-4									
Making current: 1.5 x I in AC-1									
Making and breaking current: 8 x I in AC-3 or 10 x I in AC-4									
Making and breaking current: 1.5 x I in AC-1									
1800	2200	2650	3600	4200	5050	6250	5500	—	—
1000	1230	1800	2400	3200	4400	5600	4600	—	—
850	950	1300	1700	2400	3400	4600	3600	—	—
560	620	900	1200	1500	2200	3000	2600	—	—
440	480	750	1000	1200	1600	2200	1700	—	—
250	315	400	400	500	630	800	800	—	—
315	500	500	630	800	800	1000	1000	—	—
315	400	500	500	800	1000	2 x 800 (3)	1000	2 x 800 (3)	2 x 1000 (3)
0.32	0.3	0.28	0.26	0.18	0.12	0.10	0.12	0.10	0.10
16	21	31	42	45	48	60	77	—	—
32	37	44	65	88	120	250	120	200	200
2	2	2	2	2	2	3	2	3	4
32 x 4	32 x 4	30 x 5	30 x 5	40 x 5	60 x 5	60 x 5	100 x 5	60 x 5	100 x 5
185	240	240	2 x 150	2 x 240	—	—	—	—	—
185	240	—	—	—	—	—	—	—	—
Ø10	Ø10	Ø10	Ø10	Ø12	2 x Ø12	Ø12	Ø12 (Ø10 with set of right-angled connectors LA9 F2100)		
35	35	35	35	35	58	58	58	58 (35 with set of right-angled connectors LA9 F2100)	

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Control circuit characteristics with LX1 or LX9 coil

Contactor type	Rated control circuit voltage (Uc)	50 or 60 Hz	V	LC1 F115	LC1 F150	LC1 F185
Control voltage limits ($i \leq 55^{\circ}\text{C}$)	50 or 60 Hz coils	Operation		0.85...1.1 Uc		
		Drop-out		0.35...0.55 Uc		
	40...400 Hz coils	Operation		—		
		Drop-out		—		
Average consumption at 20 °C and at Uc						
~ 50 Hz Inrush		50 Hz coil	VA	550	550	805
		40...400 Hz coil	VA	—	—	—
		Cos φ		0.3	0.3	0.3
Sealed		50 Hz coil	VA	45	45	55
		40...400 Hz coil	VA	—	—	—
		Cos φ		0.3	0.3	0.3
~ 60 Hz Inrush		60 Hz coil	VA	660	660	970
		40...400 Hz coil	VA	—	—	—
		Cos φ		0.3	0.3	0.3
Sealed		60 Hz coil	VA	55	55	66
		40...400 Hz coil	VA	—	—	—
		Cos φ		0.3	0.3	0.3
Heat dissipation						
W		12...16		12...16	18...24	
Operating time (1)		Closing "C"	ms	23...35	23...35	20...35
		Opening "O"	ms	5...15	5...15	7...15
Mechanical durability at Uc						
In millions of operating cycles				10	10	10
Maximum operating rate at ambient temperature ≤ 55 °C						
In operating cycles per hour						
Connection				Min/max c.s.a.		
Flexible cable without cable end		1 or 2 conductors	mm ²	1/4	1/4	1/4
Flexible cable with cable end		1 conductor	mm ²	1/4	1/4	1/4
		2 conductors	mm ²	1/2.5	1/2.5	1/2.5
Solid cable without cable end		1 or 2 conductors	mm ²	1/4	1/4	1/4
Tightening torque			N.m	1.2	1.2	1.2
Mechanical latching						
Mechanical latch blocks LA6 DK must not be fitted on LC1 F contactors. For similar type of operation, use magnetic latching contactors CR1 F. See pages 5/240 to 5/267.						

(1) The closing time "C" is measured from the moment the coil supply is switched on to initial contact of the main poles. The opening time "O" is measured from the moment the coil supply is switched off to the moment the main poles separate.

(2) Control circuit characteristics with LX1 coil.

Characteristics

TeSys contactors

TeSys F contactors (115 to 2100 A)

Control circuit: d.c.

LC1 F225	LC1 F265	LC1 F330	LC1 F400	LC1 F500	LC1 F630	LC1 F780	LC1 F800	LC1 F1700	LC1 F2100
24...1000			48...1000		48...1000	110...500	110...400	110...500 (2)	110...500 (2)
0.85...1.1 Uc	—								
0.35...0.55 Uc	—								
—	0.85...1.1 Uc		0.85...1.1 Uc		0.85...1.1 Uc				
—	0.35...0.55 Uc		0.3...0.5 Uc		0.25...0.5 Uc	0.2...0.4 Uc	0.3...0.5 Uc	0.3...0.5 Uc	0.3...0.5 Uc
805	—	—	—	—	—	—	—	—	—
—	650	650	1075	1100	1650	2100	1700	2200	2200
0.3	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
55	—	—	—	—	—	—	—	—	—
—	10	10	15	18	22	50	12	36	36
0.3	0.9	0.9	0.9	0.9	0.9	0.9	—	0.9	0.9
970	—	—	—	—	—	—	—	—	—
—	650	650	1075	1100	1650	2100	1700	2200	2200
0.3	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
68	—	—	—	—	—	—	—	—	—
—	10	10	15	18	22	50	12	36	36
0.3	0.9	0.9	0.9	0.9	0.9	0.9	—	0.9	0.9
18...24	8	8	14	18	20	2x22	25	2x18	2x18
20...35	40...65	40...65	40...75	40...75	40...80	40...80	60...80	40...75	40...75
7...15	100...170	100...170	100...170	100...200	130...230	150...180	100...170	100...170	100...170
10	10	10	10	10	5	5	5	5	5
2400	2400	2400	2400	2400	1200	600	600	800	600
Min/max c.s.a									
1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4
1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4
1/2.5	1/2.5	1/2.5	1/2.5	1/2.5	1/2.5	1/2.5	1/2.5	1/2.5	1/2.5
1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4
1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Mechanical latch blocks LA6 DK must not be fitted on LC1 F contactors. For similar type of operation, use magnetic latching contactors CR1 F. See pages 5/240 to 5/267.									

5

Control circuit characteristics with LX4 coil		LC1 F115	LC1 F150	LC1 F185
Contactor type	—	V	24...460	24...460
Rated control circuit voltage (Uc)	—	V	24...460	24...460
Control voltage limits ($\theta \leq 55^{\circ}\text{C}$)	Operation		0.85...1.1 Uc	0.85...1.1 Uc
	Drop-out		0.15...0.2 Uc	0.15...0.2 Uc
Average consumption at 20 °C and at Uc	—	Inrush	W	560
		Sealed	W	4.5
Average operating time at Uc (1)	Closing "C"	ms	30...40	30...40
	Opening "O"	ms	30...50	30...50
<i>Note:</i> The arcing time depends on the circuit switched by the poles. For all normal 3-phase applications, the arcing time is less than 10 ms. The load is isolated from the supply after a time equal to the sum of the opening time and the arcing time.				
Mechanical durability at Uc	In millions of operating cycles		10	10
Maximum operating rate at ambient temperature $\leq 55^{\circ}\text{C}$	In operating cycles per hour		2400	2400
Cabling		Min/max c.s.a.		
Flexible cable 1 conductor without cable end	mm ²	1/4	1/4	1/4
2 conductors	mm ²	1/4	1/4	1/4
Flexible cable 1 conductor with cable end	mm ²	1/4	1/4	1/4
2 conductors	mm ²	1/2.5	1/2.5	1/2.5
Solid cable 1 conductor without cable end	mm ²	1/4	1/4	1/4
2 conductors	mm ²	1/4	1/4	1/4
Tightening torque	N.m	1.2	1.2	1.2
Mechanical latching		Mechanical latch blocks LA6 DK must not be fitted on LC1 F contactors. For similar type of operation, use magnetic latching contactors CR1 F. See pages 5/240 to 5/267.		

(1) The operating times depend on the type of contactor electromagnet and its control mode. The closing time "C" is measured from the moment the coil supply is switched on to initial contact of the main poles. The opening time "O" is measured from the moment the coil supply is switched off to the moment the main poles separate.

References

TeSys contactors

TeSys F contactors for motor control in utilisation category AC-3 (115 to 800 A)
Control circuit: a.c. or d.c.

LC1 F225	LC1 F265	LC1 F330	LC1 F400	LC1 F500	LC1 F630	LC1 F780	LC1 F800	LC1 F1700	LC1 F2100
24...460	24...460	24...460	48...440	48...440	48...440	110...440	110...400	110...440	110...440
0.85...1.1 Uc	0.85...1.1 Uc	0.85...1.1 Uc	0.85...1.1 Uc	0.85...1.1 Uc	0.85...1.1 Uc	0.85...1.1 Uc	0.85...1.1 Uc	0.85...1.1 Uc	0.85...1.1 Uc
0.15...0.2 Uc	0.15...0.2 Uc	0.15...0.2 Uc	0.2...0.35 Uc	0.2...0.35 Uc	0.2...0.35 Uc	0.2...0.4 Uc	0.3...0.5 Uc	0.2...0.35 Uc	0.2...0.35 Uc
800	750	750	1000	1100	1600	2x1000	1900	2100	2100
5	5	5	6	6	9	2x21	12	10	10
30...40	40...50	40...50	50...60	50...60	60...70	70...80	60...80	50...60	50...60
30...50	40...65	40...65	45...60	45...60	40...50	100...130	40...50	45...60	45...60
Note: The arcing time depends on the circuit switched by the poles. For all normal 3-phase applications, the arcing time is less than 10 ms. The load is isolated from the supply after a time equal to the sum of the opening time and the arcing time.									
10	10	10	10	10	5	5	5	5	5
2400	2400	2400	2400	2400	1200	600	600	600	600
Min/max c.s.a.									
1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4
1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4
1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4
1/2.5	1/2.5	1/2.5	1/2.5	1/2.5	1/2.5	1/2.5	1/2.5	1/2.5	1/2.5
1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4
1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4
1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Mechanical latch blocks LA6 DK must not be fitted on LC1 F contactors. For similar type of operation, use magnetic latching contactors CR1 F. See pages 5/240 to 5/267.									

5



LC1 F225



LC1 F630

5

3-pole contactors													
Standard power ratings of 3-phase motors 50-60 Hz in category AC-3						Rated operational current in AC-3	Basic reference, to be completed by adding the voltage code (2)		Weight				
220 V 380 V 230 V 400 V 415 V 440 V 500 V 690 V 1000 V up to						660 V 440 V	Screw fixing, cabling (1)						
kW	kW	kW	kW	kW	kW	kW	A		kg				
30	55	59	59	75	80	85	115	LC1 F115**	3.430				
40	75	80	80	90	100	65	150	LC1 F150**	3.430				
55	90	100	100	110	110	100	185	LC1 F185**	4.650				
63	110	110	110	129	129	100	225	LC1 F225**	4.750				
75	132	140	140	160	160	147	265	LC1 F265**	7.440				
100	160	180	200	200	220	160	330	LC1 F330**	8.600				
110	200	220	250	257	280	185	400	LC1 F400**	9.100				
147	250	280	295	355	335	335	500	LC1 F500**	11.350				
200	335	375	400	400	450	450	630	LC1 F630**	18.600				
220	400	425	425	450	475	450	780	LC1 F780**	39.500				
250	450	450	450	450	475	450	800	LC1 F800**	18.750				
Note: auxiliary contact blocks, modules and accessories: see pages 5/122 to 5/127.													
(1) Power terminals can be protected against direct finger contact by the addition of shrouds, to be ordered separately, except on contactors LC1 F780 (see page 5/126).													
(2) Standard control circuit voltages (for other voltages, please consult your Regional Sales Office).													
Volts ~	24	48	110	115	120	208	220	230	240	380	400	415	440
LC1 F115...F225													
50 Hz (coil LX1)	B5	E5	F5	FE5	-	-	M5	P5	U5	V5	N5	-	
60 Hz (coil LX1)	-	E6	F6	-	G6	L6	M6	-	U6	Q6	-	R6	
40...400 Hz (coil LX9)	-	E7	F7	FE7	G7	L7	M7	P7	U7	Q7	V7	N7	R7
LC1 F265...F330													
40...400 Hz (coil LX1)	B7	E7	F7	FE7	G7	L7	M7	P7	U7	Q7	V7	N7	R7
LC1 F400...F630													
40...400 Hz (coil LX1)	-	E7	F7	FE7	G7(3)	L7	M7	P7	U7	Q7	V7	N7	R7
LC1 F780													
40...400 Hz (coil LX1)	-	-	F7	FE7	F7	L7	M7	P7	U7	Q7	V7	N7	R7
LC1 F800													
40...400 Hz (coil LX4) (4)	-	-	FW	FW	FW	-	MW	MW	MW	QW	QW	-	
Volts ::	24	48	110	125	220	230	250	400	440				
LC1 F115...F330													
(coil LX4 F)	BD	ED	FD	GD	MD	MD	UD	-	RD				
LC1 F400...F630													
(coil LX4 F)	-	ED	FD	GD	MD	-	UD	-	RD				
LC1 F780													
(coil LX4 F)	-	-	FD	GD	MD	-	UD	-	RD				
LC1 F800													
(coil LX4 F)	-	-	FW	FW	MW	MW	-	QW	-				
(3) F7 for LC1 F630													
(4) Coil LX4 F8** + rectifier DR5TE**.													

Selection :
pages 5/194 to 5/217

Characteristics :
pages 5/106 to 5/113

Dimensions :
pages 5/140 to 5/142

Schemes :
page 5/146

References (continued)



LC1 F1854



LC1 F4004



LC1 F6304



LC1 F1700



LC1 F2100

TeSys contactors

TeSys F contactors for control in category AC-1,
(200 to 2100 A)
Control circuit: a.c. or d.c.

2, 3 or 4-pole contactors

Maximum current in AC-1 (0 ≤ 40 °C)	Number of poles	Basic reference, to be completed by adding the voltage code (2) Screw fixing, cabling (1)	Weight kg
A	3	LC1 F115**	3.430
	4	LC1 F1154**	3.830
200	3	LC1 F150**	3.430
	4	LC1 F1504**	3.830
250	3	LC1 F185**	4.650
	4	LC1 F1854**	5.450
275	3	LC1 F225**	4.750
	4	LC1 F2254**	5.550
315	3	LC1 F265**	7.440
	4	LC1 F2654**	8.540
350	3	LC1 F330**	8.600
	4	LC1 F3304**	9.500
400	3	LC1 F400**	8.000
	4	LC1 F4004**	9.100
500	2	LC1 F500**	10.200
	3	LC1 F5004**	9.750
700	2	LC1 F5002**	11.350
	3	LC1 F5003**	12.950
1000	2	LC1 F6302**	15.500
	3	LC1 F6303**	18.600
1250	2	LC1 F6302**S011	15.500
	3	LC1 F6303**S011	18.600
1600	3	LC1 F780**	21.500
	4	LC1 F7804**	39.500
1700	3	LC1 F1700	48.000
	4	LC1 F2100	30.000
2100 (3)	3	LC1 F2100	31.000

Note: auxiliary contact blocks, modules and accessories: see pages 5/122 to 5/127

- (1) Power terminals can be protected against direct finger contact by the addition of shrouds, to be ordered separately (except LC1 F780, LC1 F1700 and LC1 F2100), see page 5/126.
- (2) Standard control circuit voltages, see previous page.
- (3) With set of right-angled connectors LA9 F2100 (see page 5/125).

References



LC2 F115

TeSys contactors

TeSys F reversing contactors for motor control in utilisation category AC-3 (115 to 265 A), pre-assembled
Control circuit: a.c. or d.c.

3-pole reversing contactors (horizontally mounted) (1)

Pre-wired power connections		Standard power ratings of 3-phase motors 50/60 Hz in category AC-3		Operational current in AC-3	Maximum operational voltage	Contactors supplied without coil (2)	Weight
		220 V 380 V	660 V	440 V up to	A	V	Fixing, cabling (3)
		kW	kW	kW	kW	kW	kg
30	55	59	59	75	80	65	LC2 F115 7.560
40	75	80	80	90	100	65	LC2 F150 7.560
55	90	100	100	110	110	100	LC2 F185 10.100
63	110	110	110	129	129	100	LC2 F225 14.200
75	132	140	140	160	160	147	LC2 F265 16.480

Accessories (to be ordered separately)

Description	For reversing contactors	Quantity required	Reference	Weight kg
Power terminal protection shrouds	LC2 F115	2	LA9 F701	0.250
	LC2 F150, F185	2	LA9 F702	0.250
	LC2 F225, F265	2	LA9 F703	0.250

Auxiliary contact blocks and add-on modules
See pages 5/122 to 5/127

(1) Fitted with a mechanical interlock without electrical interlocking. Order separately 2 auxiliary contact blocks LAD N•1 to obtain electrical interlocking between the 2 contactors, see page 5/123 For accessories, see pages 5/124 to 5/127

(2) Coils to be ordered separately:
- a.c. supply, see pages 5/130 and 5/131,
- d.c. supply, see page 5/133

(3) Screw fixing.

Power terminals can be protected against direct finger contact by the addition of shrouds, to be ordered separately, see above.

References (continued)

TeSys contactors

TeSys F changeover contactor pairs for control in utilisation category AC-1 (200 to 350 A), pre-assembled
Control circuit: a.c. or d.c.



LC2 F1854

4-pole changeover contactor pairs (horizontally mounted) (1)				
Pre-wired power connections				
Utilisation category AC-1 Non inductive loads Maximum operational current $\theta < 40^\circ\text{C}$	Maximum operational voltage	Contactors supplied without coil (2) Complete reference	Fixing, cabling (3)	Weight
A 200	V 1000	LC2 F1154		8.860
250	1000	LC2 F1504		8.860
275	1000	LC2 F1854		12.100
315	1000	LC2 F2254		15.200
350	1000	LC2 F2654		19.480

Accessories (to be ordered separately)				
Description	For changeover pairs	Quantity required	Reference	Weight kg
Power terminal protection shrouds	LC2 F1154	2	LA9 F706	0.250
	LC2 F1504, F1854	2	LA9 F707	0.250
	LC2 F2254, F2654	2	LA9 F708	0.250
Auxiliary contact blocks and add-on modules	—	—	See pages 5/122 to 5/127	

(1) Fitted with a mechanical interlock without electrical interlocking. Order separately 2 auxiliary contact blocks **LAD N°1** to obtain electrical interlocking between the 2 contactors, see page 5/123 For accessories, see pages 5/124 to 5/127

(2) Coils to be ordered separately:

- a.c. supply, see page 5/130;

- d.c. supply, see page 5/136.

(3) Screw fixing.

Power terminals can be protected against direct finger contact by the addition of shrouds, to be ordered separately, see above.

5

Combinations

TeSys contactors

TeSys F reversing contactors and changeover contactor pairs
Components for assembling 3-pole reversing contactors and changeover contactor pairs, for customer assembly

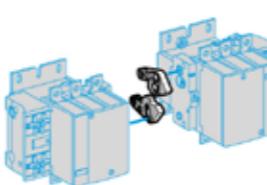
Horizontally mounted

Reversers assembled using 2 contactors of identical rating, type :

LC1 F115
LC1 F150
LC1 F185
LC1 F225
LC1 F265
LC1 F330
LC1 F400
LC1 F500
LC1 F630
LC1 F800

Mechanical interlocks

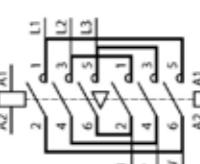
LA9 F•970 (2)



Sets of power connections

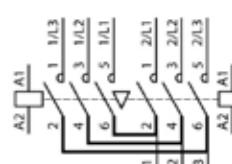
Reversing contactors

LA9 F•••76 (2)



3-pole changeover contactor pairs (1)

LA9 F•••82 (2)



Vertically mounted

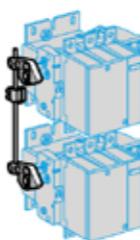
Reversers assembled using 2 contactors of identical rating, type :

LC1 F115
LC1 F150
LC1 F185
LC1 F225
LC1 F265
LC1 F330
LC1 F400
LC1 F500
LC1 F630
LC1 F800

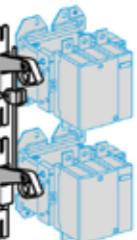
Reversers assembled using 2 contactors of different ratings, see page 5/120

Mechanical interlocks

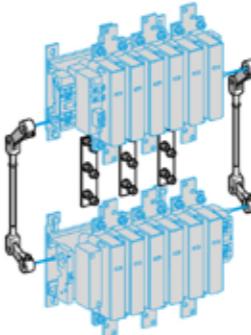
LA9 FF4F
LA9 FJ4J
LA9 FK4K
LA9 FL4L



LA9 FH4H
LA9 FJ4J
LA9 FK4K
LA9 FL4L



LC1 F780



(1) For 4-pole changeover contactor pairs, see pages 5/120 and 5/121

(2) Complete references: see page 5/119.

References

TeSys contactors

TeSys F reversing contactors and changeover pairs
Components for assembling 3-pole reversing contactors and changeover contactor pairs, for customer assembly
Control circuit: a.c. or d.c.

Reversers assembled using 2 contactors of identical rating

Contactor type (1)	Set of power connections Reference	Weight kg	Mechanical interlock Kit reference	Weight kg
For assembly of 3-pole reversing contactors for motor control				
Horizontally mounted				
LC1 F115	LA9 FF976	0.600	LA9 FF970	0.060
LC1 F150	LA9 F15076	0.600	LA9 FF970	0.060
LC1 F185	LA9 FG976	0.780	LA9 FG970	0.060
LC1 F225	LA9 F22576	1.500	LA9 FG970	0.060
LC1 F265	LA9 FH976	1.500	LA9 FJ970	0.140
LC1 F330	LA9 FJ976	2.100	LA9 FJ970	0.140
LC1 F400	LA9 FJ976	2.100	LA9 FJ970	0.140
LC1 F500	LA9 FK976	2.350	LA9 FJ970	0.140
LC1 F630 or F800	LA9 FL976	3.800	LA9 FL970	0.150
Vertically mounted				
LC1 F115 or F150 (2)	—	LA9 FF4F	0.345	
LC1 F185 (2)	—	LA9 FG4G	0.350	
LC1 F225 (2)	—	LA9 FG4G	0.350	
LC1 F265 or F330 (2)	—	LA9 FH4H	1.060	
LC1 F400 (2)	—	LA9 FJ4J	1.200	
LC1 F500 (2)	—	LA9 FK4K	1.200	
LC1 F630 or F800 (2)	—	LA9 FL4L	1.220	
LC1 F780 (3)	—	LA9 FX970 (3)	6.100	
For assembly of 3-pole changeover contactor pairs (4)				
Horizontally mounted				
LC1 F115	LA9 FF982	0.460	LA9 FF970	0.060
LC1 F150	LA9 F15082	0.460	LA9 FF970	0.060
LC1 F185	LA9 FG982	0.610	LA9 FG970	0.060
LC1 F225	LA9 F22582	1.200	LA9 FG970	0.060
LC1 F265	LA9 FH982	1.200	LA9 FJ970	0.140
LC1 F330	LA9 FJ982	1.800	LA9 FJ970	0.140
LC1 F400	LA9 FJ982	1.800	LA9 FJ970	0.140
LC1 F500	LA9 FK982	2.300	LA9 FJ970	0.140
LC1 F630 or F800	LA9 FL982	3.400	LA9 FL970	0.150
Vertically mounted				
LC1 F115 or F150 (2)	—	LA9 FF4F	0.345	
LC1 F185 (2)	—	LA9 FG4G	0.350	
LC1 F225 (2)	—	LA9 FG4G	0.350	
LC1 F265 or F330 (2)	—	LA9 FH4H	1.060	
LC1 F400 (2)	—	LA9 FJ4J	1.200	
LC1 F500 (2)	—	LA9 FK4K	1.200	
LC1 F630 or F800 (2)	—	LA9 FL4L	1.220	
LC1 F780 (3)	—	LA9 FX970 (3)	7.800	

(1) To order the 2 contactors: see pages 5/114 and 5/115. For the 2 auxiliary contact blocks

LAD N°1 required to obtain electrical interlocking between the 2 contactors, see page 5/123

For accessories, see pages 5/124 to 5/127

(2) With the exception of contactors LC1 F780, all power connections are to be made by the customer.

(3) Double mechanical interlock mechanism with 2 interlock connecting rods and 3 power connecting links.

(4) For assembly of 4-pole changeover contactor pairs, see pages 5/120 and 5/121

5

Combinations

TeSys contactors

TeSys F changeover contactor pairs

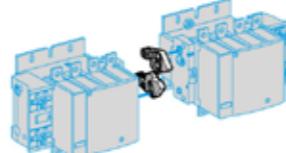
Components for assembling 3 and 4-pole changeover contactor pairs, for customer assembly

Horizontally mounted

Contactor pairs assembled using 2 contactors of identical rating.
type :
LC1 F1154
LC1 F1504
LC1 F1854
LC1 F2254
LC1 F2654
LC1 F3304
LC1 F4004
LC1 F5004
LC1 F6304

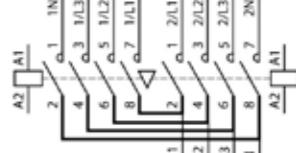
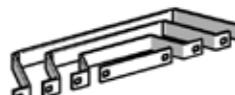
Mechanical interlocks

LA9 F970



Sets of power connections

4-pole changeover contactor pairs (1)
LA9 F***77

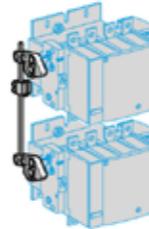


Vertically mounted

Contactor pairs assembled using 2 contactors of identical rating.
type :
LC1 F1154
LC1 F1504
LC1 F1854
LC1 F2254
LC1 F2654
LC1 F3304
LC1 F4004
LC1 F5004
LC1 F6304

Mechanical interlocks

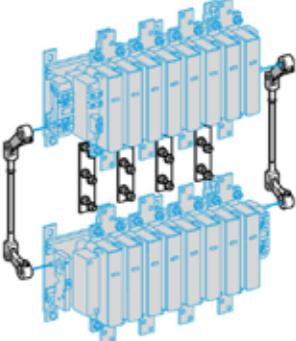
Assembly A
LA9 FF4F
LA9 FG4G



Assembly B
LA9 FH4H
LA9 FJ4J
LA9 FK4K
LA9 FL4L



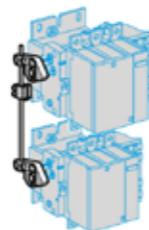
Assembly C
LA9 FX971



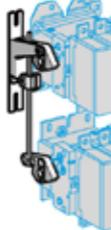
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Contactor pairs assembled using 2 contactors of different ratings.
type :
LC1 F115 or F1154
LC1 F150 or F1504
LC1 F185 or F1854
LC1 F225 or F2254
LC1 F265 or F2654
LC1 F330 or F3304
LC1 F400 or F4004
LC1 F500 or F5004
LC1 F630 or F6304
LC1 F800

Assembly A
LA9 FG4F



Assembly B
LA9 FH4F, LA9 FH4G
LA9 FJ4F, LA9 FJ4G
LA9 FK4F, LA9 FK4G
LA9 FL4F, LA9 FL4G



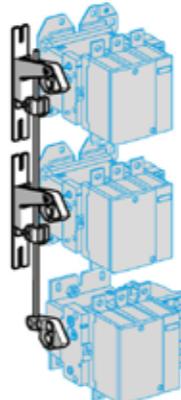
Assembly C
LA9 FJ4H
LA9 FK4H, LA9 FK4J
LA9 FL4H, LA9 FL4J and LA9 FL4K



Contactor pairs assembled using 3 contactors of identical or different ratings, type :

LC1 F115 or F1154
LC1 F150 or F1504
LC1 F185 or F1854
LC1 F225 or F2254
LC1 F265 or F2654
LC1 F330 or F3304
LC1 F400 or F4004
LC1 F500 or F5004
LC1 F630 or F6304
LC1 F800

LA9 F***4• : see pages 5/128 and 5/129



Important: the contactor ratings must be in decreasing size from top to bottom.

(1) For 3-pole changeover contactor pairs, see pages 5/118 and 5/119.

TeSys contactors

TeSys F changeover contactor pairs

Components for assembling 3 and 4-pole changeover contactor pairs, for customer assembly
Control circuit: a.c. or d.c.

Contactor pairs assembled using 2 contactors of identical rating

For assembly of 4-pole changeover contactor pairs (1)

Contactor type (2)	Set of power connections Reference	Weight kg	Mechanical interlock Kit reference	Weight kg
Horizontally mounted				
LC1 F1154	LA9 FF977	0.460	LA9 FF970	0.060
LC1 F1504	LA9 F15077	0.460	LA9 FF970	0.060
LC1 F1854	LA9 FG977	0.610	LA9 FG970	0.060
LC1 F2254	LA9 F22577	1.200	LA9 FG970	0.060
LC1 F2654	LA9 FH977	1.200	LA9 FJ970	0.140
LC1 F3304	LA9 FJ977	1.800	LA9 FJ970	0.140
LC1 F4004	LA9 FJ977	1.800	LA9 FJ970	0.140
LC1 F5004	LA9 FK977	2.300	LA9 FJ970	0.140
LC1 F6304	LA9 FL977	3.400	LA9 FL970	0.150
Vertically mounted				
LC1 F1154 or F1504 (3)	—	LA9 FF4F	0.345	
LC1 F1854 (3)	—	LA9 FG4G	0.350	
LC1 F2254 (3)	—	LA9 FG4G	0.350	
LC1 F2654 or F3304 (3)	—	LA9 FH4H	1.060	
LC1 F4004 (3)	—	LA9 FJ4J	1.200	
LC1 F5004 (3)	—	LA9 FK4K	1.200	
LC1 F6304 (3)	—	LA9 FL4L	1.220	
LC1 F7804 (4)	—	LA9 FX971 (4)	7.800	

Contactor pairs assembled using 2 contactors of different ratings

For assembly of 3 or 4-pole changeover contactor pairs

Contactor type (1)	Mechanical interlock		
At bottom	At top	Kit reference	Weight kg
Vertically mounted			
LC1 F115 or F1154 or LC1 F150 or F1504	LC1 F185 or F1854	LA9 FG4F	0.350
	LC1 F225 or F2254	LA9 FG4F	0.350
	LC1 F265 or F2654	LA9 FH4F	0.870
	LC1 F330 or F3304	LA9 FH4F	0.870
	LC1 F400 or F4004	LA9 FJ4F	0.930
	LC1 F500 or F5004	LA9 FK4F	0.940
	LC1 F630, F6304 or F800	LA9 FL4F	0.940
LC1 F185 or F1854 or LC1 F225 or F2254	LC1 F265 or F2654	LA9 FH4G	0.860
	LC1 F330 or F3304	LA9 FH4G	0.860
	LC1 F400 or F4004	LA9 FJ4G	0.940
	LC1 F500 or F5004	LA9 FK4G	0.940
	LC1 F630, F6304 or F800	LA9 FL4G	0.950
LC1 F265 or F2654 or LC1 F330 or F3304	LC1 F400 or F4004	LA9 FJ4H	1.130
	LC1 F500 or F5004	LA9 FK4H	1.130
	LC1 F630, F6304 or F800	LA9 FL4H	1.140
LC1 F400 or F4004	LC1 F500 or F5004	LA9 FJ4J	1.200
	LC1 F630 or F6304 or F800	LA9 FL4J	1.210
LC1 F500 or F5004	LC1 F630 or F6304 or F800	LA9 FL4K	1.210

For assembly of reversers using 3 contactors, vertically mounted

See pages 5/128 and 5/129.

(1) For assembly of 3-pole changeover contactor pairs, see pages 5/118 and 5/120

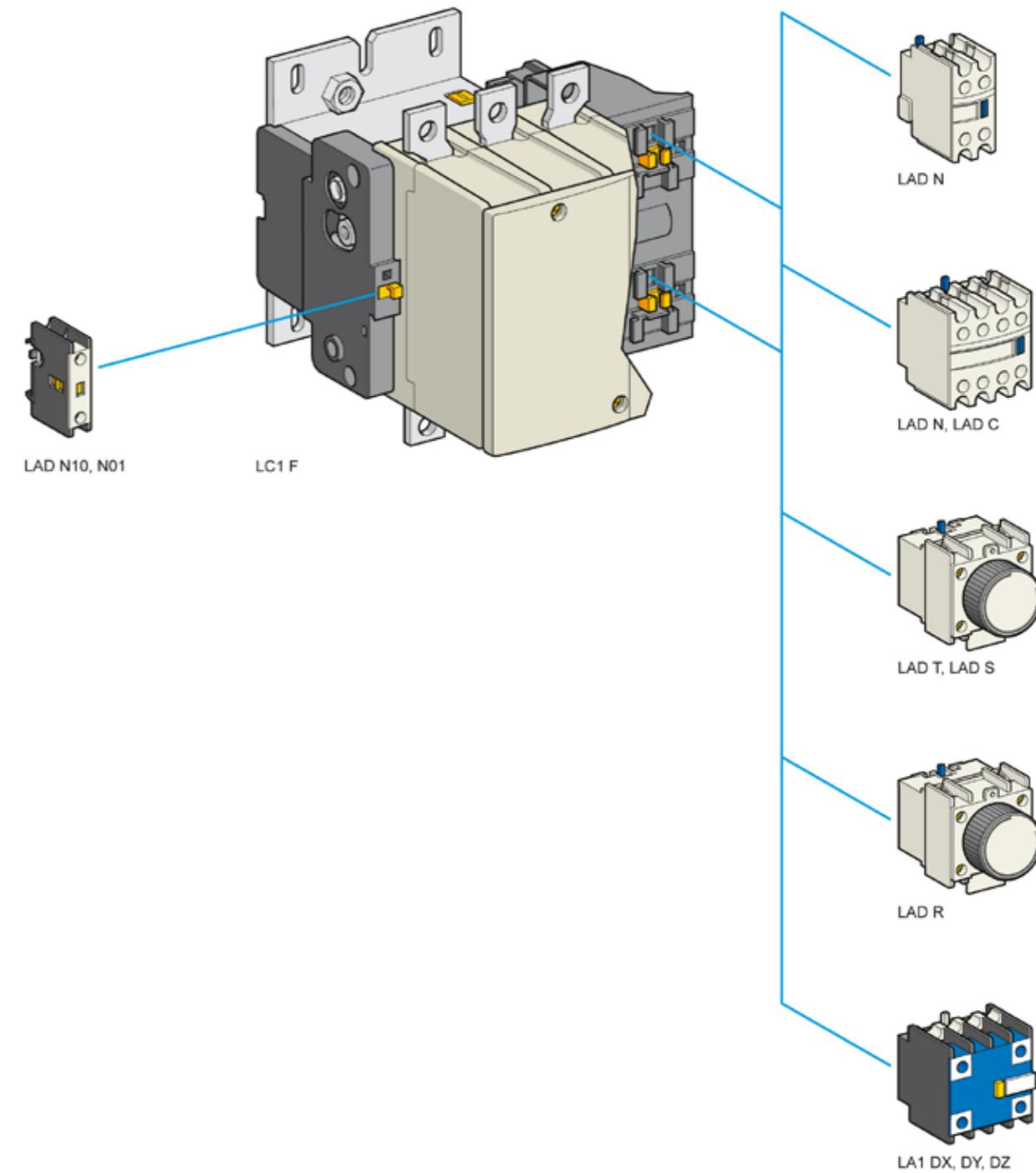
(2) To order the 2 contactors, see pages 5/114 and 5/115. For the 2 auxiliary contact blocks LAD N•1 required to obtain electrical interlocking between the 2 contactors, see page 5/123. For accessories, see pages 5/124 to 5/127

(3) All power connections are to be made by the customer.

(4) Double mechanical interlock mechanism with 2 interlock connecting rods and 4 power connecting links.

5

5



TeSys contactorsTeSys F contactors
Auxiliary contact blocks**Instantaneous auxiliary contact blocks**

For use in normal operating environments

Number of contacts	Maximum number of blocks per contactor	Composition	Reference	Weight kg
1	1	- - 1 -	LAD N10	0.020
		- - - 1	LAD N01	0.020
2	2	- - 1 1	LAD N11	0.030
		- - 2 -	LAD N20	0.030
		- - - 2	LAD N02	0.030
4	2	- - 2 2	LAD N22	0.050
		- - 1 3	LAD N13	0.050
		- - 4 -	LAD N40	0.050
		- - - 4	LAD N04	0.050
		- - 3 1	LAD N31	0.050
		- - - 2 (1)	LAD C22	0.050

With terminal referencing conforming to EN 50012

2	2	- - 1 1	LAD N11P	0.030
		- - 1 1	LAD N11G	0.030
4	2	- - 2 2	LAD N22P	0.050
		- - 2 2	LAD N22G	0.050

Instantaneous auxiliary contact blocks for connection by lugs

This type of connection is not possible for blocks with 1 contact or blocks with dust and damp protected contacts. For all other instantaneous auxiliary contact blocks, add the figure 6 to the end of the references selected above. Example: LAD N11 becomes LAD N116.

Instantaneous auxiliary contact blocks with dust and damp protected contacts

Recommended for use in particularly harsh industrial environments

Number of contacts	Maximum number of blocks per contactor	Composition	Reference	Weight kg
2	2	2 - - -	LA1 DX20	0.040
		2 2 (2) - -	LA1 DY20	0.040
4	2	2 - 2 -	LA1 DZ40	0.050
		2 - 1 1	LA1 DZ31	0.050

Time delay auxiliary contact blocks

Number of contacts	Maximum number of blocks per contactor	Time delay	Reference	Weight kg
1 N/O	2	On-delay 0.1...3 (3)	LAD T0	0.060
+ 1 N/C		0.1...30	LAD T2	0.060
		10...180	LAD T4	0.060
		1...30 (4)	LAD S2	0.060
		Off-delay 0.1...3 (3)	LAD R0	0.060
		0.1...30	LAD R2	0.060
		10...180	LAD R4	0.060

Interface for PLC control

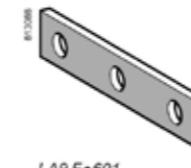
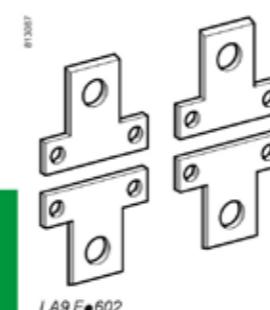
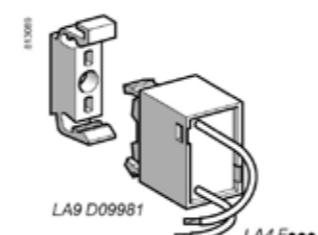
Type of I/O	Reference	Weight kg
Inputs: ... 24 V - 100 mA Outputs: ~ 480 V - 25 A	LA4 FSRE ▲	-

(1) Including 1 N/O + 1 N/C make before break

(2) Device fitted with 4 earth screen continuity terminals.

(3) With extended scale from 0.1 to 0.6 s.

(4) With switching time of 40 ms ± 15 ms between opening of the N/C contact and closing of the N/O contact.

▲ Available 2nd half 2009.**TeSys contactors**TeSys F contactors
Suppressor blocks**Suppressor blocks****RC circuits (resistor-capacitor)**

- Effective protection for circuits highly sensitive to "high frequency" interference. For use only in cases where the voltage is virtually sinusoidal, i.e. less than 5% total harmonic distortion.
- Voltage limited to 3 Uc max. and oscillating frequency limited to 400 Hz max.
- Slight increase in drop-out time (1.1 to 1.3 times the normal time).

Mounting	Uc	Reference	Weight kg
Clip-on mounting on all ratings	~	24...48 V LA4 FRCE	0.040
		50...110 V LA4 FRCF	0.040
		127...240 V LA4 FRCP	0.040
		265...415 V LA4 FRCV	0.040

Suppressor block bracket

LA9 D09981 0.010

Varistors (peak limiting)

- Protection provided by limiting the transient voltage to 2 Uc max.
- Maximum reduction of transient voltage peaks.

Clip-on mounting on all ratings	~ or ...	24...48 V LA4 FVE	0.040
		50...110 V LA4 FVF	0.040
		127...240 V LA4 FVP	0.040
		265...415 V LA4 FVV	0.040

Diodes

- No overvoltage or oscillating frequencies.
- Increase in drop-out time (3 to 4 times the normal time).
- Polarised component.

Clip-on mounting on all ratings	~	24...48 V LA4 FDE	0.040
		55...110 V LA4 FDF	0.040
		125...250 V LA4 FDP	0.040
		280...440 V LA4 FDV	0.040

Bidirectional peak limiting diodes (transit)

Clip-on mounting on all ratings	~ or ...	24...48 V LA4 FTE	0.040
		50...110 V LA4 FTF	0.040
		127...240 V LA4 FTP	0.040
		265...415 V LA4 FTW	0.040

Connection accessories

For use on 4-pole contactors	Set of 4 links	Weight kg
	Set reference	

Links for parallel connection of poles (in pairs)

LC1 F1154	LA9 FF602	0.200
LC1 F1504, F1854	LA9 FG602	0.350
LC1 F2254, F2654, F3304, F4004	LA9 FH602	1.000
LC1 F5004	LA9 FK602	1.750
LC1 F6304	LA9 FL602	3.000

Links for "star" connection of 3 poles

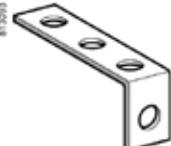
LC1 F115	LA9 FF601	0.035
LC1 F150, F185	LA9 FG601	0.050
LC1 F225, F265, F330, F400	LA9 FH601	0.120
LC1 F500	LA9 FK601	0.180
LC1 F630, F800	LA9 FL601	0.550

Control circuit voltage take-off from power terminals

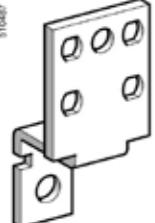
For use with contactors	Mounted on bolt size	Sold in lots of	Unit reference	Weight kg
LC1 F115	M6	10	DZ3 FA3	0.004
LC1 F150, F185				



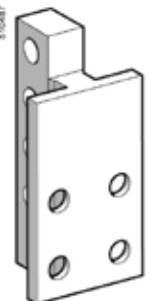
LA9 FF981



LA9 FG979



LA9 FK980



LA9 F2100

TeSys contactors

TeSys F contactors
Accessories

Right-angled connectors

For contactors or thermal overload relays

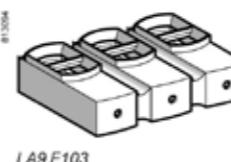
For use with	Contactors	Thermal overload relays (1)	With connector plates		Set of 3 connectors	
			Width	Type	Set reference	Weight kg
LC1 F115	LR9 F5•67, LR9 F67		15 mm	Rear	LA9 FF981	0.060
				Side	LA9 FF979	0.240
				Large surface area	LA9 FF980	0.150
LC1 F150, F185	LR9 F5•69, F5•71, LR9 F69, F71		20 mm	Rear	LA9 FG981	0.080
				Side	LA9 FG979	0.350
				Large surface area	LA9 FG980	0.200
LC1 F225, F265, F330, F400	LR9 F7•75, LR9 F75		25 mm	Rear	LA9 FJ981	0.430
				Side	LA9 FJ979	0.750
				Large surface area	LA9 FJ980	0.490
LC1 F500	LR9 F7•79, F7•81, LR9 F79, F81		30 mm	Rear	LA9 FK981	0.480
				Side	LA9 FK979	0.920
				Large surface area	LA9 FK980	0.800
LC1 F630, F800	LR9 F7•81, LR9 F81		40 mm	Rear	LA9 FL981	1.210
				Side	LA9 FL979	2.570
				Large surface area	LA9 FL980	3.190
For use with	Contactors	Thermal overload relays (1)	Width	With connector plates	Set of 6 connectors	
				Type	Set reference	Weight kg
LC1 F1700, F2100	–		60 mm	Rear	LA9 F2100	9.550

Connection accessories

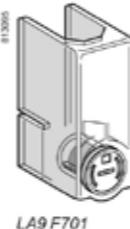
For reversing contactors or "star-delta" contactors combined with a thermal overload relay

For use with	Contactors	Thermal overload relays (1)	Width of connector plates		Set of 3 busbars	
			Set reference	Weight kg	Set reference	Weight kg
LC1 F115	LR9 F5•57, F5•63 LR9 F5•67, F5•69 LR9 F69, F71		15 mm		LA7 F401	0.110
LC1 F150 and F185	LR9 F5•57, F5•63		20 mm		LA7 F402	0.110
LC1 F185	LR9 F5•71, LR9 F71		25 mm		LA7 F407	0.160
LC1 F225 and F265	LR9 F5•71, LR9 F71		25 mm		LA7 F403	0.160
	LR9 F7•75, F7•79 LR9 F75, F79		25 mm		LA7 F404	0.160
LC1 F330 and F400	LR9 F7•75, F7•79 LR9 F75, F79		25 mm		LA7 F404	0.160
LC1 F400	LR9 F7•81, LR9 F81		25 mm		LA7 F404	0.160
LC1 F500	LR9 F7•75, F7•79 LR9 F7•81 LR9 F75, F79		30 mm		LA7 F405	0.270
LC1 F630, F800	LR9 F7•81, LR9 F81		40 mm		LA7 F406	0.600

(1) For protection relays class 10, replace the • with a 3 and for class 20, replace the • with a 5.



LA9 F103



LA9 F701

TeSys contactors

TeSys F contactors
Accessories

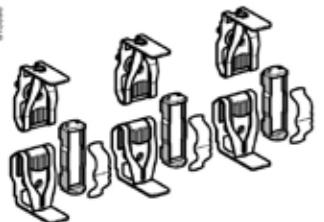
Insulated terminal blocks

For use on 3-pole contactors	Connection	Tightening tool	Set of 2 blocks	Weight kg
			Set reference	
LC1 F115, F150, F185	1 x 16...150 mm ² or 2 x 16...95 mm ²	4 mm hexagonal socket key	LA9 F103	0.560

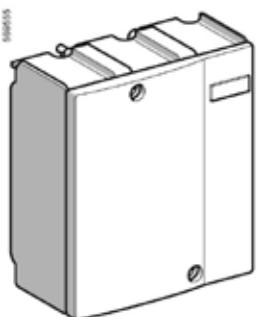
Power terminal protection shrouds

For use on 2, 3 and 4-pole contactors	Number of shrouds per set	Set reference	Weight kg
LC1 F115	6	LA9 F701	0.250
LC1 F150, F185	6	LA9 F702	0.250
LC1 F225, F265, F330, F400 and F4002 F500 and F5002	6	LA9 F703	0.250
LC1 F630, F6302 and F800	6	LA9 F704	0.250
LC1 F1154	8	LA9 F706	0.300
LC1 F1504 and F1854	8	LA9 F707	0.300
LC1 F2254, F2654, F3304, F4004, F5004	8	LA9 F708	0.300
LC1 F6304	8	LA9 F709	0.300

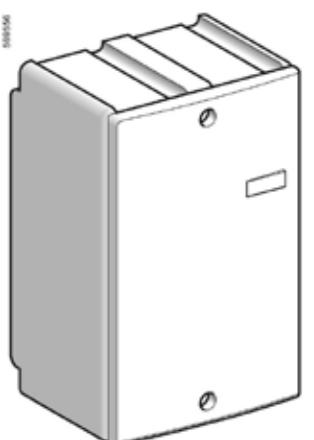
References



LA5 FG431



LA5 F40050



LA5 F210050

TeSys contactors

TeSys F contactors

Spare parts

Sets of contacts

Per pole: 2 fixed contacts, 1 moving contact, 2 deflectors, 1 back-plate, clamping screws and washers.

For contactor	Type	Replacement reference	Weight kg
2-pole	LC1 F4002	2 poles LA5 F400802	1.350
	LC1 F5002	2 poles LA5 F500802	1.950
	LC1 F6302	2 poles LA5 F630802	4.700
	LC1 F6302S011	2 poles LA5 F630802S011	4.800
3-pole	LC1 F115, F150	3 poles LA5 FF431	0.270
	LC1 F185, F225	3 poles LA5 FG431	0.350
	LC1 F265	3 poles LA5 FH431	0.660
	LC1 F330, F400	3 poles LA5 F400803	2.000
	LC1 F500	3 poles LA5 F500803	2.950
	LC1 F630	3 poles LA5 F630803	6.100
	LC1 F780	1 pole LA5 F780801 (1)	4.700
		3 poles LA5 F780803	13.200
	LC1 F800	3 poles LA5 F800803	6.100
	LC1 F6303S011	3 poles LA5 F630803S011	6.200
4-pole	LC1 F1504, F1154	4 poles LA5 FF441	0.360
	LC1 F1854, F2254	4 poles LA5 FG441	0.465
	LC1 F2654	4 poles LA5 FH441	0.880
	LC1 F3304, F4004	4 poles LA5 F400804	2.700
	LC1 F5004	4 poles LA5 F500804	3.900
	LC1 F6304	4 poles LA5 F630804	8.150
	LC1 F7804	1 pole LA5 F780801 (1)	4.700
		4 poles LA5 F780804	17.300
	LC1 F6304S011	4 poles LA5 F630804S011	8.400

Arc chambers

For contactor	Type	Replacement reference	Weight kg
2-pole	LC1 F4002	2 poles LA5 F400250	0.870
	LC1 F5002	2 poles LA5 F500250	1.250
	LC1 F6302	2 poles LA5 F630250	2.100
	LC1 F6302S011	2 poles LA5 F630250	2.100
3-pole	LC1 F115	3 poles LA5 F11550	0.490
	LC1 F150	3 poles LA5 F15050	0.490
	LC1 F185	3 poles LA5 F18550	0.670
	LC1 F225	3 poles LA5 F22550	0.670
	LC1 F265	3 poles LA5 F26550	0.920
	LC1 F330	3 poles LA5 F33050	1.300
	LC1 F400	3 poles LA5 F40050	1.300
	LC1 F500	3 poles LA5 F50050	1.850
	LC1 F630	3 poles LA5 F63050	3.150
	LC1 F780	1 pole LA5 F780150 (1)	2.100
	LC1 F800	3 poles LA5 F80050	3.150
	LC1 F6303S011	3 poles LA5 F63050	3.150
	LC1 F1700	6 poles LA5 F170050 (2)	3.750
	LC1 F2100	6 poles LA5 F210050 (2)	3.750
4-pole	LC1 F1154	4 poles LA5 F115450	0.660
	LC1 F1504	4 poles LA5 F150450	0.660
	LC1 F1854	4 poles LA5 F185450	0.910
	LC1 F2254	4 poles LA5 F225450	1.000
	LC1 F2654	4 poles LA5 F265450	1.220
	LC1 F3304	4 poles LA5 F330450	1.740
	LC1 F4004	4 poles LA5 F400450 (3)	1.740
	LC1 F5004	4 poles LA5 F500450 (3)	2.500
	LC1 F6304	4 poles LA5 F630450 (4)	4.200
	LC1 F7804	1 pole LA5 F780150 (1)	2.100
	LC1 F6304S011	4 poles LA5 F630450	4.200

(1) Comprising 2 identical items per pole.

(2) Comprising three 2-pole arc chambers.

(3) Comprising two 2-pole arc chambers.

(4) Comprising single-pole arc chambers.

References

TeSys contactors

TeSys F contactors

Accessories for assembly of reversing contactors and changeover contactor pairs using 3 contactors, vertically mounted - for customer assembly

Closing of one of the 3 contactors prevents closing of the other 2.

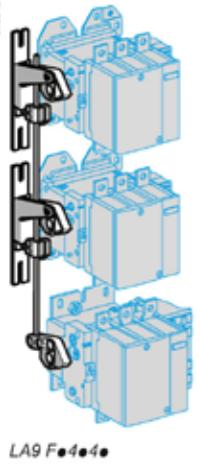
Mechanical interlock kits

Contactor type (1)	Mechanical interlock (2)		
Top	Middle	Bottom	Kit reference (3)
LC1 F115, F150, F1154 or F1504	LC1 F115, F150, F1154 or F1504	LC1 F115, F150, F1154 or F1504	LA9 FF4F4F 0.554
LC1 F185, F225, F1854 or F2254	LC1 F115, F150, F1154 or F1504	LC1 F115, F150, F1154 or F1504	LA9 FG4F4F 0.559
LC1 F185, F225, F1854 or F2254	LC1 F115, F150, F1154 or F1504	LC1 F115, F150, F1154 or F1504	LA9 FG4G4F 0.559
	LC1 F185, F225, F1854 or F2254	LC1 F185, F225, F1854 or F2254	LA9 FG4G4G 0.562
LC1 F265, F330, F2654 or F3304	LC1 F115, F150, F1154 or F1504	LC1 F115, F150, F1154 or F1504	LA9 FH4F4F 1.350
	LC1 F185, F225, F1854 or F2254	LC1 F185, F225, F1854 or F2254	LA9 FH4G4F 1.375
	LC1 F185, F225, F1854 or F2254	LC1 F185, F225, F1854 or F2254	LA9 FH4G4G 1.375
LC1 F285, F330, F2854 or F3304	LC1 F115, F150, F1154 or F1504	LC1 F115, F150, F1154 or F1504	LA9 FH4H4F 1.524
	LC1 F185, F225, F1854 or F2254	LC1 F185, F225, F1854 or F2254	LA9 FH4H4G 1.527
	LC1 F285, F330, F2854 or F3304	LC1 F285, F330, F2854 or F3304	LA9 FH4H4H 1.684
LC1 F400, F4002 or F4004	LC1 F115, F150, F1154 or F1504	LC1 F115, F150, F1154 or F1504	LA9 FJ4F4F 1.421
	LC1 F185, F225, F1854 or F2254	LC1 F185, F225, F1854 or F2254	LA9 FJ4G4F 1.424
	LC1 F265, F330, F2654 or F3304	LC1 F265, F330, F2654 or F3304	LA9 FJ4G4G 1.428
LC1 F265, F330, F2654 or F3304	LC1 F115, F150, F1154 or F1504	LC1 F115, F150, F1154 or F1504	LA9 FJ4H4F 1.595
	LC1 F185, F225, F1854 or F2254	LC1 F185, F225, F1854 or F2254	LA9 FJ4H4G 1.598
	LC1 F265, F330, F2654 or F3304	LC1 F265, F330, F2654 or F3304	LA9 FJ4H4H 1.755
LC1 F400, F4002 or F4004	LC1 F115, F150, F1154 or F1504	LC1 F115, F150, F1154 or F1504	LA9 FJ4J4F 1.666
	LC1 F185, F225, F1854 or F2254	LC1 F185, F225, F1854 or F2254	LA9 FJ4J4G 1.669
	LC1 F265, F330, F2654 or F3304	LC1 F265, F330, F2654 or F3304	LA9 FJ4J4H 1.829
LC1 F500, F5002 or F5004	LC1 F115, F150, F1154 or F1504 (continued on page 5/129)	LC1 F115, F150, F1154 or F1504 (continued on page 5/129)	LA9 FK4F4F 1.421
	LC1 F185, F225, F1854 or F2254	LC1 F185, F225, F1854 or F2254	LA9 FK4G4F 1.424
	LC1 F265, F330, F2654 or F3304	LC1 F265, F330, F2654 or F3304	LA9 FK4G4G 1.428
LC1 F265, F330, F2654 or F3304	LC1 F115, F150, F1154 or F1504	LC1 F115, F150, F1154 or F1504	LA9 FK4H4F 1.595
	LC1 F185, F225, F1854 or F2254	LC1 F185, F225, F1854 or F2254	LA9 FK4H4G 1.598
	LC1 F265, F330, F2654 or F3304	LC1 F265, F330, F2654 or F3304	LA9 FK4H4H 1.755
LC1 F400, F4002 or F4004	LC1 F115, F150, F1154 or F1504	LC1 F115, F150, F1154 or F1504	LA9 FK4J4F 1.666
	LC1 F185, F225, F1854 or F2254	LC1 F185, F225, F1854 or F2254	LA9 FK4J4G 1.669
	LC1 F265, F330, F2654 or F3304	LC1 F265, F330, F2654 or F3304	LA9 FK4J4H 1.829
LC1 F500, F5002 or F5004	LC1 F115, F150, F1154 or F1504	LC1 F115, F150, F1154 or F1504	LA9 FK4K4F 1.666

(1) To order the 3 contactors, see pages 5/114 and 5/115. For auxiliary contact blocks LAD N02 used for electrical locking, see page 5/123. For accessories, see pages 5/124 to 5/127.

(2) Minimum distances between contactors, see page 5/129.

(3) The kit contains the lever arms, the 2 x Ø 8 mm rods and all parts required for assembly.



LA9 FK4K4G

TeSys contactors

TeSys F contactors

Accessories for assembly of reversing contactors and changeover contactor pairs using 3 contactors, vertically mounted - for customer assembly

Mechanical interlock kits (continued)

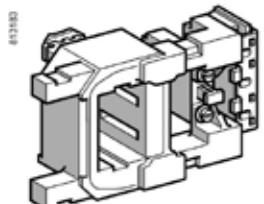
Contactor type (1)		Mechanical interlock (2)		
Top	Middle	Bottom	Kit reference (3)	Weight kg
LC1 F500, F5002 or F5004 (continued)	LC1 F500, F5002 or F5004	LC1 F185, F225, F1854 or F2254	LA9 FK4K4G	1.669
		LC1 F265, F330, F2654 or F3304	LA9 FK4K4H	1.825
		LC1 F400, F4002 or F4004	LA9 FK4K4J	1.896
		LC1-F500, F5002 or F5004	LA9 FK4K4K	1.896
LC1 F630, F800, F6302 or F6304	LC1 F115, F150, F1154 or F1504	LC1 F115, F150, F1154 or F1504	LA9 FL4F4F	1.428
		LC1 F185, F225, F1854 or F2254	LA9 FL4G4F	1.431
		LC1 F185, F225, F1854 or F2254	LA9 FL4G4G	1.436
		LC1 F265, F330, F2654 or F3304	LA9 FL4H4F	1.602
LC1 F265, F330, F2654 or F3304	LC1 F115, F150, F1154 or F1504	LC1 F115, F150, F1154 or F1504	LA9 FL4H4G	1.606
		LC1 F185, F225, F1854 or F2254	LA9 FL4H4H	1.751
		LC1 F265, F330, F2654 or F3304	LA9 FL4J4F	1.673
		LC1 F400, F4002 or F4004	LA9 FL4J4G	1.676
LC1-F500, F5002 or F5004	LC1 F115, F150, F1154 or F1504	LC1 F115, F150, F1154 or F1504	LA9 FK4K4F	1.666
		LC1 F185, F225, F1854 or F2254	LA9 FK4K4G	1.669
		LC1 F265, F330, F2654 or F3304	LA9 FK4K4H	1.825
		LC1 F400, F4002 or F4004	LA9 FK4K4J	1.896
LC1 F630, F800, F6302 or F6304	LC1 F115, F150, F1154 or F1504	LC1 F115, F150, F1154 or F1504	LA9 FL4L4F	1.680
		LC1 F185, F225, F1854 or F2254	LA9 FL4L4G	1.683
		LC1 F265, F330, F2654 or F3304	LA9 FL4L4H	1.910
		LC1 F400, F4002 or F4004	LA9 FL4L4J	1.896
LC1 F500, F5002 or F5004	LC1 F115, F150, F1154 or F1504	LC1 F115, F150, F1154 or F1504	LA9 FL4L4K	1.896
		LC1 F185, F225, F1854 or F2254	LA9 FL4L4L	1.920
		LC1 F265, F330, F2654 or F3304		
		LC1 F400, F4002 or F4004		
LC1 F630, F800, F6302 or F6304	LC1 F115, F150, F1154 or F1504	LC1 F115, F150, F1154 or F1504	LA9 FL4L4M	1.680
		LC1 F185, F225, F1854 or F2254	LA9 FL4L4N	1.683
		LC1 F265, F330, F2654 or F3304	LA9 FL4L4P	1.910
		LC1 F400, F4002 or F4004	LA9 FL4L4Q	1.896
LC1 F500, F5002 or F5004	LC1 F115, F150, F1154 or F1504	LC1 F115, F150, F1154 or F1504	LA9 FL4L4R	1.896
		LC1 F185, F225, F1854 or F2254	LA9 FL4L4S	1.920
		LC1 F265, F330, F2654 or F3304		
		LC1 F400, F4002 or F4004		
LC1 F630, F800, F6302 or F6304	LC1 F115, F150, F1154 or F1504	LC1 F115, F150, F1154 or F1504	LA9 FL4L4T	1.680
		LC1 F185, F225, F1854 or F2254	LA9 FL4L4U	1.683
		LC1 F265, F330, F2654 or F3304	LA9 FL4L4V	1.910
		LC1 F400, F4002 or F4004	LA9 FL4L4W	1.896
LC1 F500, F5002 or F5004	LC1 F115, F150, F1154 or F1504	LC1 F115, F150, F1154 or F1504	LA9 FL4L4X	1.896
		LC1 F185, F225, F1854 or F2254	LA9 FL4L4Y	1.920
		LC1 F265, F330, F2654 or F3304		
		LC1 F400, F4002 or F4004		
LC1 F630, F800, F6302 or F6304	LC1 F115, F150, F1154 or F1504	LC1 F115, F150, F1154 or F1504	LA9 FL4L4Z	1.680
		LC1 F185, F225, F1854 or F2254	LA9 FL4L4A	1.683
		LC1 F265, F330, F2654 or F3304	LA9 FL4L4B	1.910
		LC1 F400, F4002 or F4004	LA9 FL4L4C	1.896
LC1 F500, F5002 or F5004	LC1 F115, F150, F1154 or F1504	LC1 F115, F150, F1154 or F1504	LA9 FL4L4D	1.896
		LC1 F185, F225, F1854 or F2254	LA9 FL4L4E	1.920
		LC1 F265, F330, F2654 or F3304		
		LC1 F400, F4002 or F4004		
LC1 F630, F800, F6302 or F6304	LC1 F115, F150, F1154 or F1504	LC1 F115, F150, F1154 or F1504	LA9 FL4L4F	1.680
		LC1 F185, F225, F1854 or F2254	LA9 FL4L4G	1.683
		LC1 F265, F330, F2654 or F3304	LA9 FL4L4H	1.910
		LC1 F400, F4002 or F4004	LA9 FL4L4I	1.896
LC1 F500, F5002 or F5004	LC1 F115, F150, F1154 or F1504	LC1 F115, F150, F1154 or F1504	LA9 FL4L4J	1.896
		LC1 F185, F225, F1854 or F2254	LA9 FL4L4K	1.920
		LC1 F265, F330, F2654 or F3304		
		LC1 F400, F4002 or F4004		
LC1 F630, F800, F6302 or F6304	LC1 F115, F150, F1154 or F1504	LC1 F115, F150, F1154 or F1504	LA9 FL4L4L	1.680
		LC1 F185, F225, F1854 or F2254	LA9 FL4L4M	1.683
		LC1 F265, F330, F2654 or F3304	LA9 FL4L4N	1.910
		LC1 F400, F4002 or F4004	LA9 FL4L4O	1.896
LC1 F500, F5002 or F5004	LC1 F115, F150, F1154 or F1504	LC1 F115, F150, F1154 or F1504	LA9 FL4L4P	1.896
		LC1 F185, F225, F1854 or F2254	LA9 FL4L4Q	1.920
		LC1 F265, F330, F2654 or F3304		
		LC1 F400, F4002 or F4004		
LC1 F630, F800, F6302 or F6304	LC1 F115, F150, F1154 or F1504	LC1 F115, F150, F1154 or F1504	LA9 FL4L4R	1.680
		LC1 F185, F225, F1854 or F2254	LA9 FL4L4S	1.683
		LC1 F265, F330, F2654 or F3304	LA9 FL4L4T	1.910
		LC1 F400, F4002 or F4004	LA9 FL4L4U	1.896
LC1 F500, F5002 or F5004	LC1 F115, F150, F1154 or F1504	LC1 F115, F150, F1154 or F1504	LA9 FL4L4V	1.896
		LC1 F185, F225, F1854 or F2254	LA9 FL4L4W	1.920
		LC1 F265, F330, F2654 or F3304		
		LC1 F400, F4002 or F4004		
LC1 F630, F800, F6302 or F6304	LC1 F115, F150, F1154 or F1504	LC1 F115, F150, F1154 or F1504	LA9 FL4L4X	1.680
		LC1 F185, F225, F1854 or F2254	LA9 FL4L4Y	1.683
		LC1 F265, F330, F2654 or F3304	LA9 FL4L4Z	1.910
		LC1 F400, F4002 or F4004	LA9 FL4L4A	1.896
LC1 F500, F5002 or F5004	LC1 F115, F150, F1154 or F1504	LC1 F115, F150, F1154 or F1504	LA9 FL4L4B	1.896
		LC1 F185, F225, F1854 or F2254	LA9 FL4L4C	1.920
		LC1 F265, F330, F2654 or F3304		
		LC1 F400, F4002 or F4004		
LC1 F630, F800, F6302 or F6304	LC1 F115, F150, F1154 or F1504	LC1 F115, F150, F1154 or F1504	LA9 FL4L4D	1.680
		LC1 F185, F225, F1854 or F2254	LA9 FL4L4E	1.683
		LC1 F265, F330, F2654 or F3304	LA9 FL4L4F	1.910
		LC1 F400, F4002 or F4004	LA9 FL4L4G	1.896
LC1 F500, F5002 or F5004	LC1 F115, F150, F1154 or F1504	LC1 F115, F150, F1154 or F1504	LA9 FL4L4H	1.896
		LC1 F185, F225, F1854 or F2254	LA9 FL4L4I	1.920
		LC1 F265, F330, F2654 or F3304		
		LC1 F400, F4002 or F4004		

References

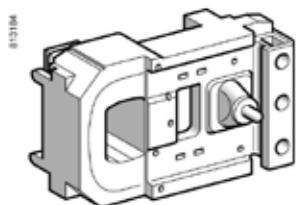
TeSys contactors

TeSys F contactors

a.c. 40 to 400 Hz supply coils



LX1 FH***2



LX1 FJ***

References

Low sealed consumption.
Operate on networks with harmonic numbers ≤ 7 .

Operating cycles/hour ($0 \leq 55^{\circ}\text{C}$): ≤ 2400 .

Control circuit voltage U_c	Average resistance at $20^{\circ}\text{C} \pm 10\%$ Inrush	Inductance of closed circuit	Voltage code	Reference	Weight kg	
For contactors LC1 F265 and LC1 F330						
24	0.8	20	(1)	B7	LX1 FH0242	0.750
48	2.96	67	(1)	E7	LX1 FH0482	0.750
110	18.7	440	(1)	F7	LX1 FH1102	0.750
115	18.7	440	(1)	FE7	LX1 FH1102	0.750
120/127	22.9	536	(1)	G7	LX1 FH1272	0.750
200/208	58.4	1366	(1)	L7	LX1 FH2002	0.750
220	70.6	1578	(1)	M7	LX1 FH2202	0.750
230	70.6	1578	(1)	P7	LX1 FH2202	0.750
240	87.94	1968	(1)	U7	LX1 FH2402	0.750
277	113	2444	(1)	W7	LX1 FH2772	0.750
380	217	4631	(1)	Q7	LX1 FH3802	0.750
400	217	4631	(1)	V7	LX1 FH3802	0.750
415	217	4631	(1)	N7	LX1-FH3802	0.750
440	265	6731	(1)	R7	LX1 FH4402	0.750
480/500	329	8543	(1)	S7	LX1 FH5002	0.750
600/660	296	10 245	(1)	X7	LX1 FH6002	0.750
1000	696	25 880	(1)	-	LX1 FH10002	0.750

Specifications

Average consumption at 20°C for 50 or 60 Hz and $\cos \varphi = 0.9$:

- inrush: 600...700 VA,

- sealed: 8...10 VA.

Heat dissipation: 8 W.

Operating time at U_c : closing = 40...65 ms, opening = 100...170 ms.

For contactor LC1 F400

48	1.6	29.5	0.18	E7	LX1 FJ048	1.000
110/120	9.8	230	1.35	F7	LX1 FJ110	1.000
115	9.8	230	1.35	FE7	LX1 FJ110	1.000
120/127	12.8	280	1.75	G7	LX1 FJ127	1.000
200/208	30	815	4.1	L7	LX1 FJ200	1.000
220	37	1030	5.1	M7	LX1 FJ220	1.000
230	37	1030	5.1	P7	LX1 FJ220	1.000
240	47.5	1320	6.4	U7	LX1 FJ240	1.000
265/277	61	1700	8.1	W7	LX1 FJ280	1.000
380	120	3310	15.8	Q7	LX1 FJ380	1.000
400	120	3310	15.8	V7	LX1 FJ380	1.000
415	145	4070	19.4	N7	LX1 FJ415	1.000
440	145	4070	19.4	R7	LX1 FJ415	1.000
500	190	4980	25.5	S7	LX1 FJ500	1.000
550/600	243	6310	27.4	X7	LX1 FJ600	1.000
1000	720	19 420	84.6	-	LX1 FJ1000	1.000

Specifications

Average consumption at 20°C for 50 or 60 Hz and $\cos \varphi = 0.9$:

- inrush: 1000...1150 VA,

- sealed: 12...18 VA.

Heat dissipation: 14 W.

Operating time at U_c : closing = 40...75 ms, opening = 100...170 ms.

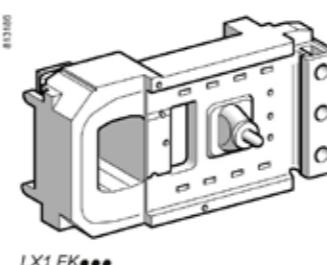
(1) Please consult your Regional Sales Office.

References (continued)

TeSys contactors

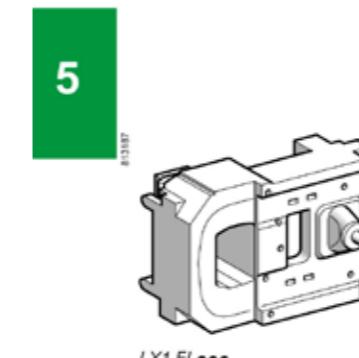
TeSys F contactors

a.c. 40 to 400 Hz supply coils



LX1 FK***

5



LX1 FL***

5

References (continued)

Low sealed consumption.
Operate on networks with harmonic numbers ≤ 7 .

Control circuit voltage U_c	Average resistance at $20^{\circ}\text{C} \pm 10\%$ Inrush	Inductance of closed circuit	Voltage code	Reference	Weight kg	
For contactor LC1 F500						
48	1.9	33.5	0.19	E7	LX1 FK048	1.150
110/120	9.55	260	1.25	F7	LX1 FK110	1.150
115	9.55	260	1.25	FE7	LX1 FK110	1.150
120/127	11.5	315	1.5	G7	LX1 FK127	1.150
200/208	29	735	3.75	L7	LX1 FK200	1.150
220	35.5	915	4.55	M7	LX1 FK220	1.150
230	35.5	915	4.55	P7	LX1 FK220	1.150
240	44.5	1160	5.75	U7	LX1 FK240	1.150
265/277	56.5	1490	7.3	W7	LX1 FK280	1.150
380	112	2980	14.7	Q7	LX1 FK380	1.150
400	112	2980	14.7	V7	LX1 FK380	1.150
415	143	3730	18.4	N7	LX1 FK415	1.150
440	143	3730	18.4	R7	LX1 FK415	1.150
500	172	4590	22.8	S7	LX1 FK500	1.150
550/600	232	5660	23.9	X7	LX1 FK600	1.150
1000	679	16 960	72	-	LX1 FK1000	1.150

Specifications

Average consumption at 20°C for 50 or 60 Hz, $\cos \varphi = 0.9$:

- inrush: 1050...1150 VA,

- sealed: 16...20 VA.

Operating cycles/hour ($0 \leq 55^{\circ}\text{C}$): ≤ 2400 .

Heat dissipation: 18 W.

Operating time at U_c : closing = 40...75 ms, opening = 100...170 ms.

For contactor LC1 F630

48	1.1	17.1	0.09	E7	LX1 FL048	1.500
110/120	6.45	165	1.85	F7	LX1 FL110	1.500
115	6.45	165	1.85	FE7	LX1 FL110	1.500
127	8.1	205	1.05	G7	LX1 FL127	1.500
200/208	20.5	605	2.65	L7	LX1 FL200	1.500
220	25.5	730	3.35	M7	LX1 FL220	1.500
230	25.5	730	3.35	P7	LX1 FL220	1.500
240	25.5	730	3.35	U7	LX1 FL220	1.500
265/277	31	900	4.1	W7	LX1 FL260	1.500
380	78	2360	10.5	Q7	LX1 FL380	1.500
400	78	2360	10.5	V7	LX1 FL380	1.500
415	96	2960	13	N7	LX1 FL415	1.500
440	96	2960	13	R7	LX1 FL415	1.500
500	120	3660	16.5	S7	LX1 FL500	1.500
550/6						

TeSys contactors

TeSys F contactors
a.c. 40 to 400 Hz supply coils

References (continued)

Low sealed consumption.
Operate on networks with harmonic numbers ≤ 7.

Control circuit voltage Uc	Average resistance at 20 °C ± 10 %	Inductance of closed circuit	Voltage code	Reference	Weight	
V	Ω	Ω	H		kg	
For contactor LC1 F780						
110/120	4.95 (2)	230 (2)	0.21	F7	LX1 FX110 (1)	3.000
115	4.95 (2)	230 (2)	0.21	FE7	LX1 FX110 (1)	3.000
127	6.1 (2)	280 (2)	0.26	G7	LX1 FX127 (1)	3.000
200/208	15.5 (2)	750 (2)	0.66	L7	LX1 FX200 (1)	3.000
220	19.5 (2)	920 (2)	0.82	M7	LX1 FX220 (1)	3.000
230	19.5 (2)	920 (2)	0.82	P7	LX1 FX220 (1)	3.000
240	19.5 (2)	920 (2)	0.82	U7	LX1 FX220 (1)	3.000
265/277	29.8 (2)	1330 (2)	1.25	W7	LX1 FX280 (1)	3.000
380	60.9 (2)	2780 (2)	2.3	Q7	LX1 FX380 (1)	3.000
400	60.9 (2)	2780 (2)	2.3	V7	LX1 FX380 (1)	3.000
415/480	74.3 (2)	3340 (2)	2.8	N7	LX1 FX415 (1)	3.000
440	74.3 (2)	3340 (2)	2.8	R7	LX1 FX415 (1)	3.000
500	92 (2)	4180 (2)	3.5	S7	LX1 FX500 (1)	3.000

Specifications

Average consumption at 20 °C for 50 or 60 Hz, cos φ = 0.9:
- inrush: 1900...2300 VA, sealed: 44...55 VA.
Operating cycles/hour (θ ≤ 55 °C): 600.
Heat dissipation: 2 x 22 W.
Operating time at Uc: closing = 40...80 ms, opening = 130...230 ms.

For contactor LC1 F800

Control circuit voltage Uc	Voltage code	Rectifier Reference (3)	Coil Reference	Weight
V				kg
110/127	FE7	DR5 TE4U	LX4 F8FW	1.650
220/240	P7	DR5 TE4U	LX4 F8MW	1.650
380/440	V7	DR5 TE4S	LX4 F8QW	1.650

Specifications

Operating cycles/hour (θ ≤ 55 °C): 600.
Average consumption at 20 °C for 50 or 60 Hz, cos φ = 0.8:
- inrush: 1700 VA, sealed: 12 VA.
Operating time at Uc: closing = 60...80 ms, opening = 160...180 ms.

Control circuit voltage Uc	Average resistance at 20 °C ± 10 %	Inductance of closed circuit	Voltage code	Reference	Weight
V	Ω	Ω	H		kg
For contactors LC1 F1700 and LC1 F2100					

110	5.92	106	0.72	F7	LX1 FK065 (4)	1.150
120	5.92	106	0.72	G7	LX1 FK070 (4)	1.150
220	9.55	260	1.25	M7	LX1 FK110 (4)	1.150
230	9.55	260	1.25	P7	LX1 FK110 (4)	1.150
240	11.5	315	1.50	U7	LX1 FK127 (4)	1.150
277	16.5	420	2.25	W7	LX1 FK140 (4)	1.150
380	29	735	3.75	Q7	LX1 FK200 (4)	1.150
400	29	735	3.75	V7	LX1 FK200 (4)	1.150
415	35.5	915	4.55	N7	LX1 FK220 (4)	1.150
440	35.5	915	4.55	R7	LX1 FK220 (4)	1.150
500	44.5	1160	5.75	S7	LX1 FK240 (4)	1.150

Specifications

Average consumption at 20 °C for 50 or 60 Hz, cos φ = 0.9:
- inrush: 1600...2400 VA, sealed: 29...37 VA.
Operating cycles/hour (θ ≤ 55 °C): 600.
Heat dissipation: 2 x 18 W.
Operating time at Uc: closing = 40...75 ms, opening = 100...170 ms.

(1) Reference of set of 2 identical coils, to be connected in series.

(2) Value for the 2 coils in series.

(3) Rectifier to be ordered separately: 0.100 kg.

(4) Order 2 coils and connect them in series.

TeSys contactors

TeSys F contactors
a.c. 40 to 400 Hz supply coils
for specific applications (1)

References

Low sealed consumption.
High tolerance to inrush voltage drops.

Immune to micro-breaks (mains supply or contact chain).
Operate on networks with harmonic numbers ≤ 7.

Control circuit voltage Uc	Average resistance at 20 °C ± 10 %	Inductance of closed circuit	Voltage code	Reference	Weight
V	Ω	Ω	H		kg
For contactors LC1 F115 and LC1 F150					

48	3.03	80.2	0.3	E7	LX9 FF048	0.430
110	14.8	579	2.08	F7	LX9 FF110	0.430
115	14.8	579	2.08	FE7	LX9 FF110	0.430
120/127	19	746	2.65	G7	LX9 FF127	0.430
208	45	1788	5.95	L7	LX9 FF200	0.430
220	59.4	2190	7.7	M7	LX9 FF220	0.430
230	59.4	2190	7.7	P7	LX9 FF220	0.430
240	73.5	2750	9.68	U7	LX9 FF240	0.430
380	173	6540	23	Q7	LX9 FF380	0.430
400	173	6540	23	V7	LX9 FF380	0.430
415	218	8460	30	N7	LX9 FF415	0.430
440	218	8460	30	R7	LX9 FF415	0.430
500	262	10 300	36	S7	LX9 FF500	0.430

Specifications

Average consumption at 20 °C: inrush: 690...855 VA, sealed: 6.6...8.1 VA.
Heat dissipation: 5.9...7.2 W.

Operating cycles/hour (θ ≤ 55 °C): < 2400.

Operating time at Uc: closing = 35 ms, opening = 130 ms.

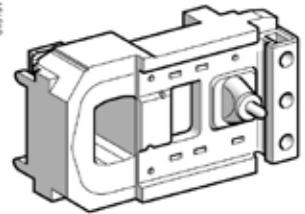
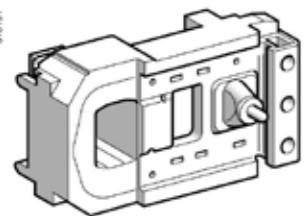
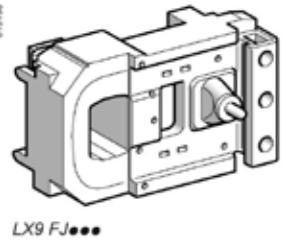
For contactors LC1 F185 and LC1 F225

48	2.2	60	0.23	E7	LX9 FG048	0.550
110	10.4	411	1.46	F7	LX9 FG110	0.550
115	10.4	411	1.46	FE7	LX9 FG110	0.550
120/127	13	520	1.85	G7	LX9 FG127	0.550
208	33	1339	4.9	L7	LX9 FG200	0.550
220	42.1	1680	5.84	M7	LX9 FG220	0.550
230	42.1	1680	5.84	P7	LX9 FG220	0.550
240	50.6	2060	7.22	U7	LX9 FG240	0.550
380	128	4730	16.4	Q7	LX9 FG380	0.550
400	128	4730	16.4	V7	LX9 FG380	0.550
415	157	5930	20.6	N7	LX9 FG415	0.550
440	157	5930	20.6	R7	LX9 FG415	0.550
500	194	7550	26.3	S7	LX9 FG500	0.550

Specifications

Average consumption at 20 °C: inrush: 950...1180 VA, sealed: 8.9...10.9 VA.

References (continued)



TeSys contactors

TeSys F contactors

a.c. 40 to 400 Hz supply coils
for specific applications

References (continued)

Coils with short operating times (at Uc):

- N/O: 60 ms,
- N/C: 50 ms (~ side), 20 ms (↔ side).

Coils with high operating rates ($i \leq 70^{\circ}\text{C}$):

- 3600 operating cycles/hour,
- 1800 for LC1 F630.

Coils with low inrush consumption.

Control circuit voltage Uc	Average resistance at 20 °C ± 10 %	Inductance of closed circuit	Rectifier Reference (1)	Coil Reference	Weight
V	Ω	Ω	H		kg
For contactor LC1 F400					
48	4.03	43	0.22	DR5 TF4V LX9 FJ917	0.970
110	25.7	246	1.3	DR5 TE4U LX9 FJ925	0.970
127	32.3	302	1.7	DR5 TE4U LX9 FJ926	0.970
220/230	99.5	919	5	DR5 TE4U LX9 FJ931	0.970
380/415	311	3011	15	DR5 TE4S LX9 FJ936	0.970
440	386	3690	19	DR5 TE4S LX9 FJ937	0.970
500	478	4380	23	DR5 TE4S LX9 FJ938	0.970

Specifications

Average consumption:

- inrush: 500 VA,

- sealed: 23 VA

Heat dissipation: 11.4...13.9 W.

For contactor LC1 F500

48	3.73	30.7	0.18	DR5 TF4V LX9 FK917	1.080
110	24	204	1.1	DR5 TE4U LX9 FK925	1.080
127	29.8	250	1.4	DR5 TE4U LX9 FK926	1.080
220/230	89.9	770	4	DR5 TE4U LX9 FK931	1.080
380/415	274	2075	12	DR5 TE4S LX9 FK936	1.080
440	361	3060	16	DR5 TE4S LX9 FK937	1.080
500	448	3750	19	DR5 TE4S LX9 FK938	1.080

Specifications

Average consumption:

- inrush: 500 VA,

- sealed: 23 VA

Heat dissipation: 15...18.3 W.

For contactor LC1 F630

48	2.81	20.8	0.17	DR5 TF4V LX9 FL917	1.450
110	13.5	114	0.77	DR5 TE4U LX9 FL924	1.450
127	20.8	167	1.2	DR5 TE4U LX9 FL926	1.450
220	52	425	2.9	DR5 TE4U LX9 FL930	1.450
220/240	64.5	518	3.6	DR5 TE4U LX9 FL931	1.450
380/400	163	1360	8.8	DR5 TE4S LX9 FL935	1.450
415/440	204	1670	11	DR5 TE4S LX9 FL936	1.450
500	312	2510	17	DR5 TE4S LX9 FL938	1.450

Specifications

Average consumption:

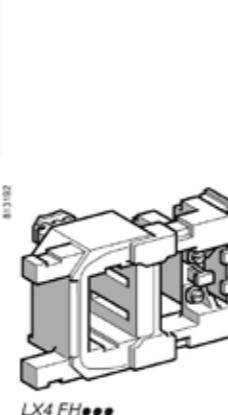
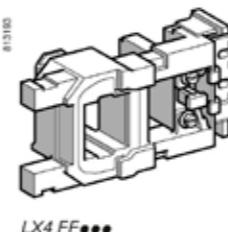
- inrush: 830 VA,

- sealed: 47 VA

Heat dissipation: 22.8...27.8 W.

(1) Rectifier to be ordered separately: 0.100 kg.

References



TeSys contactors

TeSys F contactors

d.c. supply coils

References

Low sealed consumption.
Operating cycles/hour ($0 \leq 55^{\circ}\text{C}$): ≤ 2400.

Control circuit voltage Uc	Average resistance at 20 °C ± 10 %	Inductance of closed circuit	Voltage of closed circuit	Reference code	Weight	
V	Ω	Ω	H		kg	
For contactors LC1 F115 and LC1 F150						
24	1.12	177	11	BD	LX4 FF024	0.430
48	4.52	715	42.7	ED	LX4 FF048	0.430
110	21.7	2940	179	FD	LX4 FF110	0.430
125	26.8	3560	223	GD	LX4 FF125	0.430
220/230	84	11 100	704	MD	LX4 FF220	0.430
250	105	13 000	868	UD	LX4 FF250	0.430
440/460	301	48 200	4000	RD	LX4 FF440	0.430

Specifications

Average consumption:

- inrush: 543...665 W,

- sealed: 3.94...4.83 W.

Operating time at Uc: closing = 30...40 ms, opening = 30...50 ms.

For contactors LC1 F185 and LC1 F225

24	0.79	169	14.9	BD	LX4 FG024	0.550
48	3.2	662	55.3	ED	LX4 FG048	0.550
110	14.9	2810	241	FD	LX4 FG110	0.550
125	19	3320	289	GD	LX4 FG125	0.550
220/230	57.7	10 200	890	MD	LX4 FG220	0.550
250	76	12 400	1140	UD	LX4 FG250	0.550
440/460	223	39 700	4210	RD	LX4 FG440	0.550

Specifications

Average consumption:

- inrush: 737...902 W,

- sealed: 4.13...5.07 W.

Operating time at Uc: closing = 30...40 ms, opening = 30...50 ms.

For contactors LC1 F265 and LC1 F330

24	0.9	192	26.3	BD	LX4 FH024	0.740
48	3.49	707	92.9	ED	LX4 FH048	0.740
110	16.8	3180	424	FD	LX4 FH110	0.740
125	20.8	3840	530	GD	LX4 FH125	0.740
220/230	65.7	11 500	1590	MD	LX4 FH220	0.740
250	84	13 900	1910	UD	LX4 FH250	0.740
440/460	255	44 000	7570	RD	LX4 FH440	0.740

Specifications

Average consumption:

- inrush: 655...803 W,

- sealed: 3.68...4.53 W.

Operating time at Uc: closing = 40...50 ms, opening = 40...65 ms.

For contactor LC1 F400

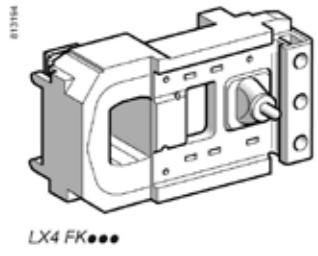
48	2.5	558	56	ED	LX4 FJ048	0.970

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References (continued)

TeSys contactors

TeSys F contactors
d.c. supply coils



LX4 FK***

References (continued)

Low sealed consumption.

Control circuit voltage Uc	Average resistance at 20 °C ± 10 %	Inrush	Inductance of closed circuit	Voltage code	Reference	Weight
V	Ω	Ω	H			kg
For contactor LC1 F500						
48	2.35	515	67	ED	LX4 FK048	1.080
110	11.5	2450	280	FD	LX4 FK110	1.080
125	15	2930	400	GD	LX4 FK125	1.080
220	44	8150	1080	MD	LX4 FK220	1.080
250	56	9650	1350	UD	LX4 FK250	1.080
440	225	31 300	5270	RD	LX4 FK440	1.080

Specifications

Average consumption:

- inrush: 990...1220 W,
- sealed: 4.54...8 W.

Operating cycles/hour ($\theta \leq 55^\circ\text{C}$): 2400.

Operating time at Uc: closing = 50...60 ms, opening = 45...60 ms.

For contactor LC1 F630

48	1.7	353	40.5	ED	LX4 FL048	1.450
110	8.1	1680	180	FD	LX4 FL110	1.450
125	10	2110	230	GD	LX4 FL125	1.450
220	31	5160	650	MD	LX4 FL220	1.450
250	38	6080	815	UD	LX4 FL250	1.450
440	152	23 120	2910	RD	LX4 FL440	1.450

Specifications

Average consumption:

- inrush: 430 W,
- sealed: 6.5...12.5 W.

Operating cycles/hour ($\theta \leq 55^\circ\text{C}$): 1200.

Operating time at Uc: closing = 60...70 ms, opening = 40...50.

For contactor LC1 F780

110	6.1 (2)	280 (2)	0.26	FD	LX4 FX110 (1)	3.000
125	7.7 (2)	410 (2)	0.33	GD	LX4 FX125 (1)	3.000
220	24.6 (2)	1100 (2)	1	MD	LX4 FX220 (1)	3.000
250	29.8 (2)	1330 (2)	1.25	UD	LX4 FX250 (1)	3.000
440	92 (2)	4180 (2)	3.5	RD	LX4 FX440 (1)	3.000

Specifications

Average consumption:

- inrush: 1960...2420 W,
- sealed: 42...52 W.

Operating cycles/hour ($\theta \leq 55^\circ\text{C}$): 600.

Operating time at Uc: closing = 70...80 ms, opening = 100...130 ms.

For contactor LC1 F800

110/120	-	-	-	FW	LX4 F8FW	1.650
220/240	-	-	-	MW	LX4 F8MW	1.650
380/400	-	-	-	QW	LX4 F8QW	1.650

Specifications

Heat dissipation: 25 W.

Operating time at Uc: closing = 60...80 ms, opening = 40...50 ms.

For contactors LC1 F1700 and LC1 F2100

110	2.94	734	98	FD	LX4 FK055 (3)	1.080
125	3.73	916	122	GD	LX4 FK065 (3)	1.080
220	11.5	2450	280	MD	LX4 FK110 (3)	1.080
250	15	2930	400	UD	LX4 FK125 (3)	1.080
440	44	8150	1080	RD	LX4 FK220 (3)	1.080

Specifications

Average consumption:

- inrush: 2000...2200 W,
- sealed: 8...10 W.

Operating cycles/hour ($\theta \leq 55^\circ\text{C}$): 600.

Operating time at Uc: closing = 50...60 ms, opening = 45...60 ms.

(1) Reference of set of 2 identical coils, to be connected in series.

(2) Value for the 2 coils in series.

(3) Order 2 coils and connect them in series.

References

TeSys contactors

TeSys F contactors
d.c. supply coils
for specific applications

References

Coils with short operating times (at Uc) :

- N/O: 60 ms,
- N/C: 20 ms.

Coils with high operating rates ($q \leq 70^\circ\text{C}$):

- 3600 operating cycles/hour,
- 1800 for LC1 F630.

Coils with low inrush consumption.

Control circuit voltage Uc	Average resistance at 20 °C ± 10 %	Inrush	Inductance of closed circuit	Qty required	Resistor(1)	Reference	Coil reference	Weight
V	Ω	Ω	H					kg
For contactor LC1 F400								
48	5.11	99	0.27	1	DR2 SC0047	LX9 FJ918	0.970	
110	32.3	632	1.7	1	DR2 SC0330	LX9 FJ926	0.970	
125	39.4	760	2	1	DR2 SC0390	LX9 FJ927	0.970	
220	123	2320	6.1	1	DR2 SC1200	LX9 FJ932	0.970	
440/460	478	9080	23	1	DR2 SC4700	LX9 FJ938	0.970	

Specifications

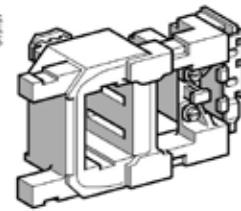
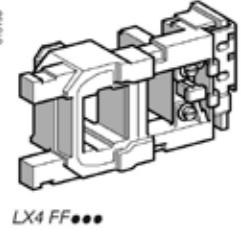
Average consumption:

- inrush: 430 W,
- sealed: 22 W.

For contactor LC1 F500

48	4.67	76.7	0.22	1	DR2 SC0039	LX9 FK918	1.080
110	29.8	470	1.4	1	DR2 SC0220	LX9 FK926	1.080
125	37.4	637	1.7				

References (continued)



LX4 FF***

LX4 FH***

TeSys contactors

TeSys F contactors

Wide range d.c. supply coils
for specific applications

References (continued)

Wide range coils: 0.7...1.25 Uc.
Operating cycles/hour: ≤ 60 (1).
Ambient temperature (operation): - 55 to + 70 °C.

Control circuit voltage Uc	Average resistance at 20 °C ± 10 % Inrush	Inductance of closed circuit H	Reference	Weight kg
For contactors LC1 F115 and LC1 F150				
24	0.71	120	7.4 LX4 FF020	0.430
48	2.86	392	27 LX4 FF040	0.430
72	7.05	1055	66 LX4 FF060	0.430
110	13.2	1970	121 LX4 FF090	0.430
125	16.9	2340	149 LX4 FF100	0.430

Specifications

Average consumption:
- inrush: 415...1300 W,
- sealed: 3...9 W.

For contactors LC1 F185 and LC1 F225

Control circuit voltage Uc	Average resistance at 20 °C ± 10 % Inrush	Inductance of closed circuit H	Reference	Weight kg
For contactors LC1 F185 and LC1 F225				
24	0.52	112	9.3 LX4 FG020	0.550
48	2	359	34.4 LX4 FG040	0.550
72	5.07	984	85 LX4 FG060	0.550
110	9.66	1840	157 LX4 FG090	0.550
125	12	2230	196 LX4 FG100	0.550

Specifications

Average consumption:
- inrush: 580...1820 W,
- sealed: 3.1...9.5 W.

For contactors LC1 F265 and LC1 F330

Control circuit voltage Uc	Average resistance at 20 °C ± 10 % Inrush	Inductance of closed circuit H	Reference	Weight kg
For contactors LC1 F265 and LC1 F330				
24	0.58	129	17.3 LX4 FH020	0.740
48	2.19	400	59.5 LX4 FH040	0.740
72	5.58	1110	149 LX4 FH060	0.740
110	11	2120	287 LX4 FH090	0.740
125	13.8	2520	353 LX4 FH100	0.740

Specifications

Average consumption:
- inrush: 515...1600 W,
- sealed: 2.7...8.5 W.

Operational voltage Uc	Average resistance at 20 °C ± 10 %	Inductance of closed circuit Reference	Coil Resistors in // Reference No. Ω	Economy resistor Resistors in // Reference No. Ω	Reference of the assembly (2)	Weight kg
For contactor LC1 F400						
24	1.05	0.049	LX2 FJW11 3	56 DR2 SC0056	LX5 FJW11	0.970
48	4.8	0.22	LX2 FJW18 3	220 DR2 SC0220	LX5 FJW18	0.970
72	9.6	0.44	LX2 FJW21 3	470 DR2 SC0470	LX5 FJW21	0.970

Specifications

Average consumption:
- inrush: 290...860 W,
- sealed: 16...47 W.

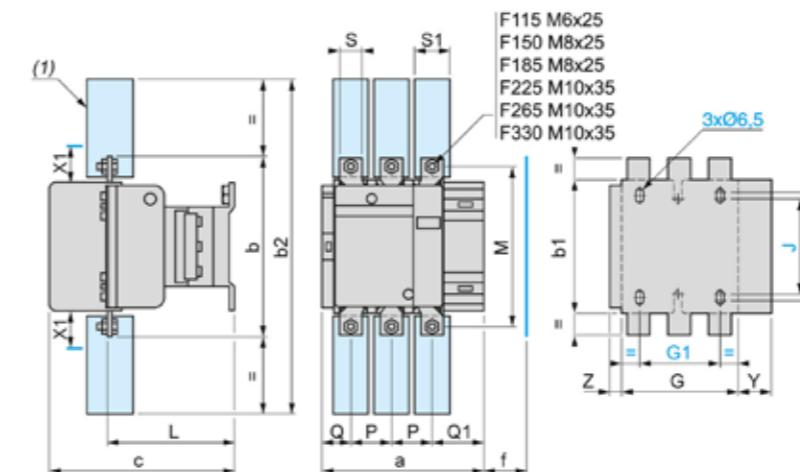
(1) The mechanical durability of the contactor is limited to 1 million operating cycles.
(2) The set comprises: 1 coil LX2 FJ and 3 resistors DR2 SC.

Dimensions

TeSys contactors

TeSys F contactors

LC1 F115 to F330



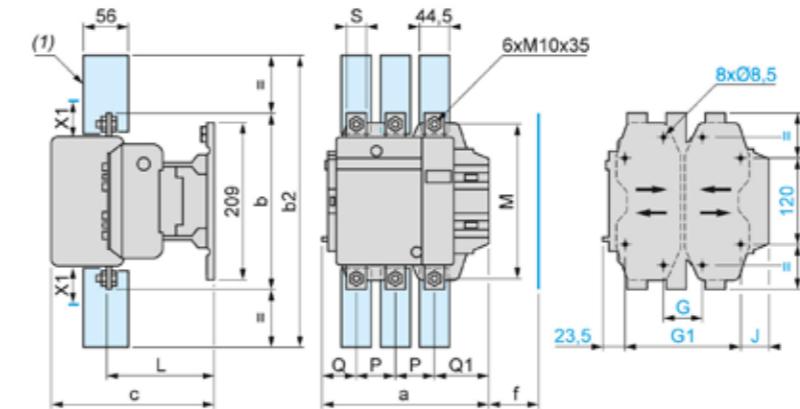
X1 (mm) = Minimum electrical clearance according to operating voltage and breaking capacity.

LC1	200...500 V	600...1000 V
F115, F150	10	15
F185	10	15
F225, F265	10	15
F330	10	15

(1) Power terminal protection shroud (see page 5/126).

5

LC1 F400 and F500



X1 (mm) = Minimum electrical clearance according to operating voltage and breaking capacity.

LC1	200...500 V	600...1000 V
F400	15	20
F500	15	20

(1) Power terminal protection shroud (see page 5/126).

5

LC1	a	b	b2	c	f	G supplied min.	G max.	G1 supplied min.	G1 max.	J	L	M	P	Q	Q1	S			
F400	2P	213	206	375	219	146	80	66	102	170	156	192	19.5	145	181	48	69	96	25
	3P	213	206	375	219	146	80	66	102	170	156	192	19.5	145	181	48	43	74	25
	4P	261	206	375	219	146	80	66	150	170	156	240	67.5	145	181	48	43	74	25
F500	2P	233	238	400	232	150	80	66	120	170	156	210	39.5	146	208	55	76	102	30
	3P	233	238	400	232	150	80	66	120	170	156	210	39.5	146	208	55	46	77	30
	4P	288	238	400	232	150	140	66	175	230	156	265	34.5	146	208	55	46	77	30

f = minimum distance required for coil removal.

Selection :
pages 5/194 to 5/217

Characteristics :
pages 5/106 to 5/113

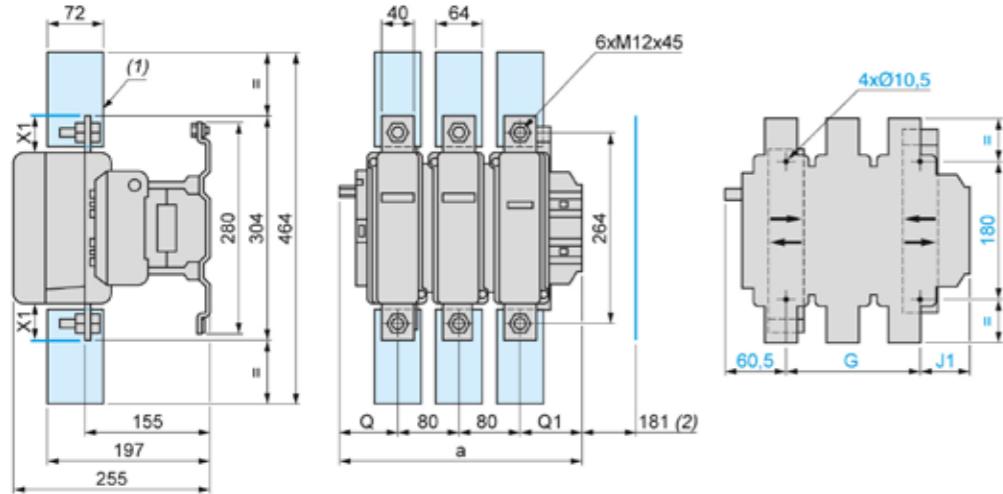
References :
pages 5/114 to 5/117

Schemes :
page 5/146

Dimensions (continued)

TeSys contactors TeSys F contactors

LC1 F630 and F800



X1 (mm) = Minimum electrical clearance according to operating voltage and breaking capacity.

LC1	a	G supplied min.	G max.	J1	Q	Q1
F630	2P	309	180	100	195	68,5
F630, F800	3P	309	180	100	195	68,5
F630	4P	389	240	150	275	68,5

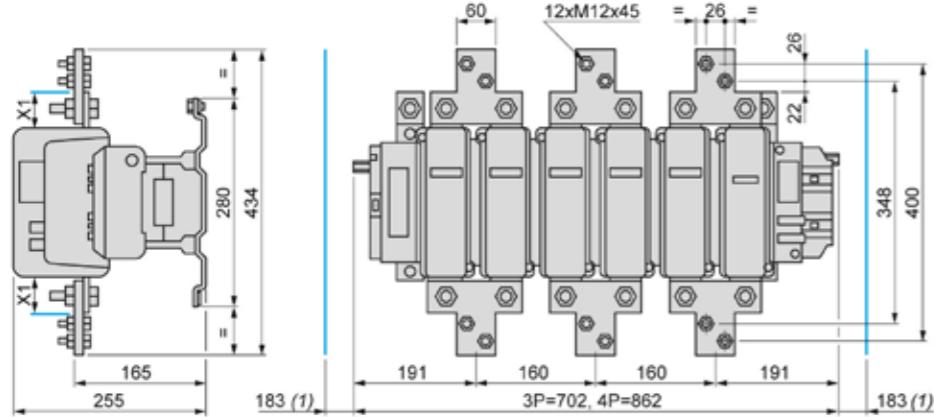
Voltage	200...500 V	690...1000 V	200...690 V	1000 V
LC1 F630	20	30	-	-
LC1 F800	-	-	10	20

(1) Power terminal protection shroud (see page 5/126).

(2) Minimum distance required for coil removal.

5

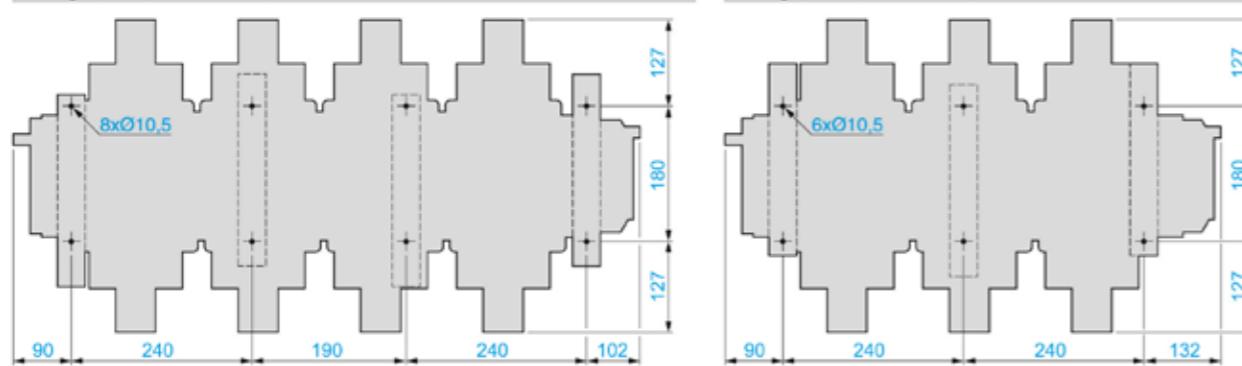
LC1 F780



X1 (mm) = Minimum electrical clearance according to operating voltage and breaking capacity.

(1) Minimum distance required for coil removal.

Fixing centres of LC1 F780



Selection :
pages 5/194 to 5/217

Characteristics :
pages 5/106 to 5/113

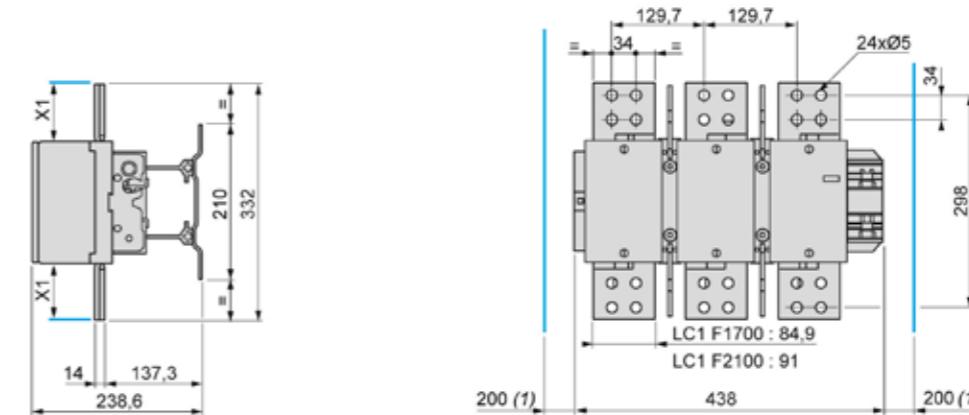
References :
pages 5/114 to 5/117

Schemes :
page 5/146

Dimensions

TeSys contactors TeSys F contactors

LC1 F1700 and LC1 F2100

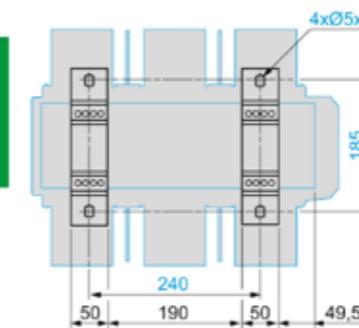


X1 (mm) = Minimum electrical clearance according to operating voltage and breaking capacity.

Voltage	200...500 V	690...1000 V
X1 (mm)	90	100

(1) Minimum distance required for coil removal.

Fixing centres of LC1 F1700 and 2100



Selection :
pages 5/194 to 5/217

Characteristics :
pages 5/106 to 5/113

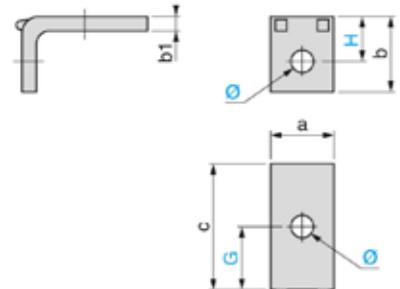
References :
pages 5/114 to 5/117

Schemes :
page 5/146

Dimensions

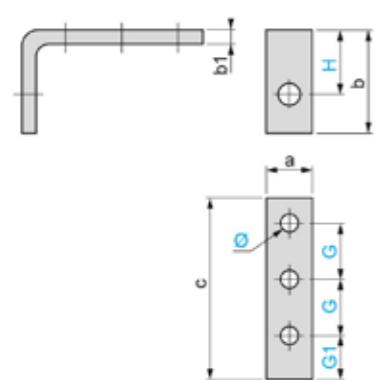
TeSys contactors TeSys F contactors Accessories

Right-angled connectors LA9 Fe981 (set of 3) for rear connection



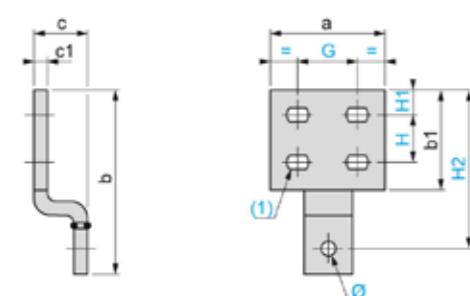
LA9	FF981	FG981	FJ981	FK981	FL981
a	15	20	25	30	40
b	18	23	29	35	48
b1	3	3	4	5	8
c	42	45	55	52	86
G	24	26	32.5	26	45
H	10.5	13	16.5	20	28
Ø	6.5	9	11	11	13

Right-angled connectors LA9 Fe979 (set of 3) for side connection



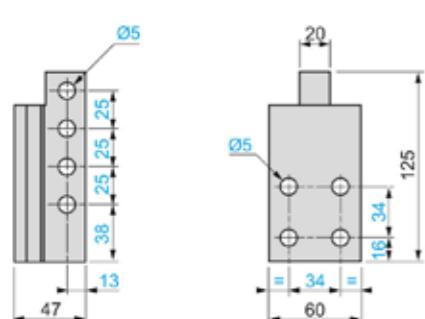
LA9	FF979	FG979	FJ979	FK979	FL979
a	15	20	25	30	40
b	54	58	63.5	68	117
b1	5	5	6	6	10
c	80	92	120	120	130
G	24	28	37	37	37.5
G1	20	22	29	29	35
H	36	39	41	42	76
Ø	6.5	9	11	11	13

Right-angled connectors LA9 Fe980 with large surface area (set of 3)



LA9	FF980	FG980	FJ980	FK980	FL980
a	35	40	50	60	100
b	70.5	82.5	98.5	114	154
b1	40	45	55	65	85
c	29	29	33	33	43
c1	3	3	5	5	10
G	18	20	25	29	53
H	18	20	22	26	40
H1	10	12	14	17	20
H2	60.5	72.5	84.5	97	132
Ø	6.5	9	11	11	13
(1)	Ø 7x10	Ø 9x12	Ø 11x14	Ø 12.5x15	Ø 12.5x15

Right-angled connectors LA9 F2100 (set of 6) for rear connection

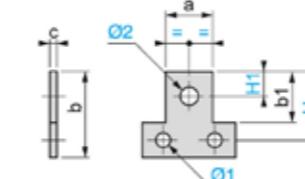


References :
page 5/125

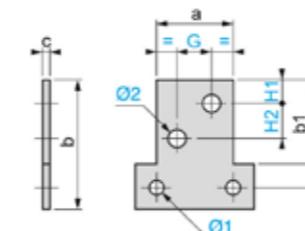
Dimensions (continued)

TeSys contactors TeSys F contactors Accessories

Paralleling links (set of 4)
LA9 FF602, FG602, FH602

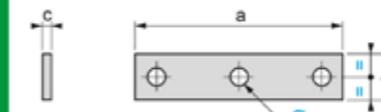


LA9 FK602, FL602



LA9	FF602	FG602	FH602	FK602	FL602
a	25	30	40	50	60
b	45	55	60	85	100
b1	30	35	40	55	65
c	4	5	8	10	10
G	—	—	—	22	26
H	37.5	45	52.5	70	85
H1	12.5	15	15	14	17
H2	—	—	—	22	26
Ø1	6.5	9	11	11	13
Ø2	11	11	13	11	14

Links for "star" connection of 3 poles
LA9 Fe601



LA9	FF601	FG601	FH601	FK601	FL601
a	69	100	121	140	200
b	15	20	20	30	40
b1	3	3	5	5	8
c	6.5x8.5	8.5x10.5	10.5x13	11	13

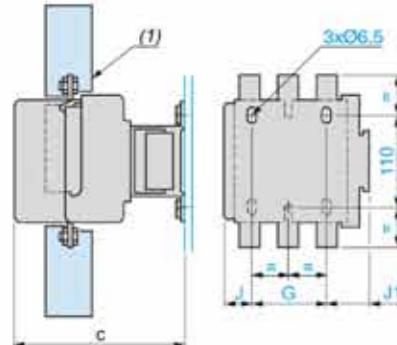
References :
page 5/124

Mounting

TeSys contactors TeSys F contactors

LC1 F115 to F330

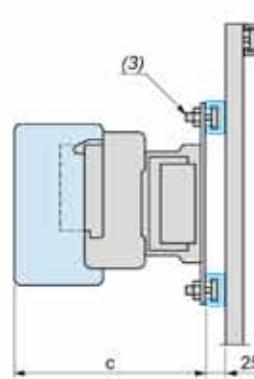
On panel



LC1	F115	F185	F265	F330
	F150	F225		
c (2) 3P	171	181	213	219
4P	171	181	213	219
G 3P	80	80	96	96
4P	80	80	96	96
J 3P	26.5	29	44.5	44.5
4P	45	49	68.5	68.5
J1 3P	57	59.5	61.5	61.5
4P	75.5	79.5	85.5	85.5

LC1 F

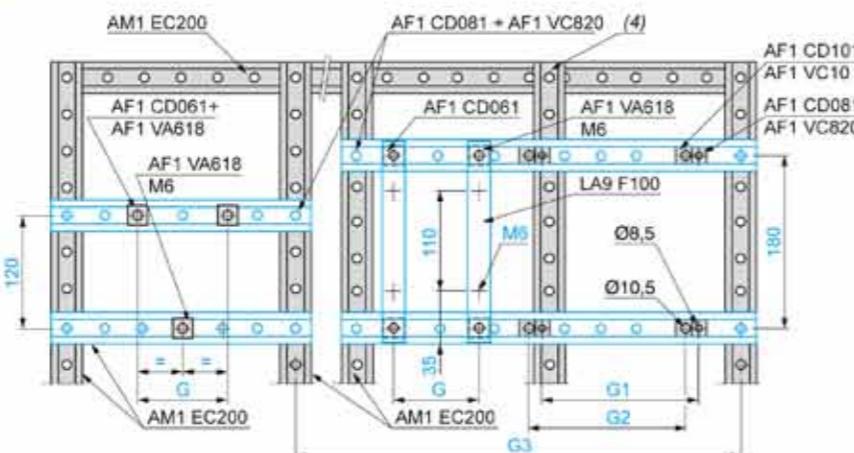
On 2 notched rails AM1 EC***



LC1 F115 to F330

LC1 F400 to F800

5



LC1	F115, F150	F185, F225	F265	F330	F400	F500	F630	F780	F800
c	3P 165 (5)	176	207	213	219	232	255	255	255
	4P 165 (5)	176	207	213	219	232	255	255	—
G (MB)	3P 80	80	96	96	—	—	—	—	—
	4P 80	80	96	96	—	—	—	—	—
G1 (Ø 8.5)	3P —	—	—	—	80	80	—	—	—
	4P —	—	—	—	—	—	—	—	—
G2 (Ø 10.5)	3P —	—	—	—	—	—	180	See page 5/141	180
	4P —	—	—	—	—	—	240		—

(1) Power terminal protection shroud (see page 5/126).

(2) See X1 (minimum electrical clearance) pages 5/140 and 5/141.

(3) AF1 CD*** and AF1 VA***.

(4) This AM1 EC200 upright is required when G2 or G3 is greater than 700 mm (please consult your Regional Sales Office).

(5) + 6 mm with time-delay block on LC1 F.

Schemes

TeSys contactors TeSys F contactors

Contactors

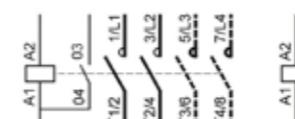
2, 3 and 4-pole contactors

LC1 F115 to F630
(coil LX1 F ~)

LC1 F115 to F265 (coil LX9 F ~)
LC1 F800 (coil LX8 F ~/::)

LC1 F780 ~ or ::

LC1 F1700 ~ or ::
LC1 F2100 ~ or ::



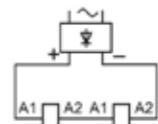
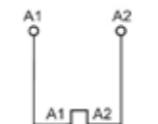
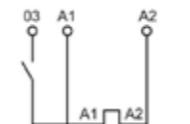
Coils

Standard ~ coils

LX1 FF, FG, FJ...FL
LX1 FH0202...FH0362
LX1 FH4402...FH10002
LX1 F8•

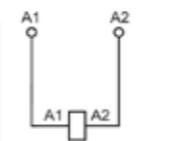
LC1 FX

Rectifier supplied and fixed on the contactor



Standard :: coils

LX4 FF, FG, FH, FJ, FK, FL, FX (1), LX4 F8•



(1) 2 coils in series.

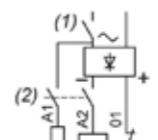
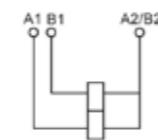
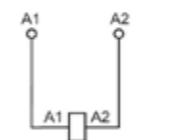
Special ~ coils

LX9 FF, FG

LC9 FH***2

LC9 FJ, FK, FL

LX4 F8•



(1) Breaking on ~ side.

Drop-out time 50 ms.

(2) Breaking on :: side.

Drop-out time 20 ms.

Schemes (continued)

TeSys contactors

TeSys F contactors

Add-on blocks

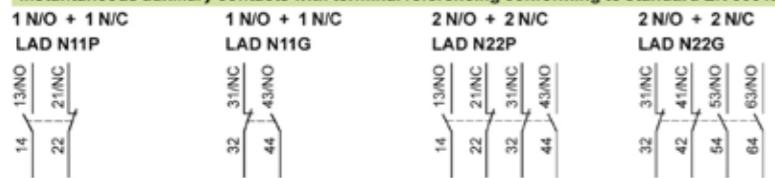
Instantaneous auxiliary contacts



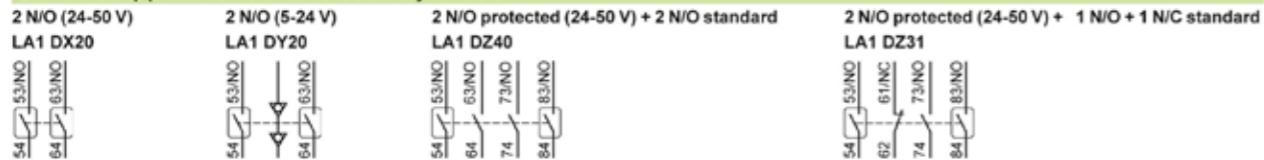
(1) Items in brackets: See "TeSys D contactors".

(2) 1 N/O + 1 N/C make before break.

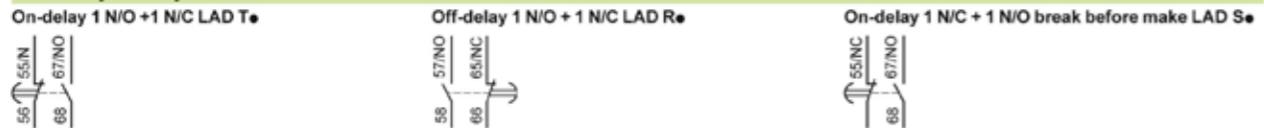
Instantaneous auxiliary contacts with terminal referencing conforming to standard EN 50012 (References: pages 5/122 and 5/123)



Dust and damp protected instantaneous auxiliary contacts



Time delay auxiliary contacts



5

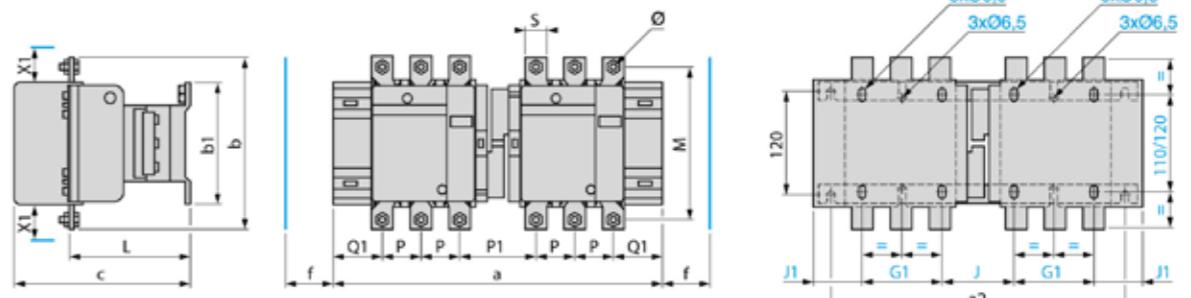
Dimensions

TeSys contactors

TeSys F reversing contactors and changeover contactor pairs
Horizontally mounted

Pre-assembled

LC2 F115 to F265 (reverser supplied on 2 bars which can be used for fixing the device)



f - Minimum distance required for coil removal.

X1 (mm) = Minimum electrical clearance according to operating voltage and breaking capacity.

LC1	200 ... 500 V	660 ... 1000 V
F115, F150	10	15
F185	10	15
F225, F265	10	15

Bar fixing centres
Vertical: 120 mm
Horizontal: a2 see table

LC2	a	a2	b	b1	c	G1	J	J1	L	M	P	P1	Q1	S	f	Ø
F115	3P	345	317	162	137	171	80	71	57	107	147	37	77	60	20	131 M6
	4P	419	378	162	137	171	80	108	75.5	107	147	37	77	60	20	131 M6
F150	3P	345	317	170	137	171	80	71	57	107	150	40	71	57	20	131 M8
	4P	422	381	170	137	171	80	111	75.5	107	150	40	71	55.5	20	131 M8
F185	3P	357	326	174	137	181	80	78	59.5	113.5	154	40	78	59.5	20	130 M8
	4P	437	390	174	137	181	80	118	79.5	113.5	154	40	78	59.5	20	130 M8
F225	3P	357	326	197	137	181	80	78	59.5	113.5	172	48	62	51.5	25	130 M10
	4P	437	390	197	137	181	80	118	79.5	113.5	172	48	54	47.5	25	130 M10
F265	3P	425	386	203	145	213	96	109	61.5	141	178	48	100	66.5	25	147 M10
	4P	521	464	203	145	213	96	157	85.5	141	178	48	100	66.5	25	147 M10

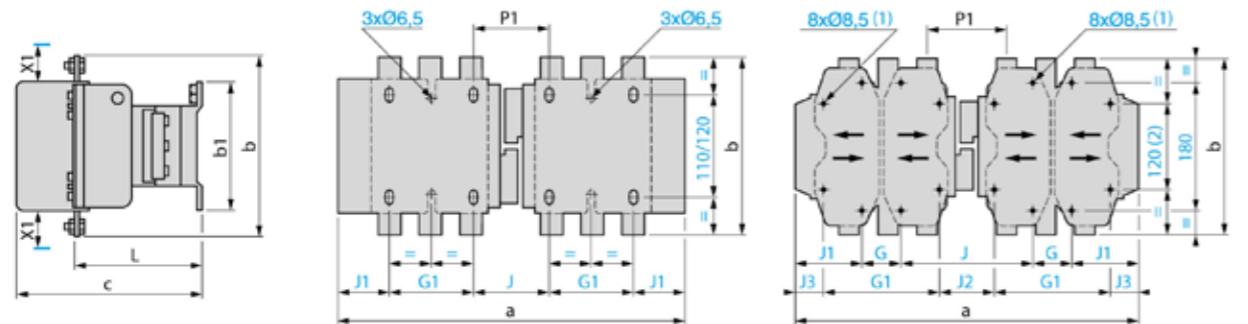
Dimensions (continued)

TeSys contactors

TeSys F reversing contactors and changeover contactor pairs Horizontally mounted

For customer assembly, fixing recommended on AM1 EC uprights, please consult your Regional Sales Office.

2 x LC1 F115 to F330



X1 (mm) = Minimum electrical clearance according to operating voltage and breaking capacity.

LC1	200...500 V	660...1000 V	200...690 V	1000 V
F115, F150	10	15	—	—
F185	10	15	—	—
F225, F265	10	15	—	—
F330	10	15	—	—
F400	15	20	—	—
F500	15	20	—	—
F630	20	30	—	—
F800	—	—	10	20

2 x LC1	a	b	b1	c	G	G1	J	J1	J2	J3	L	P1
F115	3P	345	162	137	171	—	80	71	57	—	—	107 77
	4P	419	162	137	171	—	80	108	75.5	—	—	107 77
F150	3P	345	170	137	171	—	80	71	57	—	—	107 71
	4P	422	170	137	171	—	80	111	75.5	—	—	107 71
F185	3P	357	174	137	181	—	80	78	59.5	—	—	113.5 78
	4P	437	174	137	181	—	80	118	79.5	—	—	113.5 78
F225	3P	357	197	137	181	—	80	78	59.5	—	—	113.5 62
	4P	437	197	137	181	—	80	118	79.5	—	—	113.5 54
F265	3P	425	203	145	213	—	96	109	61.5	—	—	141 100
	4P	521	203	145	213	—	96	157	85.5	—	—	141 100
F330	3P	447	206	145	219	—	96	124	65.5	—	—	145 107
	4P	543	206	145	219	—	96	172	89.5	—	—	145 107
F400	3P	446	206	209	219	80	170	157	64.5	67	19.5	145 107
	4P	542	206	209	219	80	170	157	112.5	67	67.5	145 107
F500	3P	485	238	209	232	80	170	156	84.5	66	39.5	146 112
	4P	595	238	209	232	140	230	156	79.5	66	34.5	146 112
F630	3P	636	304	280	255	180	—	139	68.5	—	—	155 137
	4P	796	304	280	255	240	—	139	88.5	—	—	155 137
F800	3P	636	304	280	255	180	—	139	68.5	—	—	155 137

(1) Except LC1 F630 and F800 : 4 x Ø 10.5.

(2) Except LC1 F630 and F800.

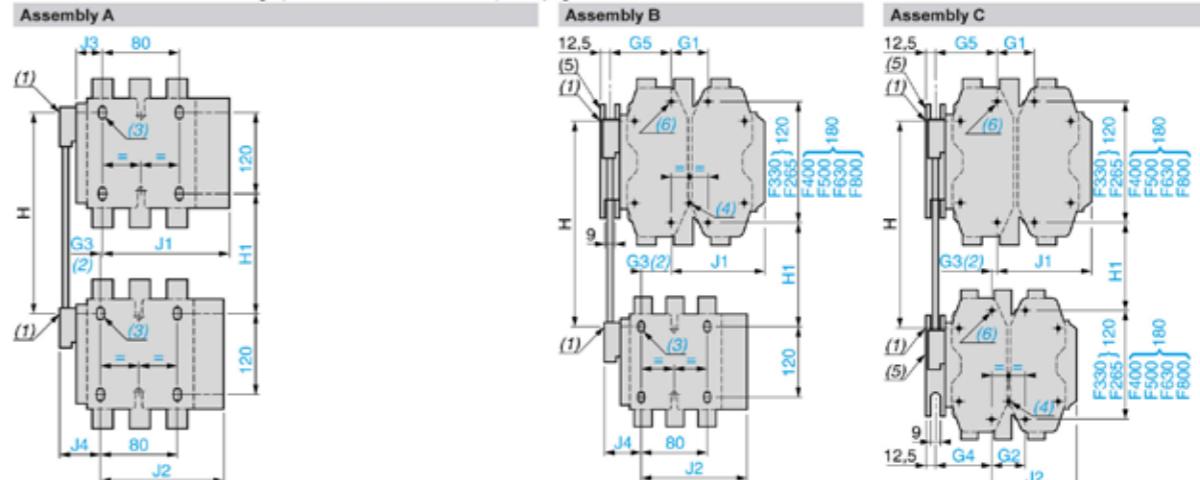
For other dimensions: see pages 5/140 and 5/141.

Dimensions

TeSys contactors

TeSys F reversing contactors and changeover contactor pairs
Vertically mounted

For customer assembly, with mechanical interlock (MI) LA9 F, fixing recommended on AM1 EC uprights (please consult your Regional Sales Office).
2 x LC1 identical or different ratings (LC1 F115 to F630 and F800). See pages 5/118 to 5/121



(1) Mechanical interlock shaft.

(2) For assembly of confactors of different ratings only.

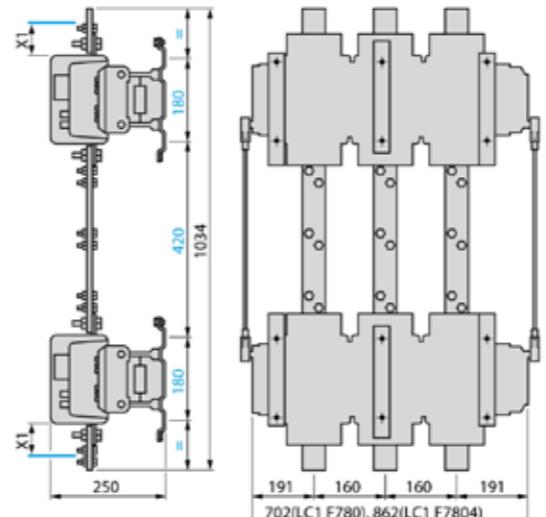
(3) 4 x Ø6.5 for LC1 F115 to F225.

Assembly A (7) - Mechanical interlock reference

	G3	3P	G3	4P	H min.	H max.	H1 min.	H1 max.	J1	3P	J1	4P
LA9 FF4F	0	0	200	310	80	190	137	155.5				
LA9 FG4F	3	4	210	300	90	180	139.5	159.5				
LA9 FG4G	0	0	220	310	100	190	139.5	159.5				
	J2	3P	J2	4P	J3	3P	J3	4P	J4	3P	J4	4P

LA9 FF4F 137 155.5 48.5 67 48.5 67
LA9 FG4F 137 155.5 53 73 54 69
LA9 FG4G 139.5 159.5 53 73 53 73

For customer assembly, fixing recommended on AM1 EC uprights,
 please consult your Regional Sales Office



X1 and fixings, see page 5/141

(7) Only 3P for E800.

(B) In this case, G4 is greater than G5.

Schemes

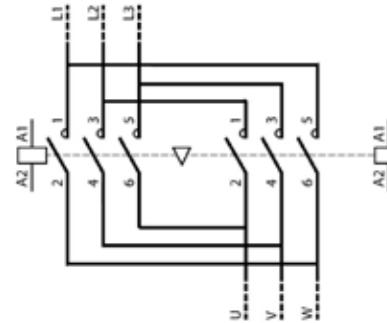
TeSys contactors

TeSys F reversing contactors and changeover contactor pairs

Reversing contactors for motor control LC2 F

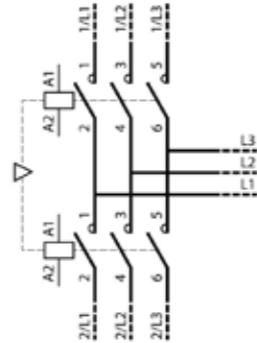
2 x LC1 F

Horizontally mounted



2 x LC1 F

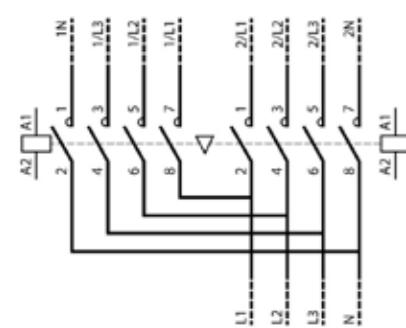
Vertically mounted



Changeover contactor pairs for distribution LC2 F

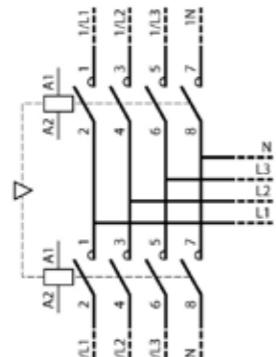
2 x LC1 F

Horizontally mounted



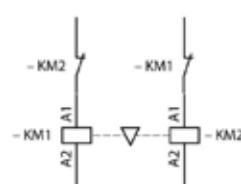
2 x LC1 F

Vertically mounted



Electrical interlocking of reversers fitted with mechanical interlock without integral electrical contacts

LA9 F



General

TeSys contactors

High power changeover contactor pairs for distribution
Control circuit: a.c. or d.c.

General

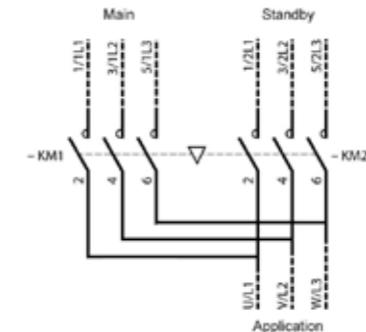
A changeover contactor pair ensures continuity of operation of an installation and energy management.

It switches between:

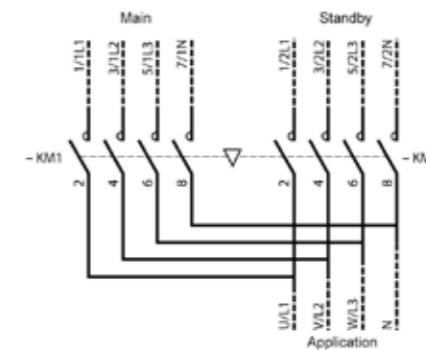
- a power supply source M (main) which normally supplies the installation,
- and a power supply source S (standby) which may be an incoming line from an additional network or a generating set.

The supply sources may be 3-phase or 3-phase + neutral.

Supply - 3-phase



Supply 3-phase + neutral

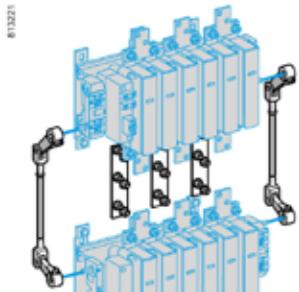


The 2 contactors must be mechanically and electrically interlocked to prevent any paralleling, even transitory, of the two supplies.

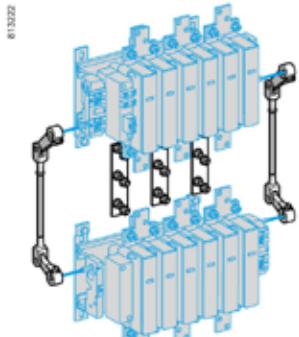
References

TeSys contactors

High power changeover contactor pairs
for distribution
Control circuit: a.c. or d.c.



LA9 FX970



LA9 FX971

Changeover contactor pairs for customer assembly: 3-phase

Vertically mounted.

Maximum operational voltage: 1000 V

Utilisation category: AC-1

Maximum temperature in the vicinity of the devices: 40 °C

Maximum operational current	Contactors (1)		Mechanical interlock (2)	
Main	Standby	Main Reference	Standby Reference	Reference
3-phase	3-phase	LC1 F780	LC1 F6309	LA9 FX970
1600 A	1000 A			

1600 A 1600 A LC1 F780 LC1 F780 LA9 FX970

Changeover contactor pairs for customer assembly: 3-phase + neutral

Vertically mounted.

Maximum operational voltage: 1000 V

Utilisation category: AC-1

Maximum temperature in the vicinity of the devices: 40 °C

Maximum operational current	Contactors (1)		Mechanical interlock (2)	
Main	Standby	Main Reference	Standby Reference	Reference
3-phase + N	3-phase + N	LC1 F78041	LC1 F63049	LA9 FX970 (3)
1600 A + 1000 A	1000 A + 1000 A			

1600 A + 1000 A 1600 A + 1000 A LC1 F78041 LC1 F78040 LA9 FX970 (3)

1600 A + 1600 A	1000 A + 1000 A	LC1 F7804	LC1 F63049	LA9 FX971
-----------------	-----------------	-----------	------------	-----------

1600 A + 1600 A 1600 A + 1600 A LC1 F7804 LC1 F7804 LA9 FX971

(1) Coils to be ordered separately, see pages 5/132 to 5/137.

(2) Double mechanical interlock mechanism with 2 interlock connecting rods and 4 power connecting links. To order the 2 auxiliary contact blocks **LAD N°1** required to obtain electrical interlocking between the 2 contactors: see page 5/123.

(3) Neutral connecting link not supplied (to be ordered separately).

5

Dimensions

TeSys contactors

High power changeover contactor pairs
for distribution

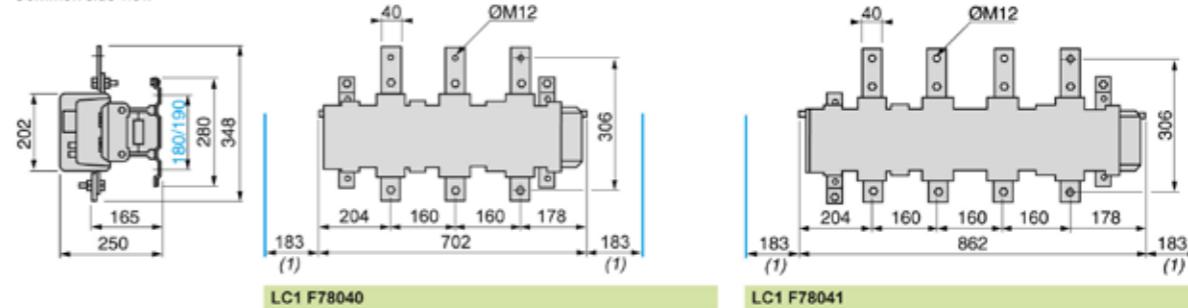
Dimensions

Contactors used to assemble high power changeover contactor pairs LC1 F780: see page 5/141

LC1 F6309

LC1 F63049

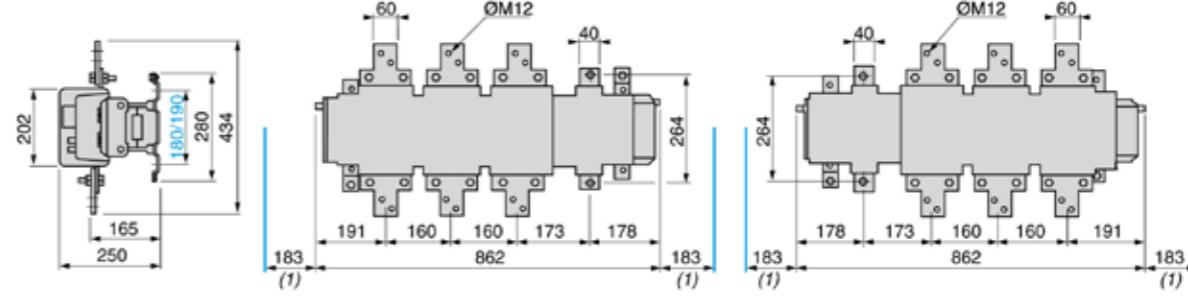
Common side view



LC1 F78040

LC1 F78041

Common side view

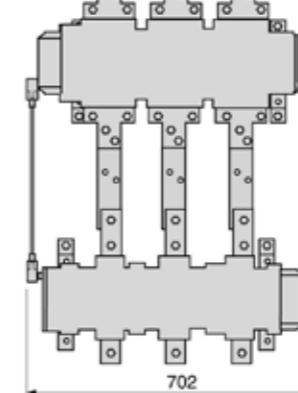
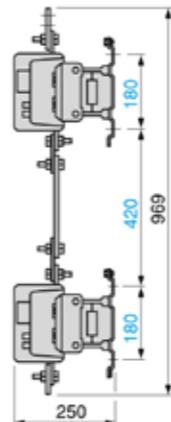


(1) Minimum distance required for removal of each coil.

3-phase changeover contactor pairs

LC1 F780 + LC1 F780 + LA9 FX970: see page 5/150

LC1 F780 + LC1 F6309 + LA9 FX970



Dimensions (continued), schemes

TeSys contactors

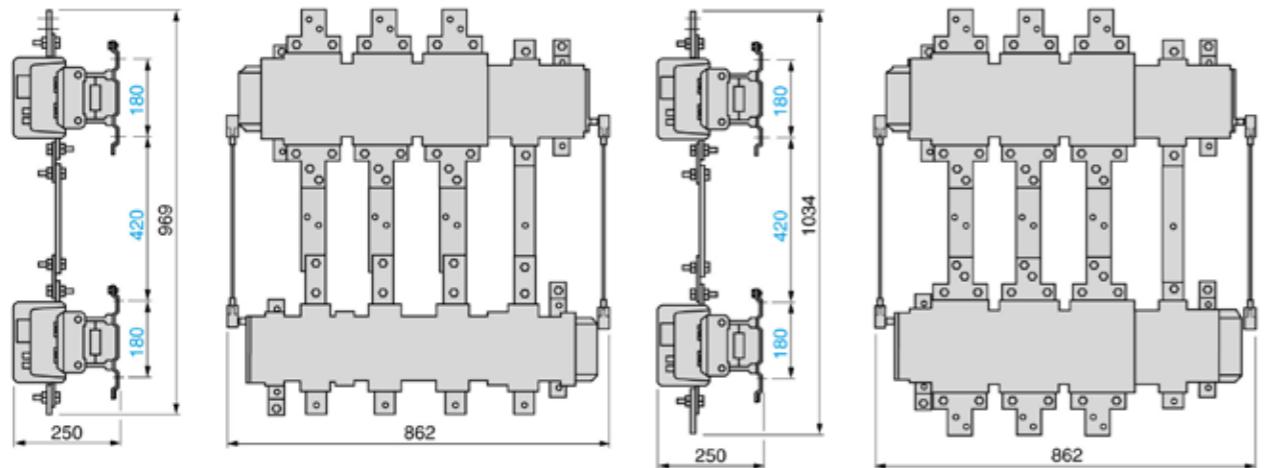
High power changeover contactor pairs
for distribution

Dimensions (continued)

3-phase + neutral changeover contactor pairs

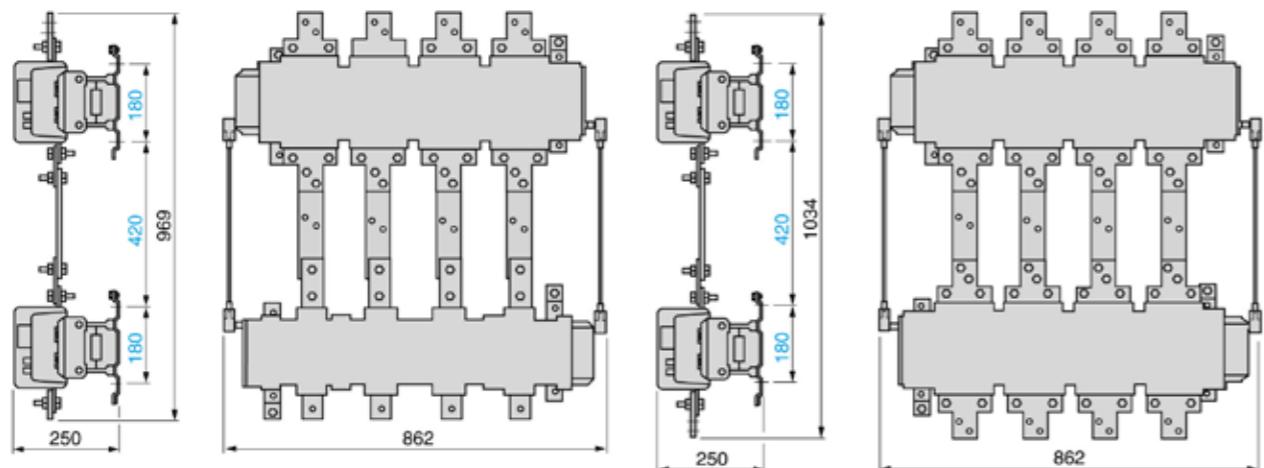
LC1 F78041 + LC1 F63049 + LA9 FX970

LC1 F78041 + LC1 F78040 + LA9 FX970



LC1 F7804 + LC1 F63049 + LA9 FX971

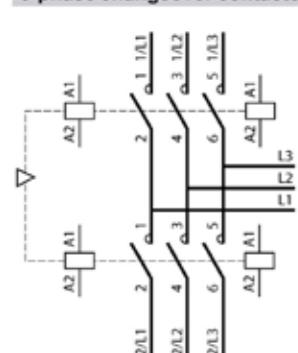
LC1 F7804 + LC1 F7804 + LA9 FX971



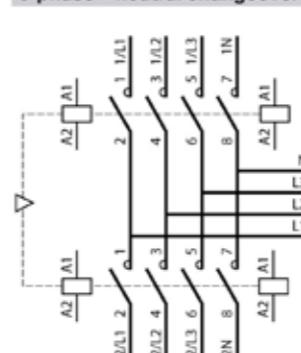
5

Schemes

3-phase changeover contactor pairs



3-phase + neutral changeover contactor pairs



References, dimensions

TeSys contactors

Capacitive delayed opening devices
For TeSys D contactors

References

These devices prevent inadvertent opening of a contactor in the event of a brief volt drop or momentary supply failure.



LAZ R90F



LAZ R91F

Control circuit : d.c. supply	Corresponding delayed opening device				
	Type (1)	Contactor reference to be completed (2)	Supply voltage 50/60 Hz	Non-adjustable delay time (Tr)	Reference
	V	s	kg		
LC1 D09, LC1 D12, LC1 D18, LC1 D25, LC1 D32 or LC1 D38	LC1 D•PD	110...115	1.5...5	LAZ R90F	0.215
	LC1 D•QD	120...127	2.5...5	LAZ R90F	0.215
	LC1 D•TD	220	4...8	LAZ R90M	0.215
	LC1 D•VD	240	5...10	LAZ R90M	0.215
	LC1 D•WD	380	4...8	LAZ R90Q	0.215
	LC1 D•XD	415...440	5.5...13	LAZ R90Q	0.215
LC1 D40, LC1 D50 or LC1 D65	LC1 D•PD	110...115	0.5...1	LAZ R90F	0.215
	LC1 D•QD	120...127	0.5...1.5	LAZ R90F	0.215
	LC1 D•TD	220...240	1...2.5	LAZ R90M	0.215
	LC1 D•WD	380	1...2.5	LAZ R90Q	0.215
	LC1 D•XD	415...440	1...3	LAZ R90Q	0.215
LC1 D80	LC1 D•PD	110...120	0.4...1	LAZ R90F	0.215
	LC1 D•QD	120...127	0.5...1	LAZ R90F	0.215
	LC1 D•TD	220	0.5...2	LAZ R90M	0.215
	LC1 D•VD	240	1...2.5	LAZ R90M	0.215
	LC1 D•WD	380	1...2	LAZ R90Q	0.215
	LC1 D•XD	415...440	1...2.5	LAZ R90Q	0.215

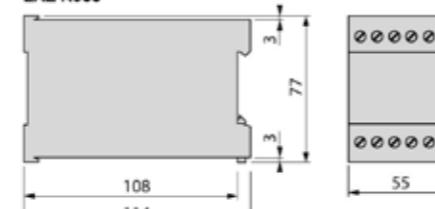
Add-on blocks for delayed opening devices	Application				
	For use with delayed opening device	Operational voltage	Non-adjustable delay time	Reference	Weight
	V	s	kg		
To double the delay time	LAZ R90F	110...127	Tr x 2	LAZ R91F	0.165
	LAZ R90M	220...240	Tr x 2	LAZ R91M	0.165
	LAZ R90Q	380...440	Tr x 2	LAZ R91Q	0.165

(1) These contactors can be supplied as standard for this application or can be adapted by replacing the coil (except for contactors LC1 D09•••• to LC1 D38•••• on which the coil is not replaceable).

(2) Reference to be completed : see page 5/62.

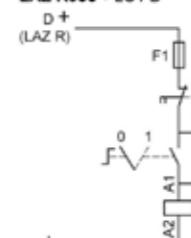
Dimensions

LAZ R9••

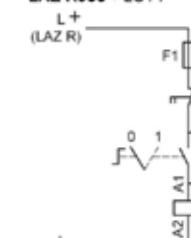


Schemes

LAZ R9•• + LC1 D



LAZ R9•• + LC1 F



Other versions

Delayed opening devices for use with other types of contactor.
Please consult your Regional Sales Office.

TeSys contactors

Capacitive delayed opening devices
For TeSys F contactors

References

These devices prevent inadvertent opening of a contactor in the event of a brief volt drop or momentary supply failure.

Control circuit : d.c. supply (1)

For use with contactor		Corresponding delayed opening device			
Type	With coil	Supply voltage 50/60 Hz	Non-adjustable delay time (Tr)	Reference	Weight
		V	s		kg
LC1 F115 or LC1 F150	LX4 FF110	110	2...5	LAZ R90F	0.215
	LX4 FF125	127	2...5	LAZ R90F	0.215
	LX4 FF220	220	2...5	LAZ R90M	0.215
	LX4 FF250	240	2...5	LAZ R90M	0.215
	LX4 FF375	380...415	2...5	LAZ R90Q	0.215
	LX4 FF440	440	2...5	LAZ R90Q	0.215
LC1 F185 or LC1 F225	LX4 FG110	110	2...5	LAZ R90F	0.215
	LX4 FG125	127	2...5	LAZ R90F	0.215
	LX4 FG220	220	2...5	LAZ R90M	0.215
	LX4 FG250	240	2...5	LAZ R90M	0.215
	LX4 FG375	380...415	2...5	LAZ R90Q	0.215
	LX4 FG440	440	2...5	LAZ R90Q	0.215
LC1 F265 or LC1 F330	LX4 FH110	110	2...5	LAZ R90F	0.215
	LX4 FH125	127	2...5	LAZ R90F	0.215
	LX4 FH220	220	2...5	LAZ R90M	0.215
	LX4 FH250	240	2...5	LAZ R90M	0.215
	LX4 FH375	380...415	2...5	LAZ R90Q	0.215
	LX4 FH440	440	2...5	LAZ R90Q	0.215
LC1 F400	LX4 FJ110	110	1...2	LAZ R90F	0.215
	LX4 FJ125	127	1...2	LAZ R90F	0.215
	LX4 FJ220	220	1...2	LAZ R90M	0.215
	LX4 FJ250	240	1...2	LAZ R90M	0.215
	LX4 FJ375	380	1...2	LAZ R90Q	0.215
	LX4 FJ400	415	1...2	LAZ R90Q	0.215
LC1 F500	LX4 FK110	110	1...2	LAZ R90F	0.215
	LX4 FK125	127	1...2	LAZ R90F	0.215
	LX4 FK220	220	1...2	LAZ R90M	0.215
	LX4 FK250	240	1...2	LAZ R90M	0.215
	LX4 FK375	380	1...2	LAZ R90Q	0.215
	LX4 FK400	415	1...2	LAZ R90Q	0.215
LC1 F630	LX4 FL110	110	1...2	LAZ R90F	0.215
	LX4 FL125	127	1...2	LAZ R90F	0.215
	LX4 FL220	220	1...2	LAZ R90M	0.215
	LX4 FL250	240	1...2	LAZ R90M	0.215
	LX4 FL375	380	1...2	LAZ R90Q	0.215
	LX4 FL400	415	1...2	LAZ R90Q	0.215
LC1 F440	LX4 FL440	440	1...2	LAZ R90Q	0.215

Add-on blocks for delayed opening devices (1)

Application	For use with delayed opening device	Operational voltage	Non-adjustable delay time	Reference	Weight
		V	s		kg
To double the delay time	LAZ R90F	110...127	Tr x 2	LAZ R91F	0.165
	LAZ R90M	220...240	Tr x 2	LAZ R91M	0.165
	LAZ R90Q	380...440	Tr x 2	LAZ R91Q	0.165

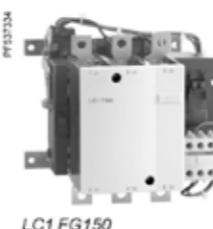
(1) Dimensions and schemes: see page 5/156.

Other versions

Delayed opening devices for use with other types of contactor.
Please consult your Regional Sales Office.

TeSys contactors

3-pole shockproof contactors LC1 FG



5

5

Presentation

In an environment subject to severe mechanical shocks, unwanted closing of a contactor's poles and the serious consequences of this, is not permissible.

Shockproof contactors LC1 FG150 to FG630 are equipped with an auxiliary electromechanical device which ensures that the contactor is mechanically locked in the "open" position when its main electromagnet is not energised.

If the contactor is subjected to mechanical impact, from back to front or from front to back, accidental closing of the poles is then impossible.

In addition, accidental opening of the poles (when the contactor is in the "on" position), is virtually impossible due to the significant pull-in force characteristic of these contactors.

Applications

■ **Marine:** on-board equipment, windlasses, capstans, winches, etc...

■ **Military equipment :** land, sea, launching silos.

■ **Heavy mechanical handling systems:** travelling cranes, cranes, gantries.

■ **Conveying and handling:** lifts, hoists, conveyors.

■ **Equipment for power stations.**

■ **Distribution boards.**

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TeSys contactors

3-pole shockproof contactors LC1 FG

Selection

TeSys contactors

3-pole shockproof contactors LC1 FG

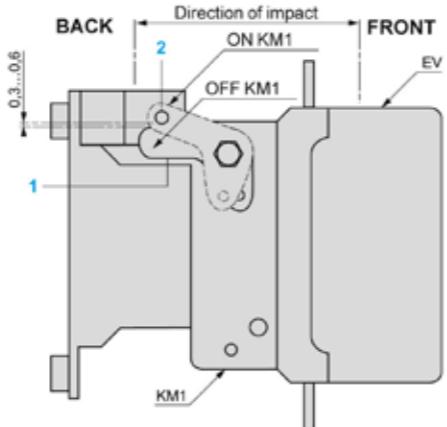
a.c. supply

According to the utilisation category and required electrical durability

Description of shockproof device

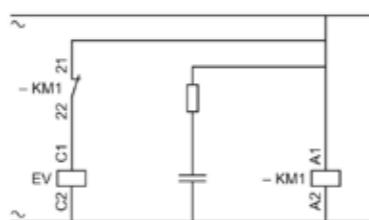
Shockproof contactors LC1 FG*** are equipped with:

- A lever 1 that is rotated by the core of the contactor's electromagnet.
- An auxiliary electromagnet (EV) for the locking function.
- An RC circuit (Resistor-Capacitor) to limit overvoltage.



Operation

- In the 'off' position (contactor open and not energised) the core 2 of the electromagnet (EV) locks the lever 1 and therefore the contactor.
- The coils (KM1) and (EV) are energised simultaneously, the core 2 releases the lever 1 and allows the contactor to close.
- De-energisation of the locking electromagnet (EV) is achieved by an auxiliary contact within the contactor. The core 2 rests freely in lever 1.
- On de-energisation of coil KM1, the moving contact drops out. Core 2, under spring pressure, once again locks lever 1.



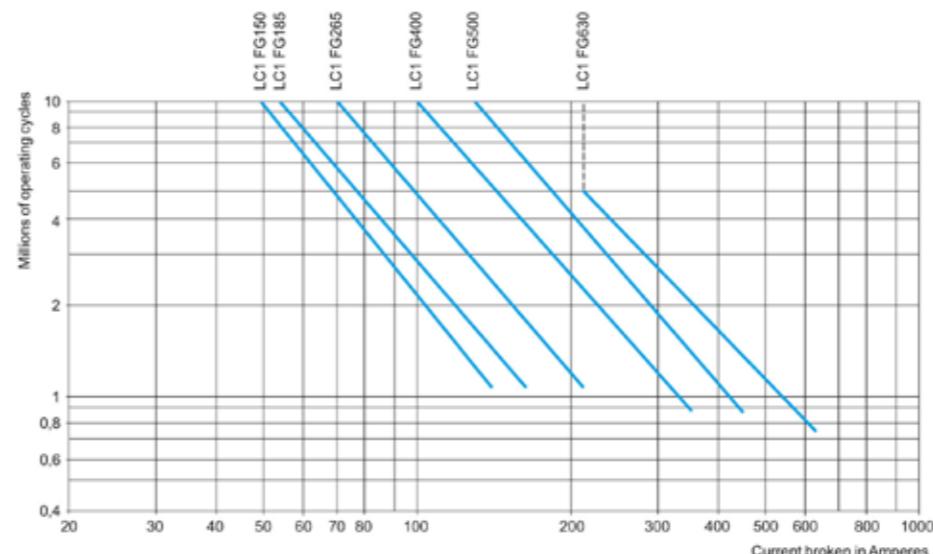
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Use in category AC-3 ($U_e \leq 440$ V)Operational current and power ($\theta \leq 55$ °C)

Contactors		LC1 FG150	LC1 FG185	LC1 FG265	LC1 FG400	LC1 FG500	LC1 FG630
Operational current	A	150	185	265	400	500	630
Operational power Standard power ratings of motors	220/230 V	kW 40	55	75	110	147	200
		hp 54	75	100	150	200	270
	380/400 V	kW 75	90	132	200	250	335
		hp 100	185	180	270	340	450
	415 V	kW 80	100	140	220	280	375
		hp 110	136	180	300	380	500
	440 V	kW 80	100	140	250	295	400
		hp 110	136	190	340	400	545
	500 V	kW 90	110	160	257	355	400
		hp 125	150	220	350	480	545
	660/690 V	kW 100	110	160	280	335	450
		hp 136	150	220	380	450	600
	1000 V	kW 65	100	147	185	335	450
		hp 85	136	200	250	450	610

Maximum operating rate (operating cycles/hour) (1)

On-load factor	Operational power	LC1 FG150	LC1 FG185	LC1 FG265	LC1 FG400	LC1 FG500	LC1 FG630
≤ 85 %	P	750	750	750	500	500	500
≤ 85 %	0.5 P	2000	2000	2000	1200	1200	1200
≤ 25 %	P	1200	1200	1200	1200	1200	1200

(1) Depending on the operational power and the on-load factor ($\theta \leq 55$ °C)Electrical durability in utilisation category AC-3 ($U_e \leq 440$ V)

Control of 3-phase asynchronous squirrel cage motors with breaking whilst running.

The current broken (Ie) in category AC-3 is equal to the rated operational current of the motor.

Example:

Asynchronous motor with P = 55 kW - Ue = 380 V - Ie = 105 A

4 million operating cycles required.

The above selection curves show the contactor rating needed: LC1 FG265.

Selection (continued)

TeSys contactors

3-pole shockproof contactors LC1 FG

a.c. supply

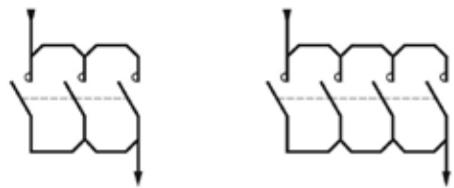
According to the utilisation category and required electrical durability

Use in category AC-1 ($U_e \leq 440$ V)

Contactors		Cable	C.s.a.	mm ²	LC1 FG150	LC1 FG185	LC1 FG265	LC1 FG400	LC1 FG500	LC1 FG630
Connection	Cable			120	150	240	-	-	-	
	Bar	Number		-	-	-	2	2	2	
		C.s.a.	mm	-	-	-	30 x 5	40 x 5	60 x 5	
Maximum operating rate in operating cycles/hour				600	600	600	600	600	600	
Operational current AC-1	≤ 40 °C	A	250	270	350	500	700	1000		
	≤ 55 °C	A	220	240	300	430	580	850		
	≤ 70 °C (1)	A	170	180	250	340	500	700		

(1) Only for operation with coil supplied at U_c .

Increase in operational current by parallel connection of poles

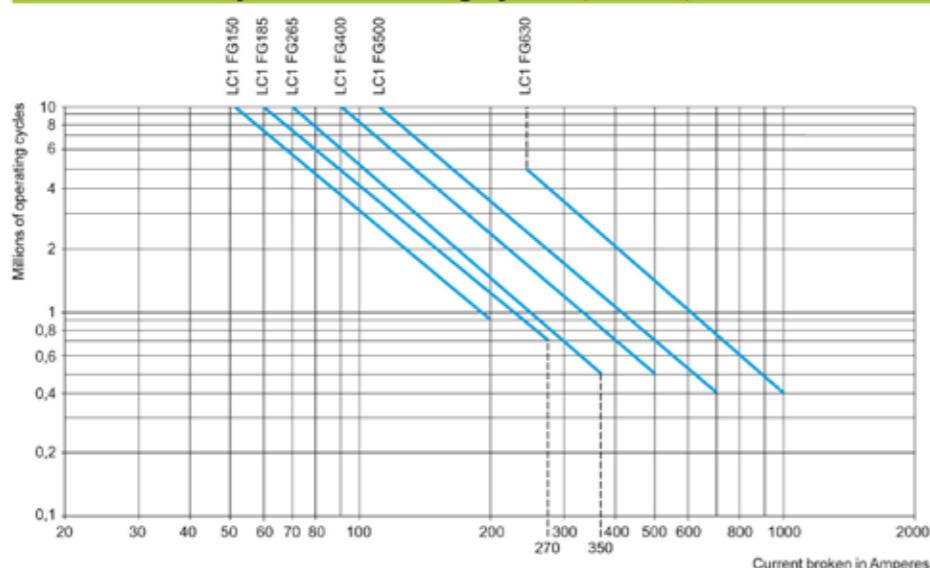


Apply the following multiplying factors to the current values given above. The factors take into account the often unbalanced current distribution between the 2 poles:

- 2 poles in parallel: K = 1.6
- 3 poles in parallel: K = 2.25
- 4 poles in parallel: K = 2.8

Recommended connection scheme to equalise the currents in each pole (see opposite).

Electrical durability in utilisation category AC-1 ($U_e \leq 440$ V)



Example:

Control of resistive circuits ($\cos \phi \geq 0.95$).

The current broken (I_c) in category AC-1 is equal to the current (I_e) normally drawn by the load.

$U_e = 220$ V - $I_c = I_e = 300$ A - $\theta = 40$ °C.

1 million operating cycles required.

The above selection curves show the contactor rating needed: LC1 FG400.

5

Selection (continued)

TeSys contactors

3-pole shockproof contactors LC1 FG

a.c. supply

According to the utilisation category and required electrical durability

Thermal limits in utilisation categories AC-2/AC-4

Contactors	Thermal limit zone	Operating cycles/hour (1)	Maximum current broken according to the duty requirements (thermal limit, ambient temperature ≤ 55 °C)	LC1 FG150	LC1 FG185	LC1 FG265	LC1 FG400	LC1 FG500	LC1 FG630
	A	From 150 and 15 % to 300 and 10 %	310	380	560	780	1100	1400	
	B	From 150 and 20 % to 600 and 10 %	280	350	500	700	950	1250	
	C	From 150 and 30 % to 1200 and 10 %	240	300	400	600	750	950	
	D	From 150 and 55 % to 2400 and 10 %	190	240	320	450	600	720	
	E	From 150 and 85 % to 3600 and 10 %	145	170	230	350	500	660	

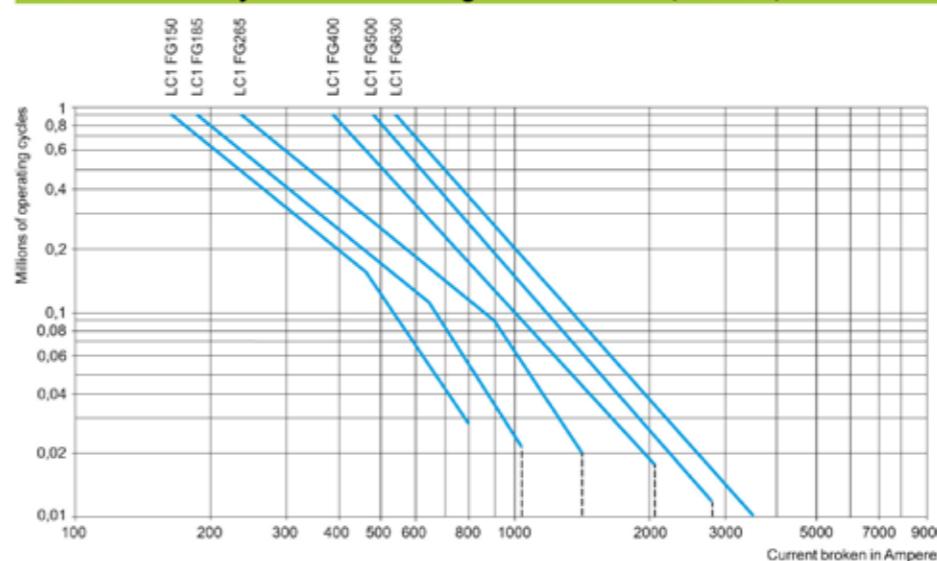
(1) Do not exceed the maximum limit for the mechanical operating cycles.

Counter current braking (plugging)

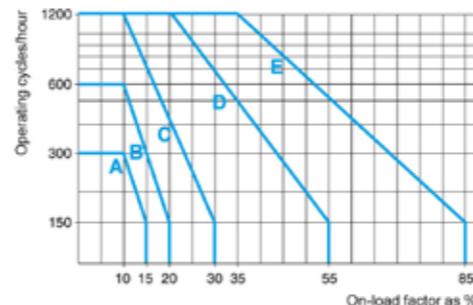
The current varies from the maximum plug-braking current to the rated motor current. The current made must be compatible with the making and breaking capacities of the contactor.

In most cases, breaking occurs at a current value close to the locked rotor current and contactor selection can therefore be made using the criteria for utilisation categories AC-2 and AC-4.

Electrical durability in utilisation categories AC-2/AC-4 ($U_e \leq 440$ V)



Example: Contactor selection



For an on-load factor of 10 % at 400 operating cycles per hour, the curve on the left indicates zone B. If the current broken is 600 A, the above table leads to selection of an LC1 FG400 contactor. Referring to the electrical durability curves, it can be seen that the contactor will be able to perform 350 000 operating cycles. Where a higher value of electrical durability is required, 1 million operating cycles for example, an LC1 FG630 contactor would be recommended.

Selection (continued)

TeSys contactors

For switching 3-phase capacitor banks,
used for power factor correction
Switching the primaries of 3-phase transformers (LV/LV)

Switching 3-phase capacitors

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 In) at high frequencies (1 to 15 kHz). The contactors are used for direct switching. The values of peak current at switch-on must not exceed the values indicated below.

An inductor or an early break resistor may be inserted in each of the three phases supplying the capacitors to reduce the peak current, if necessary. This must be done when switching multiple step capacitor banks.

Inductance values are determined according to the selected operating temperature: please refer to our "Motor starter solutions - Control and protection components" catalogue.

In addition, 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 table the below take this overload into account.

Short-circuit protection is normally provided by g1 fuses rated at 1.3 to 1.6 In.

Maximum operational power of contactors

Maximum operating rate: 120 operating cycles/hour.

Electrical durability at maximum load: 100 000 operations.

With choke inductors connected, where necessary.

Operational power at 50/60 Hz			Maximum peak current			Contactor to be used
0 ≤ 40 °C			0 ≤ 55 °C			
220 V	400 V	600 V	220 V	400 V	600 V	
kvar	kvar	kvar	kvar	kvar	kvar	A
60	100	135	40	85	90	3200
70	125	160	50	100	100	3500
90	160	225	75	125	125	5000
125	220	300	100	160	200	8000
180	300	400	125	220	300	10 000
250	400	600	190	350	500	12 000
						LC1 FG630

Switching the primaries of 3-phase transformers (LV/LV)

When a transformer is switched on, there is generally an initial current surge which can reach 20 to 40 times the rated current for the power ratings shown below.

This current reaches its peak value almost instantaneously and then decreases in a largely exponential manner, quickly dropping back down to its steady state value.

Contactor selection

Operating rate less than 120 operating cycles/hour.

Maximum operational voltages: 1000 V 50/60 Hz.

The value of the peak magnetising current must be lower than the values indicated below.

Maximum ambient temperature: 55 °C.

Contactor	LC1 FG150	LC1 FG185	LC1 FG265	LC1 FG400	LC1 FG500	LC1 FG630
Maximum permissible current peak at switch-on	A	1700	2800	3500	5500	6800
Maximum operational power (1)	220 V	kVA	25	40	50	75
	380 V	kVA	50	75	90	130
	415/440 V	kVA	55	80	100	140
	500 V	kVA	65	95	110	170
	660 V	kVA	80	120	140	200
	1000 V	kVA	100	150	200	250
						375
						470

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

Selection (continued)

TeSys contactors

3-pole shockproof contactors LC1 FG

d.c. supply

Selection guide for utilisation categories DC-1 to DC-5

Use in category DC-1 (resistive loads; time constant L/R ≤ 1 ms)

Rated operational current In

Operational voltage (Ue)	Number of poles to be wired in series	Contactors					
		LC1 FG150	LC1 FG185	LC1 FG265	LC1 FG400	LC1 FG500	LC1 FG630
24	1	160	220	300	400	600	850
	2	160	220	300	400	600	850
	3	160	220	300	400	600	850
	4	160	220	300	400	600	850

48/75

1	160	220	300	400	600	850
2	160	220	300	400	600	850
3	160	220	300	400	600	850
4	160	220	300	400	600	850

125

1	—	—	—	—	—	—
2	130	170	300	400	550	850
3	130	170	300	400	600	850
4	130	170	300	400	600	850

225

1	—	—	—	—	—	—
2	100	150	250	350	450	700
3	130	170	300	400	600	850
4	130	170	300	400	600	850

300

3	100	150	250	350	450	700
4	130	170	300	400	600	850

460

4	100	150	250	350	450	700

Use in category DC-2 to DC-5 (inductive loads; time constant L/R ≤ 15 ms)

Rated operational current In

Operational voltage (Ue)	Number of poles to be wired in series	Contactors					
		LC1 FG150	LC1 FG185	LC1 FG265	LC1 FG400	LC1 FG500	LC1 FG630
24	1	140	180	280	350	550	850
	2	140	180	280	350	550	850
	3	140	180	280	350	550	850
	4	140	180	280	350	550	850

48/75

1	140	180	280	350	550	850

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Selection (continued)

TeSys contactors

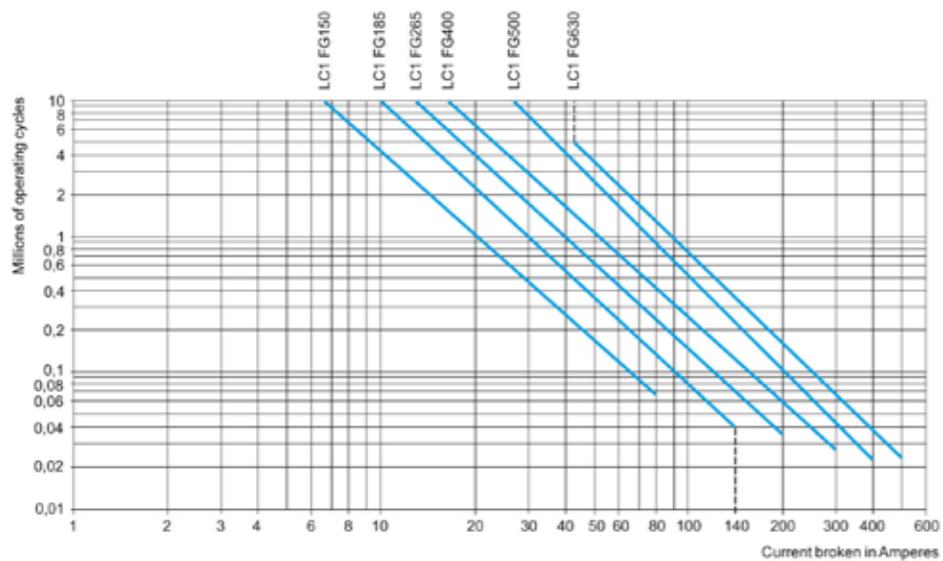
3-pole shockproof contactors LC1 FG

d.c. supply

Selection guide for utilisation categories DC-1 to DC-5

Electrical durability

Utilisation categories DC-1 to DC-5



Determining the electrical durability

The electrical durability can be read directly from the curve above, having previously calculated the power broken P_c . The following table gives, for each utilisation category, the value of P_c according to the operational current I_e and the operational voltage U_e .

Utilisation categories	P_c (Power broken)
DC-1 Non-inductive loads	$P_c = U_e \times I_e$
DC-2 Shunt motors, breaking whilst running	$P_c = 0.1 U_e \times I_e$
DC-3 Shunt motors, reversing	$P_c = U_e \times 2.5 I_e$
DC-4 Series wound motors, breaking whilst running	$P_c = 0.3 U_e \times I_e$
DC-5 Series wound motors, reversing	$P_c = U_e \times 2.5 I_e$
Counter current braking (plugging)	$P_c = 1.5 U_e \times 1.5 I_e$

Example:

Series wound motor, breaking whilst motor running, category DC-4.

$P = 50 \text{ kW}$, $U_e = 200 \text{ V}$, $I_e = 250 \text{ A}$.

Select contactor **LC1 FG265** with 3 poles in series.

The power broken is: $P_c = 0.3 U_e \times I_e = 0.3 \times 200 \times 250 = 15 \text{ kW}$.

The electrical durability read from the curve is 8 million operating cycles.

Maximum operating rate

The following operating rate used at I_e must not be exceeded: 120 operating cycles/hour.

Use of poles in parallel

The electrical durability is equal to the number of operating cycles performed by a pole, multiplied by the number of poles in parallel, multiplied by a coefficient of 0.70.

5

Characteristics

TeSys contactors

3-pole shockproof contactors LC1 FG

Control circuit: a.c.

Environment

Contactor type	Rated insulation voltage (U_i)	Conforming to IEC 60947-4-1	LC1 FG150	LC1 FG185
		Conforming to VDE 0110 gr C	V 1000	V 1500
		Conforming to standards	kV 8	EN 60947-1, EN 60947-4-1, IEC 60947-1, IEC 60947-4-1
		Product certifications	N.A.T.O.	
Degree of protection	Conforming to IEC 60529	IP 20 front face with shrouds LA9 F		
	Conforming to VDE 0106	Front face protected against direct finger contact with shrouds LA9 F		
Protective treatment	Standard version	"TH"		
Ambient air temperature around the device	Storage	°C -60...+80		
	Operation	°C -5...+55		
	Permissible at U_c (1)	°C -40...+70		
Maximum operating altitude	Without derating	m 3000		
Operating positions	Without derating			
	With derating (3)			
	Not to be used			
Shock resistance (2)			12 g, 50 ms on the three axes: X, Y, Z	15 g, 11 ms on the three axes: X, Y, Z

(1) In these conditions, it is recommended that coils LX9F be used for contactor sizes FG150 to FG265.

(2) In the least favourable direction, without change of contact state (coil at U_c).

(3) Horizontal fixing:

- The operational current AC-1 is equivalent to 80% of the value indicated in the catalogue

- Breaking and making capacities not guaranteed

- Mechanical and electrical durabilities not guaranteed

Derating of pull-in and drop-out voltage

Contactors LC1	FG150	FG185	FG265	FG400	FG500	FG630
Fixing A	Pull-in	75%	75%	75%	80%	80%
	Drop-out	105%	105%	105%	110%	110%
Fixing B	Pull-in	115%	115%	115%	120%	120%
	Drop-out	90%	90%	90%	95%	95%

Characteristics (continued)

TeSys contactors

3-pole shockproof contactors LC1 FG
Control circuit: a.c.

LC1 FG265	LC1 FG400	LC1 FG500	LC1 FG630
1000			
1500			
8			
EN 60947-1, EN 60947-4-1, IEC 60947-1, IEC 60947-4-1			
N.A.T.O.			
IP 20 front face with shrouds LA9 F			
Front face protected against direct finger contact with shrouds LA9 F			
“TH”			
-60...+80			
-5...+55			
-40...+70			
3000			
			
		30°	
			
A 			
B 			
			
12 g, 50 ms on the three axes: X, Y, Z			
15 g, 11 ms on the three axes: X, Y, Z			

5

Pole characteristics			
Contactor type		LC1 FG150	LC1 FG185
Number of poles		3	3
Rated operational current (Ie) (Ue ≤ 440 V)	In AC-3, 0 ≤ 70 °C In AC-1, 0 ≤ 70 °C 0 ≤ 55 °C	A A	150/150 220/170
Rated operational voltage (Ue)	Up to	V	1000 1000
Frequency limits	Of the operational current (1)	Hz	25 to 200 25 to 200
Conventional thermal current	θ ≤ 40	°C	250 275
Rated making capacity	I rms conforming to IEC 60947-4-1	A	Making current: 10 x I in AC-3
Rated breaking capacity	I rms conforming to IEC 60947-4-1	A	Making and breaking current: 8 x I in cat. AC-3
Permissible short time rating No current flowing for preceding 60 minutes with θ ≤ 40 °C	For 1.5 or 10 s For 30 s For 1 min For 3 min For 10 mn	A A A A A	1200 700 600 450 350
Fuse protection against short-circuits (U ≤ 440 V)	Motor circuit (type aM) With thermal overload relay (type gG) gG fuses	A A A	160 200 250
Average impedance per pole	At Ith and 50 Hz	mΩ	0.35 0.33
Power dissipation per pole for the above operational currents	AC-3 AC-1	W	8 22
Cabling Minimum c.s.a.	Bar Bar Cable with lug Cable with connector Bolt diameter	No. of bars mm mm² mm² mm	2 25 x 3 120 120 Ø 8
Tightening torque	Power circuit connections	N.m	18 18

(1) Sine wave without interference. Above these values, please consult your Regional Sales Office.

Characteristics (continued)

TeSys contactors

3-pole shockproof contactors LC1 FG
Control circuit: a.c.

LC1 FG265	LC1 FG400	LC1 FG500	LC1 FG630
3	3	3	3
265/250	400/340	500/500	630/630
300/250	430/340	580/500	850/700
1000	1000	1000	1000
25 to 200	25 to 200	25 to 200	25 to 200
350	500	700	1000
Making current: 10 x I ₁ in AC-3			
Making and breaking current: 8 x I ₁ in AC-3			
2200	3600	4200	5050
1230	2400	3200	4400
950	1700	2400	3400
620	1200	1500	2200
480	1000	1200	1600
315	400	500	630
500	630	800	800
400	500	800	1000
0.3	0.26	0.18	0.12
21	42	45	48
37	65	88	120
2	2	2	2
32 x 4	30 x 5	40 x 5	60 x 5
240	2 x 150	2 x 240	—
240	—	—	—
Ø 10	Ø 10	Ø 10	Ø 12
35	35	35	58

5

5

Control circuit characteristics with LX1 coil			
Contactor type	50 or 60 Hz	V	LC1 FG150
Rated control circuit voltage (U _c)	50 or 60 Hz	V	48...440
Control voltage limits (θ ≤ 55 °C)	50 or 60 Hz coils	Operation	0.85...1.1 U _c
		Drop-out	0.35...0.55 U _c
	40...400 Hz coils	Operation	—
		Drop-out	—
Average consumption at 20 °C and at U _c	~ 50 Hz	Inrush	50 Hz coil
			VA
			550
			805
			40...400 Hz coil
			VA
			—
			Cos φ
			0.3
			0.3
Sealed	50 Hz coil	VA	45
	40...400 Hz coil	VA	—
	Cos φ	VA	0.3
	60 Hz coil	VA	660
	40...400 Hz coil	VA	—
	Cos φ	VA	0.3
Sealed	60 Hz coil	VA	55
	40...400 Hz coil	VA	—
	Cos φ	VA	0.3
Heat dissipation		W	12...16
Operating time (1)	Closing "C"	ms	23...35
	Opening "O"	ms	5...15
Mechanical durability at U _c	In millions of operating cycles		10
Maximum operating rate at ambient temperature ≤ 55 °C	In operating cycles per hour		2400
Cabling	Flexible cable without cable end	1 or 2 conductors	mm ²
Min/max c.s.a.	Flexible cable with cable end	1 conductor	1/4
		2 conductors	mm ²
	Solid cable without cable end	1 or 2 conductors	1/2.5
		mm ²	1/4
Tightening torque		N.m	1.2
			1.2

Characteristics of the locking electromagnet (shockproof device)

Contactor type	LC1 FG150	LC1 FG185
Control circuit voltage 50/60 Hz	V	48...440
Inrush consumption	VA	100
Maximum energisation time at U _c	ms	20
Maximum operating rate	In operating cycles per hour	2400
Mechanical durability at U _c	In millions of operating cycles	1 x 10 ⁶
		1 x 10 ⁶

(1) The closing time "C" is measured from the moment the coil supply is switched on to initial contact of the main poles.
The opening time "O" is measured from the moment the coil supply is switched off to the moment the main poles separate.

Characteristics

TeSys contactors

Auxiliary contact blocks

for 3-pole shockproof contactors LC1 FG

LC1 FG265	LC1 FG400	LC1 FG500	LC1 FG630
48...440	110...440	110...440	110...440
—	—	—	—
—	—	—	—
0.85...1.1 Uc	0.85...1.1 Uc	0.65...1.1 Uc	0.65...1.1 Uc
0.35...0.55 Uc	0.3...0.5 Uc	0.3...0.5 Uc	0.25...0.5 Uc
—	—	—	—
650	1075	1100	1650
0.9	0.9	0.9	0.9
—	—	—	—
10	15	18	22
0.9	0.9	0.9	0.9
—	—	—	—
650	1075	1100	1650
0.9	0.9	0.9	0.9
—	—	—	—
10	15	18	22
0.9	0.9	0.9	0.9
8	14	18	20
40...65	40...75	40...75	40...80
100...170	100...170	100...170	100...200
10	10	10	10
2400	2400	2400	1200
1/4	1/4	1/4	1/4
1/4	1/4	1/4	1/4
1/2.5	1/2.5	1/2.5	1/2.5
1/4	1/4	1/4	1/4
1.2	1.2	1.2	1.2
LC1 FG265	LC1 FG400	LC1 FG500	LC1 FG630
48...440	110...440	110...440	110...440
100	100	100	100
20	20	20	20
2400	2400	2400	1200
1×10^6	1×10^6	1×10^6	1×10^6

5

Environment		LAD N	LAD T and LAD S	LAD R
Contact block type		IAD N	IEC 60947-5-1, NF C 63-140, VDE 0660, BS 4794, EN 60947-5-1	
Conforming to standards		UL, CSA		—
Product certifications		—		—
Protective treatment		Conforming to IEC 60068		—
Degree of protection		Conforming to VDE 0106		Protection against direct finger contact IP2X
Ambient air temperature around the device	Storage	°C	- 60...+ 80	
	Operation	°C	- 5...+ 60	
	Permissible for operation at Uc	°C	- 40...+ 70	
Maximum operating altitude		m	3000	
Cabling		Phillips N° 2 and Ø 6 mm. Flexible or solid cable with or without cable end	mm ²	Min: 1 x 1; max: 2 x 2.5
Instantaneous and time delay contact characteristics				
Contact block type		LAD N	LAD T and LAD S	LAD R
Number of contacts		1 or 4	2	2
Rated operational voltage (Ue)		V	660	
Rated insulation voltage (Ui)	Conforming to IEC 60947-5-1	V	690	
	Conforming to UL, CSA	V	600	
Conventional thermal current (Ith)		A	10	
Frequency of the operational current		Hz	25...400	
Minimum switching capacity	U min	V	17	
	I min	mA	5	
Short-circuit protection		A	10	
Conforming to IEC 60947-5-1 and VDE 0660. gG fuse		A	10	
Rated making capacity		A rms	~ 140 ; $= 250$	
Short-time rating	Permissible for	1 s	A	100
		500 ms	A	120
		100 ms	A	140
Insulation resistance		MΩ	> 10	
Non-overlap time		ms	1.5 (on energisation and on de-energisation)	
Time delay (LADT, R and S contact blocks) Accuracy only valid for setting range indicated on the front face	Ambient air temperature for operation	°C	—	- 40...+ 70
	Repeat accuracy	—	± 2 %	
	Drift up to 0.5 million operating cycles	—	+ 15 %	
	Drift depending on ambient air temperature	—	0.25 % per °C	
Mechanical durability		In millions of operating cycles	30	5
Rated operational power of contacts Conforming to IEC 60947-5-1	1 million operating cycles	V	24	48
		VA	150	300
	3 million operating cycles	VA	80	170
	10 million operating cycles	VA	30	65
	Occasional making capacity	VA	1200	2600
References : page 5/175		Schemes : page 5/181		

Characteristics (continued)

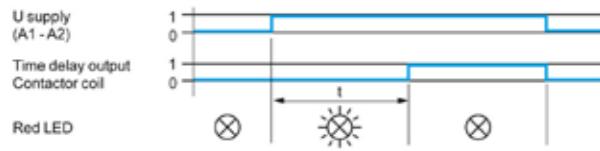
TeSys contactors

Auxiliary contact blocks
for 3-pole shockproof contactors LC1 FG

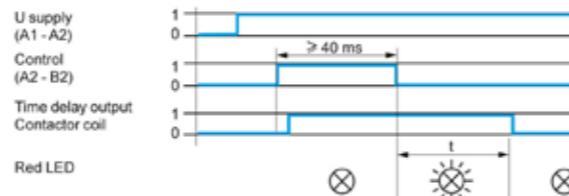
Environment		
Module type	LAD T (On-delay)	LAD R (Off-delay)
Conforming to standards		IEC 60255-5
Product certifications	UL, CSA	
Protective treatment	Conforming to IEC 60068	"TH"
Degree of protection	Conforming to VDE 0106	Protection against direct finger contact IP2X
Ambient air temperature around the device	Storage: -40...+80 °C Operation: -25...+55 °C For operation at Uc: -25...+70 °C	
Rated insulation voltage (Ui)	Conforming to IEC 60947-1	V 250
Cabling	Phillips N° 2 and Ø 6 mm. Flexible or solid cable with or without cable end	mm² Min: 1 x 1; max: 2 x 2.5
Control circuit characteristics		
Module type	LAD T (On-delay)	LAD R (Off-delay)
Built-in protection	Of the input Contactor coil suppression	By varistor By varistor By bidirectional peak limiting diode
Rated control circuit voltage (Uc)	V ~ or --- 24...250	~ 24...250
Permissible variation	0.8...1.1 Uc	0.8...1.1 Uc
Control type	By mechanical contact only	By mechanical contact only connecting cable < 10 m
Time delay characteristics		
Module type	LAD T (On-delay)	LAD R (Off-delay)
Timing ranges	s 0.1...2 ; 1.5...30 ; 25...500	0.1...2 ; 1.5...30 ; 25...500
Repeat accuracy	0...40 °C ± 3 % (10 ms minimum)	± 3 % (10 ms minimum)
Reset time	ms During time delay period: 150 After time delay period: 50	225
Immunity to microbreaks	ms During time delay period: 10 After time delay period: 2	20
Minimum impulse duration	ms -	40
Time delay signalling	By LED	Illuminates during time delay period
Switching characteristics (solid state type)		
Module type	LAD T (On-delay)	LAD R (Off-delay)
Maximum power dissipated	W 2	3.5
Leakage current	mA < 5	< 5
Residual voltage	V 3.3	3.3
Overvoltage protection		3 kV; 0.5 joule
Electrical durability	In millions of operating cycles 30	30

Operating diagrams

Electronic On-delay timer LAD T



Electronic Off-delay timer LAD R



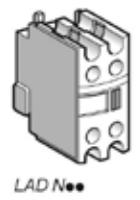
References

TeSys contactors

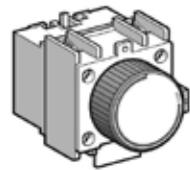
3-pole shockproof contactors LC1 FG
For control of motors and distribution circuits.
Control circuit: a.c.

3-pole shockproof contactors										(1)	Basic reference, to be completed by adding the voltage code (3)	Weight	
Standard power ratings of 3-phase motors 50-60 Hz in category AC-3							Rated operational current in cat. AC-3, 440 V/AC-1 up to	DCN ref.	Screw fixing, cabling (2)				
220 V	380 V	660 V	230 V	400 V	415 V	440 V	500 V	690 V	1000 V	kW	kW	kW	A
40	75	80	80	90	100	100	65	150/250	CR182	LC1 FG150**		3.430	
55	90	100	100	110	110	100	100	185/275	CR242	LC1 FG185**		4.650	
75	132	140	140	160	160	147	147	265/350	CR302	LC1 FG265**		7.440	
110	200	220	250	257	280	185	185	400/500	CR432	LC1 FG400**		9.100	
147	250	280	295	355	335	335	500/700	CR582	LC1 FG500**		11.350		
200	335	375	400	400	450	450	630/1000	CR852	LC1 FG630**		18.600		
<i>Note: These contactors have instantaneous auxiliary contact blocks with 2 N/O contacts, 1 N/C contact and one coil maintaining contact.</i>													
(1) Devices approved by the DCN (French naval shipyard department) and authorised for on-board use.													
(2) Power terminals can, if required, be protected against direct finger contact by the addition of shrouds, to be ordered separately (see page 5/176).													
(3) Standard control circuit voltages (for other voltages, please consult your Regional Sales Office):													
										(1)			
Volt ~										48	110	115	120
LC1 FG 150...FG185										E5	F5	F5	-
60 Hz (coil LX1)										-	M5	P5	U5
50/60 Hz (coil LX9)										E6	F6	-	-
L7 M7 P7 G6										L6	M6	-	U6 Q6
L7 M7 P7 U7 Q7 V7 N7 R7										-	-	R6	
LC1 FG265										E7	F7	F7	G7
40...400 Hz (coil LX1)										L7	M7	P7	U7
Q7 V7 N7 R7										Q7	V7	N7	
LC1 FG400...FG500										-	F7	F7	G7
L7 M7 P7 U7 Q7 V7 N7 R7										L7	M7	P7	U7
Q7 V7 N7 R7										Q7	V7	N7	
LC1 FG630										-	F7	F7	F7
L7 M7 P7 U7 Q7 V7 N7 R7										L7	M7	P7	U7
Q7 V7 N7 R7										Q7	V7	N7	

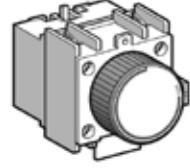
References



LAD N**



LAD T*



LAD R*

TeSys contactors

Auxiliary contact blocks for
3-pole shockproof contactors LC1 FG

Instantaneous auxiliary contact blocks

For use in normal operating environments

Number of contacts	Max. number of blocks per contactor	Composition	Reference	Weight kg
1	1	- - 1 -	LAD N10 (1)	0.020
		- - - 1	LAD N01 (1)	0.020
4	1	- - 2 2	LAD N22 (1)	0.050
		- - 4 -	LAD N40 (1)	0.050
		- - - 4	LAD N04 (1)	0.050
		- - 3 1	LAD N31 (1)	0.050

Time delay auxiliary contact blocks

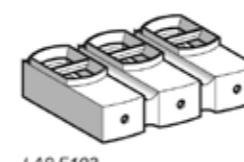
Number of contacts	Max. number of blocks per contactor	Time delay	Reference	Weight kg
		Type	Range	
1 N/O + 1 N/C	1	On-delay	0.1...3 (2) LAD T0	0.060
			0.1...30 LAD T2 (1)	0.060
			10...180 LAD T4	0.060
			1...30 (3) LAD S2	0.060
		Off-delay	0.1...3 (2) LAD R0	0.060
			0.1...30 LAD R2 (1)	0.060
			10...180 LAD R4	0.060

(1) Device approved by the DCN (French naval shipyard department) and authorised for on-board use.

(2) With extended scale from 0.1 to 0.6 s.

(3) With switching time of 40 ms ± 15 ms between opening of the N/C contact and closing of the N/O contact.

References



LA9 F103

Insulated terminal blocks

For use with contactors	Cabling	Tightening	Set of 2 blocks	Weight kg
LC1 FG150 and FG185	1 x 16...150 mm ² or 2 x 16...95 mm ²	4 mm hexagonal socket key	LA9 F103	0.560

Power terminal protection shrouds

For use with contactors	Number of shrouds per set	Set reference	Weight kg
LC1 FG150 and FG185	6	LA9 F702 (1)	0.250
LC1 FG265, FG400 and FG500	6	LA9 F703 (1)	0.250
LC1 FG630	6	LA9 F704 (1)	0.250

Shockproof devices (locking electromagnet) (2)

Maximum energisation time at U _c	Inrush consumption	For contactors	Kit reference, to be completed by adding the voltage code (3)	Weight kg
ms	VA			
20	250	LC1 FG150 and FG185	LA9 FG150603** (1)	0.200
		LC1 FG265	LA9 FG265603** (1)	0.200
		LC1 FG400 and FG500	LA9 FG400603** (1)	0.200
		LC1 FG630	LA9 FG630603** (1)	0.200

(1) Device approved by the DCN (French naval shipyard department) and authorised for on-board use.
(2) Replacement shockproof device, supplied in kit form, comprising:
- 1 locking electromagnet.
- fixings suitable for the contactor rating.
(3) Control circuit voltage:

Volt ~	48	110	115/120	208	220	230/240	380	415	440
LA9 FG150 to FG265	50/60 Hz	E	F	M	M	M	Q	N	N
LA9 FG400 to FG630	50/60 Hz	-	F	F	M	M	Q	N	N

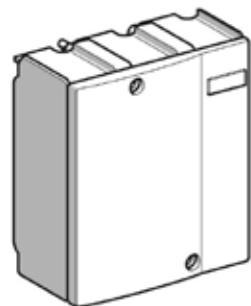
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TeSys contactors

Accessories for 3-pole shockproof contactors
LC1 FG

References (continued)



LA5 F40050

Sets of contacts

Per pole: 2 fixed contacts, 1 moving contact, 2 deflectors, 1 back-plate, clamping screws and washers.

For use on contactors	Replacement for	Reference		Weight kg
LC1 FG150	3 poles	LA5 FF431	(1)	0.270
LC1 FG185	3 poles	LA5 FG431	(1)	0.350
LC1 FG265	3 poles	LA5 FG431	(1)	0.660
LC1 FG400	3 poles	LA5 F400803	(1)	2.000
LC1 FG500	3 poles	LA5 F500803	(1)	2.950
LC1 FG630	3 poles	LA5 F630803	(1)	6.100

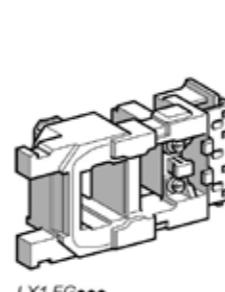
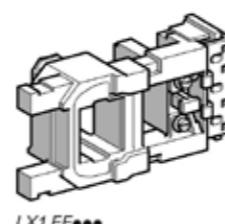
Arc chambers

For use on contactors	Replacement for	Reference		Weight kg
LC1 FG150	3 poles	LA5 F15050	(1)	0.490
LC1 FG185	3 poles	LA5 F18550	(1)	0.670
LC1 FG265	3 poles	LA5 F26550	(1)	0.920
LC1 FG400	3 poles	LA5 F40050	(1)	1.300
LC1 FG500	3 poles	LA5 F50050	(1)	1.850
LC1 FG630	3 poles	LA5 F63050	(1)	3.150

(1) Device approved by the DCN (French naval shipyard department) and authorised for on-board use.

5

References



Scheme :
page 5/181

TeSys contactors

Coils for 3-pole shockproof contactors LC1 FG
Spare or replacement parts
a.c. supply 50/60 Hz

References

Control circuit voltage Uc	Voltage code	Coil reference		Weight kg
50 Hz	60 Hz			
V	V			
Coils for contactors LC1 FG150				
-	48	E6	LX1 FF040	0.430
48	-	E5	LX1 FF048	0.430
-	110	F6	LX1 FF092	0.430
-	115/120	G6	LX1 FF095 (1)	0.430
110/115	-	F5	LX1 FF110	0.430
120	-	FE5	LX1 FF120	0.430
-	208	L6	LX1 FF170	0.430
-	320	M6	LX1 FF184	0.430
-	230/240	U6	LX1 FF187	0.430
208	-	LE5	LX1 FF200	0.430
220/230	-	M5	LX1 FF220	0.430
240	-	U5	LX1 FF240	0.430
-	380	Q6	LX1 FF316	0.430
-	415	N6	LX1 FF340	0.430
-	440	R6	LX1 FF360	0.430
380	-	Q5	LX1 FF380	0.430
415/440	-	N5	LX1 FF415	0.430

Specifications

Average consumption at 20 °C:
- inrush 50 Hz: 550 VA; 60 Hz: 660 VA,
- sealed 50 Hz: 45 VA; 60 Hz: 55 VA, $\cos \varphi = 0.32$.
Operating cycles/hour ($\theta = 55^\circ\text{C}$): 2400.

Coils for contactors LC1 FG185

	48	E6	LX1 FG040	0.550
48	-	E5	LX1 FG048	0.550
-	110	F6	LX1 FG092	0.550
-	115/120	G6	LX1 FG095 (1)	0.550
110/115	-	F5	LX1 FG110	0.550
120	-	FE5	LX1 FG120	0.550
-	208	L6	LX1 FG170	0.550
-	320	M6	LX1 FG184	0.550
-	230/240	U6	LX1 FG187	0.550
208	-	LE5	LX1 FG200	0.550
220/230	-	M5	LX1 FG220	0.550
240	-	U5	LX1 FG240	0.550
-	380	Q6	LX1 FG316	0.550
-	415	N6	LX1 FG340	0.550
-	440	R6	LX1 FG360	0.550
380	-	Q5	LX1 FG380	0.550
415/440	-	N5	LX1 FG415	0.550

Specifications

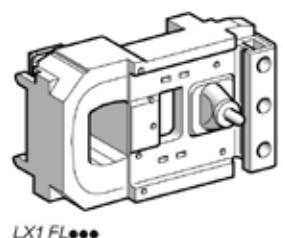
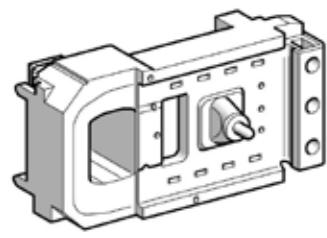
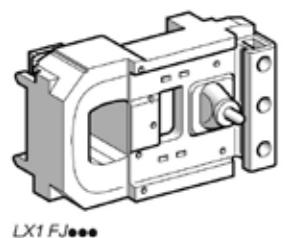
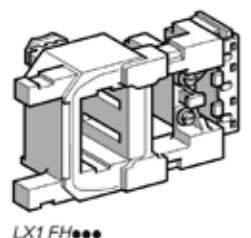
Average consumption at 20 °C:
- inrush 50 Hz: 805 VA; 60 Hz: 970 VA,
- sealed 50 Hz: 55 VA; 60 Hz: 66 VA, $\cos \varphi = 0.34$.
Operating cycles/hour ($\theta = 55^\circ\text{C}$): 2400.

(1) Device approved by the DCN (French naval shipyard department) and authorised for on-board use.

TeSys contactors

Accessories for 3-pole shockproof contactors
LC1 FG

References (continued)



TeSys contactors

Coils for 3-pole shockproof contactors LC1 FG
Spare or replacement parts
a.c. supply 50/60 Hz

References (continued)

Control circuit voltage Uc 50 and 60 Hz	Voltage code	Coil reference	Weight
V			kg
110/120	F7	LX1 FH1102	(1) 0.740
208	L7	LX1 FH2002	0.740
220/230	M7	LX1 FH2202	0.740
240	U7	LX1 FH2402	0.740
380/415	Q7	LX1 FH3802	0.740

Specifications

Average consumption at 20 °C:
- inrush 50 or 60 Hz: 600 to 700 VA,
- sealed 50 or 60 Hz: 8 to 10 VA, cos φ = 0.9.
Operating cycles/hour (θ = 55 °C): 2400.

Coils for contactors LC1 FG400

110/120	F7	LX1 FJ110	(1) 1.000
208	L7	LX1 FJ200	1.000
220/230	M7	LX1 FJ220	1.000
230/240	U7	LX1 FJ240	1.000
380/400	Q7	LX1 FJ380	1.000
415/440	N7	LX1 FJ415	1.000

Specifications

Average consumption at 20 °C:
- inrush 50 or 60 Hz: 1000 to 1150 VA,
- sealed 50 or 60 Hz: 12 to 18 VA, cos φ = 0.9.
Operating cycles/hour (θ = 55 °C): 2400.

Coils for contactors LC1 FG500

110/120	F7	LX1 FK110	(1) 1.150
208	L7	LX1 FK200	1.150
220/230	M7	LX1 FK220	1.150
230/240	U7	LX1 FK240	1.150
380/400	Q7	LX1 FK380	1.150
415/440	N7	LX1 FK415	1.150

Specifications

Average consumption at 20 °C:
- inrush 50 or 60 Hz: 1050 to 1150 VA,
- sealed 50 or 60 Hz: 16 to 20 VA, cos φ = 0.9.
Operating cycles/hour (θ = 55 °C): 2400.

Coils for contactors LC1 FG630

110/120	F7	LX1 FL110	(1) 1.500
208	L7	LX1 FL200	1.500
220/230	M7	LX1 FL220	1.500
380/400	Q7	LX1 FL380	1.500
415/440	N7	LX1 FL415	1.500

Specifications

Average consumption at 20 °C:
- inrush 50 or 60 Hz: 1500 to 1730 VA,
- sealed 50 or 60 Hz: 20 to 25 VA, cos φ = 0.9.
Operating cycles/hour (θ = 55 °C): 1200.

(1) Device approved by the DCN (French naval shipyard department) and authorised for on-board use.

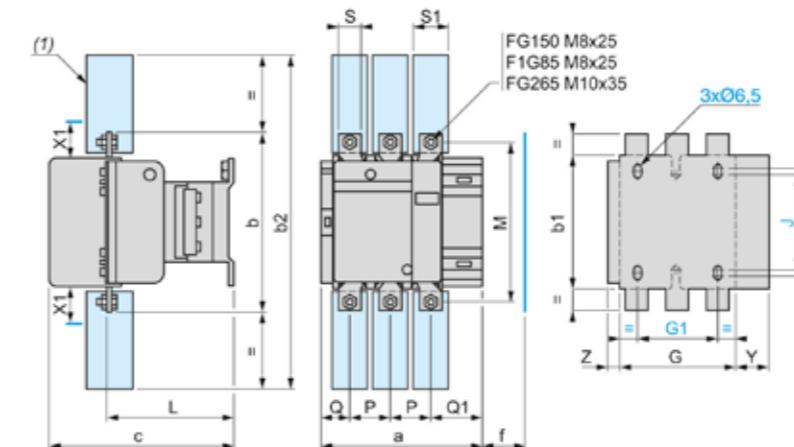
Dimensions

TeSys contactors

3-pole shockproof contactors LC1 FG

Dimensions

LC1 FG150, FG185 and FG265



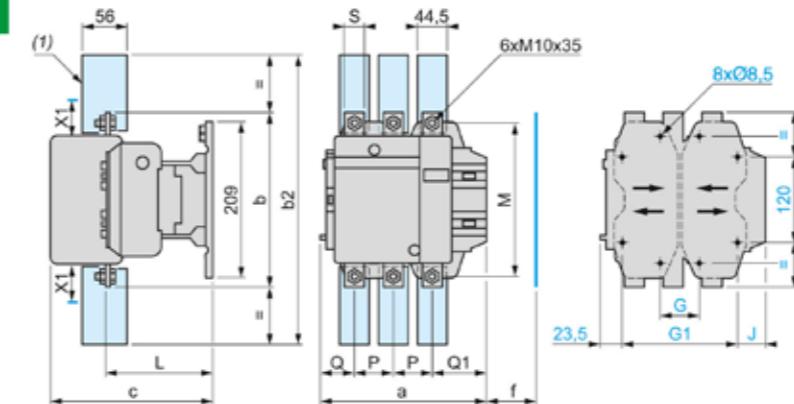
X1 (mm) = Minimum electrical clearance according to operating voltage and breaking capacity.

LC1	200...500 V	600...1000 V
FG150	10	15
FG185	10	15
FG265	10	15

(1) Power terminal protection shroud (see page 5/176).

5

LC1 FG400 and FG500



X1 (mm) = Minimum electrical clearance according to operating voltage and breaking capacity.

LC1	200...500 V	600...1000 V
FG400	15	20
FG500	15	20

(1) Power terminal protection shroud (see page 5/176).

5

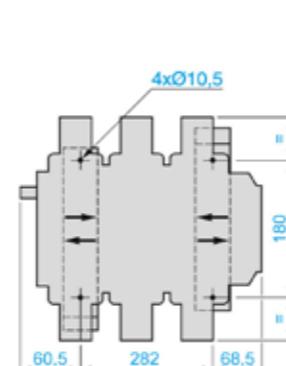
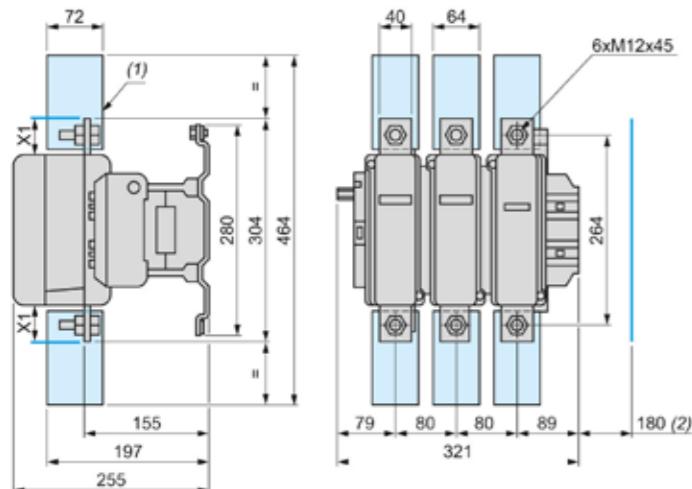
LC1

LC1	a	b	b2	c	f	G supplied min.	G supplied max.	G1 supplied min.	G1 supplied max.	J	L	M	P	Q	Q1	S		
FG400	237	206	375	234	146	80	66	102	223	156	192	19.5	160	181	48	75	74	25
FG500	257	238	400	247	150	80	66	120	223	156	210	39.5	181	208	55	78	77	30

f = minimum distance required for coil removal.

Dimensions (continued)

LC1 FG630



X1 (mm) = Minimum electrical clearance
according to operating voltage and breaking
capacity.

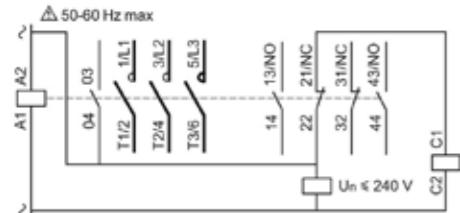
LC1 200...500 V 690...1000 V
FG630 20 30

(1) Power terminal protection shroud (see page 5/176).

(2) Minimum distance required for coil removal.

Schemes

Contactors LC1-FG150 to FG630



Add-on blocks

Instantaneous auxiliary contacts

1 N/O LAD N10



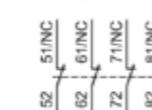
1 N/C LAD N01



2 N/O + 2 N/C LAD N22



4 N/O LAD N40



4 N/C LAD N04



3

5

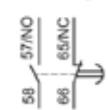


Time delay auxiliary contacts

On-delay 1 N/O + 1 N/C LAD T•

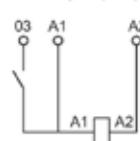


Off-delay 1 N/O + 1 N/C LAD R•



Coils ~

LX1 FF, FG, FH, FJ, FK and FL



Environment

Contactor type		LC1 BL	LC1 BM	LC1 BP	LC1 BR
Rated insulation voltage (Ui)	Conforming to IEC 60158-1/IEC 60947-4 Conforming to VDE 0110 gr C	V V	1000 1500	1000 1500	1000 1500
Conforming to standards			IEC 60158-1, IEC 60947-4, NF C 63-110, VDE 0660, BS 5424		
Product certifications			CSA, BV, RINA		
Protective treatment	Standard version Special version		"TC" "TH"		
Ambient air temperature around the device (for operation at Uc)	Storage Operation Permissible	°C °C °C	- 60... + 80 - 5... + 55 - 50... + 60		
Maximum operating altitude	Without derating	m	3000		
Operating positions	Without derating		± 30° occasional, in relation to normal vertical mounting plane		
Pole characteristics		1, 2, 3 or 4	1, 2, 3 or 4	1, 2, 3 or 4	1, 2, 3 or 4
Number of poles					
Rated operational current (Ie)	In AC-3, 0 ≤ 55 °C (Ue ≤ 440 V)	A A	750 800	1000 1250	1500 2000
Rated operational voltage (Ue)	Up to	V	1000		
Frequency limits	Without derating (sine wave)	Hz	50/60		
	Derating coefficient		100 Hz: 0.9 - 150 Hz: 0.8 - 250 Hz: 0.7 - 400 Hz: 0.5		
Maximum thermal current (Ith)	0 ≤ 40 °C	A	800	1250	2000
Rated making capacity	Irms conforming to IEC 60158-1 and 60947-4	A	10 000	10 000	15 000
Rated breaking capacity	Irms up to 440 V conforming to IEC 60158-1 and 60947-4	A	10 000 9000 8000 4000	10 000 9000 8000 4000	15 000 12 000 9000 5000
Permissible short time rating	For 1 s From cold state, with no current flowing for previous 60 minutes at 0 ≤ 40 °C	A	9600 9600 7000 4800 3500 2100 1200	9600 9600 8000 5200 3800 2400 1800	12 000 12 000 9600 6400 5200 3600 2800
Short-circuit protection by fuses U ≤ 440 V	Motor circuit (type aM) With thermal overload relay (type gl) gl fuses	A	800 1000 800	1200 1500 1200	2 x 800 (1) 2 x 1000 (1) 2 x 1200 (1)
Average impedance per pole	At Ith and 50 Hz	mΩ	0.18	0.18	0.13
Power dissipated per pole	AC-3 AC-1	W	88 115	180 280	290 520
Connection	Number of bars Bar	mm	2 50 x 5	2 80 x 5	3 100 x 5
Bolt diameter		mm	4 x Ø 8	4 x Ø 10	4 x Ø 10
Tightening torque	Power circuit connections	N.m	21	35	35

(1) Fuses must not be connected in parallel unless specified by the manufacturer.

Characteristics (continued)

TeSys contactors

TeSys LC1 B contactors

References

TeSys contactors

Control circuit characteristics							
Contactor type			LC1 BL	LC1 BM	LC1 BP	LC1 BR	
Rated control voltage	50/60 Hz	V	110...500	110...500	110...500	110...500	
	... 1,2 or 3-pole contactors	V	48...500	48...500	48...500	48...500	
	... 4-pole contactors	V	48...500	48...500	48...500	60...500	
Voltage limits	Operation	V	0.85...1.1 Uc	0.85...1.1 Uc	0.85...1.1 Uc	0.85...1.1 Ucw	
	Drop-out	V	0.30...0.50 Uc	0.30...0.50 Uc	0.35...0.50 Uc	0.40...0.50 Uc	
Maximum consumption (coil + economy resistor)	~	Number of poles: 1	VA	Inrush: 620 - sealed: 10			
		Number of poles: 2	VA	Inrush: 1000 - sealed: 20			
		Number of poles: 3	VA	Inrush: 1300 - sealed: 31			
		Number of poles: 4	VA	Inrush: 1600 - sealed: 47			
	... (1)	Number of poles: 1	W	Inrush: 520 - sealed: 10			
		Number of poles: 2	W	Inrush: 800 - sealed: 20			
		Number of poles: 3	W	Inrush: 1100 - sealed: 31			
		Number of poles: 4	W	Inrush: 1400 - sealed: 47			
Operating time (2) average at Uc (in milliseconds)	"C"	ms	100...150	100...150	100...150	100...150	
	"O" breaking on ~ side	ms	50...100	50...100	50...100	50...100	
	"O" breaking on ... side	ms	20...40	20...40	20...40	20...40	
Mechanical durability (at Uc)	In millions of operating cycles		1.2	1.2	1.2	1.2	
Maximum operating rate in mechanical operating cycles	Ambient temperature ≤ 55 °C	Op. cys/h	120	120	120	120	

Characteristics of instantaneous auxiliary contacts ZC4 GM•

(1) The inrush and sealed power values of d.c. electromagnets often require the use of intermediate relay for control.

(2) The closing time "C" is measured from the moment the coil supply is switched on to initial contact of the main poles. The opening time "O" is measured from the moment the coil supply is switched off to the moment the main poles separate.



LC1 BP:

Contactors for motor control in category AC-3, from 750 to 1800 A (~ or ---)										
3-pole contactors								Weight		
Standard power ratings of 3-phase motors 50-60 Hz in category AC-3										
220 V	380 V	660 V				Rated operational current in AC-3 440V up to	Instant- aneous auxiliary contacts			
230 V	400 V	415 V	440 V	500 V	690 V	1000 V				
kW	kW	kW	kW	kW	kW	kW	A		kg	
220	400	425	450	500	560	530	750	2	2 LC1 BL33•22	58.000
								3	1 LC1 BL33•31	58.000
								1	3 LC1 BL33•13	58.000
								4	- LC1 BL33•40	58.000
280	500	530	560	600	670	530	1000	2	2 LC1 BM33•22	57.000
								3	1 LC1 BM33•31	57.000
								1	3 LC1 BM33•13	57.000
								4	- LC1 BM33•40	57.000
425	750	800	800	700	750	670	1500	2	2 LC1 BP33•22	94.000
								3	1 LC1 BP33•31	94.000
								1	3 LC1 BP33•13	94.000
								4	- LC1 BP33•40	94.000
500	900	900	900	900	900	750	1800	2	2 LC1 BR33•22	129.000
								3	1 LC1 BR33•31	129.000
								1	3 LC1 BR33•13	129.000
								4	- LC1 BR33•40	129.000

Contactors for control in category AC-1, from 800 to 2750 A (\sim or $=$)

Single, 2, 3 or 4-pole contactors				
Maximum operational current in AC-1 ($\theta \leq 40^\circ\text{C}$)	Number of poles	Instantaneous auxiliary contacts	Basic reference, to be completed by adding the voltage code (1)	Weight
800	1		LC1 BL31•22	32.000 kg
			LC1 BL31•31	32.000
			LC1 BL31•13	32.000
			LC1 BL31•40	32.000
	2		LC1 BL32•22	45.000
			LC1 BL32•31	45.000
			LC1 BL32•13	45.000
			LC1 BL32•40	45.000
	3		LC1 BL33•22	58.000
			LC1 BL33•31	58.000
			LC1 BL33•13	58.000
			LC1 BL33•40	58.000
	4		LC1 BL34•22	72.000
			LC1 BL34•31	72.000
			LC1 BL34•13	72.000
			LC1 BL34•40	72.000

(1) Standard control circuit voltages (for other voltages, please consult your Regional Sales Office).

Volts	48	110	120	125	127	220	230	240	380	400	415	440	500
~ 50...400 Hz	-	F	K	-	G	M	P	U	Q	V	N	R	S
—	ED	ED	—	GD	—	MD	—	UD	—	—	RD	SD	—

For voltages other than those indicated above, replace the *p* in the reference with the the operational voltage (3 figures) and the type of current (2 letters): **AC** for a.c. supply and **DC** for d.c. supply. Example: 82 V d.c., the reference becomes **I.C.1.BR33082DC22**. For all characteristics, see pages 5/188 to 5/193.

References (continued)

Contactors for control in category AC-1, from 800 to 2750 A (~ or ≡) (continued)					
	Single, 2, 3 or 4-pole contactors	Number of poles	Instantaneous auxiliary contacts	Basic reference, to be completed by adding the voltage code (1)	Weight
	Maximum operational current in AC-1 (I ≤ 40 °C)				
A					
1250		1	2	LC1 BM31•22	31.000
			3	LC1 BM31•31	31.000
			1	LC1 BM31•13	31.000
			4	LC1 BM31•40	31.000
		2	2	LC1 BM32•22	44.000
			3	LC1 BM32•31	44.000
			1	LC1 BM32•13	44.000
			4	LC1 BM32•40	44.000
		3	2	LC1 BM33•22	57.000
			3	LC1 BM33•31	57.000
			1	LC1 BM33•13	57.000
			4	LC1 BM33•40	57.000
		4	2	LC1 BM34•22	71.000
			3	LC1 BM34•31	71.000
			1	LC1 BM34•13	71.000
			4	LC1 BM34•40	71.000
2000		1	2	LC1 BP31•22	41.000
			3	LC1 BP31•31	41.000
			1	LC1 BP31•13	41.000
			4	LC1 BP31•40	41.000
		2	2	LC1 BP32•22	65.000
			3	LC1 BP32•31	65.000
			1	LC1 BP32•13	65.000
			4	LC1 BP32•40	65.000
		3	2	LC1 BP33•22	94.000
			3	LC1 BP33•31	94.000
			1	LC1 BP33•13	94.000
			4	LC1 BP33•40	94.000
		4	2	LC1 BP34•22	120.000
			3	LC1 BP34•31	120.000
			1	LC1 BP34•13	120.000
			4	LC1 BP34•40	120.000
2750		1	2	LC1 BR31•22	52.000
			3	LC1 BR31•31	52.000
			1	LC1 BR31•13	52.000
			4	LC1 BR31•40	52.000
		2	2	LC1 BR32•22	85.000
			3	LC1 BR32•31	85.000
			1	LC1 BR32•13	85.000
			4	LC1 BR32•40	85.000
		3	2	LC1 BR33•22	129.000
			3	LC1 BR33•31	129.000
			1	LC1 BR33•13	129.000
			4	LC1 BR33•40	129.000
		4	2	LC1 BR34•22	160.000
			3	LC1 BR34•31	160.000
			1	LC1 BR34•13	160.000
			4	LC1 BR34•40	160.000

(1) See previous page.

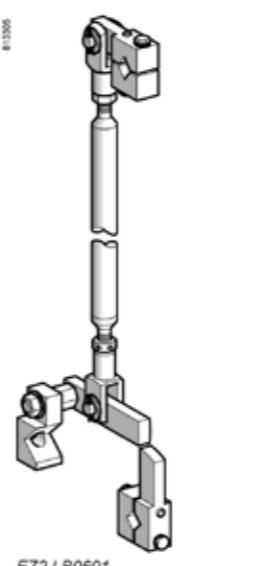
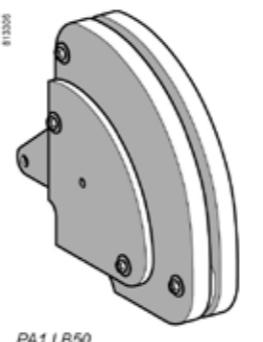
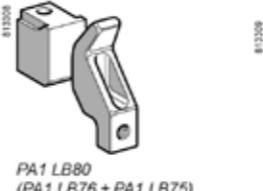
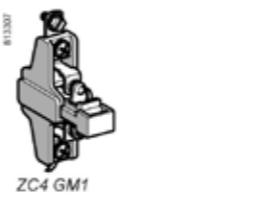


TeSys contactors TeSys LC1 B contactors

References

TeSys contactors

TeSys LC1 B contactors
Accessories and spare parts



Spare parts				
Description	For contactor	Composition	Reference	Weight kg
Instantaneous auxiliary contact blocks	LC1 B	1 N/O 1 N/C	ZC4 GM1 ZC4 GM2	0.030 0.030

Description	For contactor	Number of sets required per contactor pole	Set reference	Weight kg
Set of contacts (1 moving contact, 1 fixed contact)	LC1 BL LC1 BM LC1 BP LC1 BR	1	PA1 LB80 PA1 LB80 + PA1 LB75 PA1 LB80 PA1 LB80	0.420 0.420 0.420 0.420

Description	For contactor	Reference	Weight kg
Moving contact only (for 1 finger)	LC1 B	PA1 LB75	0.220
Fixed contact only	LC1 B	PA1 LB76	0.200
Blow-out horn only LC1 B (for 1 finger)	LC1 B	PA1 LB89	0.120
Arc chamber (for 1 contactor pole)	LC1 BL LC1 BM LC1 BP LC1 BR	PA1 LB50	3.700 3.700 6.200 8.500

Description	For contactor	Reference	Weight kg
Bar support bracket	LC1 BL to BR	LA9 B103	1.620
for mounting on 120 or 150 mm centres			

Mounting accessories

Description	For contactor	Sold in lots of	Unit reference	Weight kg
Bar support bracket	LC1 BL to BR	2	LA9 B103	1.620

Description	For contactor	Reference	Weight kg
Mechanical interlock and locking device components	LC1 B	EZ2 LB0601	1.280

Specifications

- Positive mechanical interlock between two vertically mounted contactors of the same or different ratings.
- Connecting rod with cranks mounted on the right-hand, pole side.
- Vertical fixing centres of the two contactors: 600 mm.

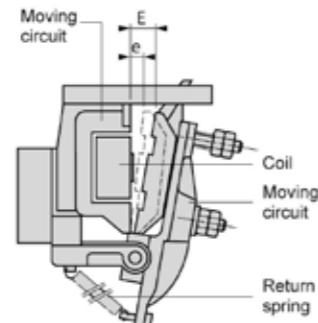
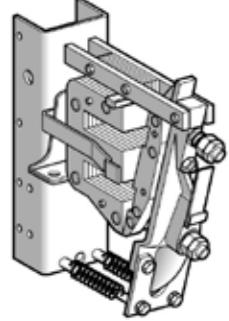
Description	Specification	Height mm	Sold in lots of	Unit reference	Weight kg
Notched mounting rails used as uprights and as equipment support	2 mm steel, with zinc chromate treatment	1650	4	AM1 EC165	2.460
		1850	4	AM1 EC185	2.760
		2000	4	AM1 EC200	2.980

Description	M8	—	10	AF1 CD081	0.020
1/4 turn sliding clip nut and corresponding screw for assembly of rails AM1 EC	M8 x 18	—	10	AF1 VC820	0.024

Electromagnet

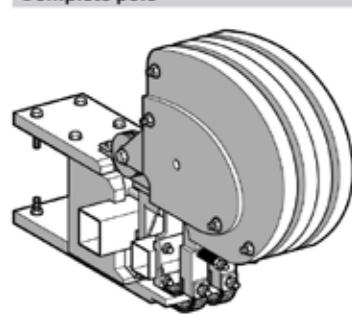
Electromagnet EB5 KB50

Adjustment of pick-up travel and pull-in travel

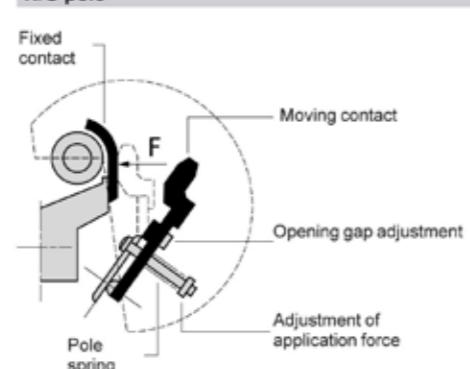


Poles

Complete pole



N/O pole



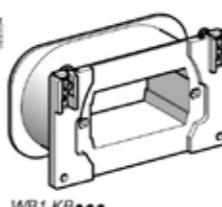
— or ~ supply adjustment characteristics with economy resistor (and rectifier on ~)

Contactor type	LC1 BL	LC1 BM	LC1 BP	LC1 BR
Electromagnet	EB5 KB50	EB5 KB50	EB5 KB50	EB5 KB50
Pick-up travel (E)	mm	30	30	30
Pull-in travel (e)	mm	10	10	10
Coil	WB1 KB***	WB1 KB***	WB1 KB***	WB1 KB***
Pull-in voltage	V	0.75 Uc	0.75 Uc	0.75 Uc
Drop-out voltage	V	0.3...0.5 Uc	0.3...0.5 Uc	0.3...0.5 Uc
N/O pole	1-pole	daN	30	30
Adjustment of application force (F) on the contact per pole according to contactor composition	2-pole	daN	30	30 (1)
	3-pole	daN	30	30 (1)
	4-pole	daN	30	30 (1)

(1) Each pole has 2 contacts; the force must be applied evenly to each of these contacts.

(2) Each pole has 3 contacts; the force must be applied evenly to each of these contacts.

5



5

References

The same coils are used for — or ~ contactor control supply.

- For d.c. operation, the following must be associated with the coil:
 - 1 economy resistor arrangement (resistors + 1 or 2 auxiliary contact(s) or 1 contactor).
- For 50 to 400 Hz a.c. operation, the following must be associated with the coil:
 - 1 individual rectifier (to be wired),
 - 1 economy resistor arrangement (resistors + auxiliary contact(s) or 1 contactor) wired into the rectified current side.

Operating range min-max (1)	Coil			Economy resistor		Rectifier (for ~ only)	Coil Reference	Weight	
	d.c.	a.c.	Resis- tance at 20 °C ± 10 %	I inrush at Un ± 10 % max	Resistor Unit reference	Total resistance			
V	V	Ω	Ω	Ω	kg				
47-51	—	5.1	10.3	DR2 SC0270	270	1	ZC4 GM2	—	WB1 KB155 1.120
52-56	—	5.9	9.5	DR2 SC0330	330	1	ZC4 GM2	—	WB1 KB132 1.120
57-64	—	7.3	8.9	DR2 SC0390	390	1	ZC4 GM2	—	WB1 KB123 1.120
65-68	—	9.5	7.1	DR2 SC0560	560	1	ZC4 GM2	—	WB1 KB133 1.120
69-79	—	11.6	6.9	DR2 SC0680	680	1	ZC4 GM2	—	WB1 KB121 1.120
80-87	—	16.2	5.3	DR2 SC0820	820	1	ZC4 GM2	—	WB1 KB130 1.120
88-94	—	19.9	4.7	DR2 SC1000	1000	1	ZC4 GM2	—	WB1 KB140 1.120
95-108	110-125	25.5	4.3	DR2 SC1200	1200	1	ZC4 GM2	DR5 TE1U	WB1 KB134 1.120
109-136	126-155	33.1	4.2	DR2 SC1800	1800	1	ZC4 GM2	DR5 TE1U	WB1 KB124 1.120
137-151	156-173	50.9	3	DR2 SC2700	2700	2	ZC4 GM2	DR5 TE1U	WB1 KB122 1.120
152-166	174-191	61.36	2.7	DR2 SC3300	3300	2	ZC4 GM2	DR5 TE1U	WB1 KB135 1.120
167-189	192-216	78.4	2.4	DR2 SC3900	3900	2	ZC4 GM2	DR5 TE1U	WB1 KB136 1.120
190-221	217-256	94.8	2.3	DR2 SC4700	4700	2	ZC4 GM2	DR5 TE1U	WB1 KB139 1.120
222-243	257-280	123.9	1.9	DR2 SC6800	6800	1	LC1 DT20 LDS135	DR5 TE1U	WB1 KB125 1.120
244-267	281-307	159.9	1.7	DR2 SC8200	4700	1	LC1 DT20 LDS135	DR5 TE1S	WB1 KB137 1.120
			+ 3300						
268-318	308-365	199.6	1.6	DR2 SC1001	5600	1	LC1 DT20 UDS135	DR5 TE1S	WB1 KB126 1.120
319-405	366-463	247.4	1.6	DR2 SC1201	6800	1	LC1 DT20 TDS135	DR5 TE1S	WB1 KB138 1.120
406-446	464-500	382	1.1 (2)	DR2 SC1001	20 000	1	LC1 DT20 VDS135	DR5 TE1S	WB1 KB127 1.120
447-500	—	506.7	1 (3)	DR2 SC1201	24 000	1	LC1 DT20 RDS135	—	WB1 KB128 1.120

Specifications

- Average coil consumption (low sealed consumption):
 - d.c.: inrush 380...520 W, sealed 0.15...0.20 W
 - a.c. (with rectifier): inrush 450...620 VA, sealed 0.15...0.20 VA
- Time constant when sealed 25 ms
- Economy resistor consumption: 7...10 W
- Operating cycles/hour at 0 ≤ 55 °C: ≤ 120
- Mechanical durability at Uc: 1.2 million operating cycles
- With a.c. operation: good resistance to voltage drop on inrush, non susceptibility to micro-breaks, mains harmonics: level ≤ 7.

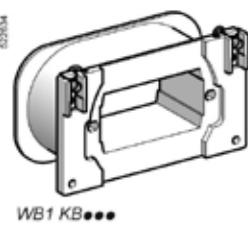
(1) For supply voltages of less than 110 V, beware of voltage drops caused by the inrush current.

(2) 2 resistors in series: 2 x 10 000 Ω.

(3) 2 resistors in series: 2 x 12 000 Ω.

TeSys contactors

TeSys LC1 B contactors

Replacement coils and accessories
for 2-pole contactors

WB1 KB***

ReferencesThe same coils are used for --- or \sim contactor control supply.

- For d.c. operation, the following must be associated with the coil:
 - 1 economy resistor arrangement (resistors + 1 or 2 auxiliary contact(s) or 1 contactor).
- For 50 to 400 Hz a.c. operation, the following must be associated with the coil:
 - 1 individual rectifier (to be wired).
 - 1 economy resistor arrangement (resistors + auxiliary contact(s) or 1 contactor) wired into the rectified current side.

Operating range min-max (1)		Coil		Economy resistor		Rectifier (for \sim only)	Coil Reference	Weight
d.c.	a.c.	Resistance at 20 °C ± 10 %	Inrush at Un max	Resistors (2 in series) Unit reference	Total resistance			
V	V	Ω	A	Ω	kg			
48-51	-	3.22	15.8	DR2 SC0068	2x68	1	ZC4 GM2	-
52-56	-	4.04	13.8	DR2 SC0082	82	1	ZC4 GM2	-
				DR2 SC0100	+ 100		WB1 KB142	1.120
57-62	-	4.96	12.5	DR2 SC0100	100	1	ZC4 GM2	-
				DR2 SC0120	+ 120		WB1 KB155	1.120
63-68	-	5.86	11.6	DR2 SC0120	2x120	1	ZC4 GM2	-
69-79	-	7.2	11	DR2 SC0150	2x150	1	ZC4 GM2	-
80-85	-	9.6	8.8	DR2 SC0180	180	1	ZC4 GM2	-
				DR2 SC0220	+ 220		WB1 KB133	1.120
86-98	99-113	11.4	8.6	DR2 SC0220	220	1	ZC4 GM2	-
				DR2 SC0270	+ 270		WB1 KB121	1.120
99-108	114-125	16.3	6.6	DR2 SC0330	2x330	1	ZC4 GM2	DR5 TE1U
109-119	126-136	19.7	6	DR2 SC0390	2x390	1	ZC4 GM2	WB1 KB130
120-136	137-156	25.2	5.4	DR2 SC0470	2x470	2	ZC4 GM2	DR5 TE1U
137-173	157-196	32.5	5.3	DR2 SC0680	2x680	2	ZC4 GM2	WB1 KB134
174-191	197-216	49.7	3.8	DR2 SC1000	2x1000	2	ZC4 GM2	DR5 TE1U
192-210	217-238	61	3.4	DR2 SC1200	2x1200	2	ZC4 GM2	WB1 KB122
211-238	239-272	77.2	3	DR2 SC1500	1500	2	ZC4 GM2	DR5 TE1U
				DR2 SC1800	+ 1800		WB1 KB136	1.120
239-279	273-318	94	3	DR2 SC1800	1800	1	LP1 DT20 LDS135	DR5 TE1S
				DR2 SC2200	+ 2200		WB1 KB139	1.120
280-310	319-359	128	2.4	DR2 SC2700	2x2700	1	LP1 DT20 UDS135	DR5 TE1S
311-341	360-387	160	2.1	DR2 SC3300	2x3300	1	LP1 DT20 TDS135	DR5 TE1S
342-399	388-452	197	2	DR2 SC3900	2x3900	1	LP1 DT20 TDS135	DR5 TE1S
400-500	453-500	257	1.9	DR2 SC4700	4700	1	LP1 DT20 VDS135	DR5 TE1S
				DR2 SC5600	+ 5600		WB1 KB138	1.120

Specifications

- Average coil consumption (low sealed consumption):
 - d.c.: inrush 600...800 W, sealed 0.35...0.5 W
 - a.c. (with rectifier): inrush 720...1000 VA, sealed 0.35...0.5 VA
- Time constant when sealed 25 ms
- Economy resistor consumption: 15...20 W
- Operating cycles/hour at $0 \leq 55^{\circ}\text{C}, \leq 120$
- Mechanical durability at Uc: 1.2 million operating cycles
- With a.c. operation: good resistance to voltage drop on inrush, non susceptibility to micro-breaks, mains harmonics: level ≤ 7 .

(1) For supply voltages of less than 110 V, beware of voltage drops caused by the inrush current.

TeSys contactors

TeSys LC1 B contactors

Replacement coils and accessories
for 3-pole contactors**References**The same coils are used for --- or \sim contactor control supply.

- For d.c. operation, the following must be associated with the coil:
 - 1 economy resistor arrangement (resistors + 1 or 2 auxiliary contact(s) or 1 contactor).
- For 50 to 400 Hz a.c. operation, the following must be associated with the coil:
 - 1 individual rectifier (to be wired).
 - 1 economy resistor arrangement (resistors + auxiliary contact(s) or 1 contactor) wired into the rectified current side.

Operating range min-max (1)		Coil		Economy resistor		Rectifier (for \sim only)	Coil Reference	Weight
d.c.	a.c.	Resistance at 20 °C ± 10 %	Inrush at Un max	Resistors (2 in parallel or in series) Unit reference	Total resistance			
V	V	Ω	A	Ω	kg			
47-50	-	1.85	27	DR2 SC0150	2x150//	1	ZC4 GM2	-
51-55	-	2.35	23.5	DR2 SC0180	2x180//	1	ZC4 GM2	-
56-60	-	3.22	18.5	DR2 SC0220	2x220//	1	ZC4 GM2	-
61-66	-	4.04	16	DR2 SC0270	2x270//	1	ZC4 GM2	-
67-72	-	4.96	14.5	DR2 SC0330	2x330//	1	ZC4 GM2	-
73-79	-	5.86	13.5	DR2 SC0100	2x100	1	ZC4 GM2	-
80-92	-	7.2	12.8	DR2 SC0120	2x120	1	ZC4 GM2	-
93-98	108-113	9.6	10.2	DR2 SC0150	150	1	ZC4 GM2	DR5 TE1U
				DR2 SC0180	+ 180		WB1 KB133	1.120
99-114	114-132	11.4	10	DR2 SC0180	180	1	ZC4 GM2	DR5 TE1U
				DR2 SC0220	+ 220		WB1 KB121	1.120
115-126	133-145	16.3	7.7	DR2 SC0270	2x270	2	ZC4 GM2	DR5 TE1U
127-139	146-160	11.7	7	DR2 SC0330	2x330	2	ZC4 GM2	WB1 KB140
140-159	161-181	25.2	6.3	DR2 SC0390	390	2	ZC4 GM2	DR5 TE1U
				DR2 SC0470	+ 470		WB1 KB134	1.120
160-201	182-228	32.2	6.2	DR2 SC0560	2x560	2	ZC4 GM2	DR5 TE1U
202-222	229-255	49.7	4.5	DR2 SC0820	2x820	2	ZC4 GM2	WB1 KB122
223-246	256-282	61	4	DR2 SC1000	2x1000	1	LC1 DT20 LDS135	DR5 TE1S
247-277	283-316	77.2	3.6	DR2 SC1200	2x1200	1	LC1 DT20 LDS135	DR5 TE1S
278-327	317-372	94	3.5	DR2 SC1500	2x1500	1	LC1 DT20 UDS135	DR5 TE1S
328-360	373-408	128	2.8	DR2 SC1500	3x1500	1	LC1 DT20 TDS135	DR5 TE1S
361-399	409-452	160	2.5	DR2 SC1800	3x1800	1	LC1 DT20 VDS135	DR5 TE1S
400-469	453-500	197	2.4	DR2 SC2200	3x2200	1	LC1 DT20 VDS135	DR5 TE1S
470-500	-	257	1.9	DR2 SC2700	3x2700	1	LC1 DT20 RDS135	WB1 KB138

Specifications

- Average coil consumption (low sealed consumption):
 - d.c.: inrush 900...1100 W, sealed 0.7...1 W
 - a.c. (with rectifier): inrush 1100...1300 VA, sealed 0.7...1 VA
- Time constant when sealed 25 ms
- Economy resistor consumption: 24...30 W
- Operating cycles/hour at $0 \leq 55^{\circ}\text{C}, \leq 120$
- Mechanical durability at Uc: 1.2 million operating cycles
- With a.c. operation: good resistance to voltage drop on inrush, non susceptibility to micro-breaks, mains harmonics: level ≤ 7 .

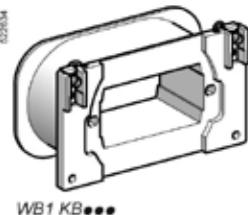
(1) For supply voltages of less than 110 V, beware of voltage drops caused by the inrush current.

References

TeSys contactors

TeSys LC1 B contactors

Replacement coils and accessories
for 4-pole contactors



WB1 KB***

References

The same coils are used for \equiv or \sim contactor control supply.

- For d.c. operation, the following must be associated with the coil:
 - 1 economy resistor arrangement (resistors + 1 or 2 auxiliary contact(s) or 1 contactor).
- For 50 to 400 Hz a.c. operation, the following must be associated with the coil:
 - 1 individual rectifier (to be wired).
 - 1 economy resistor arrangement (resistors + auxiliary contact(s) or 1 contactor) wired into the rectified current side.

Operating range min-max (1)	Coil		Economy resistor			Rectifier (for \sim only)	Coil	Weight	
	d.c.	a.c.	Resis- tance $\pm 10\%$ at 20 °C $\pm 10\%$	I inrush at Un max	Resistors (3 in series) Reference	Contact Total resis- tance Reference			
V	V	Ω	A	Ω	kg				
57-61	-	2.35	26	DR2 SC0027	3x27	1 ZC4 GM2	-	WB1 KB153	1.120
62-67	-	3.22	21	DR2 SC0033	3x33	1 ZC4 GM2	-	WB1 KB141	1.120
68-73	-	4.04	18	DR2 SC0039	3x39	1 ZC4 GM2	-	WB1 KB142	1.120
74-81	-	4.96	16.3	DR2 SC0047	3x47	1 ZC4 GM2	-	WB1 KB155	1.120
82-89	-	5.86	15	DR2 SC0056	3x56	1 ZC4 GM2	-	WB1 KB132	1.120
90-102	105-119	7.2	14	DR2 SC0068	3x58	1 ZC4 GM2	DR5 TE1U	WB1 KB123	1.120
103-111	120-128	9.6	11.5	DR2 SC0100	3x100	2 ZC4 GM2	DR5 TE1U	WB1 KB133	1.120
112-129	129-148	11.4	11.3	DR2 SC0100	3x100	2 ZC4 GM2	DR5 TE1U	WB1 KB121	1.120
130-143	149-163	16.3	8.7	DR2 SC0150	3x150	2 ZC4 GM2	DR5 TE1U	WB1 KB130	1.120
144-157	164-179	19.7	8	DR2 SC0180	3x180	2 ZC4 GM2	DR5 TE1U	WB1 KB140	1.120
158-180	180-204	25.2	7.1	DR2 SC0220	3x220	2 ZC4 GM2	DR5 TE1U	WB1 KB134	1.120
181-226	205-259	32.5	6.9	DR2 SC0330	3x330	2 ZC4 GM2	DR5 TE1U	WB1 KB124	1.120
227-251	260-288	49.7	5	DR2 SC0470	3x470	1 LC1 DT20 LDS135	DR5 TE1S	WB1 KB122	1.120
252-278	289-317	61	4.5	DR2 SC0560	3x560	1 LC1 DT20 UDS135	DR5 TE1S	WB1 KB135	1.120
279-313	318-356	77.2	4	DR2 SC0680	3x580	1 LC1 DT20 UDS135	DR5 TE1S	WB1 KB136	1.120
314-368	357-418	94	3.9	DR2 SC0820	3x820	1 LC1 DT20 TDS135	DR5 TE1S	WB1 KB139	1.120
369-408	419-462	128	3.2	DR2 SC1200	3x1200	1 LC1 DT20 VDS135	DR5 TE1S	WB1 KB125	1.120
409-448	463-500	160	2.8	DR2 SC1500	3x1500	1 LC1 DT20 VDS135	DR5 TE1S	WB1 KB137	1.120
449-500	-	197	2.5	DR2 SC1800	3x1800	1 LC1 DT20 RDS135	-	WB1 KB126	1.120

Specifications

- Average coil consumption (low sealed consumption):
 - d.c.: inrush 1100...1400 W, sealed 1.2...1.6 W
 - a.c. (with rectifier): inrush 1300...1600 VA, sealed 1.2...1.6 VA
- Time constant when sealed 25 ms
- Economy resistor consumption: 35...45 W
- Operating cycles/hour at $0 \leq 55^{\circ}\text{C} \leq 120$
- Mechanical durability at Uc: 1.2 million operating cycles
- With a.c. operation: good resistance to voltage drop on inrush, non susceptibility to micro-breaks, mains harmonics: level ≤ 7 .

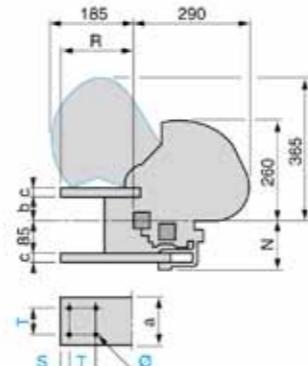
(1) For supply voltages of less than 110 V, beware of voltage drops caused by the inrush current.

Dimensions

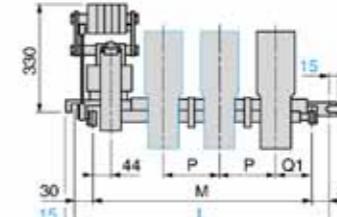
TeSys contactors

TeSys LC1 B contactors

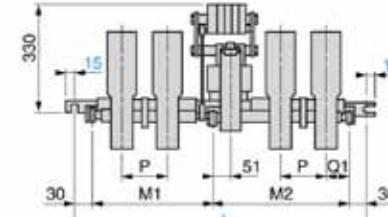
Single, 2, 3 or 4-pole contactors LC1 B Common side view



Single, 2 or 3-pole contactors LC1 B•31, B•32 or B•33



4-pole contactors LC1 B•34

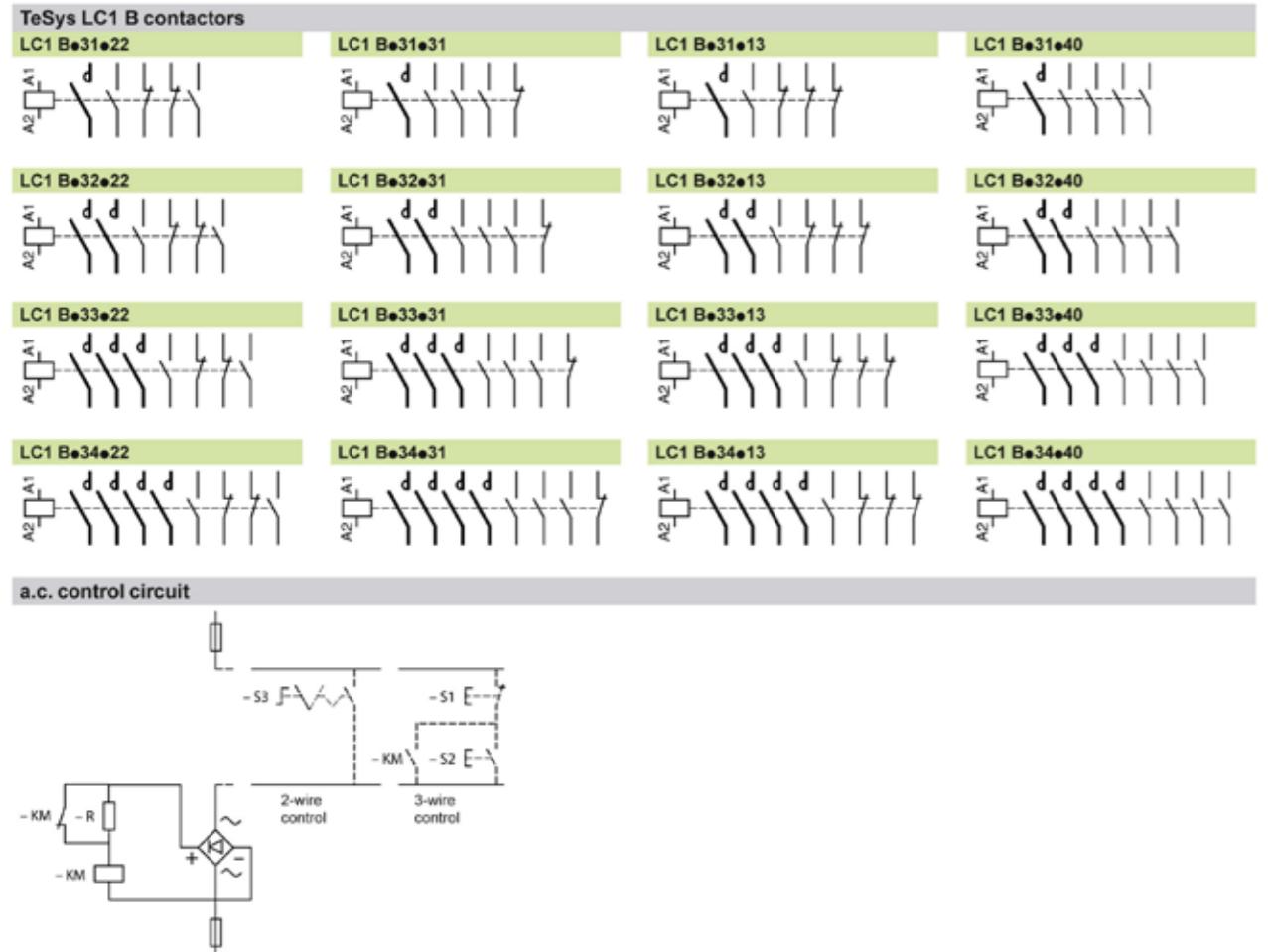


Number of poles	LC1 BL				LC1 BM				LC1 BP				LC1 BR			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
a	50	50	50	50	63	63	63	63	100	100	100	100	125	125	125	125
b	59	59	59	59	55	55	55	55	55	55	55	55	50	50	50	50
c	16	16	16	16	20	20	20	20	20	20	20	20	25	25	25	25
L	345	445	540	780	345	445	540	780	385	540	780	1065	445	635	855	1065
M	285	385	480	-	285	385	480	-	325	480	700	-	385	575	825	-
M1	-	-	-	-	308	-	-	-	-	-	-	-	455	-	-	455
M2	-	-	-	-	392	-	-	-	-	-	-	-	550	-	-	550
N	121	121	121	121	125	125	125	125	125	125	125	125	130	130	130	130
P	100	100	100	100	100	100	100	100	150	150	150	150	195	195	195	195
Q1	100	100	100	100	110	110	110	110	110	110	110	110	130	130	130	130
R	122	122	122	122	157	157	157	157	173	173	173	173	173	173	173	173
S	10	10	10	10	17	17	17	17	20	20	20	20	20	20	20	20
T	30	30	30	30	30	30	30	30	60	60	60	60	60	60	60	60
Ø	9	9	9	9	11	11	11	11	11	11	11	11	11	11	11	11

Electrical safety clearance

Values X1 and X2 are given for a breaking capacity of 10 In (\sim 3-phase supply).

3-phase voltage	LC1 BL				LC1 BM				LC1 BP				LC1 BR			
	X1	X2	X1	X2												
380/440 V	100	150	100	150	100	150	100	150	200	250	200	250	200	250	200	250
500 V	100	150	100	150	100	150	100	150	220	250	220	2				

**d.c. control circuit**

Dotted lines show optional wiring and external items required.

Note : It is essential to check that the control circuit contacts have ratings compatible with the voltage and power consumption of the operating coil of the contactor.
If not, an intermediate "KA" relay must be fitted and wired as shown.

Dotted lines show optional wiring and external items required.

Selection :
pages 5/194 to 5/217

References :
pages 5/184 to 5/186

Dimensions :
page 5/192

Schneider
Electric

5/193

Selection

TeSys contactors

For utilisation category AC-3

Operational current and power conforming to IEC ($\theta \leq 60^\circ\text{C}$)

Contactor size	LC1/ LP1 K06	LC1/ LP1 K09	LC1/ K12	LC1/ K16	LC1/ D09	LC1/ D12	LC1/ D18	LC1/ D25	LC1/ D32	LC1/ D38	LC1/ D40A		
Maximum operational current in AC-3	≤ 440 V	A	6	9	12	16	9	12	18	25	32	38	40
Rated operational power P (standard motor power ratings)	220/240 V	kW	1.5	2.2	3	3	2.2	3	4	5.5	7.5	9	11
	380/400 V	kW	2.2	4	5.5	7.5	4	5.5	7.5	11	15	18.5	18.5
	415 V	kW	2.2	4	5.5	7.5	4	5.5	9	11	15	18.5	22
	440 V	kW	3	4	5.5	7.5	4	5.5	9	11	15	18.5	22
	500 V	kW	3	4	4	5.5	5.5	7.5	10	15	18.5	18.5	22
	660/690 V	kW	3	4	4	4	5.5	7.5	10	15	18.5	18.5	30
	1000 V	kW	—	—	—	—	—	—	—	—	—	—	—

Maximum operating rate in operating cycles/hour (1)

On-load factor	Operational power	LC1 D09	LC1 D12	LC1 D18	LC1 D25	LC1 D32	LC1 D38	LC1 D40A
≤ 85 %	P	—	—	—	—	1200	1200	1200
	0.5 P	—	—	—	—	3000	3000	2500
	≤ 25 %	P	—	—	—	1800	1800	1800

Operational current and power conforming to UL, CSA ($\theta \leq 60^\circ\text{C}$)

Contactor size	LC1/ LP1 K06	LC1/ LP1 K09	LC1/ K12	LC1/ D09	LC1/ D12	LC1/ D18	LC1/ D25	LC1/ D32	LC1/ D38	LC1/ D40A		
Maximum operational current in AC-3	≤ 440 V	A	6	9	12	9	12	18	25	—	40	
Rated operational power P (standard motor power ratings 60 Hz)	200/208 V	HP	1.5	2	3	2	3	5	7.5	10	—	10
	230/240 V	HP	1.5	3	3	2	3	5	7.5	10	—	10
	460/480 V	HP	3	5	7.5	5	7.5	10	15	20	—	30
	575/600 V	HP	3	5	10	7.5	10	15	20	25	—	30

(1) Depending on the operational power and the on-load factor ($\theta \leq 60^\circ\text{C}$).

5

5/194

Schneider
Electric

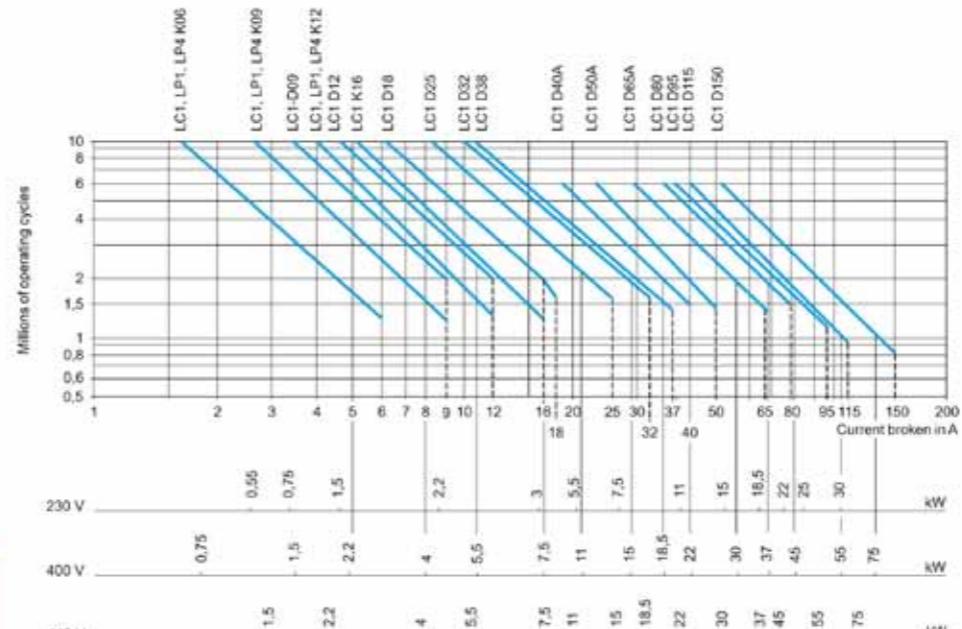
LC1 D50A	LC1 D65A	LC1 D80	LC1 D95	LC1 D115	LC1 D150	LC1 F185	LC1 F225	LC1 F265	LC1 F330	LC1 F400	LC1 F500	LC1 F630	LC1 F780	LC1 BL	LC1 BM	LC1 BP	LC1 BR	
50	65	80	95	115	150	185	225	265	330	400	500	630	780	800	750	1000	1500	1800
15	18,5	22	25	30	40	55	63	75	100	110	147	200	220	250	220	280	425	500
22	30	37	45	55	75	90	110	132	160	200	250	335	400	450	400	500	750	900
25	37	45	45	59	80	100	110	140	180	220	280	375	425	450	425	530	800	900
30	37	45	45	59	80	100	110	140	200	250	295	400	425	450	450	560	800	900
30	37	55	55	75	90	110	129	160	200	257	355	400	450	450	500	600	750	900
33	37	45	45	80	100	110	129	160	220	280	335	450	475	475	560	670	750	900
-	-	45	45	65	75	100	100	147	160	185	335	450	450	530	530	670	750	750

LC1 D50A	LC1 D65A	LC1 D80	LC1 D95	LC1 D115	LC1 D150	LC1 F185	LC1 F225	LC1 F265	LC1 F330	LC1 F400	LC1 F500	LC1 F630	LC1 F780	LC1 BL	LC1 BM	LC1 BP	LC1 BR
1000	1000	750	750	750	750	750	750	750	500	500	500	500	500	120	120	120	120
2500	2500	2000	2000	2000	1200	2000	2000	2000	2000	1200	1200	1200	1200	120	120	120	120
1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	600	120	120	120

LC1 D50A	LC1 D65A	LC1 D80	LC1 D95	LC1 D115	LC1 D150	LC1 F185	LC1 F225	LC1 F265	LC1 F330	LC1 F400	LC1 F500	LC1 F630	LC1 F780	LC1 F800			
50	65	80	95	115	150	185	225	265	330	400	500	630	780	800			
15	20	30	30	30	40	50	60	60	75	100	150	250	-	350			
15	20	30	30	40	50	60	75	75	100	125	200	300	450	400			
40	40	60	60	75	100	125	150	150	200	250	400	600	900	900			
40	50	60	60	100	125	150	150	200	250	300	500	800	-	900			

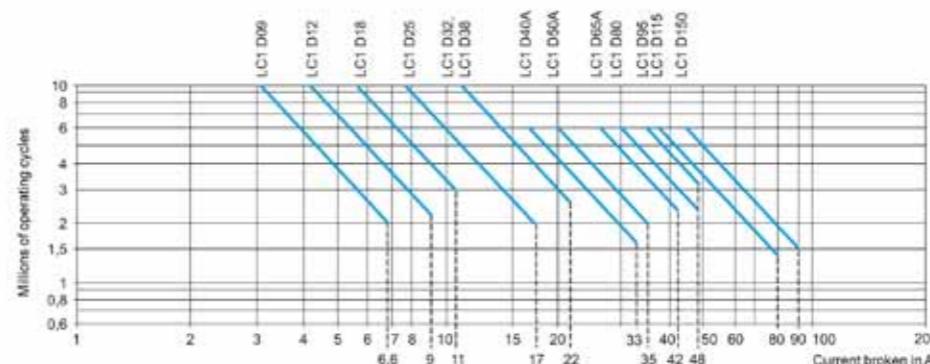
5

Selection according to required electrical durability, in category AC-3 ($U_e \leq 440$ V)

Control of 3-phase asynchronous squirrel cage motors with breaking whilst running.
The current broken (Ic) in category AC-3 is equal to the rated operational current (Ie) of the motor.


5

Selection according to required electrical durability, in category AC-3 ($U_e = 660/690$ V) (1)

Control of 3-phase asynchronous squirrel cage motors with breaking whilst running.
The current broken (Ic) in category AC-3 is equal to the rated operational current (Ie) of the motor.

(1) For $U_e = 1000$ V, use the 660/690 V curves, but do not exceed the operational current at the operational power indicated for 1000 V.

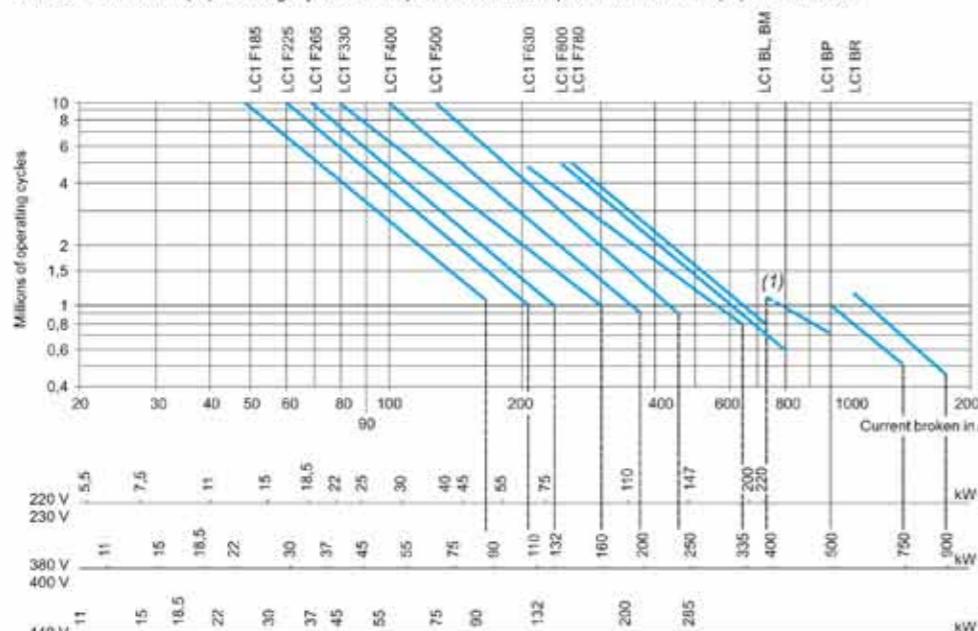
TeSys contactors

For utilisation category AC-3

Selection according to required electrical durability, in category AC-3 ($U_e \leq 440$ V)

Control of 3-phase asynchronous squirrel cage motors with breaking whilst running.

The current broken (I_c) in category AC-3 is equal to the rated operational current (I_e) of the motor.



Example:

Asynchronous motor with $P = 132$ kW - $U_e = 380$ V - $I_e = 245$ A - $I_c = I_e = 245$ A
or asynchronous motor with $P = 132$ kW - $U_e = 415$ V - $I_e = 240$ A - $I_c = I_e = 240$ A

1.5 million operating cycles required.

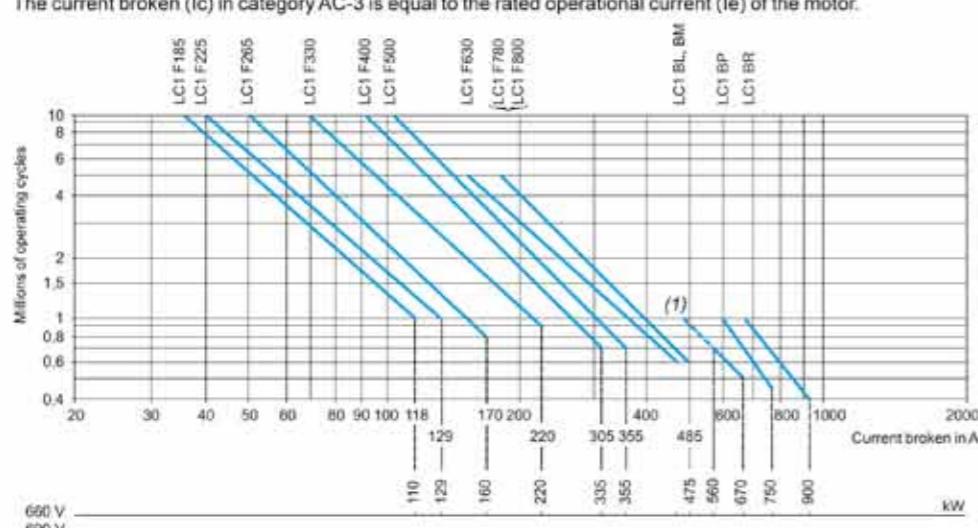
The above selection curves show the contactor rating needed: LC1 F330.

(1) The dotted lines are only applicable to LC1 BL contactors.

Selection according to required electrical durability, in category AC-3 ($U_e = 660/690$ V)

Control of 3-phase asynchronous squirrel cage motors with breaking whilst running.

The current broken (I_c) in category AC-3 is equal to the rated operational current (I_e) of the motor.



Example:

Asynchronous motor with $P = 132$ kW - $U_e = 660$ V - $I_e = 140$ A - $I_c = I_e = 140$ A

1.5 million operating cycles required.

The above selection curves show the contactor rating needed: LC1 F330.

(1) The dotted lines are only applicable to LC1 BL contactors.

TeSys contactors

For utilisation category AC-1

Maximum operational current (open-mounted device)

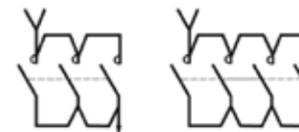
Contactor size	LC1/ LP1 K09	LC1/ LP1 K12	LC1/ D09	LC1/ D12	LC1/ DT20	LC1/ DT25	LC1/ D18	LC1/ D32	LC1/ DT32	LC1/ D40A	LC1/ D38	LC1/ DT60A
Maximum operating rate in operating cycles/hour	600	600	600	600	600	600	600	600	600	600	600	600
Connection conforming to IEC 60947-1	Cable c.s.a. mm ²	4	4	4	4	4	6	6	10	10	35	
	Bar c.s.a. mm	-	-	-	-	-	-	-	-	-	-	
Operational current in AC-1 in A, according to the ambient temperature conforming to IEC 60947-1	≤ 40 °C A	20	20	25	20	25	32	40	50	50	60	
	≤ 60 °C A	20	20	25	20	25	32	40	50	50	60	
	≤ 70 °C A (at UC) (1)	(1)	17	(1)	17	22	28	35	35	42		
Maximum operational power ≤ 60 °C	220/230 V kW	8	8	9	8	9	11	14	18	18	21	
	240 V kW	8	8	9	8	9	12	15	19	19	23	
	380/400 V kW	14	14	15	14	15	20	25	31	31	37	
	415 V kW	14	14	17	14	17	21	27	34	34	41	
	440 V kW	15	15	18	15	18	23	29	36	36	43	
	500 V kW	17	17	20	17	20	23	33	41	41	49	
	660/690 V kW	22	22	27	22	27	34	43	54	54	65	
	1000 V kW	-	-	-	-	-	-	-	-	-	-	

(1) Please consult your Regional Sales Office.

Increase in operational current by parallel connection of poles

Apply the following coefficients to the currents or power values given above; these coefficients take into account an often unbalanced current distribution between the poles:

- 2 poles in parallel: K = 1.6
- 3 poles in parallel: K = 2.25
- 4 poles in parallel: K = 2.8



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Selection according to required electrical durability, in category AC-1 ($U_e \leq 440$ V)

Control of resistive circuits ($\cos \varphi \geq 0.95$).

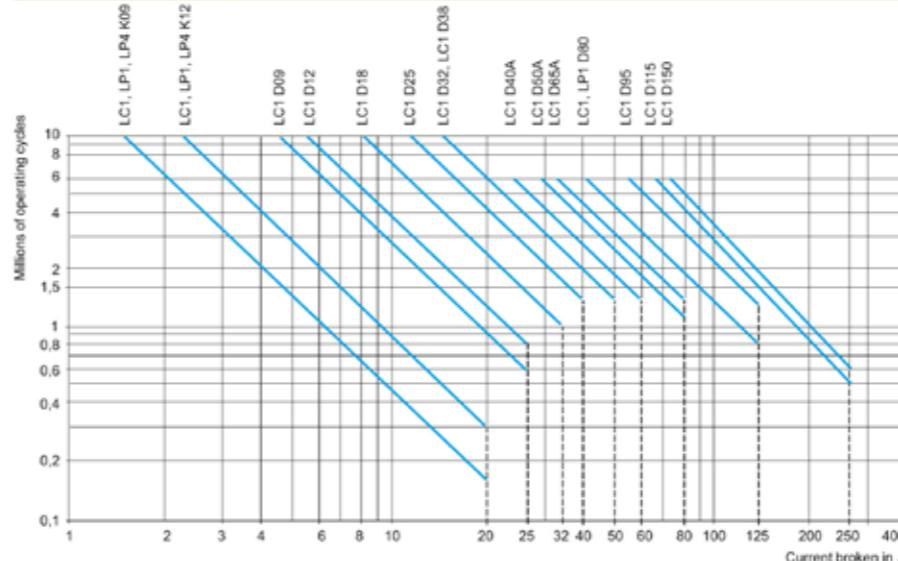
The current broken (I_c) in category AC-1 is equal to the current (I_e) normally drawn by the load.

Example:

■ $U_e = 220$ V - $I_e = 50$ A @ ≤ 40 °C - $I_c = I_e = 50$ A.

■ 2 million operating cycles required.

■ The above selection curves show the contactor rating needed: either LC1 or LP1 D50.



(1) The dotted lines are only applicable to LC1 BL contactors.

LC1 D80A	LC1 D65A	LC1/ DT80A	LC1/ D80	LC1 D95	LC1 D115	LC1 D150	LC1 F185	LC1/ F225	LC1 F265	LC1 F330	LC1 F400	LC1 F500	LC1 F630	LC1 F780	LC1 F800	LC1 F1700	LC1/ F2100	LC1 BL	LC1 BM	LC1 BP	LC1 BR
600	600	600	600	600	600	600	600	600	600	600	600	600	600	600	600	200	200	120	120	120	120
35	35	50	50	120	120	150	185	185	240	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	2 30x5	2 40x5	2 60x5	2 100x5	2 60x5	3 100x5	4 1005	2 50x5	2 80x5	2 100x5	2 5100x10	
80	80	125	125	250	250	275	315	350	400	500	700	1000	1600	1000	1700	2100	800	1250	2000	2750	(2)
80	80	125	125	200	200	275	280	300	360	430	580	850	1350	850	1450	1750	700	1100	1750	2400	(2)
56	56	80	80	160	160	180	200	250	290	340	500	700	1100	700	—	—	600	900	1500	2000	(2)
29	29	45	45	80	80	90	100	120	145	170	240	350	550	350	570	700	300	425	700	1000	(2)
31	31	49	49	83	83	100	110	125	160	180	255	370	570	370	600	780	330	450	800	1100	(2)
50	50	78	78	135	135	165	175	210	250	300	430	600	950	600	1000	1200	500	800	1200	1600	(2)
54	54	85	85	140	140	170	185	220	260	310	445	630	1000	630	1050	1300	525	825	1250	1700	(2)
58	58	90	90	150	150	180	200	230	290	330	470	670	1050	670	1100	1350	550	850	1400	2000	(2)
65	65	102	102	170	170	200	220	270	320	380	660	750	1200	750	1250	1550	600	900	1500	2100	(2)
80	80	135	135	235	235	280	300	370	400	530	740	1000	1650	1000	1700	2100	800	1100	1900	2700	(2)
—	—	120	120	345	345	410	450	540	640	760	950	1500	2400	1500	2500	3100	1100	1700	3000	4200	(2)

(2) With set of right-angled connectors LA9 F2100

(1) Do not exceed the maximum number of operating cycles.
(2) For temperatures higher than 60 °C, use a maximum operating rate value equal to 80% of the actual value when selecting from the tables.**Maximum breaking current**

Category AC-2: slip ring motors - breaking the starting current.

Category AC-4: squirrel cage motors - breaking the starting current.

Contactor size	LC1/ LP1 K06	LC1/ LP1 K09	LC1/ K12	LC1 D09	LC1 D12	LC1 D18	LC1 D25	LC1 D32	LC1 D38	LC1 D40A		
In category AC-4 (Ie max)	Ue ≤ 440 V Ie max broken = 6 x I motor	A	36	54	54	54	72	108	150	192	192	240
	440 V < Ue ≤ 690 V Ie max broken = 6 x I motor	A	26	40	40	40	50	70	90	105	105	150
Depending on the maximum operating rate (1) and the on-load factor, θ ≤ 60 °C (2)												
From 150 and 15 % to 300 and 10 %	A	20	30	30	30	40	45	75	80	80	110	
From 150 and 20 % to 600 and 10 %	A	18	27	27	27	36	40	67	70	70	96	
From 150 and 30 % to 1200 and 10 %	A	16	24	24	24	30	35	56	60	60	80	
From 150 and 55 % to 2400 and 10 %	A	13	19	19	19	24	30	45	50	50	62	
From 150 and 85 % to 3600 and 10 %	A	10	16	16	16	21	25	40	45	45	53	

(1) Do not exceed the maximum number of operating cycles.

(2) For temperatures higher than 60 °C, use a maximum operating rate value equal to 80% of the actual value when selecting from the tables.

Counter current braking (plugging)

The current varies from the maximum plug-braking current to the rated motor current.

The making current must be compatible with the rated making and breaking capacities of the contactor.

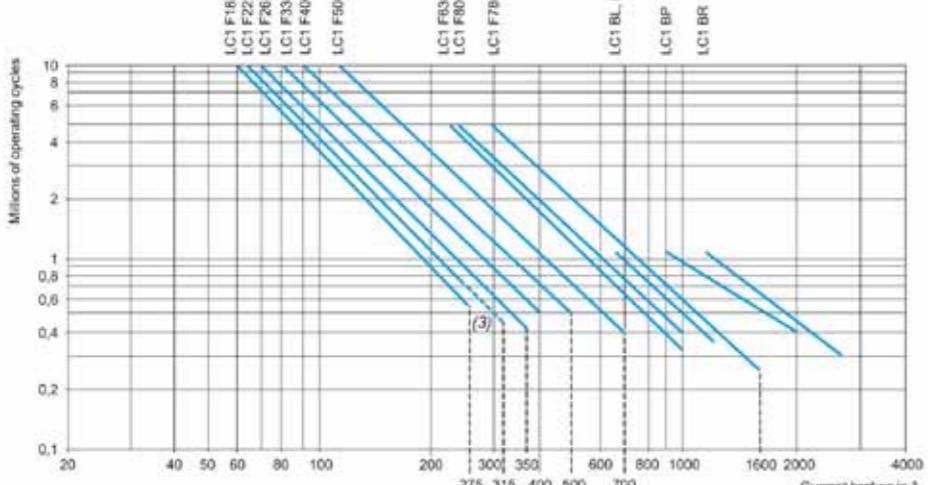
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As breaking normally takes place at a current value at or near the locked rotor current, the contactor can be selected using the criteria for categories AC-2 and AC-4.

Permissible AC-4 power rating for 200 000 operating cycles

Operational voltage	LC _• / LP _• K06	LC _• / LP _• K09	LC _• / LP _• K12	LC _• D09	LC _• D12	LC _• D18	LC _• D25	LC _• D32	LC _• D38	LC _• D40A	
220/230 V	kW	0.75	1.1	1.1	1.5	1.5	2.2	3	4	4	4
380/400 V	kW	1.5	2.2	2.2	2.2	3.7	4	5.5	7.5	7.5	9
415 V	kW	1.5	2.2	2.2	2.2	3	3.7	5.5	7.5	7.5	9
440 V	kW	1.5	2.2	2.2	2.2	3	3.7	5.5	7.5	7.5	11
500 V	kW	2.2	3	3	3	4	5.5	7.5	9	9	11
660/690 V	kW	3	4	4	4	5.5	7.5	10	11	11	15

**Example:**

■ Ue = 220 V - Ie = 500 A - θ = 40 °C - Ic = Ie = 500 A.

■ 2 million operating cycles required.

■ The above selection curves show the contactor rating needed: LC1 F780.

(3) The dotted lines are only applicable to LC1 F225.

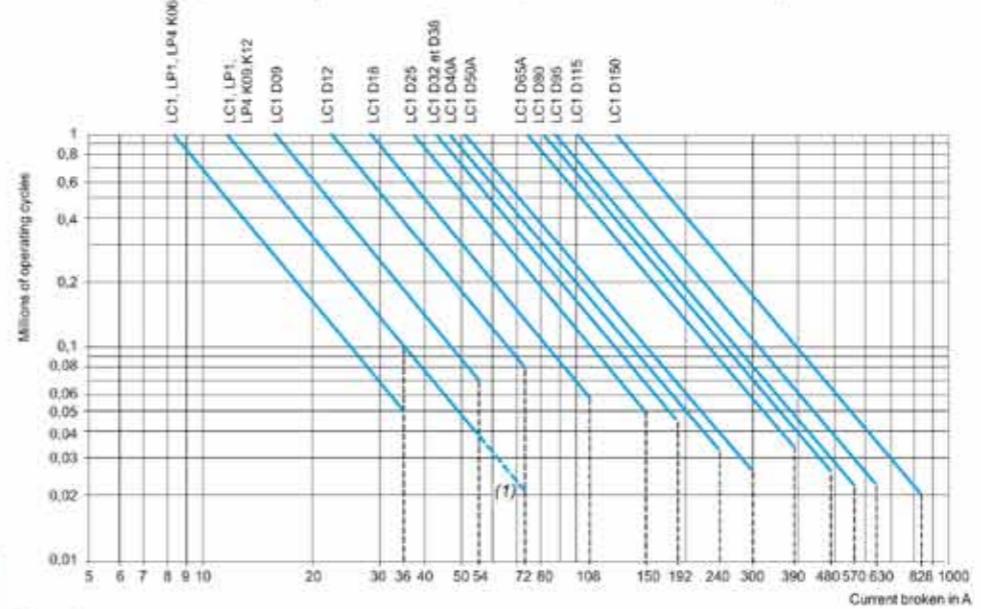
LC1 D50A	LC1 D65A	LC1 D80	LC1 D95	LC1 D115	LC1 D150	LC1 F185	LC1 F225	LC1 F26	LC1 F330	LC1 F40	LC1 F500	LC1 F630	LC1 F780	LC1 F800	LC1 BL	LC1 BM	LC1 BP	LC1 BR
300	390	480	570	630	830	1020	1230	1470	1800	2220	2760	3360	4260	3690	4320	5000	7500	9000
170	210	250	250	540	640	708	810	1020	1410	1830	2130	2760	2910	2910	4000	4800	5400	6600
140	160	200	200	280	310	380	420	560	670	780	1100	1400	1600	1600	2250	3000	4500	5400
120	148	170	170	250	280	350	400	500	600	700	950	1250	1400	1400	2000	2400	3750	5000
100	132	145	145	215	240	300	330	400	500	600	750	950	1100	1100	1500	2000	3000	3600
80	110	120	120	150	170	240	270	320	390	450	600	720	820	820	1000	1500	2000	2500
70	90	100	100	125	145	170	190	230	290	350	500	660	710	710	750	1000	1500	1800

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LC• D50A	LC• D65A	LC• D80	LC• D95	LC1 D115	LC1 D150	LC1 F185	LC1 F225	LC1 F26	LC1 F330	LC1 F40	LC1 F500	LC1 F630	LC1 F780	LC1 F800	LC1 BL	LC1 BM	LC1 BP	LC1 BR
5.5	7.5	7.5	9	9	11	18.5	22	28	33	40	45	55	63	63	90	110	150	200
11	11	15	15	18.5	22	33	40	51	59	75	80	100	110	110	160	160	220	250
11	11	15	15	18.5	22	37	45	55	63	80	90	100	110	110	160	160	250	280
11	15	15	15	18.5	22	37	45	59	63	80	100	110	132	132	160	200	250	315
15	15	22	22	30	37	45	55	63	75	90	110	132	150	150	180	200	250	355
15	18.5	25	25	30	45	63	75	90	110	129	140	160	185	185	200	250	315	450

Selection according to required electrical durability, in categories AC-2 or AC-4 ($U_e \leq 440$ V)

Control of 3-phase asynchronous squirrel cage motors (AC-4) or slip ring motors (AC-2) with breaking whilst motor stalled.

The current broken (Ic) in AC-2 is equal to $2.5 \times I_e$.The current broken (Ic) in AC-4 is equal to $6 \times I_e$. (I_e = rated operational current of the motor).

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Example:

■ Asynchronous motor with $P = 5.5$ kW - $U_e = 400$ V - $I_e = 11$ A. $I_c = 6 \times I_e = 66$ A.■ or asynchronous motor with $P = 5.5$ kW - $U_e = 415$ V - $I_e = 11$ A. $I_c = 6 \times I_e = 66$ A.

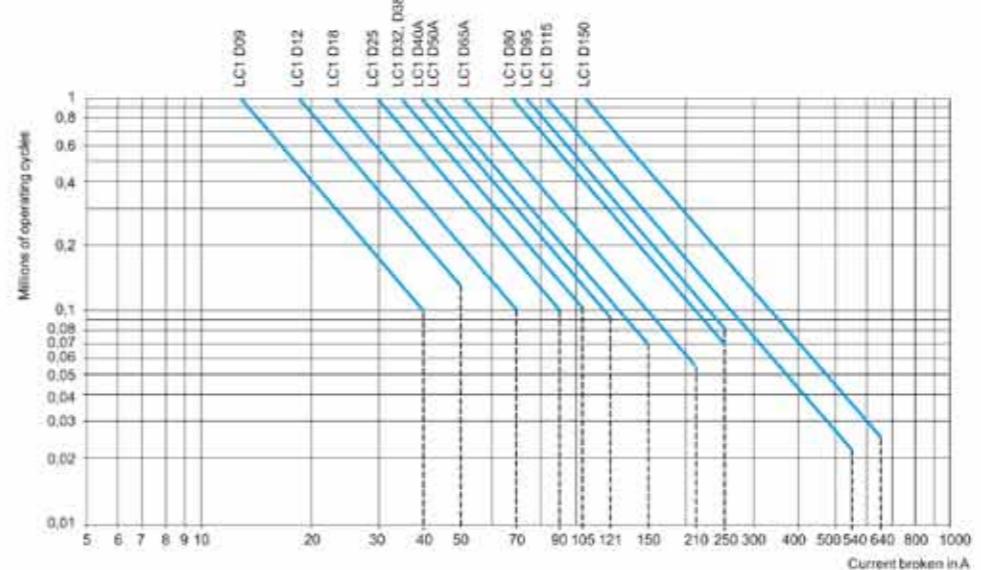
■ 200 000 operating cycles required.

■ The above selection curves show the contactor rating needed: LC1 D25.

(1) The dotted lines are only applicable to LC1, LP1 K12 contactors.

Selection according to required electrical durability, use in category AC-4 ($440 \text{ V} < U_e \leq 890 \text{ V}$)

Control of 3-phase asynchronous squirrel cage motors with breaking whilst motor stalled

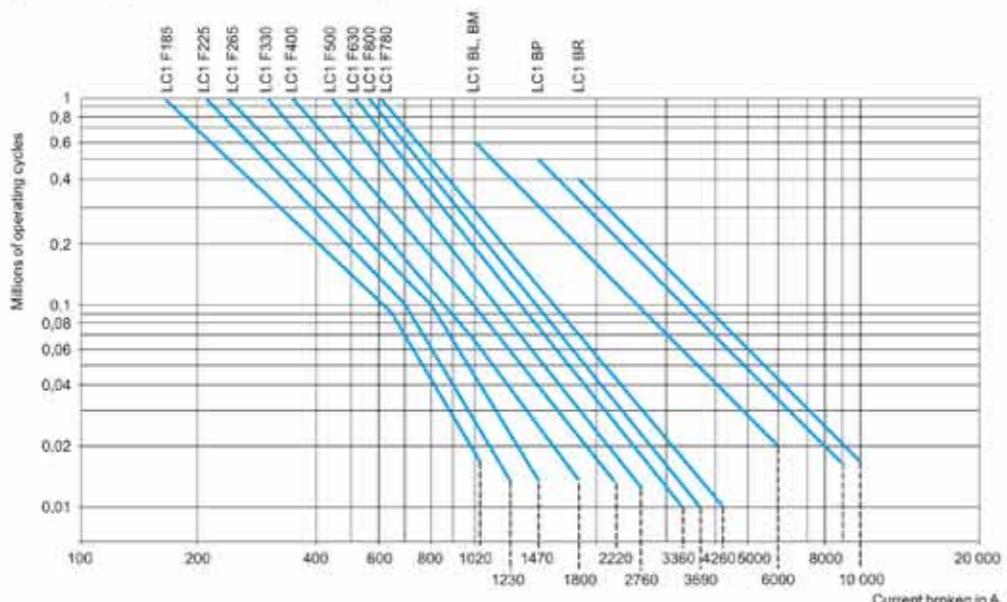
The current broken (Ic) in AC-2 is equal to $2.5 \times I_e$.The current broken (Ic) in AC-4 is equal to $6 \times I_e$. (I_e = rated operational current of the motor).

TeSys contactors

For utilisation categories AC-2 or AC-4

Selection according to required electrical durability, in categories AC-2 or AC-4 ($U_e \leq 440$ V)

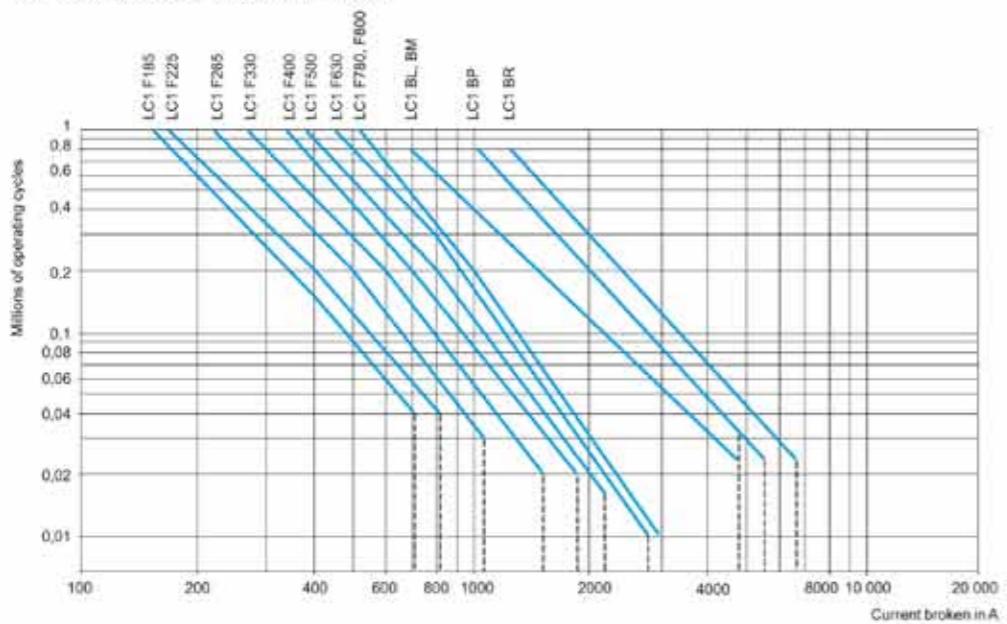
Control of 3-phase asynchronous squirrel cage motors (AC-4) or slip ring motors (AC-2) with breaking whilst motor stalled.
The current broken (I_c) in AC-4 is equal to $6 \times I_e$.
(I_e = rated operational current of the motor).

**Example:**

- Asynchronous motor with $P = 90$ kW - $U_e = 380$ V - $I_e = 170$ A, $I_c = 6 \times I_e = 1020$ A or asynchronous motor with $P = 90$ kW - $U_e = 415$ V - $I_e = 165$ A, $I_c = 6 \times I_e = 990$ A.
- 60 000 operating cycles required.
- The above selection curves show the contactor rating needed: LC1 F265.

Selection according to required electrical durability, use in category AC-4 (440 V < $U_e \leq 690$ V)

Control of 3-phase asynchronous squirrel cage motors with breaking whilst motor stalled.
The current broken (I_c) in AC-4 is equal to $6 \times I_e$.
(I_e = rated operational current of the motor).



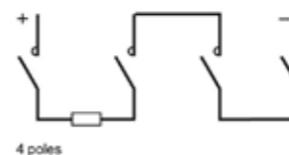
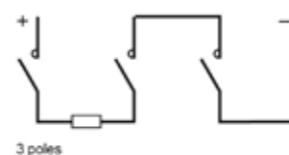
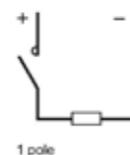
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TeSys contactors

For utilisation categories DC-1 to DC-5

Rated operational current (I_e) in Amperes, in utilisation category DC-1, resistive loads: time constant $\frac{L}{R} \leq 1$ ms, ambient temperature $\leq 60^\circ\text{C}$

Rated operational voltage U_e	No. of poles connected in series	Contactor rating (1)							
		LC1 D09	LC1 DT20	LC1 D12	LC1 D18	LC1 D25	LC1 DT25	LC1 D32	LC1 DT32
24	1	20	20	20	25	32	40	40	50
	2	20	20	20	25	32	40	40	50
	3	20	20	20	25	32	40	40	50
	4	-	20	20	25	32	-	-	50
48/75	1	20	20	20	25	32	40	40	50
	2	20	20	20	25	32	40	40	50
	3	20	20	20	25	32	40	40	50
	4	-	20	20	25	32	-	-	50
125	1	4	4	4	4	7	7	7	7
	2	20	20	20	25	32	40	40	50
	3	20	20	20	25	32	40	40	50
	4	-	20	20	25	32	-	-	50
250	1	1	1	1	1	1	1	1	1
	2	4	4	4	4	7	7	7	7
	3	20	20	20	25	32	40	40	50
	4	-	20	20	25	32	-	-	50
300	3	4	4	4	4	7	7	7	7
	4	-	20	20	25	32	-	-	50
460	1	-	-	-	-	-	-	-	-
	4	-	-	-	-	-	-	-	-
900	2	-	-	-	-	-	-	-	-
1200	3	-	-	-	-	-	-	-	-
1500	4	-	-	-	-	-	-	-	-



Rated operational current (I_e) in Amperes, in utilisation category DC-2 to DC-5, inductive loads: time constant $\frac{L}{R} \leq 15$ ms, ambient temperature $\leq 60^\circ\text{C}$

Rated operational voltage U_e	No. of poles connected in series	Contactor rating (1)							
		LC1 D09	LC1 DT20	LC1 D12	LC1 D18	LC1 D25	LC1 DT25	LC1 D32	LC1 DT32
24	1	20	20	20	25	32	40	40	50
	2	20	20	20	25	32	40	40	50
	3	20	20	20	25	32	40	40	50
	4	-	20	20	25	32	-	-	50
48/75	1	20	20	20	25	32	40	40	50
	2	20	20	20	25	32	40	40	50
	3	20	20	20	25	32	40	40	50
	4	-	20	20	25	32	-	-	50
125	1	2	2	2	2	3	3	3	4
	2	20	20	20	25	32	40	40	50
	3	20	20	20	25	32	40	40	50
	4	-	20	20	25	32	-	-	50
250	1	0,5	0,5	0,5	0,5	0,5	0,5	0,5	1
	2	2	2	2	2	3	3	3	4
	3	8	8	8	8	32	40	40	50
	4	-	20	20	25	32	-	-	50
300	3	2	2	2	2	3	3	3	3
	4	-	8	8	8	32	-	-	50
460	1	-	-	-	-	-	-	-	-
	4	-	-	-	-	-	-	-	-
900	2	-	-	-	-	-	-	-	-
1200	3	-	-	-	-	-	-	-	-
1500	4	-	-	-	-	-	-	-	-

(1) For rated operational currents of contactors LC1 and LP1 K: please consult your Regional Sales Office.

LC1 D50A	LC1 D65A	LC1 DT80A	LC1 D80	LC1 D95	LC1 D115	LC1 D150	LC1 F185	LC1 F225	LC1 F265	LC1 F330	LC1 F400	LC1 F500	LC1 F630	LC1 F780	LC1 F800	LC1 BL	LC1 BM	LC1 BP	LC1 BR
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65	65	65	100	100	200	200	240	260	300	360	430	580	850	1300	850	700	1100	1750	2400	
65	65	65	100	100	200	200	240	260	300	360	430	580	850	1300	850	700	1100	1750	2400	
65	65	65	100	100	200	200	240	260	300	360	430	580	850	1300	850	700	1100	1750	2400	
-	-	65	100	-	200	-	240	260	300	360	430	580	850	1300	850	700	1100	1750	2400	
65	65	65	100	100	200	200	240	260	300	360	430	580	850	1300	850	700	1100	1750	2400	
65	65	65	100	100	200	200	240	260	300	360	430	580	850	1300	850	700	1100	1750	2400	
65	65	65	100	100	200	200	240	260	300	360	430	580	850	1300	850	700	1100	1750	2400	
-	-	65	100	-	200	-	240	260	300	360	430	580	850	1300	850	700	1100	1750	2400	
7	7	7	12	12	12	12	210	230	270	320	380	520	760	1180	760	700	1100	1750	2400	
65	65	65	100	100	200	200	210	230	270	320	380	520	760	1180	760	700	1100	1750	2400	
65	65	65	100	100	200	200	240	260	300	360	430	580	850	1300	850	700	1100	1750	2400	
-	-	65	100	-	200	-	240	260	300	360	430	580	850	1300	850	700	1100	1750	2400	
1	1,5	1,5	2	2	10	10	-	-	-	-	-	-	-	-	-	-	700	1100	1750	2400
7	7	7	12	12	200	200	190	200	250	280	350	450	700	1000	700	700	1100	1750	2400	
65	65	65	100	100	200	200	240	260	300	360	430	580	850	1300	850	700	1100	1750	2400	
-	-	65	100	-	200	-	240	260	300	360	430	580	850	1300	850	700	1100	1750	2400	
7	7	7	12	12	200	200	190	200	250	280	350	450	700	1000	700	700	1100	1750	2400	
-	-	65	100	-	200	-	240	260	300	360	430	580	850	1000	850	700	1100	1750	2400	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	700	1100	1750	2400	
-	-	-	-	-	200	-	190	200	250	280	350	450	700	1000	700	700	1100	1750	2400	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	700	1100	1750	2400	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	700	1100	1750	2400	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	700	1100	1750	2400	

LC1 LC1

D50A D65A DT80A D80 D95 D115 D150 F185 F225 F265 F330 F400 F500 F630 F780 F800 BL BM BP BR

65	65	65	100	100	200	200	240	260	300	360	430	580	850	1300	850	700	1100	1750	2400	
65	65	65	100	100	200	200	240	260	300	360	430	580	850	1300	850	700	1100	1750	2400	
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65	65	65	100	100	200	200	240	260	300	360	430	580	850	1300	850	-	-	-	-	
65	65	65	100	100	200	200	240	260	300	360	430	580	850	1300	850	700	1100	1750	2400	
-	-	65	100	-	200	-	240	260	300	360	430	580	850	1300	850	700	1100	1750	2400	
4	4	4	5	5	10	10	-	-	-	-	-	-	-	-	-	-	700	1100	1750	2400
65	65	65	100	100	200	200	160	180	250	300	350	500	700	1000	700	700	1100	1750	2400	
65	65	65	100	100	200	200	240	240	280	310	350	550	850	1000	850	700	1100	1750	2400	
-	-	65	100	-	200	-	240	240	280	310	350	550	850	1000	850	700	1100	1750	2400	
1	1.5	1.5	1	1	3	3	-	-	-	-	-	-	-	-	-	-	700	1100	1750	2400
4	4	4	5	5	200	200	140	160	220	280	310	480	680	900	680	700	1100	1750	2400	
65	65	65	100	100	200	200	160	180	250	300	350	500	700	1000	700	700	1100	1750	2400	
-	-	65	100	-	200	-	240	260	300	360	430	580	850	1300	850	700	1100	1750	2400	
3	3	3	5	5	200	200	140	160	220	280	310	480	680	900	680	700	1100	1750	2400	
-	-	65	100	-	200	-	240	260	300	360	430	580	850	1300	850	700	1100	1750	2400	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	700	1100	1750	2400
-	-	-	-	-	-	200	-	140	160	220	280	310	480	680	800	680	700	1100	1750	2400
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	700	1100	1750	2400
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	700	1100	1750	2400
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	700	1100	1750	2400

Selection according to required electrical durability, use in categories DC-1 to DC-5

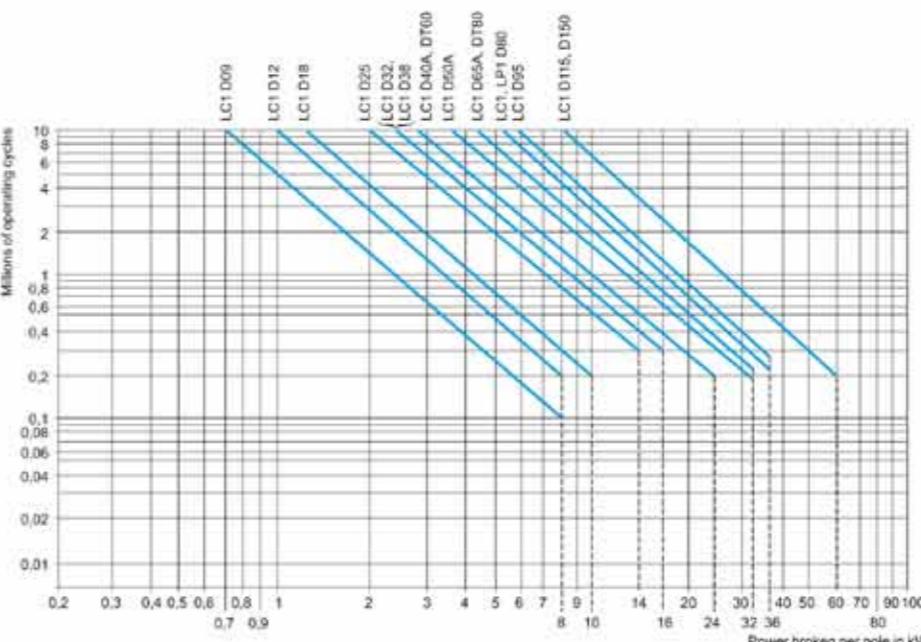
The criteria for contactor selection are:

- the rated operational current I_e ,
 - the rated operational voltage U_e ,
 - the utilisation category and the time constant L/R ,
 - the required electrical durability.

Maximum operating rate (operating cycles)

The following limits must not be exceeded: 120 operating cycles/hour at rated operational current i.e.

Electrical durability



Example

Example Series wound motor - $P = 1.5 \text{ kW}$ - $U_e = 200 \text{ V}$ - $I_e = 7.5 \text{ A}$. Utilisation: reversing, inching.

- Utilisation category = DC-5.
 - Select contactor LC1 D09 with 3 poles in series.
 - The power broken is: P_c total = $2.5 \times 200 \times 7.5 = 3.75$ kW.
 - The power broken per pole is: 1.25 kW.
 - The electrical durability read from the curve is ≥ 3 millions of operating cycles.

Use of poles in parallel

Electrical durability can be increased by using poles connected in parallel.

With N poles connected in parallel, the electrical durability becomes: electrical durability read from the curves $\times N \times 0.7$.



Note: 1

When the poles are connected in parallel, the maximum operational currents indicated on pages 5/204 and 5/205 must not be exceeded.

Note: 3

Note: 2
Ensure that the connections are made in such a way as to equalise the currents in each pole.



Selection according to required electrical durability, use in categories DC-1 to DC-5

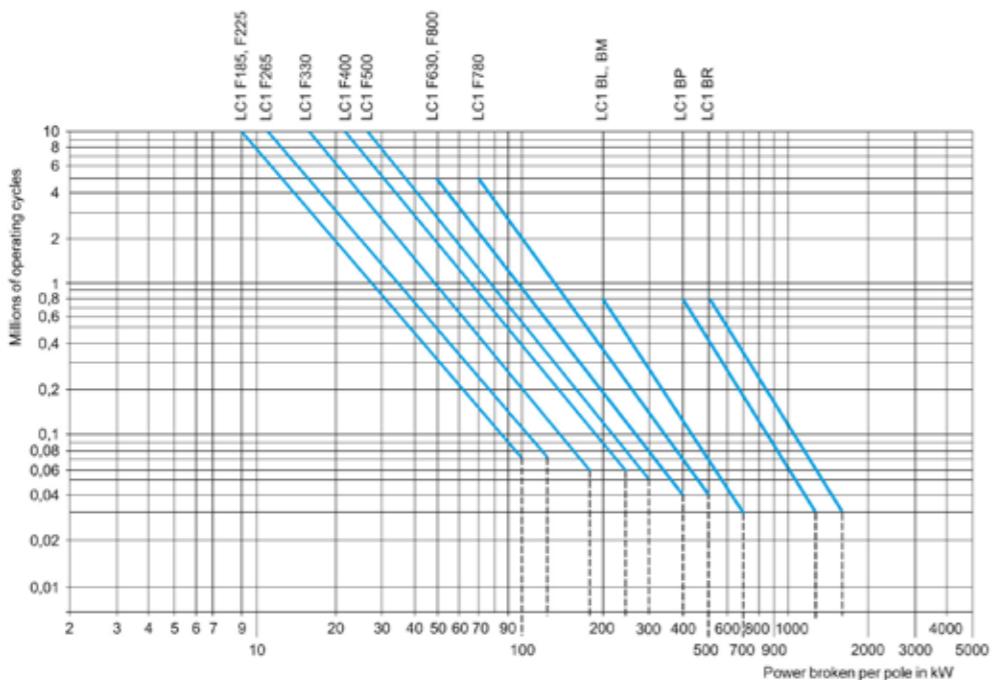
Determining the electrical durability

The electrical durability can be read directly from the curves below, having previously calculated the power broken as follows:

P broken = U broken x I broken

The tables below give the values of Uc and Ic for the various utilisation categories.

Utilisation categories	U broken	I broken	P broken
DC-1 Non inductive or slightly inductive loads	Ue	Ie	Ue x Ie
DC-2 Shunt wound motors, breaking whilst motor running	0.1 Ue	Ie	0.1 Ue x Ie
DC-3 Shunt wound motors, reversing, inching	Ue	2.5 Ie	Ue x 2.5 Ie
DC-4 Series wound motors, breaking whilst motor running	0.3 Ue	Ie	0.3 Ue x Ie
DC-5 Series wound motors, reversing, inching	Ue	2.5 Ie	Ue x 2.5 Ie



Example

Series wound motor: P = 40 kW - Ue = 200 V - Ie = 200 A. Utilisation: reversing, inching.

Utilisation category = DC-5.

■ Select contactor LC1 F265 with 2 poles in series.

■ The power broken is: $P_c = 2.5 \times 200 \times 200 = 100 \text{ kW}$.

■ The power broken per pole is 50 kW.

■ The electrical durability read from the curve is 500 000 operating cycles.

5

5

General

The operating conditions of lighting circuits have the following characteristics:

- continuous duty: the switching device can remain closed for several days or even months.
- a dispersion factor of 1: all luminaires in the same group are switched on or off simultaneously.
- a relatively high temperature around the device due to the enclosure, the presence of fuses, or an unventilated control panel location.

This is why the operational current for lighting is lower than the value given for AC-1 duty.

Protection

The continuous duty current drawn by a lighting circuit is constant.

In fact:

- it is unlikely that the number of luminaires of an existing circuit will be modified,
 - this type of circuit cannot create an overload of long duration.
- It is therefore only necessary to provide short-circuit protection.

This can be provided by:

- gG type fuses, or
- modular circuit-breakers.

Nevertheless, it is always possible and sometimes more economical (smaller cable size) to protect the circuit by a thermal overload relay and associated aM type fuses.

Distribution system

Single-phase circuit, 220/240 V

The tables on pages 5/209 to 5/213 are based on a single-phase 220/240 V circuit and can therefore be applied directly in this case.

3-phase circuit, 380/415 V (with neutral)

The total number of lamps (N) to be switched simultaneously is divided into three equal groups, each connected between one phase and neutral. The contactor can then be selected from the 220/240 V single-phase tables for a number of lamps equal to $\frac{N}{3}$ lamps.

3-phase circuit, 220/240 V

The total number of lamps (N) to be switched simultaneously is divided into three equal groups, each connected between 2 phases (L1-L2), (L2-L3), (L3-L1). The contactor can then be selected from the 220/240 V single-phase table for a number of lamps equal to $\frac{N}{\sqrt{3}}$ lamps.

Contactor selection tables

For the different types of lamps, the tables on pages 5/209 to 5/213 give the maximum number of lamps of unit power P (in Watts), which can be switched simultaneously for each size of contactor.

They are based on:

- a 220/240 V single-phase circuit,
- an ambient temperature of 55 °C (1), taking into account the operating conditions (see General paragraph).
- an electrical life of more than 10 years (200 days' operation per year).

They take into account:

- the total current drawn (including ballast),
- transient phenomena which occur at switch-on,
- the starting currents and their duration,
- the circulation of any harmonics which may be present.

Lamps with compensating capacitor C (μF) connected in parallel

Parallel connected compensating capacitors C cause a current peak at the moment of switch-on. To ensure that the value of this current peak remains compatible with the making characteristics of the contactors, the unit value of the capacitance must not exceed the following:

Switching contactor rating	LC1 LP1	LC1 LC1							
Maximum unit value C (μF) of parallel connected compensating capacitor	K09	K09	D09	D12	D18	D25	D32	D38	D40A D50A D65A D80

Switching contactor rating	LC1 LC1								
Maximum unit value C (μF) of parallel connected compensating capacitor	D95	D115	D150	F185	F225	F265	F330	F400	F500 F630 F800

Switching contactor rating	LC1 LC1								
Maximum unit value C (μF) of parallel connected compensating capacitor	240	300	360	800	1200	1700	2500	4000	6000 9000 10 800

This value is independent of the number of lamps switched by the contactor.

(1) For an ambient temperature of 40 °C, multiply the number by 1.2.

TeSys contactors

For lighting circuits

**TeSys contactors**

For lighting circuits

**Usual values**

The tables show the following values:

- IB: value of current drawn by each lamp at its rated voltage.
 - C: unit capacitance for each lamp,
- corresponding to the values normally quoted by lamp manufacturers.

These values are given for an ambient temperature of 55 °C (for 40 °C, multiply the number by 1.2).

Incandescent and halogen lamps

P (W)	60	75	100	150	200	300	500	750	1000	LC1
IB (A)	0.27	0.34	0.45	0.68	0.91	1.40	2.30	3.40	4.60	
Max. no. of lamps according to P (W)	35	28	21	14	10	6	4	2	2	K09
	59	47	35	23	17	11	7	4	3	D09, D12
	77	61	46	30	23	15	9	6	4	D18
	92	73	55	36	27	18	11	7	5	D25
	129	103	77	51	38	25	15	10	7	D32, D38
	163	129	97	64	48	31	19	13	9	D40A
	207	164	124	82	62	40	24	16	12	D50A, D65A
	296	235	177	117	88	57	34	23	17	D80, D95
	430	340	256	170	126	82	50	34	24	D115
	466	370	280	184	138	90	54	36	26	D150
	710	564	426	282	210	136	82	56	40	F185
	770	610	462	304	228	148	90	60	44	F225
	888	704	532	352	262	170	104	70	52	F265
	1006	800	604	400	298	194	118	80	58	F330
	1274	1010	764	504	378	244	148	100	74	F400
	1718	1364	1030	682	508	330	200	136	100	F500
	2328	1850	1396	924	690	448	272	184	136	F630
	2776	2204	1666	1102	824	534	326	220	162	F800

Mixed lighting lamps

P (W)	100	160	250	500	1000	LC1
IB (A)	0.45	0.72	1.10	2.30	4.50	
Max. no. of lamps according to P (W)	21	13	8	4	2	K09
	35	22	14	7	3	D09, D12
	46	29	18	9	4	D18
	55	36	23	11	5	D25
	77	48	30	15	7	D32, D38
	97	61	38	19	9	D40A
	124	77	49	24	12	D50A, D65A
	177	111	70	34	17	D80, D95
	256	160	104	50	26	D115
	280	174	114	54	28	D150
	426	266	174	82	42	F185
	462	288	188	90	46	F225
	532	332	218	104	52	F265
	604	378	246	118	60	F330
	764	478	312	150	76	F400
	1030	644	422	202	102	F500
	1398	874	572	272	140	F630
	1666	1040	680	326	166	F800

5

Usual values

The tables show the following values:

- IB: value of current drawn by each lamp at its rated voltage,
 - C: unit capacitance for each lamp,
- corresponding to the values normally quoted by lamp manufacturers.

These values are given for an ambient temperature of 55 °C (for 40 °C, multiply the number by 1.2).

Fluorescent lamps with starter. Single fitting

Non corrected					With parallel correction						
P (W)	20	40	65	80	110	20	40	65	80	110	
IB (A)	0.39	0.45	0.70	0.80		1.2	0.17	0.26	0.42	0.52	0.72
C (μF)	—	—	—	—	—	—	5	5	7	7	16
Max. no. of lamps according to P (W)	24	21	13	12		8	56	36	22	18	—
	41	35	22	20		13	94	61	38	30	22
	53	46	30	26		17	123	80	50	40	29
	66	57	37	32		21	152	100	61	50	36
	89	77	50	43		29	205	134	83	67	48
	112	97	62	55		36	258	169	104	84	61
	143	124	80	70		46	329	215	133	107	77
	205	177	114	100		66	470	367	190	153	111
	410	354	228	200		132	940	614	380	306	222
	492	426	274	240		160	1128	738	456	368	266
	532	462	296	260		172	1224	800	490	400	288
	614	532	342	300		200	1412	922	570	462	332
	696	604	388	340		226	1600	1046	648	522	378
	882	764	490	430		286	2024	1322	818	662	478
	1190	1030	662	580		386	2728	1724	1104	892	644
	1612	1398	698	786		524	3700	2418	1498	1210	874
					LC1						F630, F800

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Fluorescent lamps with starter. Twin fitting

Non corrected						With series correction				
P (W)	2x20	2x40	2x65	2x80	2x110	2x20	2x40	2x65	2x80	2x110
IB (A)	2x0.22	2x0.41	2x0.67	2x0.82	2x1.1					
Max. no. of lamps according to P (W)	2x21	2x11	2x7	2x5	2x4	2x36	2x20	2x12	2x10	2x7
	2x36	2x18	2x10	2x8	2x6	2x60	2x32	2x20	2x16	2x12
	2x46	2x24	2x14	2x12	2x8	2x80	2x42	2x26	2x20	2x16
	2x58	2x30	2x18	2x14	2x10	2x100	2x54			

TeSys contactors

For lighting circuits



Usual values

The tables show the following values:
 ■ IB: value of current drawn by each lamp at its rated voltage,
 ■ C: unit capacitance for each lamp,
 corresponding to the values normally quoted by lamp manufacturers.

These values are given for an ambient temperature of 55 °C (for 40 °C, multiply the number by 1.2).

Fluorescent lamps without starter. Single fitting

P (W)	Non corrected					With parallel correction				
	20	40	65	80	110	20	40	65	80	110
	IB (A)	0.43	0.55	0.80	0.95	1.4	0.19	0.29	0.46	0.57
C (μF)	-	-	-	-	-	5	5	7	7	16
Max. no. of lamps according to P (W)	22	17	12	10	6	50	33	20	16	-
37	29	20	16	11	-	84	55	34	28	20
48	38	26	22	15	-	110	72	45	36	26
60	47	32	27	18	-	136	89	56	45	32
97	63	43	36	25	-	184	101	76	61	44
102	80	55	46	31	-	231	151	95	77	55
130	101	70	58	40	-	294	193	121	98	70
186	145	100	84	57	-	421	275	173	140	101
372	290	200	168	114	-	842	550	346	280	202
446	348	240	202	136	-	1010	662	416	336	242
484	378	260	218	148	-	1094	716	452	364	262
558	436	300	252	170	-	1262	828	522	420	304
632	494	340	286	194	-	1432	938	590	476	344
800	624	430	362	246	-	1810	1186	748	604	434
1078	844	580	488	330	-	2442	1600	1008	814	586
1462	1144	786	662	448	-	3310	2168	1366	1104	796
					-					F630, F800

Fluorescent lamps without starter. Twin fitting

P (W)	Non corrected					With series correction				
	2x20	2x40	2x65	2x80	2x110	2x20	2x40	2x65	2x80	2x110
	IB (A)	2x0.25	2x0.47	2x0.76	2x0.93	2x1.3	2x0.14	2x0.26	2x0.43	2x0.53
Max. no. of lamps according to P (W)	2x19	2x10	2x6	2x5	2x3	2x34	2x18	2x11	2x9	2x6
2x32	2x16	2x10	2x8	2x6	-	2x56	2x30	2x18	2x14	2x10
2x42	2x22	2x12	2x10	2x8	-	2x74	2x40	2x24	2x18	2x14
2x52	2x26	2x16	2x12	2x10	-	2x92	2x50	2x30	2x24	2x18
2x70	2x36	2x22	2x18	2x12	-	2x124	2x66	2x40	2x32	2x24
2x88	2x46	2x28	2x22	2x16	-	2x156	2x84	2x50	2x40	2x30
2x112	2x58	2x36	2x30	2x20	-	2x200	2x106	2x64	2x52	2x38
2x160	2x84	2x52	2x42	2x30	-	2x234	2x152	2x92	2x74	2x54
2x320	2x170	2x104	2x86	2x60	-	2x570	2x306	2x186	2x150	2x110
2x384	2x204	2x126	2x102	2x74	-	2x686	2x368	2x222	2x180	2x132
2x416	2x220	2x136	2x112	2x80	-	2x742	2x400	2x242	2x196	2x144
2x480	2x254	2x158	2x128	2x92	-	2x856	2x462	2x278	2x226	2x166
2x544	2x288	2x178	2x146	2x104	-	2x970	2x522	2x316	2x256	2x188
2x688	2x366	2x226	2x184	2x132	-	2x1228	2x662	2x400	2x324	2x238
2x928	2x494	2x304	2x248	2x178	-	2x1656	2x892	2x540	2x438	2x322
2x1258	2x668	2x414	2x338	2x242	-	2x2246	2x1210	2x730	2x592	2x436
					-					F630, F800

TeSys contactors

For lighting circuits



Usual values

The tables show the following values:
 ■ IB: value of current drawn by each lamp at its rated voltage,
 ■ C: unit capacitance for each lamp,
 corresponding to the values normally quoted by lamp manufacturers.

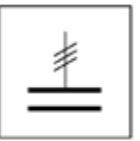
These values are given for an ambient temperature of 55 °C (for 40 °C, multiply the number by 1.2).

Low pressure sodium vapour lamps

P (W)	Non corrected							With parallel correction							
	35	55	90	135	150	180	200	35	55	90	135	150	180	200	
	IB (A)	1.2	1.6	2.4	3.1	3.2	3.3	3.4	0.3	0.4	0.6	0.9	1	1.2	1.3
C (μF)	-	-	-	-	-	-	-	17	17	25	36	36	36	36	LC1
Max. no. of lamps according to P (W)	6	5	3	2	2	2	2	-	-	-	-	-	-	-	K09
10	7	5	3	3	3	3	3	40	30	-	-	-	-	-	D09, D12
12	9	6	4	4	4	4	4	50	37	25	-	-	-	-	D18
15	11	7	6	5	5	5	5	63	47	31	21	19	15	14	D25
21	16	10	8	8	7	7	7	86	65	43	28	26	21	20	D32, D38
27	20	13	10	10	10	9	9	110	82	55	36	33	27	25	D40A
35	26	17	13	13	12	12	12	140	105	70	46	42	35	32	D50A, D65A
50	37	25	19	18	18	17	17	200	150	100	66	60	50	46	D80, D95
100	75	50	38	36	36	34	100	400	300	200	132	120	100	92	D115, D150
140	104	70	54	52	50	48	140	560	420	280	186	168	140	128	F1

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 ($> 180 I_n$) 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 In.

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 5/102.

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.

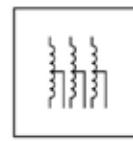
Operational power at 50/60 Hz			Max. peak current			Contactor rating
$\theta \leq 40^\circ \text{C}$ (1)			$\theta \leq 55^\circ \text{C}$ (1)			
kvAR	kvAR	kVAR	kvAR	kvAR	kvAR	A
6	11	15	6	11	15	560 LC1 D09, D12
9	15	20	9	15	20	850 LC1 D18
11	20	25	11	20	25	1600 LC1 D25
14	25	30	14	25	30	1900 LC1 D32, 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.

Recommended wiring scheme, operation, curves

TeSys contactors

For auto-transformer starting



Applications

Auto-transformer starting is suitable for starting all types of squirrel cage motors: with 3, 6 or even 9 terminals according to North American technology.

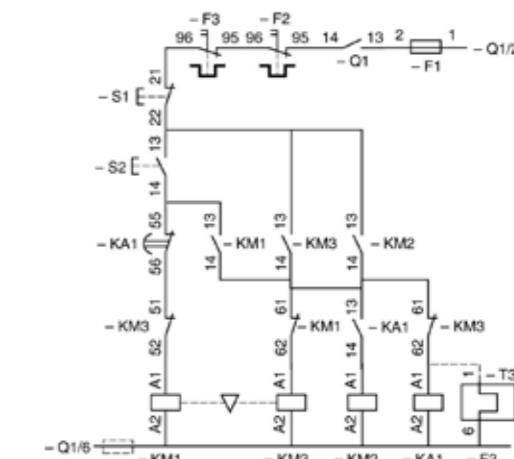
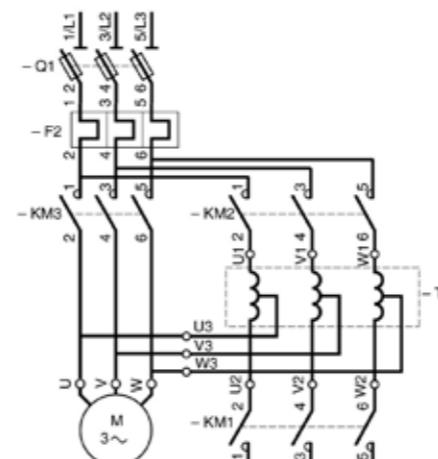
Starting is performed at reduced voltage and produces maximum torque at minimum line current.

It allows the starting torque ($C = f(U)^2$) to be adapted to the resistive torque of the driven machine by means of the 2 or 3 intermediate voltage take-off connections on the auto-transformer (0.65 and 0.8 Un or 0.5, 0.65 and 0.8 Un). In general, only one take-off connection is used.

This type of starting is used for high power and/or high inertia machines.

The motor is never disconnected from its power supply during starting (closed transition) and transient phenomena are eliminated.

Recommended wiring scheme



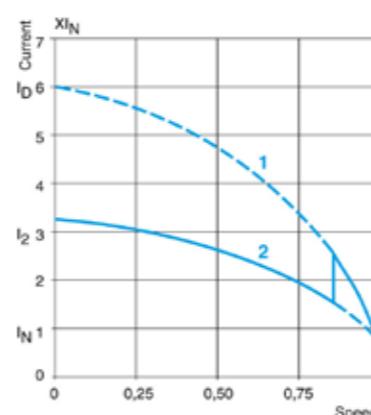
Operation

Starting is performed in 3 stages:

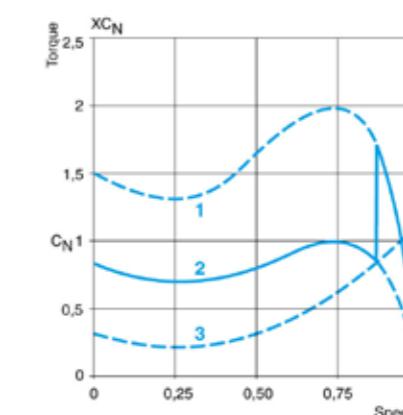
- star connection of the auto-transformer is made by KM1, then contactor KM2 closes and the motor starts under reduced voltage;
- the neutral point is opened by KM1; part of the auto-transformer winding is switched into each phase for a short moment, constituting a stator starting inductance;
- KM3 switches the motor to full mains voltage and causes the auto-transformer to be shunted out of circuit by KM2.

The auto-transformer used generally has an air gap (adjusted or not) in order to obtain, during the second phase of starting, a series inductance whose value is compatible with correct starting.

Operating curves



1 Direct switching current
2 Current with auto-transformer
3 Resistive torque of the machine



1 Direct motor torque
2 Torque with auto-transformer
3 Resistive torque of the machine

Auto-transformer starters from 59 to 900 kW up to 440 V (type 1 coordination)

The components recommended in the table below have been determined according to the following characteristics:

- auto-transformer: on 0.65 Un connection with non adjusted air gap,
- 3 starts per hour, of which 2 consecutive,
- Motor starting current: $Id/In = 6$,
- $Iq = 70 \text{ kA}$,
- Transient current on closing of $KM3 \leq 7\sqrt{2} In$,
- Maximum starting time: 30 seconds,
- Ambient temperature $0 \leq 40^\circ\text{C}$.

Switch-disconnector-fuses: operators and accessories, please consult your Regional Sales Office.

Contactors: 3-pole.

LC1 D: see pages 5/62 and 5/65,

LC1 F: please consult your Regional Sales Office,

LC1 B: please consult your Regional Sales Office.

Auxiliary contact blocks:

- for contactors LC1 D: one LAD N11 (1 N/O + 1 N/C) on KM1,
- for contactors LC1 F: one LAD N22 (2 N/O + 2 N/C) on KM1, KM2 and KM3.

Thermal overload relays:

- LRD: see pages 6/20 to 6/25,
- LR9 D: see page 6/23,
- LR9 F: please consult your Regional Sales Office.

Standard power ratings of 3-phase motors 50/60 Hz in category AC-3				Switch- disconnector- fuse Reference	aM fuses	Size	Rating	Contactors			Overload relays	
220/ 380/ 415V	440V	In max	230V 400V					KM3 LC1	KM2 LC1	KM1 LC1	Reference (1)	Setting range
30	55	59	59	105	GS• K	22x58	125	D115	D115	D3210	LR9 D5369	90...150
											LRD 4367	95...120
40	75	80	80	138	GS• L	T0	160	D150	D115	D5011	LR9 D5369	90...150
											LRD 4369	110...140
51	90	90	100	170	GS• N	T1	200	F185	D115	D5011	LR9 F5371	132...220
63	110	110	110	205	GS• N	T1	250	F225	D150	D8011	LR9 F5371	132...220
75	132	132	150	245	GS• N	T1	250	F265	F185	D115	LR9 F5375	200...330
90	160	160	185	300	GS• QQ	T2	315	F330	F265	D115	LR9 F5375	200...330
110	200	200	220	370	GS• QQ	T2	400	F400	F330	D115	LR9 F5379	300...500
140	250	257	280	460	GS2 S	T3	500	F500	F400	D115	LR9 F5379	300...500
180	315	355	375	584	GS2 S	T3	630	F630	F400	D185	LR9 F5381	380...630
200	355	375	400	635	GS2 V	T4	800	F800	F500	F185	TC800/1 + LRD 05	505...800
220	400	425	450	710	GS2 V	T4	800	F800	F500	F265	TC800/1 + LRD 05	505...800
250	450	475	500	800	GS2 V	T4	800	F800	F500	F265	TC1000/1 + LRD 05	630...1000
280	500	530	560	900	GS2 V	T4	1000	BM33•22	F630	F330	TC1000/1 LRD 05	630...1000
315	560	600	630	1000	GS2 V	T4	1000	BM33•22	F630	F400	TC1250/1 LRD 05	790...1250
335	630	670	710	1100	GS2 V	T4	1250	BP33•22	F630	F400	TC1250/1 LRD 05	790...1250
400	710	750	800	1260	On base	T4	2 x 800 (2)	BP33•22	F780	F400	TC1500/1 LRD 05	945...1500
450	800	800	800	1450	On base	T4	2 x 800 (2)	BP33•22	F780	F400	TC1750/1 LRD 05	100...1750
500	900	900	900	1600	On base	T4	2 x 800 (2)	BR33•22	F780	F500	TC2000/1 LRD 05	260...2000

(1) For power ratings greater than or equal to 400 kW at 415 V, use one LRD-05 on the current transformer.

(2) Check with the motor manufacturer whether the fuses should be fitted in parallel.

5

Applications

These contactors are used to eliminate starting resistance in the rotor circuit of slip-ring motors.

The most common application is for starters without inching and without rotor speed adjustment: pumps, fans, conveyors, compressors, ...

In the case of control by means of a manually operated master controller, the use of contactors with magnetic blow-out is recommended. Please consult your Regional Sales Office.

For hoisting applications, contactor selection must take into account the type of motor duty, the operating rate, the rotor voltage and current, the type of connection, the ambient temperature, etc.
Please consult your Regional Sales Office.

Operation

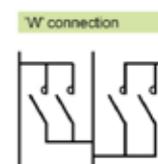
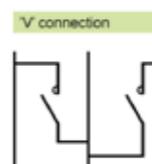
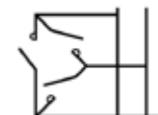
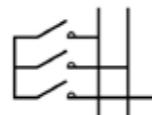
The rotor circuit contactors are interlocked with the stator contactor and therefore do not open until after the stator contactor has opened, when the rotor voltage has disappeared, or virtually disappeared.

They make the current corresponding to the normal starting peak (1.5 to 2.5 times the rated rotor current) and open the circuit under no-load. Making and breaking are easy.

Different types of rotor connection

Star connection

Delta connection



Contactor selection according to the type of connection

Rotor current and voltage coefficients

Coefficients to be applied to the operational current values shown in the table below.

Type of connection	Rotor I coefficient	3-phase rotor Ue (1)			
		Maximum		With counter-current	
	Operational I	LC1 F	LC1 B	LC1 F	LC1 B
Star	1	2000 V	2000 V	1000 V	1000 V
Delta	1.4	1700 V	1700 V	850 V	850 V
In V	1	1700 V	1700 V	850 V	850 V
In W	1.6	1700 V	1700 V	850 V	850 V

Selection according to the operational current

The selection examples below take into account:

■ a ratio of 2 between the maximum operational rotor voltage (Uer) and the rated stator operational voltage (Ues). This ratio is given in standard IEC 60947-4,

■ a guarantee of occasional duty (making and breaking capacities) specified in the above standards.

Time current flowing	Contactor rating										
	LC1 D150	LC1 F185	LC1 F265	LC1 F400	LC1 F500	LC1 F630	LC1 F780	LC1 BL	LC1 BM	LC1 BP	LC1 BR
Intermediate contactor: with number of operating cycles ≤ 30/h											
10 s	450 A	550 A	800 A	1100 A	1500 A	2000 A	2500 A	2000 A	2400 A	3750 A	5000 A
30 s	280 A	400 A	550 A	730 A	1000 A	1500 A	2000 A	1200 A	1800 A	2600 A	3600 A
60 s	220 A	300 A	400 A	550 A	750 A	1200 A	1500 A	1000 A	1500 A	2200 A	3000 A
Intermediate contactor: with number of operating cycles ≤ 60/h											
5 s	450 A	550 A	800 A	1100 A	1500 A	2000 A	2500 A	2000 A	2400 A	3750 A	5000 A
10 s	330 A	450 A	620 A	860 A	1250 A	1800 A	2300 A	1600 A	2200 A	3400 A	4500 A
30 s	220 A	300 A	400 A	550 A	750 A	1200 A	1500 A	1000 A	1500 A	2200 A	3000 A
Intermediate contactor: with number of operating cycles ≤ 150/h for LC1 F and 120/h for LC1 B											
5 s	300 A	420 A	580 A	820 A	1150 A	1650 A	2200 A	1500 A	2100 A	3200 A	4200 A
10 s	250 A	350 A	430 A	600 A	850 A	1300 A	1600 A	1100 A	1600 A	2300 A	3200 A
Rotor short-circuit contactor and intermediate contactor: with number of operating cycles > 150/h for LC1 F and 120/h for LC1 B											
-	200 A	270 A	350 A	500 A	700 A	1000 A	1600 A	800 A	1250 A	2000 A	2750 A

Electrical durability

For automatic starting, the electrical durability is in the region of 1 million operating cycles.

(1) For use up to 3000 V, please consult your Regional Sales Office.

5

Voltage drop caused by the inrush current

When the operating coil of a contactor is energised, the inrush current produces a voltage drop in the control circuit cable caused by the resistance of the conductors, which can adversely affect closing of the contactor.

An excessive voltage drop in the control supply cables (both a.c. and d.c.) can lead to non closure of the contactor poles or even destruction of the coil due to overheating.

This phenomenon is aggravated by:

- a long line,
- a low control circuit voltage,
- a cable with a small c.s.a.,
- a high inrush power drawn by the coil.

The maximum length of cable, depending on the control voltage, the inrush power and the conductor c.s.a., is indicated in the graphs below.

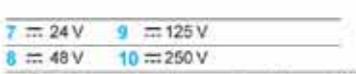
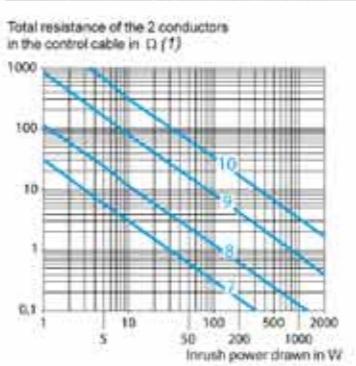
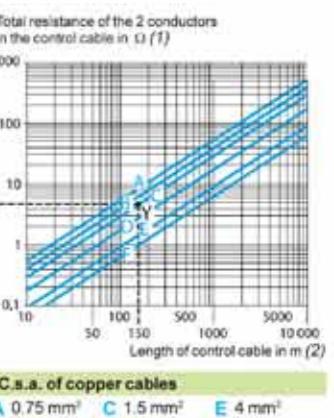
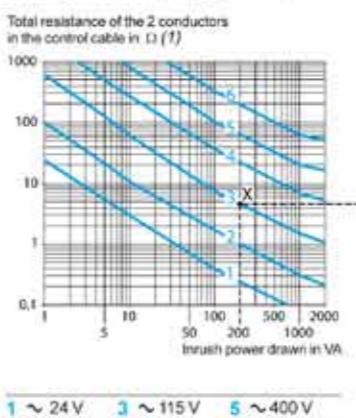
Remedial action

To reduce the voltage drop at switch-on:

- increase the conductor c.s.a.,
- use a higher control circuit voltage,
- use an intermediate control relay.

Selection of conductor c.s.a.

These graphs are for a maximum line voltage drop of 5%. They give a direct indication of the copper conductor c.s.a. to be used for the control cable, depending on its length, the inrush power drawn by the contactor coil and the control circuit voltage (see example page 5/223).



(1) For 3-wire control, the current only flows in 2 of the conductors.

(2) This is the length of the cable comprising 2 or 3 conductors. (Distance between the contactor and the control device).

TeSys contactors

Long distance remote control

TeSys contactors

Long distance remote control

Voltage drop caused by the inrush current (continued)

What cable c.s.a. is required for the control circuit of an LC1 D40A, 115 V contactor, operated from a distance of 150 metres?

- Contactor LC1 D40A, voltage 115 V, 50 Hz; inrush power: 200 VA

On the left-hand graph on the page opposite, point X is at the intersection of the vertical line corresponding to 200 VA and the ~ 115 V voltage curve.

On the right-hand graph on the page opposite, point Y is at the intersection of the vertical line corresponding to 150 m and the horizontal line passing through point X.

Use the conductor c.s.a. indicated by the curve which passes through point Y, i.e.: 1.5 mm².

If point Y lies between two c.s.a. curves, choose the larger of the c.s.a. values.

Calculating the maximum cable length

The maximum permissible length for acceptable line voltage drop is calculated by the formula:

$$L = \frac{U^2}{SA} \cdot s \cdot K$$

where:

L : distance between the contactor and the control device in m (length of the cable),

U : supply voltage in V,

SA : apparent inrush power drawn by the coil in VA,

s : conductor c.s.a. in mm²,

K : factor given in the table below.

a.c. supply	SA in VA	20	40	100	150	200
	K	1.38	1.5	1.8	2	2.15

d.c. supply	Irrespective of the apparent inrush power SA, expressed in W
	K = 1.38

5

Residual current in the coil due to cable capacitance

When the control contact of a contactor is opened, the control cable capacitance is effectively in series with the coil of the electromagnet. This capacitance can cause a residual current to be maintained in the coil, with the risk that the contactor will remain closed.

This only applies to contactors operating on an a.c. supply.

This phenomenon is aggravated by:

- a long line length between the coil control contact and the contactor, or between the coil control contact and the power supply,
- a high control circuit voltage,
- a low coil consumption, sealed,
- a low value of contactor drop-out voltage.

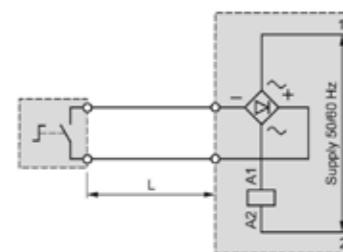
The maximum control cable length, according to the contactor coil supply voltage, is indicated in the graph on the page opposite

Remedial action

Various solutions can be adopted to avoid the risk of the contactor remaining closed due to cable capacitance:

- use a d.c. control voltage, or,
- add a rectifier, connected as shown in the scheme below, but retaining an a.c. operating coil: in this way, rectified a.c. current flows in the control cable.

When calculating the maximum cable length, take the resistance of the conductors into account.



- Connect a resistor in parallel with the contactor coil (1).

Value of the resistance :

$$R \Omega = \frac{1}{10^{-3} C (\mu F)} \quad (C \text{ capacitance of the control cable})$$

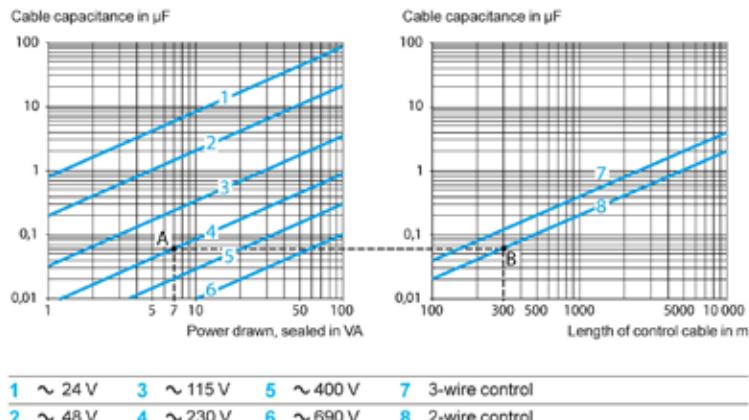
Power to be dissipated :

$$P_W = \frac{U^2}{R}$$

(1) To avoid increasing the voltage drop due to inrush current, this resistor must be brought into operation after the contactor has closed by using an N/O contact.

Residual current in the coil due to cable capacitance (continued)

These graphs are for a capacitance, between 2 conductors, of 0.2 µF/km. They make it possible to determine whether there is a risk of the contactor remaining closed due to the power drawn by the coil when sealed, as well as the control circuit voltage, according to the length of the control cable.



In the zones below the straight lines for 3-wire and 2-wire control respectively, there is a risk of the contactor remaining closed.

Examples

5

What is the maximum length for the control cable of an LC1 D12 contactor, operating on 230 V, with 2-wire control?

■ Contactor LC1 D12, voltage 230 V, 50 Hz: power sealed 7 VA.

On the left-hand graph, point A is at the intersection of the vertical line for 7 VA with the ~ 230 V voltage curve.

On the right-hand graph, point B is at the intersection of the horizontal line with the 2-wire control curve.

The maximum cable length is therefore 300 m.

In the same example, with a 600 m cable, the point lies in the risk zone. A resistor must therefore be connected in parallel with the contactor coil.

Value of this resistance :

$$R = \frac{1}{10^{-3} \cdot C} = \frac{1}{10^{-3} \cdot 0.12} = 8.3 \Omega$$

Power to be dissipated :

$$P = \frac{U^2}{R} = \frac{(220)^2}{8300} = 6 W$$

Alternative solution: use a d.c. control supply.

Calculating the cable length

The maximum permitted length of control cable to avoid the effects of capacitance is calculated using the formula:

$$L = 455 \cdot \frac{S}{U^2 \cdot C_o}$$

L : distance between the contactor and the control device in km (length of the cable),

S : apparent power, sealed, in VA,

U : control voltage in V,

C_o : line capacitance of the cable in µF/km.