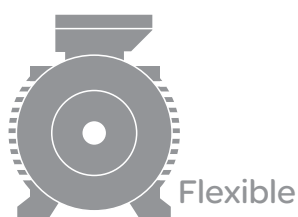


TeSys

Motor control and protection components



Motor starters **M**



Smart Circuit breakers

Protection Contactors

Thermal overload relays

Fuse switch-disconnectors

Reliable

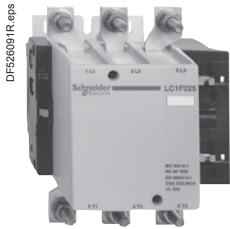
Motor controllers



TeSys contactors

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

TeSys F



LC1 F225



LC1 F630

3-pole contactors								Basic reference, to be completed by adding the voltage code (2) Screw fixing, cabling (1)	Weight
Standard power ratings of 3-phase motors 50-60 Hz in category AC-3									
220 V 380 V		415 V 440 V		500 V 690 V		1000 V		440 V up to	kg
kW	kW	kW	kW	kW	kW	kW	A		
30	55	59	59	75	80	65	115	LC1F115●●	3.430
40	75	80	80	90	100	65	150	LC1F150●●	3.430
55	90	100	100	110	110	100	185	LC1F185●●	4.650
63	110	110	110	129	129	100	225	LC1F225●●	4.750
75	132	140	140	160	160	147	265	LC1F265●●	7.440
100	160	180	200	200	220	160	330	LC1F330●●	8.600
110	200	220	250	257	280	185	400	LC1F400●●	9.100
147	250	280	295	355	335	335	500	LC1F500●●	11.350
200	335	375	400	400	450	450	630	LC1F630●●	18.600
220	400	425	425	450	475	450	780	LC1F780●●	39.500
250	450	450	450	450	475	450	800	LC1F800●●	18.750

Note: auxiliary contact blocks, modules and accessories: see pages B9/10 to B9/27.

(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 B9/14).

(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	Q5	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	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 LC1F630.

(4) Coil LX4 F8●● + rectifier DR5TE●●.

TeSys contactors

TeSys F contactors for motor control in utilisation category AC-3 (115 to 2100 A)
Control circuit: a.c. or d.c.

TeSys F



LC1 F1854



LC1 F4004



LC1 F6304




LC1 F1700



LC1 F2100

2, 3 or 4-pole contactors

Maximum current in AC-1 ($\theta \leq 40^\circ\text{C}$)	Number of poles 	Basic reference, to be completed by adding the voltage code ⁽²⁾ Screw fixing, cabling ⁽¹⁾	Weight
A			kg
200	3	LC1F115●●	3.430
	4	LC1F1154●●	3.830
250	3	LC1F150●●	3.430
	4	LC1F1504●●	3.830
275	3	LC1F185●●	4.650
	4	LC1F1854●●	5.450
315	3	LC1F225●●	4.750
	4	LC1F2254●●	5.550
350	3	LC1F265●●	7.440
	4	LC1F2654●●	8.540
400	3	LC1F330●●	8.600
	4	LC1F3304●●	9.500
500	2	LC1F4002●●	8.000
	3	LC1F400●●	9.100
	4	LC1F4004●●	10.200
	4	LC1F4004●●	10.200
700	2	LC1F5002●●	9.750
	3	LC1F500●●	11.350
	4	LC1F5004●●	12.950
	4	LC1F5004●●	12.950
1000	2	LC1F6302●●	15.500
	3	LC1F630●●	18.600
	4	LC1F6304●●	21.500
	4	LC1F6304●●	21.500
1260	3	LC1F1250●●	19.000
1400	3	LC1F1400●●	29.000
1600	3	LC1F780●●	39.500
	4	LC1F7804●●	48.000
1700	3	LC1F1700●●	30.000
2100 ⁽³⁾	3	LC1F2100●●	31.000

Note: auxiliary contact blocks, modules and accessories: see pages B9/10 to B9/27.

⁽¹⁾ Power terminals can be protected against direct finger contact by the addition of shrouds, to be ordered separately (except LC1 F780, LC1 F1250, LC1 F1400, LC1 F1700 and LC1 F2100), see page "TeSys contactors", page B9/14.

⁽²⁾ Standard control circuit voltages, see previous page.

⁽³⁾ With set of right-angled connectors LA9 F2100 (see page "References", page B9/16).

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.



LC2F115

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⁾ Complete reference Fixing, cabling ⁽³⁾	Weight
220 V 380 V 660 V							440 V			
230 V 400 V 415 V 440 V 500 V 690 V 1000 V							up to			
kW	kW	kW	kW	kW	kW	kW	A	V		kg
30	55	59	59	75	80	65	115	1000	LC2F115	7.560
40	75	80	80	90	100	65	150	1000	LC2F150	7.560
55	90	100	100	110	110	100	185	1000	LC2F185	10.100
63	110	110	110	129	129	100	225	1000	LC2F225	14.200
75	132	140	140	160	160	147	265	1000	LC2F265	16.480

Accessories (to be ordered separately)

Description	For reversing contactors	Quantity required	Reference
Power terminal protection shrouds	LC2 F115	2	LA9F701
	LC2 F150, F185	2	LA9F702
	LC2 F225, F265	2	LA9F703
Auxiliary contact blocks and add-on modules	–	–	See pages B9/10 to B9/14

⁽¹⁾ Fitted with a mechanical interlock without electrical interlocking. Order separately 2 auxiliary contact blocks LADN●1 to obtain electrical interlocking between the 2 contactors, see page B9/11. For accessories, see pages B9/12 to B9/14.

⁽²⁾ Coils to be ordered separately:

- a.c. supply, see pages B9/17 to B9/4,
- d.c. supply, see pages B9/5 and B9/24.

⁽³⁾ Screw fixing.

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

TeSys contactors

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

DF526098R.eps



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	V		kg
200	1000	LC2F1154	8.860
250	1000	LC2F1504	8.860
275	1000	LC2F1854	12.100
315	1000	LC2F2254	15.200
350	1000	LC2F2654	19.480

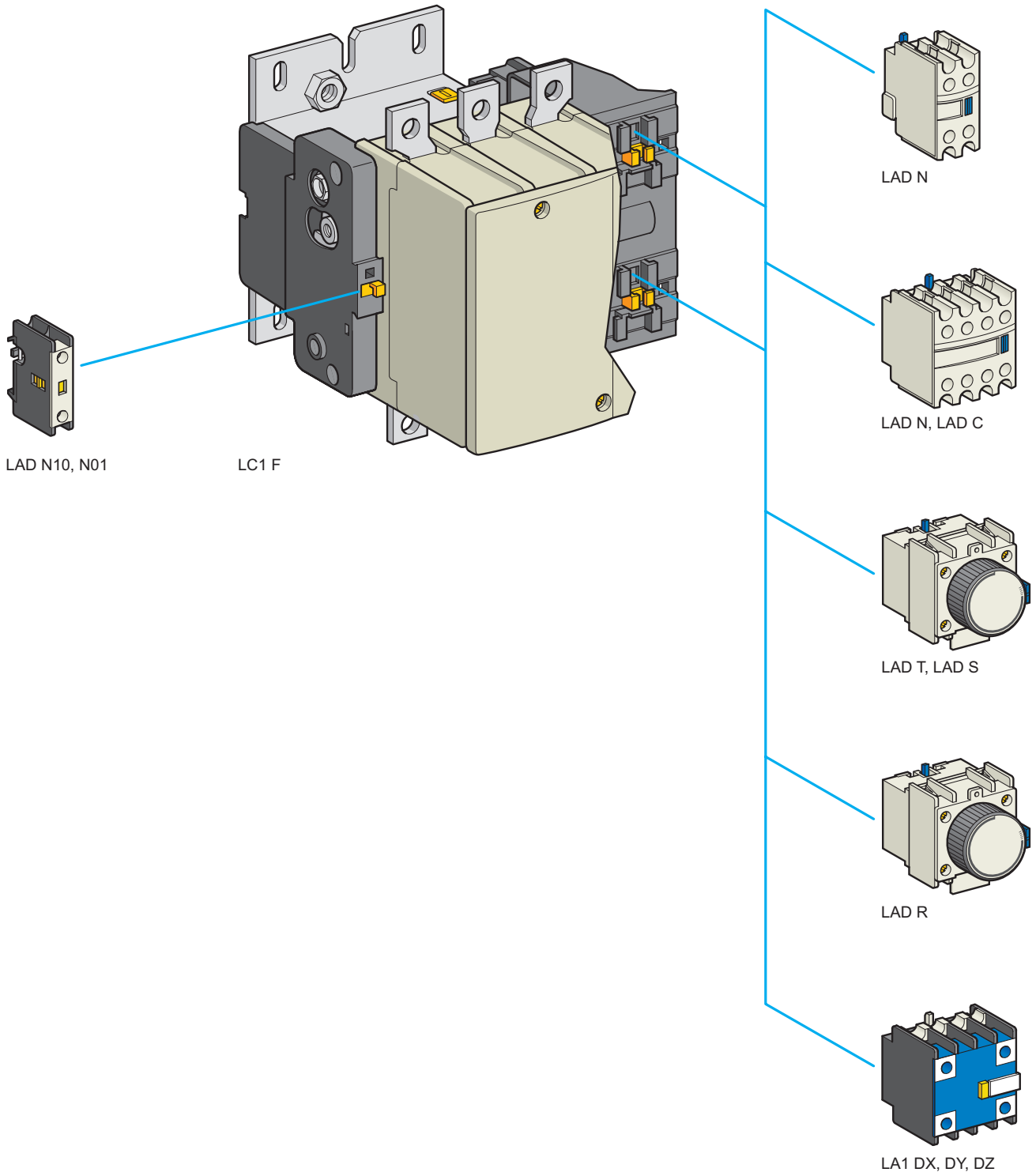
Accessories (to be ordered separately)

Description	For changeover pairs	Quantity required	Reference
Power terminal protection shrouds	LC2 F1154	2	LA9F706
	LC2 F1504, F1854	2	LA9F707
	LC2 F2254, F2654	2	LA9F708
Auxiliary contact blocks and add-on modules	–	–	See pages B9/10 to B9/14

⁽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 B9/11. For accessories, see pages B9/12 to B9/14.

⁽²⁾ Coils to be ordered separately:
- a.c. supply, see pages B9/17 to B9/4,
- d.c. supply, see pages B9/5 and B9/24.

⁽³⁾ Screw fixing.
Power terminals can be protected against direct finger contact by the addition of shrouds, to be ordered separately, see above.



TeSys contactors





TeSys F contactors

Auxiliary contact blocks

TeSys F

Instantaneous auxiliary contact blocks

For use in normal operating environments

Number of contacts	Maximum number of blocks per contactor Clip-on mounting	Composition				Reference
						
1	1	-	-	1	-	LADN10
		-	-	-	1	LADN01
2	2	-	-	1	1	LADN11
		-	-	2	-	LADN20
		-	-	-	2	LADN02
4	2	-	-	2	2	LADN22
		-	-	1	3	LADN13
		-	-	4	-	LADN40
		-	-	-	4	LADN04
		-	-	3	1	LADN31
		-	-	2	2 ⁽¹⁾	LADC22

With terminal referencing conforming to EN 50012





2	2	-	-	1	1	LADN11P
		-	-	1	1	LADN11G
4	2	-	-	2	2	LADN22P
		-	-	2	2	LADN22G

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 Clip-on mounting	Composition				Reference
						
2	2	2	-	-	-	LA1DX20
		2	2 ⁽²⁾	-	-	LA1DY20
4	2	2	-	2	-	LA1DZ40
		2	-	1	1	LA1DZ31

Time delay auxiliary contact blocks

Number of contacts	Maximum number of blocks per contactor Clip-on mounting	Time delay		Reference
		Type	Range s	
1 N/O +	2	On-delay	0.1...3 ⁽³⁾	LADT0
			0.1...30	LADT2
		Off-delay	10...180	LADT4
			1...30 ⁽⁴⁾	LADS2
1 N/C	2	Off-delay	0.1...3 ⁽³⁾	LADR0
			0.1...30	LADR2
			10...180	LADR4

(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.

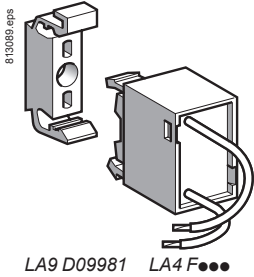
(4) With switching time of 40 ms ± 15 ms between opening of the N/C contact and closing of the N/O contact.

TeSys contactors

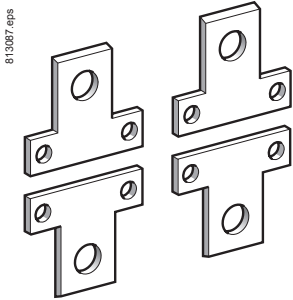
TeSys F contactors

Suppressor blocks

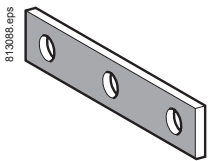
TeSys F



LA9 D09981 LA4 F...



LA9 F...602



LA9 F...601



DZ3 FA3

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 U_c 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	U_c		Reference
Clip-on mounting on all ratings and all a.c. coils.	~	24...48 V	LA4FRCE
		50...110 V	LA4FRCF
		127...240 V	LA4FRCP
		265...415 V	LA4FRCV
Suppressor block bracket			LA9D09981

Varistors (peak limiting)

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

Mounting	U_c		Reference
Clip-on mounting on all ratings and all coils.	~ or ---	24...48 V	LA4FVE
		50...110 V	LA4FVF
		127...240 V	LA4FVP
		265...415 V	LA4FVV

Diodes

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

Mounting	U_c		Reference
Clip-on mounting on all ratings and all d.c. coils.	---	24...48 V	LA4FDE
		55...110 V	LA4FDF
		125...250 V	LA4FDP
		280...440 V	LA4FDV

Bidirectional peak limiting diodes (transil)

- Protection provided by limiting the transient voltage to between 2 and 2.5 times U_c max.
- Maximum reduction of transient voltage peaks.

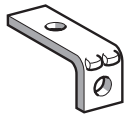
Mounting	U_c		Reference
Clip-on mounting on all ratings and all coils.	~ or ---	24...48 V	LA4FTE
		50...110 V	LA4FTF
		127...240 V	LA4FTP
		265...415 V	LA4FTV

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	LA9FF602	0.200	
LC1 F1504, F1854	LA9FG602	0.350	
LC1 F2254, F2654, F3304, F4004	LA9FH602	1.000	
LC1 F5004	LA9FK602	1.750	
LC1 F6304	LA9FL602	3.000	
Links for "star" connection of 3 poles			
LC1 F115	LA9FF601	0.035	
LC1 F150, F185	LA9FG601	0.050	
LC1 F225, F265, F330, F400	LA9FH601	0.120	
LC1 F500	LA9FK601	0.180	
LC1 F630, F800	LA9FL601	0.550	
Control circuit voltage take-off from power terminals			
For use with contactors	Mounted on bolt size	Sold in lots of	Unit reference
LC1 F115	M6	10	DZ3FA3
LC1 F150, F185	M8	10	DZ3GA3
LC1 F225...F500	M10	10	DZ3HA3
LC1 F630, F800	M12	10	DZ3JA3

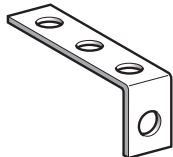
TeSys F

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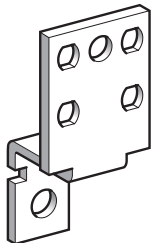
LA9 F981

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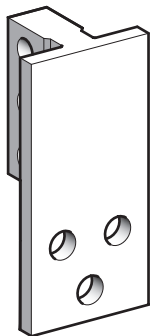
LA9 F979

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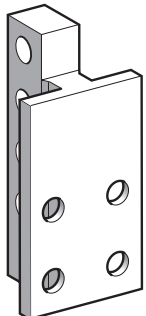
LA9 FL980

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LA9 F1250

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LA9 F2100

Right-angled connectors

For contactors or thermal overload relays

For use with		With connector plates		Set of 3 connectors	Weight kg
Contactors	Thermal overload relays ⁽¹⁾	Width	Type	Set reference	
LC1 F115	LR9 F5●67, LR9 F67	15 mm	Rear	LA9FF981	0.060
			Side	LA9FF979	0.240
			Large surface area	LA9FF980	0.150
LC1 F150, F185	LR9 F5●69, F5●71, LR9 F69, F71	20 mm	Rear	LA9FG981	0.080
			Side	LA9FG979	0.350
			Large surface area	LA9FG980	0.200
LC1 F225, F265, F330, F400	LR9 F7●75, LR9 F75	25 mm	Rear	LA9FJ981	0.430
			Side	LA9FJ979	0.750
			Large surface area	LA9FJ980	0.490
LC1 F500	LR9 F7●79, F7●81, LR9 F79, F81	30 mm	Rear	LA9FK981	0.480
			Side	LA9FK979	0.920
			Large surface area	LA9FK980	0.800
LC1 F630, F800	LR9 F7●81, LR9 F81	40 mm	Rear	LA9FL981	1.210
			Side	LA9FL979	2.570
			Large surface area	LA9FL980	3.190
For use with		With connector plates		Set of 6 connectors	Weight kg
Contactors		Width	Type	Set reference	
LC1 F1250		60 mm	Rear	LA9F1250	5.480
LC1 F1400, F1700, F2100		60 mm	Rear	LA9F2100	9.550

Connection accessories

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

For use with		Width of connector plates	Set of 3 busbars
Contactors	Thermal overload relays ⁽¹⁾		Set reference
LC1 F115	LR9 F5●57, F5●63 LR9 F5●67, F5●69 LR9 F69, F71	15 mm	LA7F401
LC1 F150 and F185	LR9 F5●57, F5●63	20 mm	LA7F402
LC1 F185	LR9 F5●71, LR9 F71	25 mm	LA7F407
	LR9 F5●71, LR9 F71	25 mm	LA7F403
LC1 F225 and F265	LR9 F7●75, F7●79 LR9 F75, F79	25 mm	LA7F404
	LR9 F7●75, F7●79 LR9 F75, F79	25 mm	LA7F404
LC1 F330 and F400	LR9 F7●75, F7●79 LR9 F75, F79	25 mm	LA7F404
LC1 F400	LR9 F7●81, LR9 F81	25 mm	LA7F404
LC1 F500	LR9 F7●75, F7●79 LR9 F7●81 LR9 F75, F79, F81	30 mm	LA7F405
LC1 F630, F800	LR9 F7●81, LR9 F81	40 mm	LA7F406

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

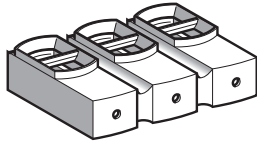
TeSys contactors

TeSys F contactors

Accessories

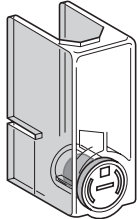
TeSys F

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LA9 F103

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LA9 F701

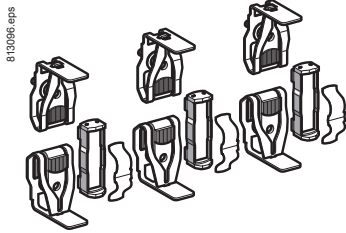
Insulated terminal blocks

For use on 3-pole contactors	Connection	Tightening tool	Set of 2 blocks Set reference
LC1 F115, F150, F185	1 x 16...150 mm ² or 2 x 16...95 mm ²	4 mm hexagonal socket key	LA9F103

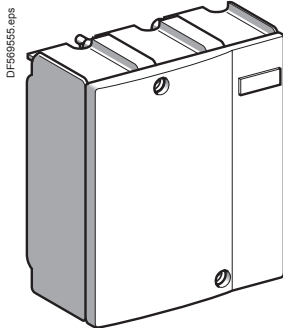
Power terminal protection shrouds

For use on 2, 3 and 4-pole contactors	Number of shrouds per set	Set reference
LC1 F115	6	LA9F701
LC1 F150, F185	6	LA9F702
LC1 F225, F265, F330, F400 and F4002 F500 and F5002	6	LA9F703
LC1 F630, F6302 and F800	6	LA9F704
LC1 F1154	8	LA9F706
LC1 F1504 and F1854	8	LA9F707
LC1 F2254, F2654, F3304, F4004, F5004	8	LA9F708
LC1 F6304	8	LA9F709

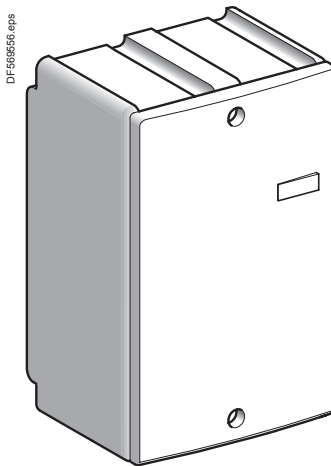
TeSys F



LA5 FG431



LA5 F40050



LA5 F210050

Sets of contacts

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

For contactor	Type	Replacement for	Reference	Weight kg
2-pole	LC1 F4002	2 poles	LA5F400802	1.350
	LC1 F5002	2 poles	LA5F500802	1.950
	LC1 F6302	2 poles	LA5F630802	4.700
	LC1 F6302S011	2 poles	LA5F630802S011	4.800
3-pole	LC1 F115. F150	3 poles	LA5FF431	0.270
	LC1 F185. F225	3 poles	LA5FG431	0.350
	LC1 F265	3 poles	LA5FH431	0.660
	LC1 F330. F400	3 poles	LA5F400803	2.000
	LC1 F500	3 poles	LA5F500803	2.950
	LC1 F630	3 poles	LA5F630803	6.100
	LC1 F780	1 pole	LA5F780801 ⁽¹⁾	4.700
		3 poles	LA5F780803	13.200
	LC1 F800	3 poles	LA5F800803	6.100
	LC1 F630S011	3 poles	LA5F630803S011	6.200
4-pole	LC1 F1504. F1154	4 poles	LA5FF441	0.360
	LC1 F1854. F2254	4 poles	LA5FG441	0.465
	LC1 F2654	4 poles	LA5FH441	0.880
	LC1 F3304. F4004	4 poles	LA5F400804	2.700
	LC1 F5004	4 poles	LA5F500804	3.900
	LC1 F6304	4 poles	LA5F630804	8.150
	LC1 F7804	1 pole	LA5F780801 ⁽¹⁾	4.700
		4 poles	LA5F780804	17.300
	LC1 F6304S011	4 poles	LA5F630804S011	8.400

Arc chambers

For contactor	Type	Replacement for	Reference	Weight kg
2-pole	LC1 F4002	2 poles	LA5F400250	0.870
	LC1 F5002	2 poles	LA5F500250	1.250
	LC1 F6302	2 poles	LA5F630250	2.100
	LC1 F6302S011	2 poles	LA5F630250	2.100
3-pole	LC1 F115	3 poles	LA5F11550	0.490
	LC1 F150	3 poles	LA5F15050	0.490
	LC1 F185	3 poles	LA5F18550	0.670
	LC1 F225	3 poles	LA5F22550	0.670
	LC1 F265	3 poles	LA5F26550	0.920
	LC1 F330	3 poles	LA5F33050	1.300
	LC1 F400	3 poles	LA5F40050	1.300
	LC1 F500	3 poles	LA5F50050	1.850
	LC1 F630	3 poles	LA5F63050	3.150
	LC1 F780	1 pole	LA5F780150 ⁽¹⁾	2.100
	LC1 F800	3 poles	LA5F80050	3.150
	LC1 F630S011	3 poles	LA5F63050	3.150
	LC1 F1250	3 poles	LA5F125050	3.150
	LC1 F1400	6 poles	LA5F140050 ⁽²⁾	3.750
LC1 F1700	6 poles	LA5F170050 ⁽²⁾	3.750	
LC1 F2100	6 poles	LA5F210050 ⁽²⁾	3.750	
4-pole	LC1 F1154	4 poles	LA5F115450	0.660
	LC1 F1504	4 poles	LA5F150450	0.660
	LC1 F1854	4 poles	LA5F185450	0.910
	LC1 F2254	4 poles	LA5F225450	1.000
	LC1 F2654	4 poles	LA5F265450	1.220
	LC1 F3304	4 poles	LA5F330450	1.740
	LC1 F4004	4 poles	LA5F400450 ⁽³⁾	1.740
	LC1 F5004	4 poles	LA5F500450 ⁽³⁾	2.500
	LC1 F6304	4 poles	LA5F630450 ⁽⁴⁾	4.200
	LC1 F7804	1 pole	LA5F780150 ⁽¹⁾	2.100
	LC1 F6304S011	4 poles	LA5F630450	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.

TeSys contactors

Capacitive delayed opening devices

For TeSys F contactors

TeSys F



LAZ R90F

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

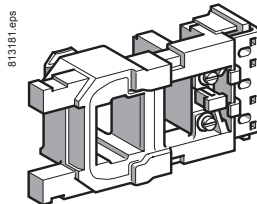
For use with contactor		Corresponding delayed opening device		
Type	With coil	Supply voltage 50/60 Hz	Non-adjustable delay time (Tr)	Reference
		V	s	
LC1 F115 or LC1 F150	LX4 FF110	110	2...5	LAZR90F
	LX4 FF125	127	2...5	LAZR90F
	LX4 FF220	220	2...5	LAZR90M
	LX4 FF250	240	2...5	LAZR90M
	LX4 FF375	380...415	2...5	LAZR90Q
	LX4 FF440	440	2...5	LAZR90Q
LC1 F185 or LC1 F225	LX4 FG110	110	2...5	LAZR90F
	LX4 FG125	127	2...5	LAZR90F
	LX4 FG220	220	2...5	LAZR90M
	LX4 FG250	240	2...5	LAZR90M
	LX4 FG375	380...415	2...5	LAZR90Q
	LX4 FG440	440	2...5	LAZR90Q
LC1 F265 or LC1 F330	LX4 FH110	110	2...5	LAZR90F
	LX4 FH125	127	2...5	LAZR90F
	LX4 FH220	220	2...5	LAZR90M
	LX4 FH250	240	2...5	LAZR90M
	LX4 FH375	380...415	2...5	LAZR90Q
	LX4 FH440	440	2...5	LAZR90Q
LC1 F400	LX4 FJ110	110	1...2	LAZR90F
	LX4 FJ125	127	1...2	LAZR90F
	LX4 FJ220	220	1...2	LAZR90M
	LX4 FJ250	240	1...2	LAZR90M
	LX4 FJ375	380	1...2	LAZR90Q
	LX4 FJ400	415	1...2	LAZR90Q
	LX4 FJ440	440	1...2	LAZR90Q
LC1 F500	LX4 FK110	110	1...2	LAZR90F
	LX4 FK125	127	1...2	LAZR90F
	LX4 FK220	220	1...2	LAZR90M
	LX4 FK250	240	1...2	LAZR90M
	LX4 FK375	380	1...2	LAZR90Q
	LX4 FK400	415	1...2	LAZR90Q
	LX4 FK440	440	1...2	LAZR90Q
LC1 F630	LX4 FL110	110	1...2	LAZR90F
	LX4 FL125	127	1...2	LAZR90F
	LX4 FL220	220	1...2	LAZR90M
	LX4 FL250	240	1...2	LAZR90M
	LX4 FL375	380	1...2	LAZR90Q
	LX4 FL400	415	1...2	LAZR90Q
	LX4 FL440	440	1...2	LAZR90Q

Add-on blocks for delayed opening devices

Application	For use with delayed opening device	Operational voltage	Non- adjustable delay time	Reference
		V	s	
To double the delay time	LAZ R90F	110...127	Tr x 2	LAZR91F
	LAZ R90M	220...240	Tr x 2	LAZR91M
	LAZ R90Q	380...440	Tr x 2	LAZR91Q

Other versions

Delayed opening devices for use with other types of contactor. Please consult your Regional Sales Office.



LX1 FF●●●

References

Maximum ambient air temperature: 55 °C. Above this, use an LX9 F coil, see page B9/22.

Operating cycles/hour ($\theta \leq 55$ °C): ≤ 2400 .

Control circuit voltage		Average resistance at 20 °C ± 10 %	Inductance of closed circuit	Voltage code	Reference
Uc - 50 Hz	Uc - 60 Hz				
V	V	Ω	H		
For contactors LC1 F115 and LC1 F150					
24	–	0.27	0.04	B5	LX1FF024
42	–	0.94	0.13	D5	LX1FF042
–	48	0.78	0.11	E6	LX1FF040
48	–	1.17	0.16	E5	LX1FF048
–	110	4.55	0.59	F6	LX1FF092
–	120	4.77	0.64	G6	LX1FF095
110	–	6.38	0.86	F5	LX1FF110
115	–	6.38	0.86	FE5	LX1FF110
127/132	–	9.14	1.15	G5	LX1FF127
–	200/208	14.5	1.87	L6	LX1FF162
–	220	18.4	2.38	M6	LX1FF184
–	240	18.9	2.5	U6	LX1FF187
220	265/277	28.1	3.44	M5	LX1FF220
230	–	28.1	3.44	P5	LX1FF220
240	–	31.1	4.1	U5	LX1FF240
–	380	57.2	7.05	Q6	LX1FF316
–	440	72.6	9.21	R6	LX1FF360
380	460/480	86.9	10.3	Q5	LX1FF380
400	–	86.9	10.3	V5	LX1FF380
415	–	95.1	12	N5	LX1FF415
500	–	141	17	S5	LX1FF500
–	660	172	20.3	Y6	LX1FF550
660/690	–	254	28.9	Y5	LX1FF660
–	1000	414	48.9	–	LX1FF850
1000	–	610	68.5	–	LX1FF1000

Specifications

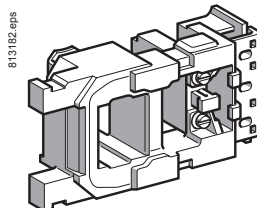
Average consumption at 20 °C:

■ inrush 50 Hz: 550 VA; 60 Hz: 660 VA

■ sealed 50 Hz: 45 VA; 60 Hz: 55 VA, $\cos \varphi = 0.3$.

Heat dissipation: 12...16 W.

Operating time at U_c: closing = 23...35 ms, opening = 5...15 ms.



LX1 FG●●●

For contactors LC1 F185 and LC1 F225					
24	–	0.18	0.03	B5	LX1FG024
42	–	0.57	0.09	–	LX1FG042
–	48	0.47	0.08	E6	LX1FG040
48	–	0.71	0.12	E5	LX1FG048
–	110	2.74	0.44	F6	LX1FG092
–	115/120	2.87	0.49	G6	LX1FG095
110	–	4.18	0.65	F5	LX1FG110
115	–	4.18	0.65	FE5	LX1FG110
127/132	–	5.35	0.86	G5	LX1FG127
–	200/208	8.8	1.41	L6	LX1FG162
–	220	11.1	1.8	M6	LX1FG184
–	240	11.4	1.87	U6	LX1FG187
220	265/277	16.5	2.59	M5	LX1FG220
230	–	16.5	2.59	P5	LX1FG220
240	–	20.1	3.09	U5	LX1FG240
–	380	34	5.32	Q6	LX1FG316
–	440	43.5	6.94	R6	LX1FG360
380	460/480	51.3	7.75	Q5	LX1FG380
400	–	51.3	7.75	V5	LX1FG380
415	–	62.3	9.06	N5	LX1FG415
500	–	82.7	12.8	S5	LX1FG500
–	660	103	15.3	Y6	LX1FG550
660/690	–	154	21.8	Y5	LX1FG660
–	1000	249	36.6	–	LX1FG850
1000	–	370	51.6	–	LX1FG1000

Specifications

Average consumption at 20 °C:

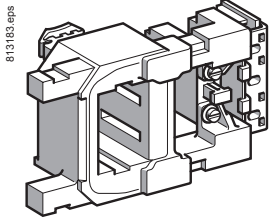
■ inrush 50 Hz: 805 VA; 60 Hz: 970 VA

■ sealed 50 Hz: 55 VA; 60 Hz: 66 VA, $\cos \varphi = 0.3$.

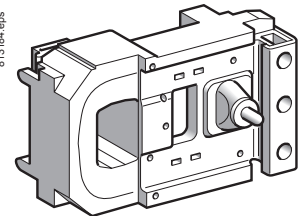
Heat dissipation: 18...24 W.

Operating time at U_c: closing = 20...35 ms, opening = 7...15 ms.

TeSys F



LX1 FH●●●2



LX1 FJ●●●

References

Low sealed consumption.

Operate on networks with harmonic numbers ≤ 7 .

Operating cycles/hour ($\theta \leq 55\text{ °C}$): ≤ 2400 .

Control circuit voltage Uc	Average resistance at 20 °C $\pm 10\%$		Inductance of closed circuit	Voltage code	Reference
	Inrush	Sealed			
V	Ω	Ω	H		
For contactors LC1 F265 and LC1 F330					
24	0.8	20	(1)	B7	LX1FH0242
48	2.96	67	(1)	E7	LX1FH0482
110	18.7	440	(1)	F7	LX1FH1102
115	18.7	440	(1)	FE7	LX1FH1102
120/127	22.9	536	(1)	G7	LX1FH1272
200/208	58.4	1366	(1)	L7	LX1FH2002
220	70.6	1578	(1)	M7	LX1FH2202
230	70.6	1578	(1)	P7	LX1FH2202
240	87.94	1968	(1)	U7	LX1FH2402
277	113	2444	(1)	W7	LX1FH2772
380	217	4631	(1)	Q7	LX1FH3802
400	217	4631	(1)	V7	LX1FH3802
415	217	4631	(1)	N7	LX1FH3802
440	265	6731	(1)	R7	LX1FH4402
480/500	329	8543	(1)	S7	LX1FH5002
600/660	296	10245	(1)	X7	LX1FH6002
1000	696	25880	(1)	–	LX1FH10002

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	LX1FJ048
110/120	9.8	230	1.35	F7	LX1FJ110
115	9.8	230	1.35	FE7	LX1FJ110
120/127	12.8	280	1.75	G7	LX1FJ127
200/208	30	815	4.1	L7	LX1FJ200
220	37	1030	5.1	M7	LX1FJ220
230	37	1030	5.1	P7	LX1FJ220
240	47.5	1320	6.4	U7	LX1FJ240
265/277	61	1700	8.1	W7	LX1FJ280
380	120	3310	15.8	Q7	LX1FJ380
400	120	3310	15.8	V7	LX1FJ380
415	145	4070	19.4	N7	LX1FJ415
440	145	4070	19.4	R7	LX1FJ415
500	190	4980	25.5	S7	LX1FJ500
550/600	243	6310	27.4	X7	LX1FJ600
1000	720	19420	84.6	–	LX1FJ1000

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.

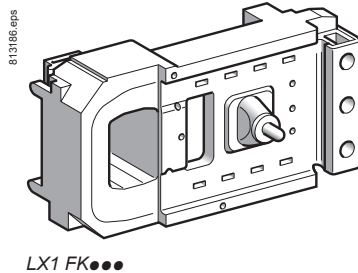
(1) Please consult your Regional Sales Office.

TeSys contactors

TeSys F contactors

a.c. 40 to 400 Hz supply coils

TeSys F



References

Low sealed consumption.

Operate on networks with harmonic numbers ≤ 7 .

Control circuit voltage Uc	Average resistance at 20 °C $\pm 10\%$		Inductance of closed circuit H	Voltage code	Reference	Weight kg
	Inrush Ω	Sealed Ω				
For contactor LC1 F500						
48	1.9	33.5	0.19	E7	LX1FK048	1.150
110/120	9.55	260	1.25	F7	LX1FK110	1.150
115	9.55	260	1.25	FE7	LX1FK110	1.150
120/127	11.5	315	1.5	G7	LX1FK127	1.150
200/208	29	735	3.75	L7	LX1FK200	1.150
220	35.5	915	4.55	M7	LX1FK220	1.150
230	35.5	915	4.55	P7	LX1FK220	1.150
240	44.5	1160	5.75	U7	LX1FK240	1.150
265/277	56.5	1490	7.3	W7	LX1FK280	1.150
380	112	2980	14.7	Q7	LX1FK380	1.150
400	112	2980	14.7	V7	LX1FK380	1.150
415	143	3730	18.4	N7	LX1FK415	1.150
440	143	3730	18.4	R7	LX1FK415	1.150
500	172	4590	22.8	S7	LX1FK500	1.150
550/600	232	5660	23.9	X7	LX1FK600	1.150
1000	679	16960	72	–	LX1FK1000	1.150

Specifications

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

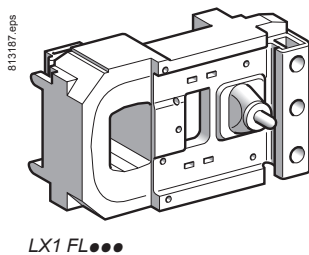
■ inrush: 1050...1150 VA,

■ sealed: 16...20 VA.

Operating cycles/hour ($\theta \leq 55$ °C): ≤ 2400 .

Heat dissipation: 18 W.

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



For contactor LC1 F630 and LC1 F1250

48	1.1	17.1	0.09	E7	LX1FL048 ⁽¹⁾	1.500
110/120	6.45	165	1.85	F7	LX1FL110	1.500
115	6.45	165	1.85	FE7	LX1FL110	1.500
127	8.1	205	1.05	G7	LX1FL127	1.500
200/208	20.5	605	2.65	L7	LX1FL200	1.500
220	25.5	730	3.35	M7	LX1FL220	1.500
230	25.5	730	3.35	P7	LX1FL220	1.500
240	25.5	730	3.35	U7	LX1FL220	1.500
265/277	31	900	4.1	W7	LX1FL260	1.500
380	78	2360	10.5	Q7	LX1FL380	1.500
400	78	2360	10.5	V7	LX1FL380	1.500
415	96	2960	13	N7	LX1FL415	1.500
440	96	2960	13	R7	LX1FL415	1.500
500	120	3660	16.5	S7	LX1FL500	1.500
550/600	155	4560	19.5	X7	LX1FL600	1.500
1000	474	12880	56.2	–	LX1FL1000 ⁽¹⁾	1.500

⁽¹⁾ Incompatible with LC1F1250.

Specifications

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

■ inrush: 1500...1730 VA,

■ sealed: 20...25 VA.

Operating cycles/hour ($\theta \leq 55$ °C): 1200.

Heat dissipation: 20 W.

Operating time at U_c: closing = 40...80 ms, opening = 100...200 ms.

TeSys contactors

TeSys F contactors

a.c. 40 to 400 Hz supply coils

TeSys F

References

Low sealed consumption.

Operate on networks with harmonic numbers ≤ 7 .

Control circuit voltage U_c	Average resistance at 20 °C ± 10 %		Inductance of closed circuit	Voltage code	Reference	Weight
	Inrush	Sealed				
V	Ω	Ω	H			kg
For contactor LC1 F780						
110/120	4.95 ⁽²⁾	230 ⁽²⁾	0.21	F7	LX1FX110 ⁽¹⁾	3.000
115	4.95 ⁽²⁾	230 ⁽²⁾	0.21	FE7	LX1FX110 ⁽¹⁾	3.000
127	6.1 ⁽²⁾	280 ⁽²⁾	0.26	G7	LX1FX127 ⁽¹⁾	3.000
200/208	15.5 ⁽²⁾	750 ⁽²⁾	0.66	L7	LX1FX200 ⁽¹⁾	3.000
220	19.5 ⁽²⁾	920 ⁽²⁾	0.82	M7	LX1FX220 ⁽¹⁾	3.000
230	19.5 ⁽²⁾	920 ⁽²⁾	0.82	P7	LX1FX220 ⁽¹⁾	3.000
240	19.5 ⁽²⁾	920 ⁽²⁾	0.82	U7	LX1FX220 ⁽¹⁾	3.000
265/277	29.8 ⁽²⁾	1330 ⁽²⁾	1.25	W7	LX1FX280 ⁽¹⁾	3.000
380	60.9 ⁽²⁾	2780 ⁽²⁾	2.3	Q7	LX1FX380 ⁽¹⁾	3.000
400	60.9 ⁽²⁾	2780 ⁽²⁾	2.3	V7	LX1FX380 ⁽¹⁾	3.000
415/480	74.3 ⁽²⁾	3340 ⁽²⁾	2.8	N7	LX1FX415 ⁽¹⁾	3.000
440	74.3 ⁽²⁾	3340 ⁽²⁾	2.8	R7	LX1FX415 ⁽¹⁾	3.000
500	92 ⁽²⁾	4180 ⁽²⁾	3.5	S7	LX1FX500 ⁽¹⁾	3.000

Specifications

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

■ inrush: 1900...2300 VA, sealed: 44...55 VA.

Operating cycles/hour ($\theta \leq 55$ °C): 600.

Heat dissipation: 2 x 22 W.

Operating time at U_c : closing = 40...80 ms, opening = 130...230 ms.

Control circuit voltage U_c	Voltage code	Rectifier Reference ⁽³⁾	Coil Reference	Weight
V				kg
For contactor LC1 F800				
110/127	FE7	DR5TE4U	LX4F8FW	1.650
220/240	P7	DR5TE4U	LX4F8MW	1.650
380/440	V7	DR5TE4S	LX4F8QW	1.650

Specifications

Operating cycles/hour ($\theta \leq 55$ °C): 600.

Average consumption at 20 °C for 50 or 60 Hz, $\cos \varphi = 0.8$:

■ inrush: 1700 VA, sealed: 12 VA.

Operating time at U_c : closing = 60...80 ms, opening = 160...180 ms.

Control circuit voltage U_c	Average resistance at 20 °C ± 10 %		Inductance of closed circuit	Voltage code	Reference	Weight
	Inrush	Sealed				
V	Ω	Ω	H			kg
For contactors LC1 F1400, LC1 F1700 and LC1 F2100						
110	5.92	106	0.72	F7	LX1FK065 ⁽⁴⁾	1.150
120	5.92	106	0.72	G7	LX1FK070 ⁽⁴⁾	1.150
220	9.55	260	1.25	M7	LX1FK110 ⁽⁴⁾	1.150
230	9.55	260	1.25	P7	LX1FK110 ⁽⁴⁾	1.150
240	11.5	315	1.50	U7	LX1FK127 ⁽⁴⁾	1.150
277	16.5	420	2.25	W7	LX1FK140 ⁽⁴⁾	1.150
380	29	735	3.75	Q7	LX1FK200 ⁽⁴⁾	1.150
400	29	735	3.75	V7	LX1FK200 ⁽⁴⁾	1.150
415	35.5	915	4.55	N7	LX1FK220 ⁽⁴⁾	1.150
440	35.5	915	4.55	R7	LX1FK220 ⁽⁴⁾	1.150
500	44.5	1160	5.75	S7	LX1FK240 ⁽⁴⁾	1.150

Specifications

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

■ inrush: 1600...2400 VA, sealed: 29...37 VA.

Operating cycles/hour ($\theta \leq 55$ °C): 600.

Heat dissipation: 2 x 18 W.

Operating time at U_c : 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⁾

TeSys F

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 U_c	Average resistance at 20 °C ± 10 %		Inductance of closed circuit	Voltage code	Reference	Weight
	Inrush	Sealed				
V	Ω	Ω	H			
For contactors LC1 F115 and LC1 F150						
48	3.03	80.2	0.3	E7	LX9FF048	
110	14.8	579	2.08	F7	LX9FF110	
115	14.8	579	2.08	FE7	LX9FF110	
120/127	19	746	2.65	G7	LX9FF127	
208	45	1788	5.95	L7	LX9FF200	
220	59.4	2190	7.7	M7	LX9FF220	
230	59.4	2190	7.7	P7	LX9FF220	
240	73.5	2750	9.68	U7	LX9FF240	
380	173	6540	23	Q7	LX9FF380	
400	173	6540	23	V7	LX9FF380	
415	218	8460	30	N7	LX9FF415	
440	218	8460	30	R7	LX9FF415	
500	262	10300	36	S7	LX9FF500	

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 ($\theta \leq 55$ °C): < 2400.

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

For contactors LC1 F185 and LC1 F225						
48	2.2	60	0.23	E7	LX9FG048	
110	10.4	411	1.46	F7	LX9FG110	
115	10.4	411	1.46	FE7	LX9FG110	
120/127	13	520	1.85	G7	LX9FG127	
208	33	1339	4.9	L7	LX9FG200	
220	42.1	1680	5.84	M7	LX9FG220	
230	42.1	1680	5.84	P7	LX9FG220	
240	50.6	2060	7.22	U7	LX9FG240	
380	128	4730	16.4	Q7	LX9FG380	
400	128	4730	16.4	V7	LX9FG380	
415	157	5930	20.6	N7	LX9FG415	
440	157	5930	20.6	R7	LX9FG415	
500	194	7550	26.3	S7	LX9FG500	

Specifications

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

Heat dissipation: 8...9.8 W.

Operating cycles/hour ($\theta \leq 55$ °C): < 2400.

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

For contactors LC1 F265 and LC1 F330						
48	2.96	72	⁽²⁾	–	LX9FH0482	
110/115	18.7	415	⁽²⁾	–	LX9FH1102	
120/127	22.9	156	⁽²⁾	–	LX9FH1272	
220/230	71.6	1621	⁽²⁾	–	LX9FH2202	
240	88	1968	⁽²⁾	–	LX9FH2402	
380/415	222	5075	⁽²⁾	–	LX9FH3802	
500	345	7990	⁽²⁾	–	LX9FH5002	

Specifications

Average consumption at 20 °C: inrush: 560...660 VA, sealed: 8...10 VA.

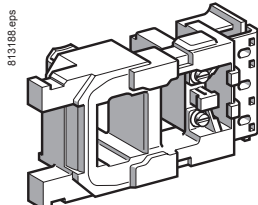
Heat dissipation: 8.4...10.4 W.

Operating cycles/hour ($\theta \leq 55$ °C): < 3600.

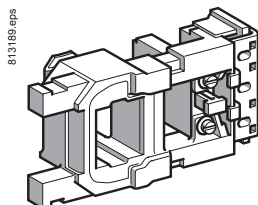
Operating time at U_c : closing = 45 ms, opening = 25 ms.

⁽¹⁾ Application examples: hoisting (inching, high operating rates), Main-Standby (unstable mains supplies). These coils are particularly suited for use at higher operating temperatures (mounting in non-ventilated compartments, enclosures, etc.).

⁽²⁾ Please consult your Regional Sales Office.



LX9 FF●●●



LX9 FG●●●

References

Coils with short operating times (at U_c):

- N/O: 60 ms
- N/C: 50 ms (~ side); 20 ms (≡ side).

Coils with high operating rates ($\theta \leq 70$ °C):

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

Coils with low inrush consumption.

Control circuit voltage U_c	Average resistance at 20 °C ± 10 %		Inductance of closed circuit	Rectifier Reference ⁽¹⁾	Coil Reference	Weight
	Inrush	Sealed				
V	Ω	Ω	H			kg
For contactor LC1 F400						
48	4.03	43	0.22	DR5TF4V	LX9FJ917	0.970
110	25.7	246	1.3	DR5TE4U	LX9FJ925	0.970
127	32.3	302	1.7	DR5TE4U	LX9FJ926	0.970
220/230	99.5	919	5	DR5TE4U	LX9FJ931	0.970
380/415	311	3011	15	DR5TE4S	LX9FJ936	0.970
440	386	3690	19	DR5TE4S	LX9FJ937	0.970
500	478	4380	23	DR5TE4S	LX9FJ938	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	DR5TF4V	LX9FK917	1.080
110	24	204	1.1	DR5TE4U	LX9FK925	1.080
127	29.8	250	1.4	DR5TE4U	LX9FK926	1.080
220/230	89.9	770	4	DR5TE4U	LX9FK931	1.080
380/415	274	2075	12	DR5TE4S	LX9FK936	1.080
440	361	3060	16	DR5TE4S	LX9FK937	1.080
500	448	3750	19	DR5TE4S	LX9FK938	1.080

Specifications

Average consumption:

- inrush: 550 VA
- sealed: 31 VA.

Heat dissipation: 15...18.3 W.

For contactor LC1 F630

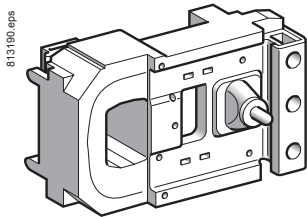
48	2.81	20.8	0.17	DR5TF4V	LX9FL917	1.450
110	13.5	114	0.77	DR5TE4U	LX9FL924	1.450
127	20.8	167	1.2	DR5TE4U	LX9FL926	1.450
220	52	425	2.9	DR5TE4U	LX9FL930	1.450
220/240	64.5	518	3.6	DR5TE4U	LX9FL931	1.450
380/400	163	1360	8.8	DR5TE4S	LX9FL935	1.450
415/440	204	1670	11	DR5TE4S	LX9FL936	1.450
500	312	2510	17	DR5TE4S	LX9FL938	1.450

Specifications

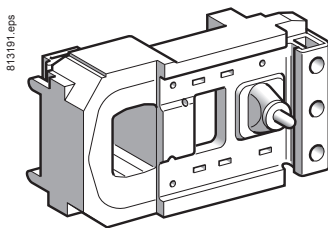
Average consumption:

- inrush: 830 VA
- sealed: 47 VA.

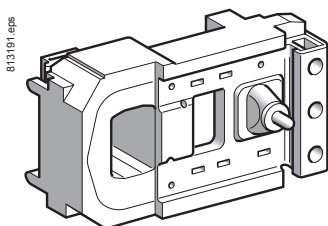
Heat dissipation: 22.8...27.8 W.

⁽¹⁾ Rectifier to be ordered separately: 0.100 kg.

LX9 FJ●●●

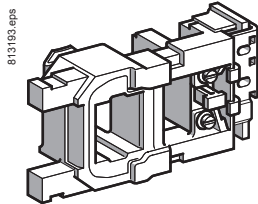


LX9 FK●●●

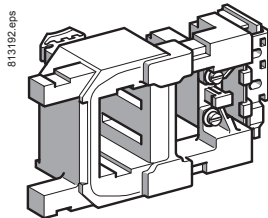


LX9 FL●●●

TeSys F



LX4 FF●●●



LX4 FH●●●

References

Low sealed consumption.

Operating cycles/hour ($\theta \leq 55\text{ °C}$): ≤ 2400 .

Control circuit voltage U_c	Average resistance at $20\text{ °C} \pm 10\%$		Inductance of closed circuit	Voltage code	Reference
	Inrush	Sealed			
V	Ω	Ω	H		
For contactors LC1 F115 and LC1 F150					
24	1.12	177	11	BD	LX4FF024
48	4.52	715	42.7	ED	LX4FF048
110	21.7	2940	179	FD	LX4FF110
125	26.8	3560	223	GD	LX4FF125
220/230	84	11100	704	MD	LX4FF220
250	105	13000	868	UD	LX4FF250
440/460	301	48200	4000	RD	LX4FF440

Specifications

Average consumption:

■ inrush: 543...665 W,

■ sealed: 3.94...4.83 W.

Operating time at U_c : closing = 30...40 ms, opening = 30...50 ms.

For contactors LC1 F185 and LC1 F225

24	0.79	169	14.9	BD	LX4FG024
48	3.2	662	55.3	ED	LX4FG048
110	14.9	2810	241	FD	LX4FG110
125	19	3320	289	GD	LX4FG125
220/230	57.7	10200	890	MD	LX4FG220
250	76	12400	1140	UD	LX4FG250
440/460	223	39700	4210	RD	LX4FG440

Specifications

Average consumption:

■ inrush: 737...902 W,

■ sealed: 4.13...5.07 W.

Operating time at U_c : closing = 30...40 ms, opening = 30...50 ms.

For contactors LC1 F265 and LC1 F330

24	0.9	192	26.3	BD	LX4FH024
48	3.49	707	92.9	ED	LX4FH048
110	16.8	3180	424	FD	LX4FH110
125	20.8	3840	530	GD	LX4FH125
220/230	65.7	11500	1590	MD	LX4FH220
250	84	13900	1910	UD	LX4FH250
440/460	255	44000	7570	RD	LX4FH440

Specifications

Average consumption:

■ inrush: 655...803 W,

■ sealed: 3.68...4.53 W.

Operating time at U_c : closing = 40...50 ms, opening = 40...65 ms.

For contactor LC1 F400

48	2.5	558	56	ED	LX4FJ048
110	12.7	2660	270	FD	LX4FJ110
125	15.8	3130	330	GD	LX4FJ125
220	47	8820	910	MD	LX4FJ220
250	61	10500	1200	UD	LX4FJ250
440	236	33750	4435	RD	LX4FJ440

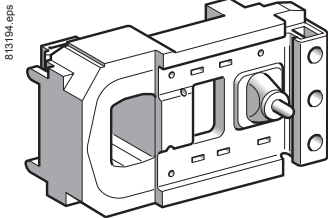
Specifications

Average consumption:

■ inrush: 920...1140 W,

■ sealed: 4...7.5 W.

Operating time at U_c : closing = 50...60 ms, opening = 45...60 ms.



LX4 FK●●●

References

Low sealed consumption.

Control circuit voltage U _c	Average resistance at 20 °C ±10 %		Inductance of closed circuit	Voltage code	Reference	Weight
	Inrush	Sealed				
V	Ω	Ω	H			kg
For contactor LC1 F500						
48	2.35	515	67	ED	LX4FK048	1.080
110	11.5	2450	280	FD	LX4FK110	1.080
125	15	2930	400	GD	LX4FK125	1.080
220	44	8150	1080	MD	LX4FK220	1.080
250	56	9650	1350	UD	LX4FK250	1.080
440	225	31300	5270	RD	LX4FK440	1.080

Specifications

Average consumption:

- inrush: 990...1220 W,
- sealed: 4.54...8 W.

Operating cycles/hour ($\theta \leq 55$ °C): 2400.Operating time at U_c: closing = 50...60 ms, opening = 45...60 ms.

For contactor LC1 F630 and LC1 F1250

48	1.7	353	40.5	ED	LX4FL048	1.450
110	8.1	1680	180	FD	LX4FL110	1.450
125	10	2110	230	GD	LX4FL125 ⁽¹⁾	1.450
220	31	5160	650	MD	LX4FL220	1.450
250	38	6080	815	UD	LX4FL250	1.450
440	152	23120	2910	RD	LX4FL440 ⁽¹⁾	1.450

⁽¹⁾ Incompatible with LC1 F1250.

Specifications

Average consumption:

- inrush: 1420...1920 W,
- sealed: 6.5...12.5 W.

Operating cycles/hour ($\theta \leq 55$ °C): 1200.Operating time at U_c: closing = 60...70 ms, opening = 40...50 ms.

For contactor LC1 F780

110	6.1 ⁽²⁾	280 ⁽³⁾	0.26	FD	LX4FX110 ⁽²⁾	3.000
125	7.7 ⁽²⁾	410 ⁽³⁾	0.33	GD	LX4FX125 ⁽²⁾	3.000
220	24.6 ⁽²⁾	1100 ⁽³⁾	1	MD	LX4FX220 ⁽²⁾	3.000
250	29.8 ⁽²⁾	1330 ⁽³⁾	1.25	UD	LX4FX250 ⁽²⁾	3.000
440	92 ⁽²⁾	4180 ⁽³⁾	3.5	RD	LX4FX440 ⁽²⁾	3.000

Specifications

Average consumption:

- inrush: 1960...2420 W
- sealed: 42...52 W.

Operating cycles/hour ($\theta \leq 55$ °C): 600.Operating time at U_c: closing = 70...80 ms, opening = 100...130 ms.

For contactor LC1 F800

110/120	–	–	–	FW	LX4F8FW	1.650
220/240	–	–	–	MW	LX4F8MW	1.650
380/400	–	–	–	QW	LX4F8QW	1.650

Specifications

Heat dissipation: 25 W.

Operating time at U_c: closing = 60...80 ms, opening = 40...50 ms.

For contactors LC1 F1400, LC1 F1700 and LC1 F2100

110	2.94	734	98	FD	LX4FK055 ⁽⁴⁾	1.080
125	3.73	916	122	GD	LX4FK065 ⁽⁴⁾	1.080
220	11.5	2450	280	MD	LX4FK110 ⁽⁴⁾	1.080
250	15	2930	400	UD	LX4FK125 ⁽⁴⁾	1.080
440	44	8150	1080	RD	LX4FK220 ⁽⁴⁾	1.080

Specifications

Average consumption:

- inrush: 2000...2200 W,
- sealed: 8...10 W.

Operating cycles/hour ($\theta \leq 55$ °C): 600.Operating time at U_c: closing = 50...60 ms, opening = 45...60 ms.⁽²⁾ Reference of set of 2 identical coils, to be connected in series.⁽³⁾ Value for the 2 coils in series.⁽⁴⁾ Order 2 coils and connect them in series.

TeSys contactors

TeSys F contactors

d.c. supply coils for specific applications

TeSys F

References

Coils with short operating times (at U_c):

- N/O: 60 ms
- N/C: 20 ms.

Coils with high operating rates ($\theta \leq 70$ °C):

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

Coils with low inrush consumption.

Control circuit voltage U_c	Average resistance at 20 °C ± 10 %		Inductance of closed circuit	Resistor ⁽¹⁾ Qty required	Coil		Weight
	Inrush	Sealed			Reference	Reference	
V	Ω	Ω	H				kg
For contactor LC1 F400							
48	5.11	99	0.27	1	DR2SC0047	LX9FJ918	0.970
110	32.3	632	1.7	1	DR2SC0330	LX9FJ926	0.970
125	39.4	760	2	1	DR2SC0390	LX9FJ927	0.970
220	123	2320	6.1	1	DR2SC1200	LX9FJ932	0.970
440/460	478	9080	23	1	DR2SC4700	LX9FJ938	0.970

Specifications

Average consumption:

- inrush: 430 W
- sealed: 22 W.

For contactor LC1 F500

48	4.67	76.7	0.22	1	DR2SC0039	LX9FK918	1.080
110	29.8	470	1.4	1	DR2SC0220	LX9FK926	1.080
125	37.4	637	1.7	1	DR2SC0330	LX9FK927	1.080
220	115	1935	5.1	1	DR2SC1000	LX9FK932	1.080
440/460	448	7050	19	1	DR2SC3300	LX9FK938	1.080

Specifications

Average consumption:

- inrush: 470 W
- sealed: 29 W.

For contactor LC1 F630

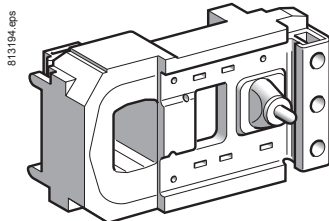
48	3.43	52.9	0.20	2	DR2SC0047	LX9FL918	1.450
110	17.2	272	0.98	2	DR2SC0270	LX9FL925	1.450
125	20.8	333	1.2	2	DR2SC0330	LX9FL926	1.450
220	64.5	1018	3.6	2	DR2SC1000	LX9FL931	1.450
440/460	260	4010	14	2	DR2SC3900	LX9FL937	1.450

Specifications

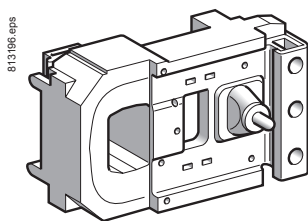
Average consumption:

- inrush: 733 W
- sealed: 48 W.

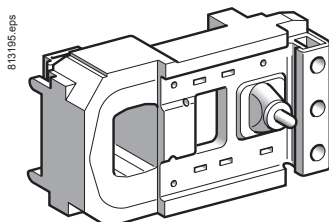
⁽¹⁾ Resistor to be ordered separately, weight of resistor: 0.030 kg.



LX9 FJ●●●



LX9 FK●●●



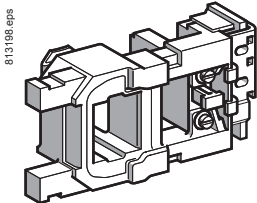
LX9 FL●●●

TeSys contactors

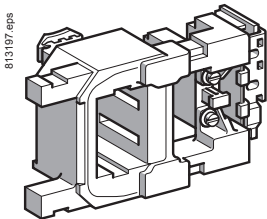
TeSys F contactors

Wide range d.c. supply coils for specific applications

TeSys F



LX4 FF●●●



LX4 FH●●●

References

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 %		Inductance of closed circuit	Reference
	Inrush	Sealed		
V	Ω	Ω	H	
For contactors LC1 F115 and LC1 F150				
24	0.71	120	7.4	LX4FF020
48	2.86	392	27	LX4FF040
72	7.05	1055	66	LX4FF060
110	13.2	1970	121	LX4FF090
125	16.9	2340	149	LX4FF100

Specifications

Average consumption:

- inrush: 415...1300 W
- sealed: 3...9 W.

For contactors LC1 F185 and LC1 F225

24	0.52	112	9.3	LX4FG020
48	2	359	34.4	LX4FG040
72	5.07	984	85	LX4FG060
110	9.66	1840	157	LX4FG090
125	12	2230	196	LX4FG100

Specifications

Average consumption:

- inrush: 580...1820 W
- sealed: 3.1...9.5 W.

For contactors LC1 F265 and LC1 F330

24	0.58	129	17.3	LX4FH020
48	2.19	400	59.5	LX4FH040
72	5.58	1110	149	LX4FH060
110	11	2120	287	LX4FH090
125	13.8	2520	353	LX4FH100

Specifications

Average consumption:

- inrush: 515...1600 W
- sealed: 2.7...8.5 W.

Operational voltage	Average resistance at 20 °C ±10 %	Inductance of closed circuit	Coil		Economy resistor		Reference of the assembly ⁽²⁾
			Reference	No. Ω	Reference	No. Ω	
V	Ω	H					
For contactor LC1 F400							
24	1.05	0.049	LX2 FJW11	3	56	DR2 SC0056	LX5FJW11
48	4.8	0.22	LX2 FJW18	3	220	DR2 SC0220	LX5FJW18
72	9.6	0.44	LX2 FJW21	3	470	DR2 SC0470	LX5FJW21

Specifications

Average consumption:

- inrush: 290...860 W
- sealed: 16...47 W.

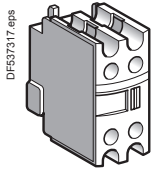
⁽¹⁾ The mechanical durability of the contactor is limited to 1 million operating cycles.

⁽²⁾ The set comprises: 1 coil **LX2 FJ** and 3 resistors **DR2 SC**.

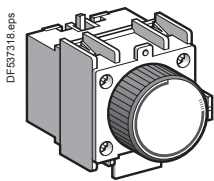
TeSys contactors

Auxiliary contact blocks for 3-pole shockproof contactors LC1 FG

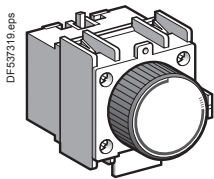
TeSys F



LAD N●●



LAD T●



LAD R●

Instantaneous auxiliary contact blocks

For use in normal operating environments

Number of contacts	Max. number of blocks per contactor Clip-on mounting	Composition				Reference	
1	1	-	-	1	-	LADN10	(1)
		-	-	-	1	LADN01	(1)
4	1	-	-	2	2	LADN22	(1)
		-	-	4	-	LADN40	(1)
		-	-	-	4	LADN04	(1)
		-	-	3	1	LADN31	(1)

Time delay auxiliary contact blocks

Number of contacts	Max. number of blocks per contactor Clip-on mounting	Time delay		Reference	
		Type	Range		
			s		
1 N/O + 1 N/C	1	On-delay	0.1...3 (2)	LADT0	
			0.1...30	LADT2	(1)
			10...180	LADT4	
		Off-delay	1...30 (3)	LADS2	
			0.1...3 (2)	LADR0	
		0.1...30	LADR2	(1)	
		10...180	LADR4		

(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.

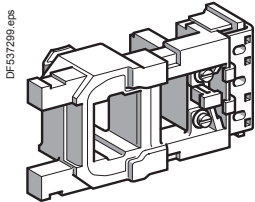
(3) With switching time of 40 ms ±15 ms between opening of the N/C contact and closing of the N/O contact.

TeSys contactors

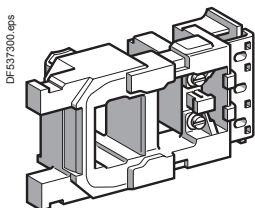
Coils for 3-pole shockproof contactors LC1 FG

Spare or replacement parts

a.c. supply 50/60 Hz




LX1 FF●●●



LX1 FG●●●

References

Control circuit voltage U _c		Voltage code	Coil reference	
50 Hz	60 Hz			
V	V			
Coils for contactors LC1 FG150				
–	48	E6	LX1FF040	
48	–	E5	LX1FF048	
–	110	F6	LX1FF092	
–	115/120	G6	LX1FF095	(1)
110/115	–	F5	LX1FF110	
120	–	FE5	LX1FF120	
–	208	L6	LX1FF170	
–	320	M6	LX1FF184	
–	230/240	U6	LX1FF187	
208	–	LE5	LX1FF200	
220/230	–	M5	LX1FF220	
240	–	U5	LX1FF240	
–	380	Q6	LX1FF316	
–	415	N6	LX1FF340	
–	440	R6	LX1FF360	
380	–	Q5	LX1FF380	
415/440	–	N5	LX1FF415	

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 ($\theta = 55$ °C): 2400.

Coils for contactors LC1 FG185

–	48	E6	LX1FG040	
48	–	E5	LX1FG048	
–	110	F6	LX1FG092	
–	115/120	G6	LX1FG095	(1)
110/115	–	F5	LX1FG110	
120	–	FE5	LX1FG120	
–	208	L6	LX1FG170	
–	320	M6	LX1FG184	
–	230/240	U6	LX1FG187	
208	–	LE5	LX1FG200	
220/230	–	M5	LX1FG220	
240	–	U5	LX1FG240	
–	380	Q6	LX1FG316	
–	415	N6	LX1FG340	
–	440	R6	LX1FG360	
380	–	Q5	LX1FG380	
415/440	–	N5	LX1FG415	

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 ($\theta = 55$ °C): 2400.

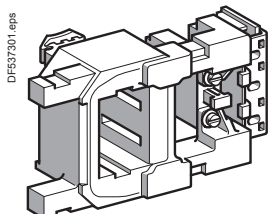
(1) Device approved by the DCN (French naval shipyard department) and authorised for on-board use.

TeSys contactors

Coils for 3-pole shockproof contactors LC1 FG

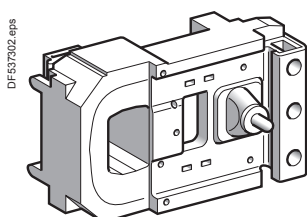
Spare or replacement parts a.c. supply 50/60 Hz

TeSys F



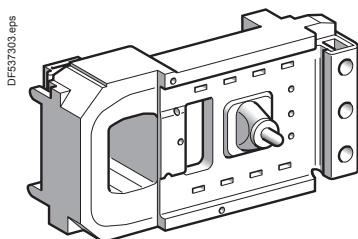
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LX1 FH●●●



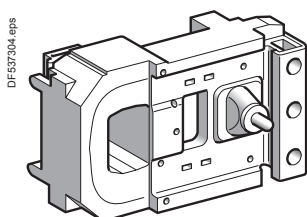
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LX1 FJ●●●



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LX1 FK●●●



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LX1 FL●●●

References

Control circuit voltage Uc 50 and 60 Hz	Voltage code	Coil reference		Weight
V				kg
Coils for contactors LC1 FG265				
110/120	F7	LX1FH1102	(1)	0.740
208	L7	LX1FH2002		0.740
220/230	M7	LX1FH2202		0.740
240	U7	LX1FH2402		0.740
380/415	Q7	LX1FH3802		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, $\cos \varphi = 0.9$.

Operating cycles/hour ($\theta = 55$ °C): 2400.

Coils for contactors LC1 FG400

110/120	F7	LX1FJ110	(1)	1.000
208	L7	LX1FJ200		1.000
220/230	M7	LX1FJ220		1.000
230/240	U7	LX1FJ240		1.000
380/400	Q7	LX1FJ380		1.000
415/440	N7	LX1FJ415		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, $\cos \varphi = 0.9$.

Operating cycles/hour ($\theta = 55$ °C): 2400.

Coils for contactors LC1 FG500

110/120	F7	LX1FK110	(1)	1.150
208	L7	LX1FK200		1.150
220/230	M7	LX1FK220		1.150
230/240	U7	LX1FK240		1.150
380/400	Q7	LX1FK380		1.150
415/440	N7	LX1FK415		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, $\cos \varphi = 0.9$.

Operating cycles/hour ($\theta = 55$ °C): 2400.

Coils for contactors LC1 FG630

110/120	F7	LX1FL110	(1)	1.500
208	L7	LX1FL200		1.500
220/230	M7	LX1FL220		1.500
380/400	Q7	LX1FL380		1.500
415/440	N7	LX1FL415		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, $\cos \varphi = 0.9$.

Operating cycles/hour ($\theta = 55$ °C): 1200.

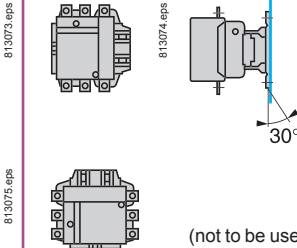
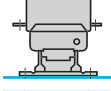
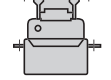

(1) Device approved by the DCN (French naval shipyard department) and authorised for on-board use.

TeSys contactors

TeSys F contactors (115 to 2100 A)

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

TeSys F

Environment				LC1 F115	LC1 F150	LC1 F185
Rated insulation voltage (Ui)	Conforming to IEC 60947-4-1	V	1000	1000	1000	
	Conforming to VDE 0110 gr C	V	1500	1500	1500	
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					
						
			 <p>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.</p> <p>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.</p> <p>In either case: neither the making and breaking capacities nor the electrical and mechanical durabilities can be assured.</p>			
	Not to be used					
Shock resistance ⁽²⁾ 1/2 sine wave = 11 ms	Contactor open		9 gn	9 gn	7 gn	
	Contactor closed		15 gn	15 gn	15 gn	
Vibration resistance ⁽²⁾ 5...300 Hz	Contactor open		2 gn	2 gn	2 gn	
	Contactor 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.

TeSys contactors

TeSys F contactors (115 to 2100 A)

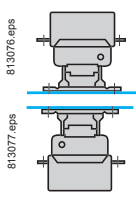
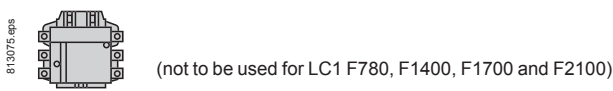
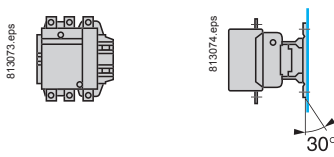
Control circuit: a.c. or d.c.

TeSys F

LC1 F225	LC1 F265	LC1 F330	LC1 F400	LC1 F500	LC1 F630	LC1 F780	LC1 F800	LC1 F1250	LC1 F1400	LC1 F1700	LC1 F2100
1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
8	8	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	CSA, CCC, ETL-UL
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		

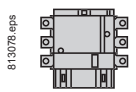


Apply the following derating coefficients: 0.75 on the pull-in voltage, 0.9 on the drop-out voltage and 0.8 on the operational current in AC-1.

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	6 gn	6 gn
15 gn	15 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	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	4 gn	4 gn

High power contactors

TeSys F

Pole characteristics							
Contactor type			LC1 F115	LC1 F150	LC1 F185	LC1 F225	LC1 F265
Number of poles			3 or 4	3 or 4	3 or 4	3 or 4	3 or 4
Rated operational current (Ie) (Ue ≤ 440 V)	In AC-3, θ ≤ 55 °C	A	115	150	185	225	265
	In AC-1, θ ≤ 40 °C	A	200	250	275	315	350
Rated operational voltage (Ue)	Up to	V	1000	1000	1000	1000	1000
Frequency limits	Of the operational current ⁽¹⁾	Hz	16 ^{2/3} ...200	16 ^{2/3} ...200	16 ^{2/3} ...200	16 ^{2/3} ...200	16 ^{2/3} ...200
Conventional thermal current	θ ≤ 40 °C	A	200	250	275	315	350
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 No current flowing for previous 60 minutes, at θ ≤ 40 °C	For 10 s	A	1100	1200	1500	1800	2200
	For 30 s	A	640	700	920	1000	1230
	For 1 min	A	520	600	740	850	950
	For 3 min	A	400	450	500	560	620
	For 10 min	A	320	350	400	440	480
Short-circuit protection by fuses U ≤ 440 V	Motor circuit (type aM)	A	125	160	200	250	315
	With thermal overload relay (type gG)	A	200	200	315	315	500
	gG fuses	A	200	250	315	315	400
Average impedance per pole	At Ith and 50 Hz	mΩ	0.37	0.35	0.33	0.32	0.3
Power dissipation per pole for the above operational currents	AC-3	W	5	8	12	16	21
	AC-1	W	15	22	25	32	37
Connection			Maximum c.s.a.				
Bar	Number of bars		2	2	2	2	2
	Bar	mm	20 x 3	25 x 3	25 x 3	32 x 4	32 x 4
Cable with lug		mm²	95	120	150	185	240
Cable with connector		mm²	95	120	150	185	240
Bolt diameter		mm	Ø6	Ø8	Ø8	Ø10	Ø10
Tightening torque	Power circuit connections	N.m	10	18	18	35	35

(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 B9/13).

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

TeSys contactors

TeSys F contactors (115 to 2100 A)

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

TeSys F

LC1 F330	LC1 F400	LC1 F500	LC1 F630	LC1 F780	LC1 F800	LC1 F1250	LC1 F1400	LC1 F1700	LC1 F2100
3 or 4	2, 3 or 4	2, 3 or 4	2, 3 or 4	3 or 4	3	3	3	3	3
330	400	500	630	780	800	-	-	-	-
400	500	700	1000	1600	1000	1260	1400	1700	2100 ⁽²⁾
1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
16 ^{2/3} ...200	16 ^{2/3} ...200	16 ^{2/3} ...200	16 ^{2/3} ...200	16 ^{2/3} ...200	16 ^{2/3} ...200	16 ^{2/3} ...200	16 ^{2/3} ...200	16 ^{2/3} ...200	16 ^{2/3} ...200
400	500	700	1000	1600	1000	1260	1400	1700	2100 ⁽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			
2650	3600	4200	5050	6250	5500	8000	8000	10000	10000
1800	2400	3200	4400	5600	4600	5200	6000	7500	7500
1300	1700	2400	3400	4600	3600	4000	4500	5500	5500
900	1200	1500	2200	3000	2600	3000	4000	4200	4200
750	1000	1200	1600	2200	1700	2000	2600	3000	3000
400	400	500	630	800	800	-	-	-	-
500	630	800	800	1000	1000	-	-	-	-
500	500	800	1000	2 x 800 ⁽³⁾	1000	1000	2 x 800 ⁽³⁾	2 x 800 ⁽³⁾	2 x 1000 ⁽³⁾
0.28	0.26	0.18	0.12	0.10	0.12	0.12	0.10	0.10	0.10
31	42	45	48	60	77	-	-	-	-
44	65	88	120	250	120	120	150	200	200
Maximum c.s.a.									
2	2	2	2	2	2	2	2	3	4
30 x 5	30 x 5	40 x 5	60 x 5	100 x 5	60 x 5	100 x 5	100 x 5	100 x 5	100 x 5
240	2 x 150	2 x 240	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-
Ø10	Ø10	Ø10	Ø12	2 x Ø12	Ø12	3 x Ø12 (Ø11.5 with set of right-angled connectors LA9 F1250)	4 x Ø12 (Ø11.5 with set of right-angled connectors LA9 F2100)		
35	35	35	58	58	58	58 (35 with set of right-angled connectors LA9 F1250)	58 (35 with set of right-angled connectors LA9 F2100)		

TeSys F

Control circuit characteristics with LX1 or LX9 coil			LC1 F115	LC1 F150	LC1 F185	LC1 F225	LC1 F265	
Contactor type								
Rated control circuit voltage (Uc)	50 or 60 Hz	V	24...1000					
Control voltage limits ($\theta \leq 55^\circ\text{C}$) 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	805	-	
		VA	-	-	-	-	650	
		Cos φ	0.3	0.3	0.3	0.3	0.9	
	Sealed	50 Hz coil	VA	45	45	55	55	-
		40...400 Hz coil	VA	-	-	-	-	10
		Cos φ	0.3	0.3	0.3	0.3	0.9	
	~ 60 Hz Inrush	60 Hz coil	VA	660	660	970	970	-
		40...400 Hz coil	VA	-	-	-	-	650
		Cos φ	0.3	0.3	0.3	0.3	0.9	
	Sealed	60 Hz coil	VA	55	55	66	66	-
		40...400 Hz coil	VA	-	-	-	-	10
		Cos φ	0.3	0.3	0.3	0.3	0.9	
Heat dissipation		W	12...16	12...16	18...24	18...24	8	
Operating time ⁽¹⁾	Closing "C"	ms	23...35	23...35	20...35	20...35	40...65	
	Opening "O"	ms	5...15	5...15	7...15	7...15	100...170	
Mechanical durability at Uc	In millions of operating cycles		10	10	10	10	10	
Maximum operating rate at ambient temperature $\leq 55^\circ\text{C}$	In operating cycles per hour		2400	2400	2400	2400	2400	
Connection	Flexible cable without cable end	1 or 2 conductors	mm²	Min/max c.s.a.				
			1/4	1/4	1/4	1/4	1/4	
	Flexible cable with cable end	1 conductor	mm²	1/4	1/4	1/4	1/4	1/4
		2 conductors	mm²	1/2.5	1/2.5	1/2.5	1/2.5	1/2.5
Solid cable without cable end	1 or 2 conductors	mm²	1/4	1/4	1/4	1/4	1/4	
Tightening torque		N.m	1.2	1.2	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 B9/30 to B9/35.							

(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.

TeSys contactors

TeSys F contactors (115 to 2100 A)

Control circuit: a.c.

TeSys F

LC1 F330	LC1 F400	LC1 F500	LC1 F630	LC1 F780	LC1 F800	LC1 F1250	LC1 F1400	LC1 F1700	LC1 F2100
24...1000	48...1000		48...1000	110...500	110...400	110...600	110...500 ⁽²⁾	110...500 ⁽²⁾	110...500 ⁽²⁾

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
0.35...0.55 Uc	0.3...0.5 Uc		0.25...0.5 Uc	0.2...0.4 Uc	0.3...0.5 Uc	0.25...0.5 Uc	0.3...0.5 Uc	0.3...0.5 Uc	0.3...0.5 Uc
650	1075	1100	1650	2100	1700	1650	2200	2200	2200
0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
10	15	18	22	50	12	22	36	36	36
0.9	0.9	0.9	0.9	0.9	-	0.9	0.9	0.9	0.9
650	1075	1100	1650	2100	1700	1650	2200	2200	2200
0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
10	15	18	22	50	12	22	36	36	36
0.9	0.9	0.9	0.9	0.9	-	0.9	0.9	0.9	0.9
8	14	18	20	2 x 22	25	20	2 x 18	2 x 18	2 x 18
40...65	40...75	40...75	40...80	40...80	60...80	40...80	40...75	40...75	40...75
100...170	100...170	100...170	100...200	130...230	150...180	100...200	100...170	100...170	100...170
10	10	10	5	5	5	1	0.5	0.5	0.5
2400	2400	2400	1200	600	600	1200	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
1/2.5	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 B9/30 to B9/35.

TeSys F

Control circuit characteristics with LX4 coil								
Contactor type			LC1 F115	LC1 F150	LC1 F185	LC1 F225	LC1 F265	
Rated control circuit voltage (Uc) ---	V		24...460	24...460	24...460	24...460	24...460	
Control voltage limits ($\theta \leq 55^\circ\text{C}$)	Operation		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	
	Drop-out		0.15...0.2 Uc	0.15...0.2 Uc	0.15...0.2 Uc	0.15...0.2 Uc	0.15...0.2 Uc	
Average consumption at 20 °C and at Uc	---	Inrush	W	560	560	800	800	750
		Sealed	W	4.5	4.5	5	5	5
Average operating time at Uc ⁽¹⁾	Closing "C"		ms	30...40	30...40	30...40	30...40	40...50
	Opening "O"		ms	30...50	30...50	30...50	30...50	40...65
			<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>					
Mechanical durability at Uc	In millions of operating cycles		10	10	10	10	10	
Maximum operating rate at ambient temperature $\leq 55^\circ\text{C}$	In operating cycles per hour		2400	2400	2400	2400	2400	
Cabling	Flexible cable without cable end	1 conductor	mm ²	Min/max c.s.a. 1/4	1/4	1/4	1/4	1/4
		2 conductors	mm ²	1/4	1/4	1/4	1/4	1/4
	Flexible cable with cable end	1 conductor	mm ²	1/4	1/4	1/4	1/4	1/4
		2 conductors	mm ²	1/2.5	1/2.5	1/2.5	1/2.5	1/2.5
	Solid cable without cable end	1 conductor	mm ²	1/4	1/4	1/4	1/4	1/4
		2 conductors	mm ²	1/4	1/4	1/4	1/4	1/4
Tightening torque		N.m	1.2	1.2	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 B9/30 to B9/35.							

⁽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.

TeSys contactors

TeSys F contactors (115 to 2100 A)

Control circuit: d.c

TeSys F

LC1 F330	LC1 F400	LC1 F500	LC1 F630	LC1 F780	LC1 F800	LC1 F1250	LC1 F1400	LC1 F1700	LC1 F2100
24...460	48...440	48...440	48...440	110...440	110...400	48...250	110...440	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	0.2...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	0.2...0.35 Uc	0.2...0.35 Uc
750	1000	1100	1600	2 x 1000	1900	1600	2100	2100	2100
5	6	6	9	2 x 21	12	9	10	10	10
40...50	50...60	50...60	60...70	70...80	60...80	60...70	50...60	50...60	50...60
40...65	45...60	45...60	40...50	100...130	40...50	40...50	45...60	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	5	5	5	1	0.5	0.5	0.5
2400	2400	2400	1200	600	600	1200	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

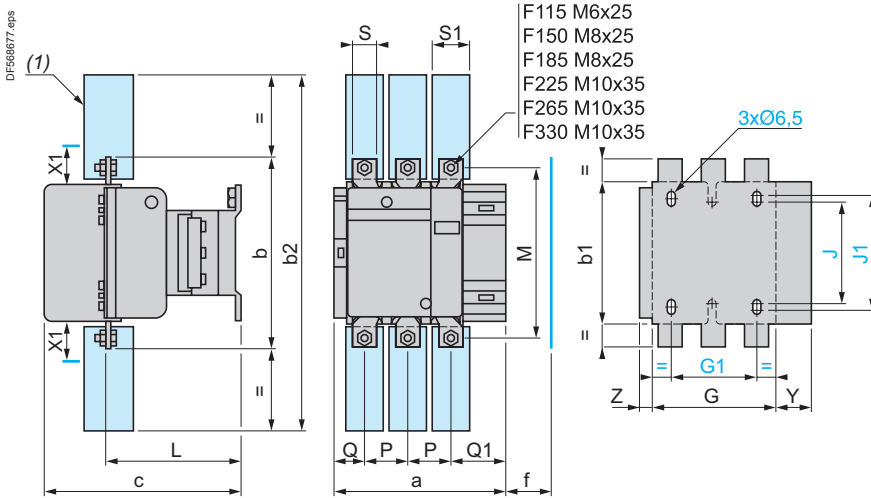
Mechanical latch blocks LA6 DK must not be fitted on LC1 F contactors.
For similar type of operation, use magnetic latching contactors CR1 F.
See pages B9/30 to B9/35.

TeSys contactors

TeSys F contactors

TeSys F

LC1 F115 to F330



X1 (mm) = Minimum electrical clearance according to operating voltage and breaking capacity.

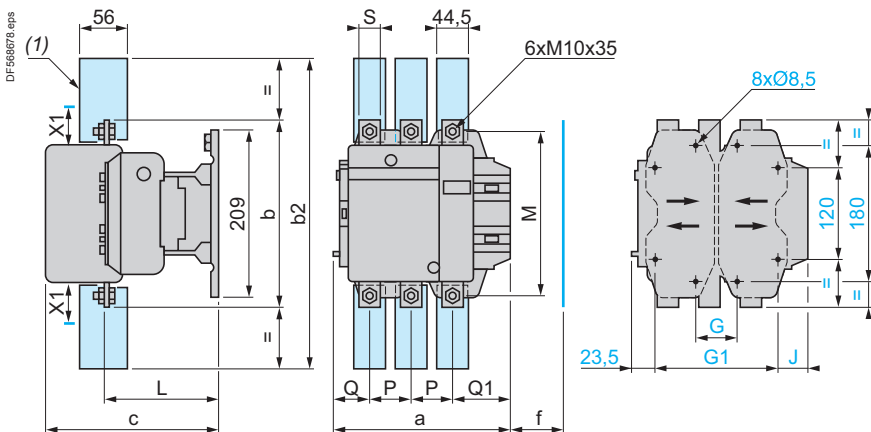
LC1	200...500 V	600...1000 V
F115, F150	10	15
F185	10	15
F225, F265	10	15
F330	10	15

(1) Power terminal protection shroud (see page B9/14).

LC1		a	b	b1	b2	c	f	G	G1	J	J1	L	M	P	Q	Q1	S	S1	Y	Z
F115	3P	163.5	162	137	265	171	131	106	80	106	120	107	147	37	29.5	60	20	26	44	13.5
	4P	200.5	162	137	265	171	131	143	80	106	120	107	147	37	29.5	60	20	26	44	13.5
F150	3P	163.5	170	137	301	171	131	106	80	106	120	107	150	40	26	57.5	20	34	44	13.5
	4P	200.5	170	137	301	171	131	143	80	106	120	107	150	40	26	55.5	20	34	44	13.5
F185	3P	168.5	174	137	305	181	130	111	80	106	120	113.5	154	40	29	59.5	20	34	44	13.5
	4P	208.5	174	137	305	181	130	151	80	106	120	113.5	154	40	29	59.5	20	34	44	13.5
F225	3P	168.5	197	137	364	181	130	111	80	106	120	113.5	172	48	21	51.5	25	44.5	44	13.5
	4P	208.5	197	137	364	181	130	151	80	106	120	113.5	172	48	17	47.5	25	44.5	44	13.5
F265	3P	201.5	203	145	375	213	147	142	96	106	120	141	178	48	39	66.5	25	44.5	38	21.5
	4P	244.5	203	145	375	213	147	190	96	106	120	141	178	48	34	66.5	25	44.5	38	21.5
F330	3P	213	206	145	375	219	147	154.5	96	106	120	145	181	48	43	74	25	44.5	38	20.5
	4P	261	206	145	375	219	147	202.5	96	106	120	145	181	48	43	74	25	44.5	38	20.5

f = minimum distance required for coil removal.

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

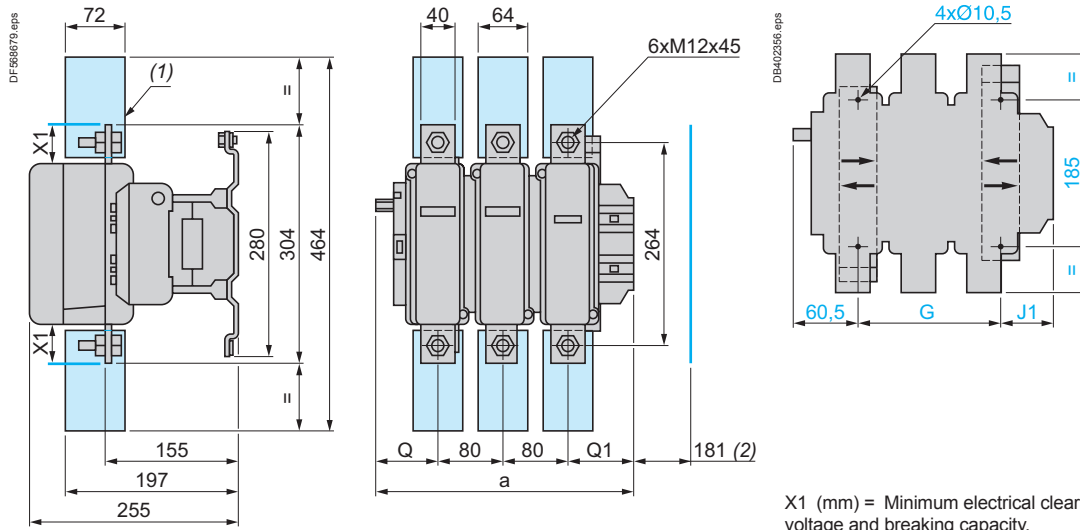
(1) Power terminal protection shroud (see page B9/14).

LC1		a	b	b2	c	f	G	G	G	G1	G1	G1	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.

TeSys F

LC1 F630 and F800



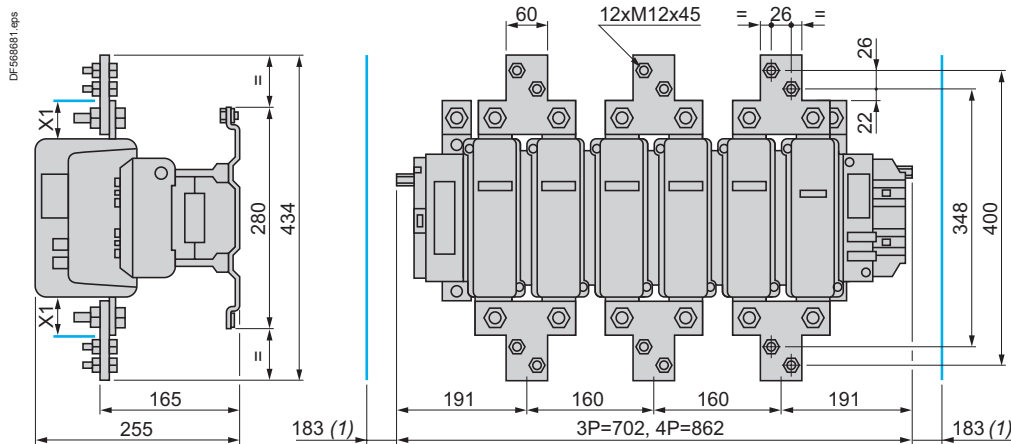
X1 (mm) = Minimum electrical clearance according to operating voltage and breaking capacity.

LC1		a	G supplied min.	G max.	J1	Q	Q1
F630	2P	309	180	100	195	68.5	102
F630, F800	3P	309	180	100	195	68.5	60
F630	4P	389	240	150	275	68.5	60

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 B9/14).
 (2) Minimum distance required for coil removal.

LC1 F780



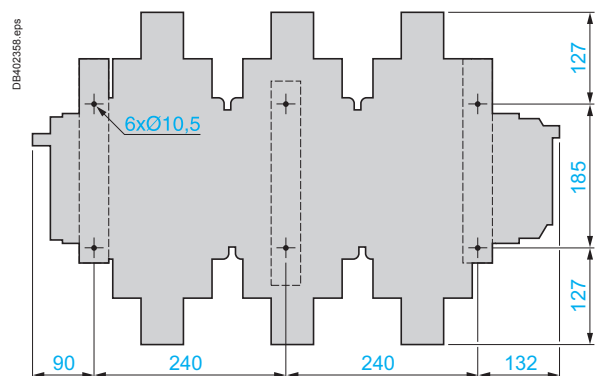
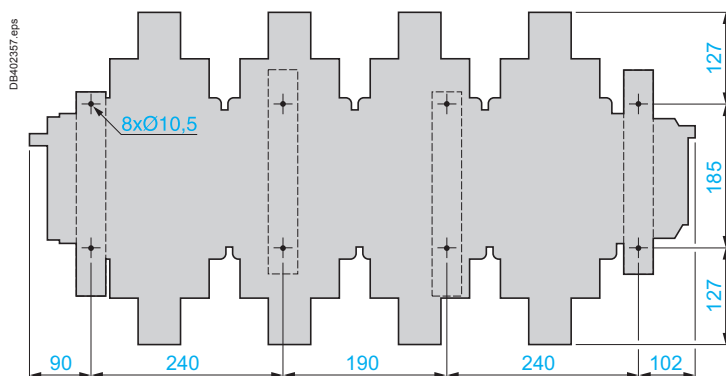
X1 (mm) = Minimum electrical clearance according to operating voltage and breaking capacity.

(1) Minimum distance required for coil removal.

Voltage	200...500 V	690...1000 V
X1 (mm)	30	35

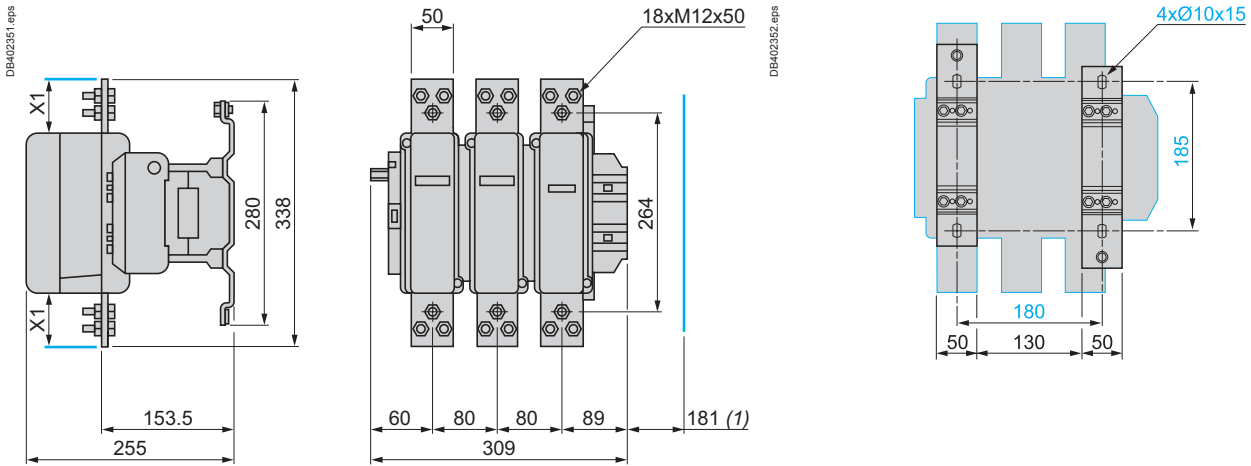
Fixing centres of LC1 F7804

Fixing centres of LC1 F780



TeSys F

LC1 F1250

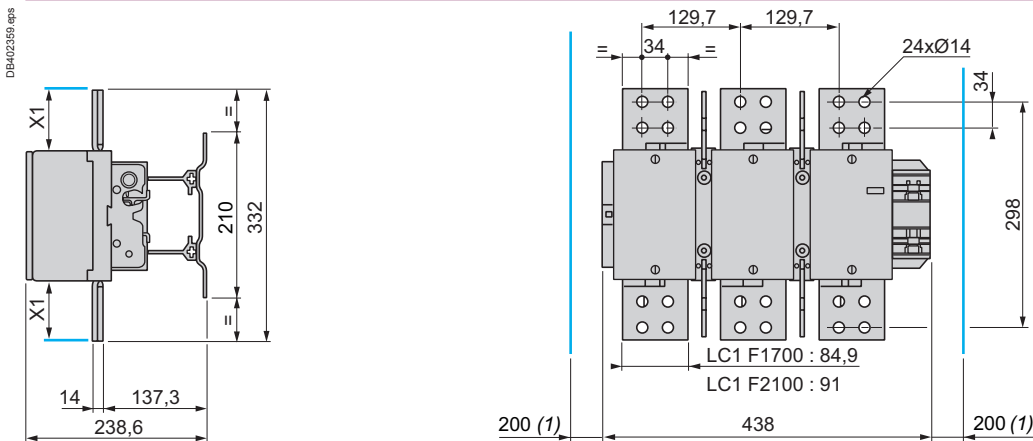


(1) Minimum distance required for coil removal.

X1 (mm) = Minimum electrical clearance according to operating voltage and breaking capacity.

Voltage	200...500 V	690...1000 V
X1 (mm)	20	30

LC1 F1400, LC1 F1700 and LC1 F2100

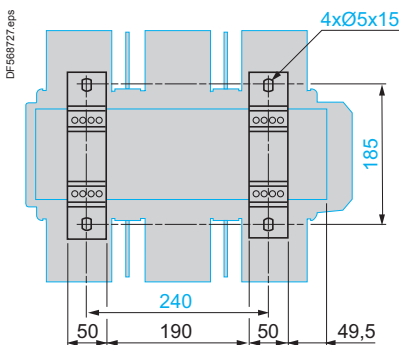


(1) Minimum distance required for coil removal.

X1 (mm) = Minimum electrical clearance according to operating voltage and breaking capacity.

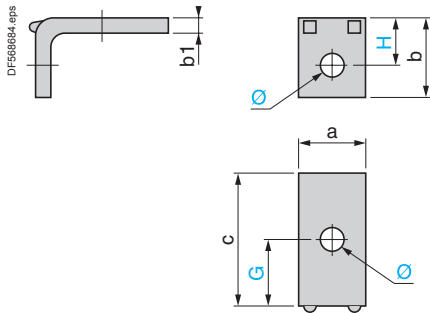
Voltage	200...500 V	690...1000 V
X1 (mm)	90	100

Fixing centres of LC1 F1400, F1700 and 2100



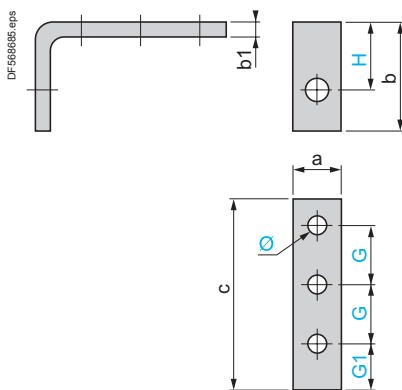
TeSys F

Right-angled connectors LA9 F●981 (set of 3) for rear connection



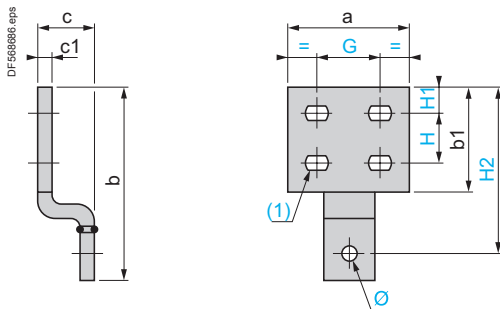
LA9	FF981	FG981	FJ981	FK981	FL981
a	15	20	25	30	40
b	18	23	29	35	48
b1	3	3	4	5	8
c	42	45	55	52	86
G	24	26	32.5	26	45
H	10.5	13	16.5	20	28
Ø	6.5	9	11	11	13

Right-angled connectors LA9 F●979 (set of 3) for side connection



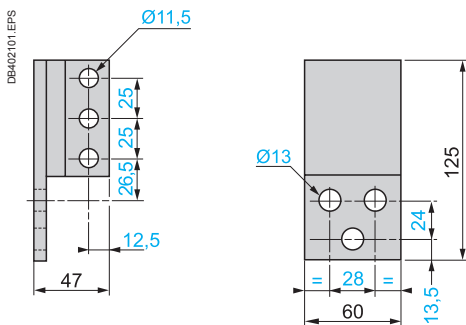
LA9	FF979	FG979	FJ979	FK979	FL979
a	15	20	25	30	40
b	54	58	63.5	68	117
b1	5	5	6	6	10
c	80	92	120	120	130
G	24	28	37	37	37.5
G1	20	22	29	29	35
H	36	39	41	42	76
Ø	6.5	9	11	11	13

Right-angled connectors LA9 F●980 with large surface area (set of 3)

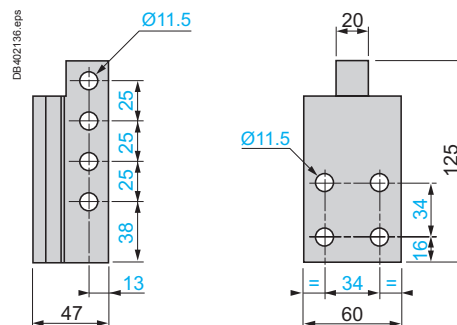


LA9	FF980	FG980	FJ980	FK980	FL980
a	35	40	50	60	100
b	70.5	82.5	98.5	114	154
b1	40	45	55	65	85
c	29	29	33	33	43
c1	3	3	5	5	10
G	18	20	25	29	53
H	18	20	22	26	40
H1	10	12	14	17	20
H2	60.5	72.5	84.5	97	132
Ø	6.5	9	11	11	13
(1)	Ø7 x 10	Ø9 x 12	Ø11 x 14	Ø12.5 x 15	Ø12.5 x 15

Right-angled connectors LA9 F1250 (set of 6)



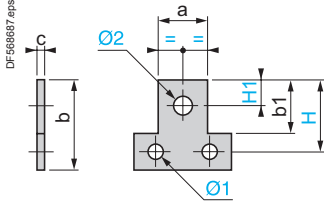
Right-angled connectors LA9 F2100 (set of 6) for rear connection



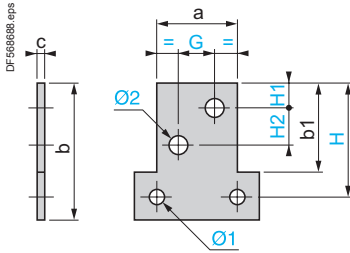
TeSys F

Paralleling links (set of 4)

LA9 FF602, FG602, FH602



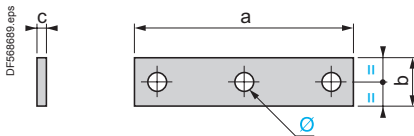
LA9 FK602, FL602



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

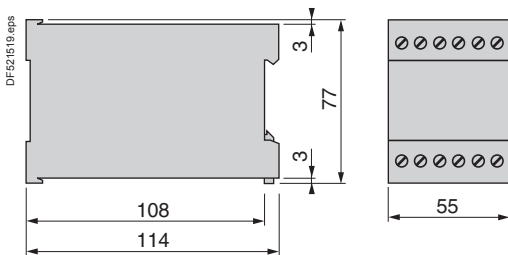
LA9 F●601



LA9	FF601	FG601	FH601	FK601	FL601
a	69	100	121	140	200
b	15	20	20	30	40
c	3	3	5	5	8
Ø	6.5 x 8.5	8.5 x 10.5	10.5 x 13	11	13

Capacitive delayed opening devices for TeSys F contactors

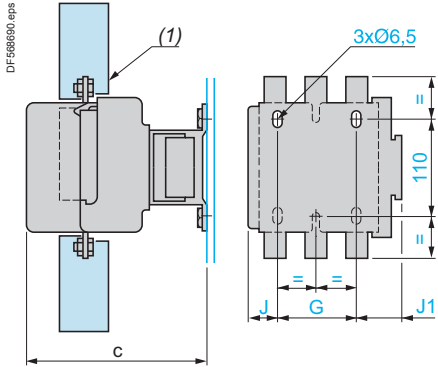
LAZ R9●●



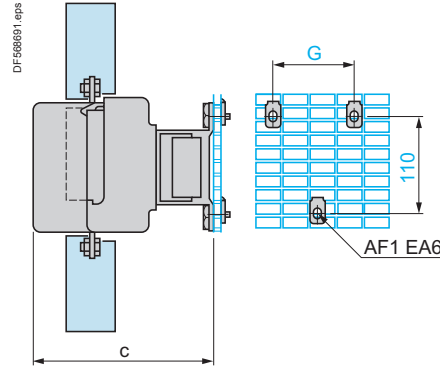
TeSys F

LC1 F115 to F330

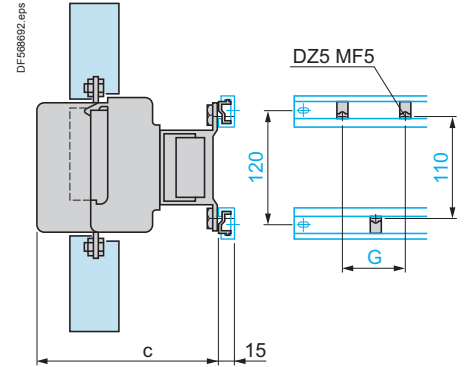
On panel



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



On rails DZ5 MB on 120 mm centres



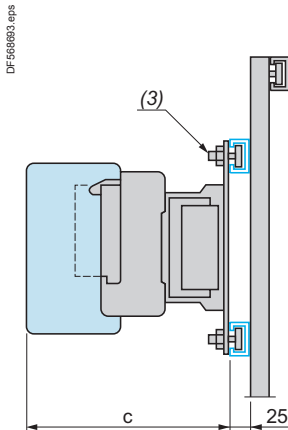
LC1	F115 F150	F185 F225	F265	F330
c ⁽²⁾	3P 171	181	213	219
	4P 171	181	213	219
G	3P 80	80	96	96
	4P 80	80	96	96
J	3P 26.5	29	44.5	44.5
	4P 45	49	68.5	68.5
J1	3P 57	59.5	61.5	61.5
	4P 75.5	79.5	85.5	85.5

LC1	F115 F150	F185 F225	F265	F330
c ⁽²⁾	3P 171	181	213	219
	4P 171	181	213	219
G	3P 80	80	96	96
	4P 80	80	96	96

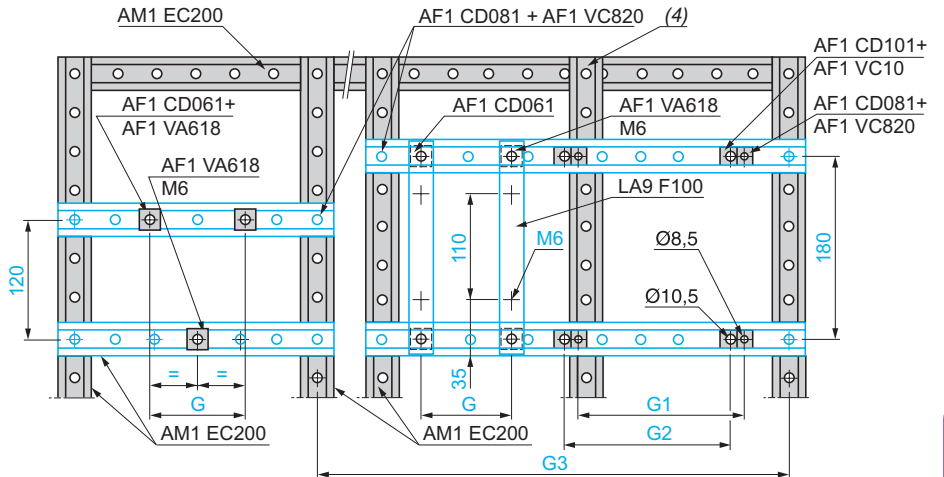
LC1	F115 F150	F185 F225	F265	F330
c ⁽²⁾	3P 171	181	213	219
	4P 171	181	213	219
G	3P 80	80	96	96
	4P 80	80	96	96

LC1 F

On 2 notched rails AM1 EC●●●



LC1 F115 to F330



LC1 F400 to F800

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 (M6)	3P 80	80	96	96	-	-	-	-	-
	4P 80	80	96	96	-	-	-	-	-
G1 (Ø 8.5)	3P -	-	-	-	80	80	-	-	-
	4P -	-	-	-	80	140	-	-	-
G2 (Ø 10.5)	3P -	-	-	-	-	-	180	See page B9/55	180
	4P -	-	-	-	-	-	240	See page B9/55	-

(1) Power terminal protection shroud (see page B9/14).

(2) See X1 (minimum electrical clearance) pages B9/54 and B9/55.

(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).

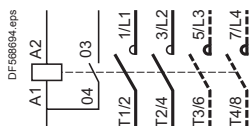
(5) + 6 mm with time-delay block on LC1 F.

TeSys F

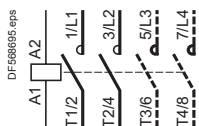
Contactors

2, 3 and 4-pole contactors

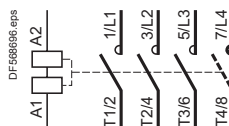
LC1 F115 to F630, F1250
(coil LX1 F ~)



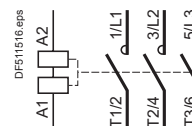
LC1 F115 to F630, F1250 (coil LX4 F ~:~)
LC1 F115 to F265 (coil LX9 F ~)
LC1 F800 (coil LX8 F ~ / ~:~)



LC1 F780 ~ or ~:~



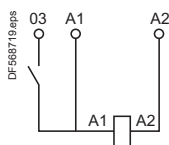
LC1 F1400 ~ or ~:~
LC1 F1700 ~ or ~:~
LC1 F2100 ~ or ~:~



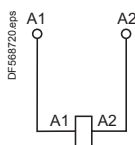
Coils

Standard ~ coils

LX1 FF, FG, FJ...FL
LX1 FH0422...FH3802

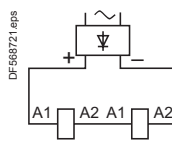


LX1 FH0202...FH0362
LX1 FH4402...FH10002
LX1 F8●



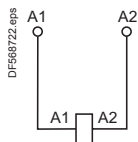
LX1 FX

Rectifier supplied and fixed on the contactor



Standard ~:~ coils

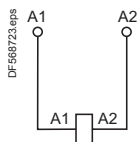
LX4 FF, FG, FH, FJ, FK, FL, FX (1), LX4 F8●



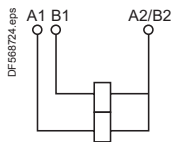
(1) 2 coils in series.

Special ~ coils

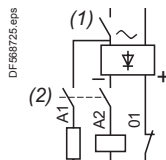
LX9 FF, FG



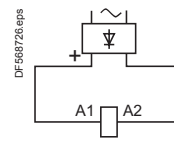
LX9 FH●●●2



LX9 FJ, FK, FL



LX4 F8●

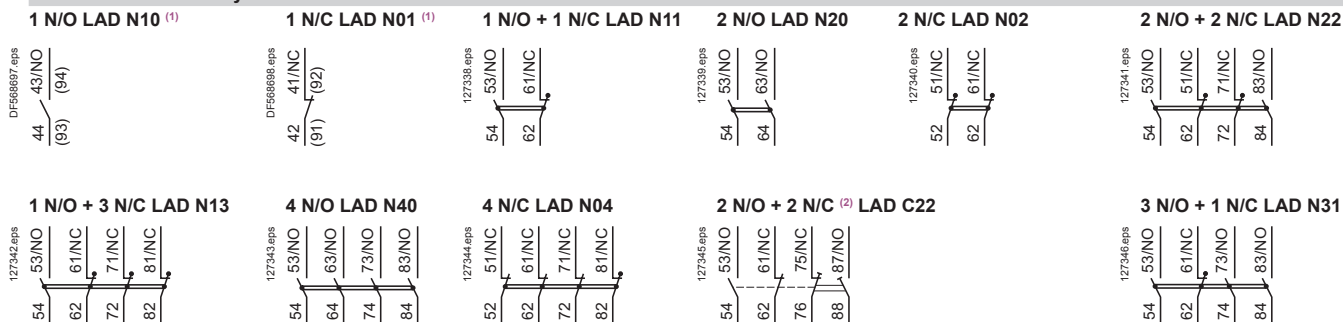


(1) Breaking on ~ side.
Drop-out time 50 ms.
(2) Breaking on ~:~ side.
Drop-out time 20 ms.

TeSys F

Add-on blocks

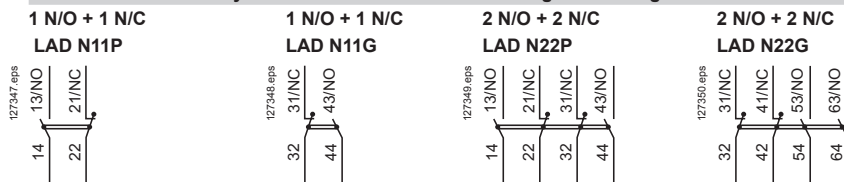
Instantaneous auxiliary contacts



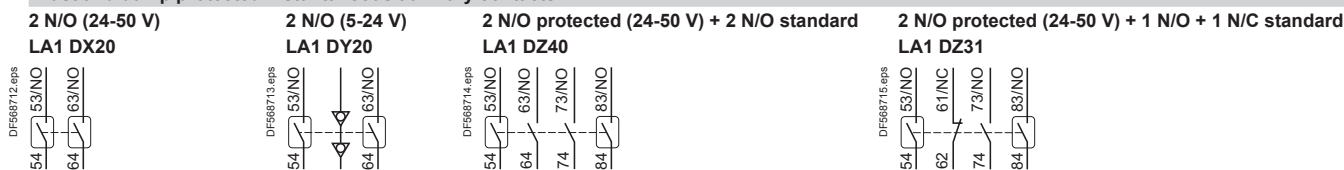
⁽¹⁾ Items in brackets: See "TeSys D contactors".

⁽²⁾ 1 N/O + 1 N/C make before break.

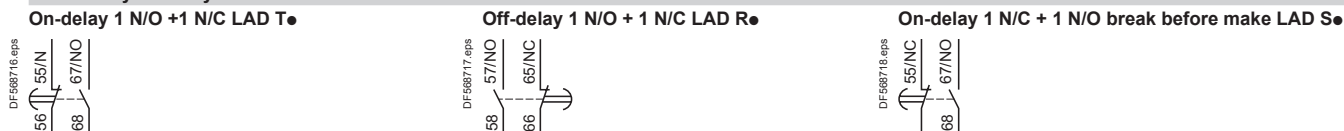
Instantaneous auxiliary contacts with terminal referencing conforming to standard EN 50012 (References: pages B9/10 and B9/11)



Dust and damp protected instantaneous auxiliary contacts

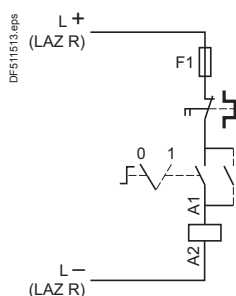


Time delay auxiliary contacts



Capacitive delayed opening devices for TeSys F contactors

LAZ R9●● + LC1 F



TeSys F



LC1 FG150



LC1 FG265

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 it's 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.

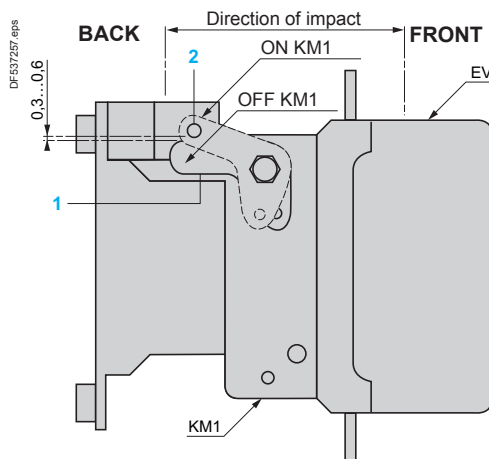
Applications

- **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.**

Description of shockproof device

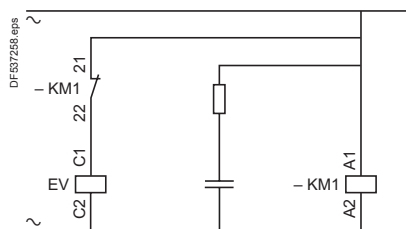
Shockproof contactors **LC1 FG●●●** are equipped with:

- 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**.



TeSys contactors

3-pole shockproof contactors LC1 FG a.c. supply

According to the utilisation category and required electrical durability

TeSys F

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

Operational current and power ($\theta \leq 55$ °C)

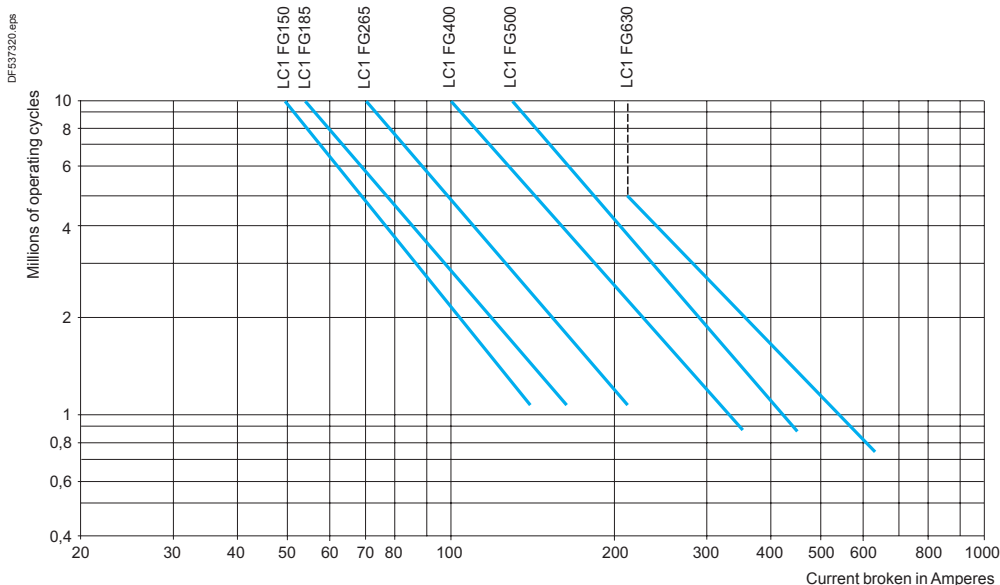
Operational current	A	LC1 FG150	LC1 FG185	LC1 FG265	LC1 FG400	LC1 FG500	LC1 FG630
Operational power	220/230 V	kW 40	55	75	110	147	200
Standard power ratings of motors)		hp 54	75	100	150	200	270
	380/400 V	kW 75	90	132	200	250	335
		hp 100	185	180	270	340	450
	415 V	kW 80	100	140	220	280	375
		hp 110	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 (I_e) in category AC-3 is equal to the rated operational current of the motor.

Example:

Asynchronous motor with $P = 55$ kW - $U_e = 380$ V - $I_e = 105$ A

4 million operating cycles required.

The above selection curves show the contactor rating needed: **LC1 FG265**.

TeSys contactors

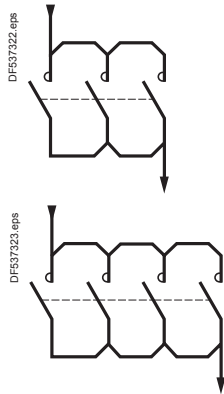
3-pole shockproof contactors LC1 FG a.c. supply

According to the utilisation category and required electrical durability

Use in category AC-1 ($U_e \leq 440$ V)											
Contactors				LC1 FG150	LC1 FG185	LC1 FG265	LC1 FG400	LC1 FG500	LC1 FG630		
Connection	Cable	C.s.a.	mm ²	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

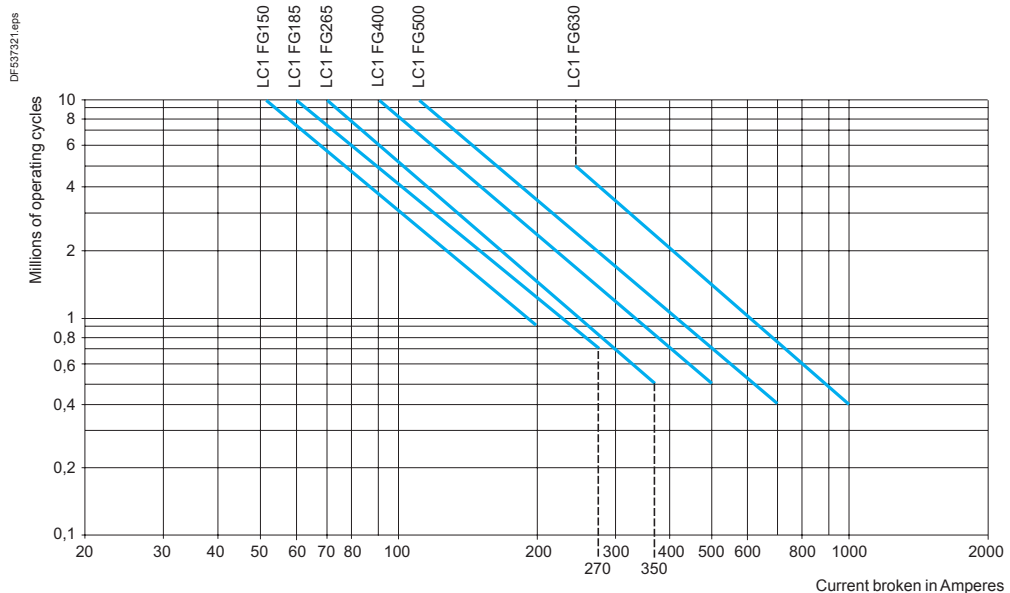


Apply the following multiplying factors to the current values given above.
 The factors take into account the often unbalanced current distribution between the 2 poles:

- 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 ($\cos \varphi \geq 0.95$).
 The current broken (I_c) in category AC-1 is equal to the current (I_e) normally drawn by the load.
 $U_e = 220$ 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**.

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		LC1 FG150	LC1 FG185	LC1 FG265	LC1 FG400	LC1 FG500	LC1 FG630
Thermal limit zone	Operating cycles/hour ⁽¹⁾ and on-load factor	Maximum current broken according to the duty requirements (thermal limit, ambient temperature ≤ 55 °C)					
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

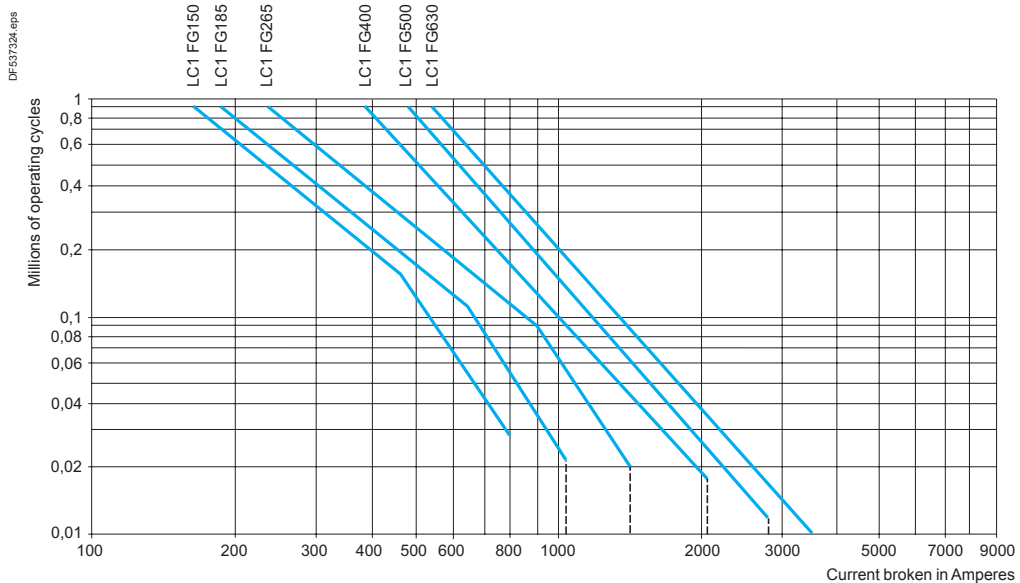
(1) Do not exceed the maximum limit for the mechanical operating cycles.

Counter current braking (plugging)

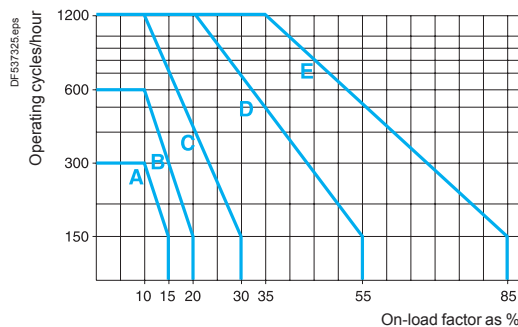
The current varies from the maximum plug-braking current to the rated motor current. The current made must be compatible with the making and breaking capacities of the contactor.

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 ≤ 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.

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
θ ≤ 40 °C			θ ≤ 55 °C				
220 V	400 V	600 V	220 V	400 V	600 V	A	
240 V	440 V	660 V	240 V	440 V	660 V		
kvar	kvar	kvar	kvar	kvar	kvar		
60	100	135	40	85	90	3200	LC1FG150
70	125	160	50	100	100	3500	LC1FG185
90	160	225	75	125	125	5000	LC1FG265
125	220	300	100	160	200	8000	LC1FG400
180	300	400	125	220	300	10 000	LC1FG500
250	400	600	190	350	500	12 000	LC1FG630

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	9000
Maximum operational power ⁽¹⁾	220 V	kVA	25	40	50	75	100
	380 V	kVA	50	75	90	130	225
	415/440 V	kVA	55	80	100	140	250
	500 V	kVA	65	95	110	170	280
	660 V	kVA	80	120	140	200	315
	1000 V	kVA	100	150	200	250	375

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

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 I _e							
Operational voltage (U _e)	Number of poles to be wired in series	Contactors					
		LC1 FG150	LC1 FG185	LC1 FG265	LC1 FG400	LC1 FG500	LC1 FG630
V		A	A	A	A	A	A
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 I _e							
Operational voltage (U _e)	Number of poles to be wired in series	Contactors					
		LC1 FG150	LC1 FG185	LC1 FG265	LC1 FG400	LC1 FG500	LC1 FG630
V		A	A	A	A	A	A
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
	2	140	180	280	350	550	850
	3	140	180	280	350	550	850
	4	140	180	280	350	550	850
125	1	–	–	–	–	–	–
	2	100	140	250	350	550	850
	3	120	160	280	350	550	850
	4	120	160	280	350	550	850
225	1	–	–	–	–	–	–
	2	80	100	200	280	450	700
	3	100	140	250	350	550	850
	4	120	160	280	350	550	850
300	3	80	100	200	280	450	700
	4	120	160	280	350	550	850
460	4	80	100	200	280	450	700

TeSys contactors

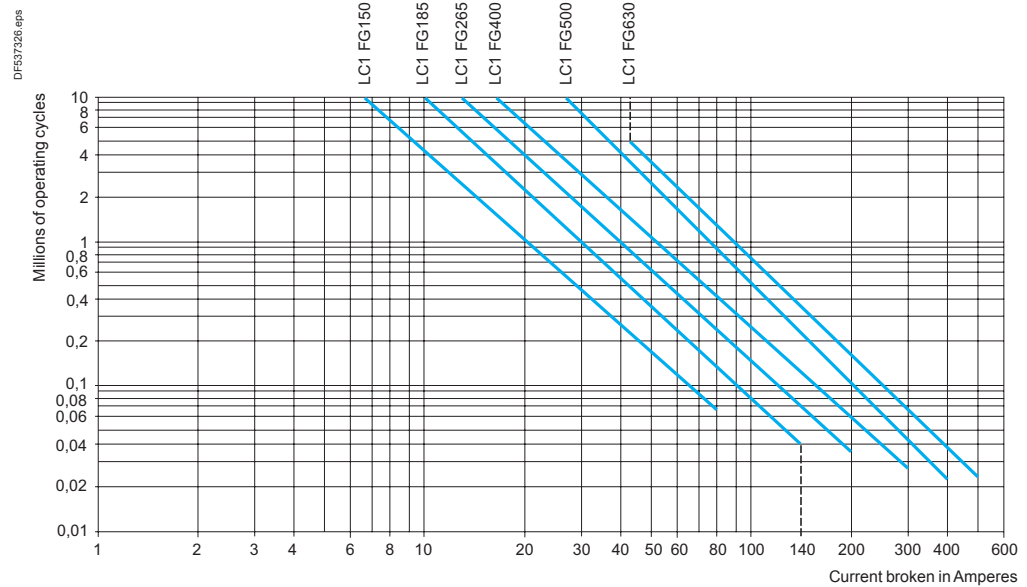
3-pole shockproof contactors LC1 FG

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:

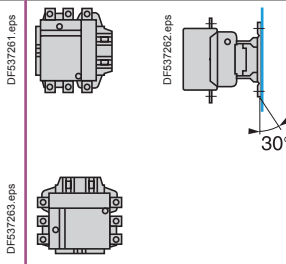
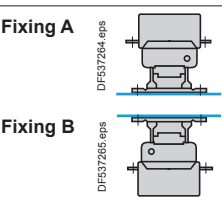
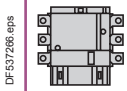
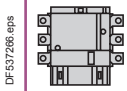
Series wound motor, breaking whilst motor running, category DC-4.
 $P = 50 \text{ kW}$, $U_e = 200 \text{ V}$, $I_e = 250 \text{ A}$.
 Select contactor **LC1 FG265** with 3 poles in series.
 The power broken is: $P_c = 0.3 U_e \times I_e = 0.3 \times 200 \times 250 = 15 \text{ kW}$.
 The electrical durability 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.

Environment			LC1 FG150	LC1 FG185
Contactor type				
Rated insulation voltage (Ui)	Conforming to IEC 60947-4-1	V	1000	
	Conforming to VDE 0110 gr C	V	1500	
Rated impulse withstand voltage (Uimp)	Coil not connected to the power circuit	kV	8	
Conforming to standards			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 Uc ⁽¹⁾	°C	-40...+70	
Maximum operating altitude	Without derating	m	3000	
Operating positions	Without derating			
				
	With derating ⁽³⁾			
Shock resistance ⁽²⁾	Not to be used			
			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 Uc).

(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

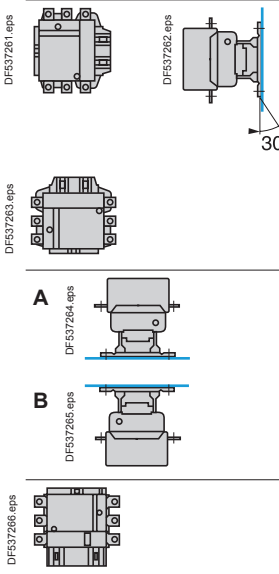
Contactors LC1		FG150	FG185	FG265	FG400	FG500	FG630
Fixing A	Pull-in	75 %	75 %	75 %	80 %	80 %	80 %
	Drop-out	105 %	105 %	105 %	110 %	110 %	110 %
Fixing B	Pull-in	115 %	115 %	115 %	120 %	120 %	120 %
	Drop-out	90 %	90 %	90 %	95 %	95 %	95 %

TeSys contactors

3-pole shockproof contactors LC1 FG

Control circuit: a.c.

TeSys F

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			
			
12 g, 50 ms on the three axes: X, Y, Z			
15 g, 11 ms on the three axes: X, Y, Z			

High power contactors

TeSys F

Pole characteristics				
Contactor type			LC1 FG150	LC1 FG185
Number of poles			3	3
Rated operational current (Ie) (Ue ≤ 440 V)	In AC-3, θ ≤ 70 °C	A	150/150	185/180
	In AC-1, θ ≤ 70 °C	A	220/170	240/180
Rated operational voltage (Ue)			V	1000
Frequency limits			Hz	25 to 200
Conventional thermal current			°C	250
Rated making capacity			A	Making current: 10 x I in AC-3
Rated breaking capacity			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	A	1200	1500
	For 30 s	A	700	920
	For 1 mn	A	600	740
	For 3 mn	A	450	500
	For 10 mn	A	350	400
Fuse protection against short-circuits (U ≤ 440 V)	Motor circuit (type aM)	A	160	200
	With thermal overload relay (type gG)	A	200	315
	gG fuses	A	250	315
Average impedance per pole			mΩ	0.35
Power dissipation per pole for the above operational currents	AC-3	W	8	12
	AC-1	W	22	25
Cabling Minimum c.s.a.	Bar	No. of bars	2	2
		Bar	mm	25 x 3
		Cable with lug	mm ²	120
		Cable with connector	mm ²	120
		Bolt diameter	mm	Ø8
Tightening torque			N.m	18

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

TeSys contactors

3-pole shockproof contactors LC1 FG

Control circuit: a.c.

TeSys F

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 in AC-3			
Making and breaking current: 8 x I 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	–	–	–
Ø10	Ø10	Ø10	Ø12
35	35	35	58

Control circuit characteristics with LX1 coil					LC1 FG150	LC1 FG185
Contactor type				V		
Rated control circuit voltage (Uc)		50 or 60 Hz		V	48...440	
Control voltage limits (θ ≤ 55 °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	805
			40...400 Hz coil	VA	–	–
			Cos φ		0.3	0.3
		Sealed	50 Hz coil	VA	45	55
			40...400 Hz coil	VA	–	–
			Cos φ		0.3	0.3
	~ 60 Hz	Inrush	60 Hz coil	VA	660	970
			40...400 Hz coil	VA	–	–
			Cos φ		0.3	0.3
		Sealed	60 Hz coil	VA	55	66
			40...400 Hz coil	VA	–	–
			Cos φ		0.3	0.3
Heat dissipation				W	12...16	18...24
Operating time ⁽¹⁾	Closing "C"		ms	23...35	20...35	
	Opening "O"		ms	5...15	7...15	
Mechanical durability at Uc		In millions of operating cycles			10	10
Maximum operating rate at ambient temperature ≤ 55 °C		In operating cycles per hour			2400	2400
Cabling Min/max c.s.a.	Flexible cable without cable end	1 or 2 conductors	mm ²	1/4	1/4	
		1 conductor	mm ²	1/4	1/4	
	Flexible cable with cable end	1 conductor	mm ²	1/2.5	1/2.5	
		2 conductors	mm ²	1/2.5	1/2.5	
Solid cable without cable end		1 or 2 conductors	mm ²	1/4	1/4	
Tightening torque				N.m	1.2	1.2

Characteristics of the locking electromagnet (shockproof device)					LC1 FG150	LC1 FG185
Contactor type				V		
Control circuit voltage 50/60 Hz				V	48...440	48...440
Inrush consumption				VA	100	100
Maximum energisation time at Uc				ms	20	20
Maximum operating rate		In operating cycles per hour			2400	2400
Mechanical durability at Uc		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.

TeSys F

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	0.85...1.1 Uc	0.85...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 x 10 ⁶	1 x 10 ⁶	1 x 10 ⁶	1 x 10 ⁶

TeSys contactors

Auxiliary contact blocks

for 3-pole shockproof contactors LC1 FG

TeSys F

Environment					
Contact block type			LAD N	LAD T and LAD S	LAD R
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 IP2X		
Ambient air temperature around the device	Storage	°C	-60...+80		
	Operation	°C	-5...+60		
	Permissible for operation at U _c	°C	-40...+70		
Maximum operating altitude	Without derating	m	3000		
Cabling	Phillips n° 2 and Ø6 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 (U _e)	Up to	V	660							
Rated insulation voltage (U _i)	Conforming to IEC 60947-5-1	V	690							
	Conforming to UL, CSA	V	600							
Conventional thermal current (I _{th})	For ambient temperature ≤ 60 °C	A	10							
Frequency of the operational current			Hz	25...400						
Minimum switching capacity	U _{min}	V	17							
	I _{min}	mA	5							
Short-circuit protection	Conforming to IEC 60947-5-1 and VDE 0660. gG fuse	A	10							
Rated making capacity	Conforming to IEC 60947-5-1, 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						
Non-overlap time	Guaranteed between N/C and N/O contacts		ms	1.5 (on energisation and on de-energisation)						
Time delay (LAD T, R and S contact blocks) Accuracy only valid for setting range indicated on the front face	Ambient air temperature for operation	°C	-	-40...+70	-40...+70					
	Repeat accuracy		-	±2 %	±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					
Rated operational power of contacts Conforming to IEC 60947-5-1	1 million operating cycles	V	24	48	110/127	220/230	380/400	440	600	
		VA	150	300	400	480	500	500	500	
		VA	80	170	250	290	320	320	320	
		VA	30	65	90	120	130	130	130	
		VA	1200	2600	7000	13 000	15 000	13 000	9000	
Occasional making capacity			VA	1200	2600	7000	13 000	15 000	13 000	9000

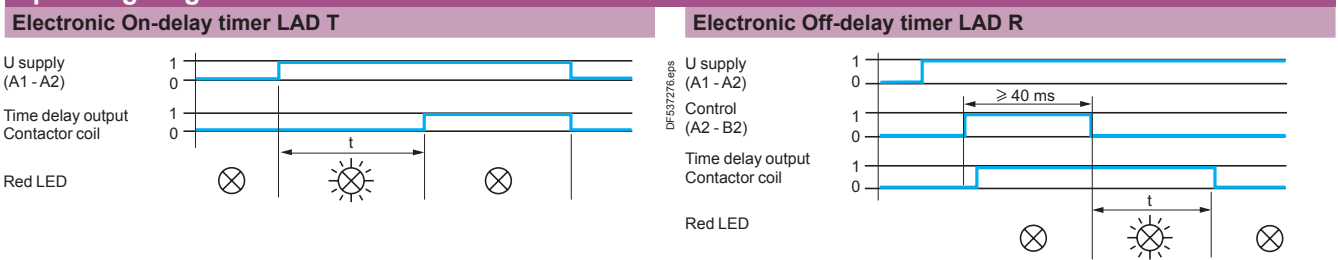
Environment				
Module type			LAD T (On-delay)	LAD R (Off-delay)
Conforming to standards			IEC 60255-5	
Product certifications			UL, CSA	
Protective treatment	Conforming to IEC 60068		"TH"	
Degree of protection	Conforming to VDE 0106		Protection against direct finger contact IP2X	
Ambient air temperature around the device	Storage	°C	-40...+80	
	Operation	°C	-25...+55	
	For operation at U_c	°C	-25...+70	
Rated insulation voltage (U_i)	Conforming to IEC 60947-1	V	250	
Cabling	Phillips n° 2 and Ø6 mm. Flexible or solid cable with or without cable end	mm ²	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		By varistor	By varistor
	Contactor coil suppression		By varistor	By bidirectional peak limiting diode
Rated control circuit voltage (U_c)		V	~ or ~- 24...250	~ 24...250
Permissible variation			0.8...1.1 U_c	0.8...1.1 U_c
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	During time delay period	ms	150	225
	After time delay period	ms	50	-
Immunity to microbreaks	During time delay period	ms	10	20
	After time delay period	ms	2	-
Minimum impulse duration		ms	-	40
Time delay signalling	By LED		Illuminates during time delay period	Illuminates during time delay period

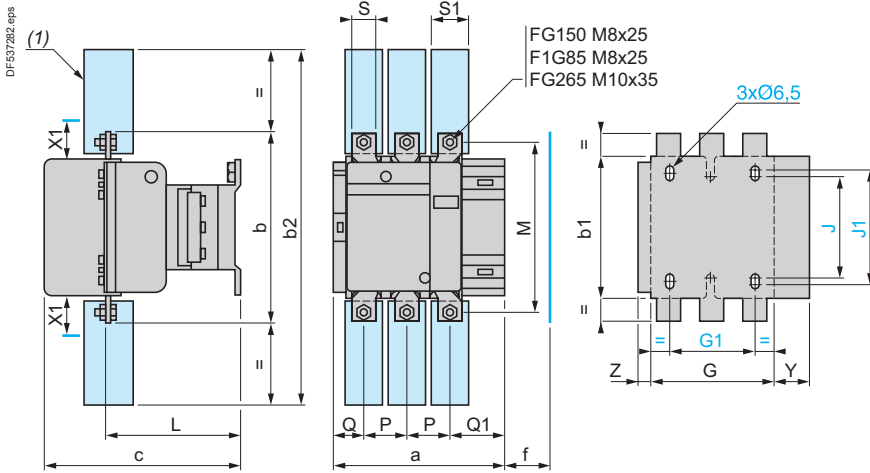
Switching characteristics (solid state type)				
Module type			LAD T (On-delay)	LAD R (Off-delay)
Maximum power dissipated		W	2	3.5
Leakage current		mA	< 5	< 5
Residual voltage		V	3.3	3.3
Overvoltage protection			3 kV; 0.5 joule	3 kV; 0.5 joule
Electrical durability	In millions of operating cycles		30	30

Operating diagrams



Dimensions

LC1 FG150, FG185 and FG265



X1 (mm) = Minimum electrical clearance according to operating voltage and breaking capacity.

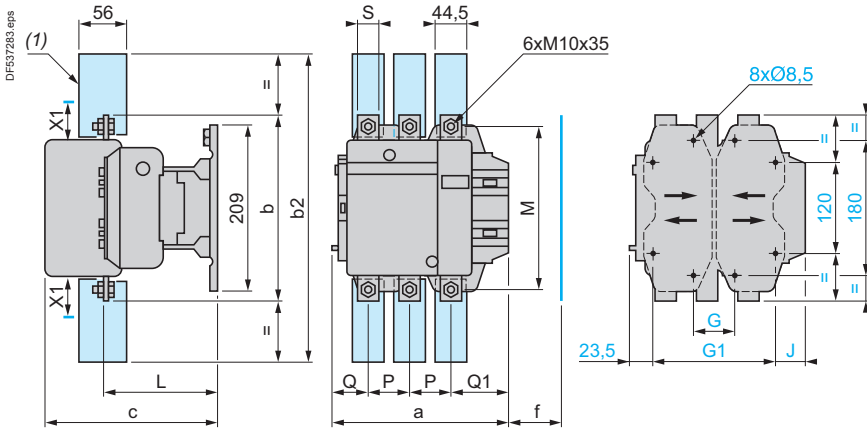
LC1	200...500 V	600...1000 V
FG150	10	15
FG185	10	15
FG265	10	15

(1) Power terminal protection shroud (see page B9/14).

LC1	a	b	b1	b2	c	f	G	G1	J	J1	L	M	P	Q	Q1	S	S1	Y	Z
FG150	181	170	137	301	180	131	106	80	106	120	116	150	40	26	57.5	20	34	44	13.5
FG185	183.5	174	137	305	190	130	111	80	106	120	122.5	154	40	29	59.5	20	34	44	13.5
FG265	217.5	203	145	375	222	147	142	96	106	120	150	178	48	39	66.5	25	44.5	38	21.5

f = minimum distance required for coil removal.

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 B9/14).

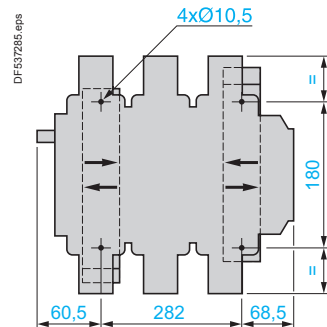
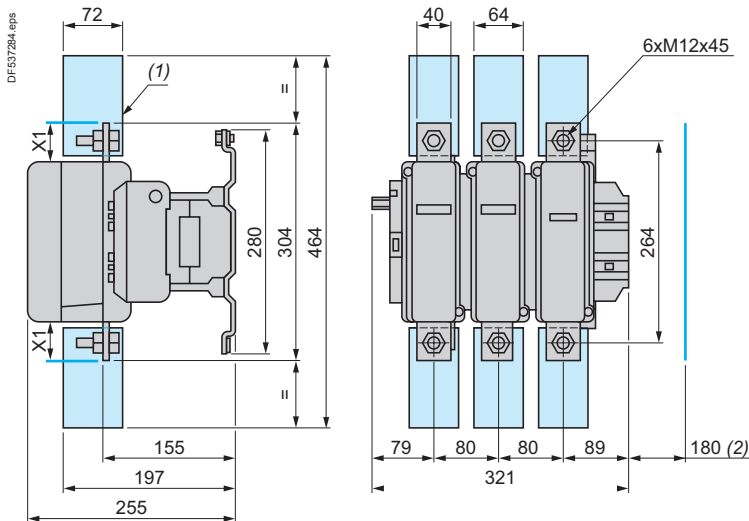
LC1	a	b	b2	c	f	G	G supplied	G min.	G max.	G1 supplied	G1 min.	G1 max.	J	L	M	P	Q	Q1	S
FG400	237	206	375	234	146	80	66	66	102	223	156	192	19.5	160	181	48	75	74	25
FG500	257	238	400	247	150	80	66	66	120	223	156	210	39.5	181	208	55	78	77	30

f = minimum distance required for coil removal.

TeSys F

Dimensions

LC1 FG630



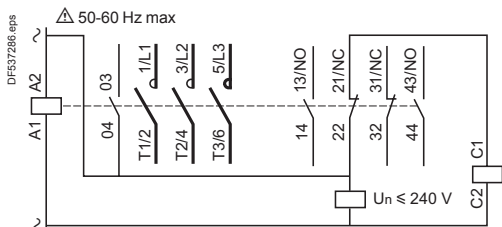
X1 (mm) = Minimum electrical clearance according to operating voltage and breaking capacity.

LC1	200...500 V	690...1000 V
FG630	20	30

- (1) Power terminal protection shroud (see page B9/14).
- (2) Minimum distance required for coil removal.

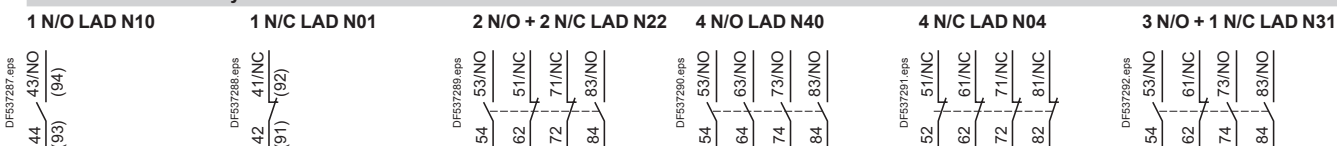
Schemes

Contactors LC1-FG150 to FG630



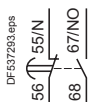
Add-on blocks

Instantaneous auxiliary contacts

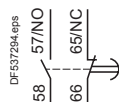


Time delay auxiliary contacts

On-delay 1 N/O + 1 N/C LAD T●

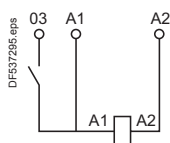


Off-delay 1 N/O + 1 N/C LAD R●



Coils ~

LX1 FF, FG, FH, FJ, FK and FL



TeSys contactors

Magnetic latching contactors

TeSys F

Magnetic latching contactors of both block and bar mounted types are fitted with a special electromagnet which enables them to remain in the "On" position when the coil is no longer energised.

Applications

The special properties of magnetic latching contactors make them suitable for a large number of applications.

Properties

- Retention of the sequence memory in automatic control equipment in the event of loss of control voltage.
- Energy saving, since the source of supply to the coil does not need to supply current when the contactor is latched in the closed state.
- Change of state from "Closed" to "Open" by current signal through the coil.
- Unaffected by mains interference.
- Utilisation of contactors beyond their breaking capacity, as operations are performed off-load.
- Contactors are silent in the latched position.

Applications

- Refineries, power stations, excitation circuits.
 - Contactors remaining in the closed state for long periods.
- Examples: refineries, power supplies, low voltage distribution.
- Selective opening control.
 - No unwanted opening and closing of the main power poles.
 - Current carrying at voltages up to 1000 Volts.

Operation of the electromagnet

CR1 F block contactors

CR1 F magnetic latching contactors are fitted with a double coil with 3 terminals comprising a latching winding and an unlatching winding. The 2 windings have a common point which can necessitate special wiring precautions when the latching supply is separate from the unlatching supply.

The power supplies may be a.c. or d.c. For d.c. operation, the polarities indicated must be complied with.

Operating precautions:

- the 2 windings must not be supplied simultaneously
- a winding must not be supplied continuously
- supply to the coils must be via pulsed contacts.

Manual opening:

if the control voltage is not present, the contactor can be unlatched manually.

CR1 B bar mounted contactors

CR1 B magnetic latching contactors are fitted with a single coil, supplied with d.c. or with a.c. through a rectifier.

Latching is obtained by direct supply of the coil in one direction of current flow.

Unlatching is obtained by a reverse current, adjusted by resistors.

Mechanical latching contactors

LC1 D block contactors

For applications using smaller contactor sizes than those described on page B9/78, it is possible to obtain the same function by the addition of a mechanical latch block type LA6 DK, which can be mounted on LC1 D contactors (see page B9/78).

TeSys contactors

Magnetic latching contactors

Selection guide for direct on-line starting of squirrel cage motors

TeSys F

Continuous or intermittent duty up to 30 operating cycles/hour																
Motor ⁽¹⁾												3-pole contactor	3-pole differential thermal overload relay		3 fuses Type	
220 V 230 V			380 V 400 V			415 V			440 V				⁽²⁾	Reference	Setting range	aM
P	In		P	In		P	In		P	In		Reference		A	Rating	A
kW	HP	A	kW	HP	A	kW	HP	A	kW	HP	A					
25	35	85	-	-	-	-	-	-	-	-	-	CR1F150	LR9F5367	60...100	100	125
30	40	103	51	70	98	55	75	100	59	80	97	CR1F150	LR9F5369	90...150	100	160
33	45	113	55	75	105	-	-	-	-	-	-	-	-	-	-	-
-	-	-	59	80	112	59	80	105	63	85	109	CR1F150	LR9F5369	90...150	125	160
-	-	-	63	85	117	63	85	115	-	-	-	-	-	-	-	-
37	50	126	75	100	138	75	100	135	75	100	125	CR1F150	LR9F5369	90...150	160	200
40	54	134	-	-	-	-	-	-	80	110	131	-	-	-	-	-
45	60	150	80	110	147	80	110	138	90	125	146	CR1F185	LR9F5369	90...150	160	200
51	70	170	90	125	170	90	125	165	100	136	162	CR1F185	LR9F5371	132...220	200	250
55	75	182	-	-	-	100	136	182	-	-	-	-	-	-	-	-
59	80	195	100	138	188	110	150	200	110	150	178	CR1F265	LR9F5371	132...220	250	315
63	85	203	110	150	205	-	-	-	129	175	209	-	-	-	-	-
75	100	240	129	175	242	129	175	230	132	180	215	CR1F265	LR9F7375	200...330	250	315
-	-	-	132	180	245	132	180	240	-	-	-	-	-	-	-	-
-	-	-	-	-	-	140	190	250	140	190	227	CR1F265	LR9F7375	200...330	315	400
80	110	260	140	190	260	147	200	260	147	200	236	CR1F400	LR9F7375	200...330	315	400
-	-	-	147	200	273	150	205	270	150	205	246	-	-	-	-	-
-	-	-	150	205	280	160	220	280	160	220	256	-	-	-	-	-
90	125	295	160	220	300	-	-	-	180	245	289	CR1F400	LR9F7375	200...330	315	400
-	-	-	-	-	-	-	-	-	185	250	295	-	-	-	-	-
100	136	325	180	245	333	180	245	320	200	270	321	CR1F400	LR9F7379	300...500	400	500
110	150	356	185	250	342	185	250	325	220	300	353	-	-	-	-	-
-	-	-	200	270	370	200	270	340	250	340	401	CR1F400	LR9F7379	300...500	400	500
-	-	-	-	-	-	220	300	385	-	-	-	-	-	-	-	-
129	175	420	220	300	408	-	-	-	257	350	412	CR1F500	LR9F7379	300...500	500	630
132	180	425	250	340	460	250	340	425	280	380	450	CR1F500	LR9F7381	380...630	500	630
140	190	450	-	-	-	257	350	450	-	-	-	-	-	-	-	-
147	200	472	-	-	-	-	-	-	295	400	473	CR1F500	LR9F7381	380...630	500	630
-	-	-	257	350	475	280	380	475	300	410	481	CR1F630	LR9F7381	380...630	500	630
-	-	-	-	-	-	295	400	500	-	-	-	-	-	-	-	-
150	205	483	280	380	510	300	410	510	315	430	505	CR1F630	LR9F7381	380...630	630	800
160	220	520	295	400	546	315	430	535	335	450	518	-	-	-	-	-
180	245	578	300	410	565	335	450	550	355	480	549	CR1F630	LR9F7381	380...630	630	800
185	250	595	315	430	584	355	480	580	375	500	575	-	-	-	-	-
200	270	626	335	450	620	375	500	610	400	454	611	CR1F630	LR9F7381	380...630	800	1000
220	*	700	355	*	635	400	*	650	425	*	650	CR1BL33	-	500...800	800	1000
-	-	-	375	*	670	425	*	690	445	*	680	-	-	-	-	-
-	-	-	400	*	710	445	*	730	450	*	690	-	-	-	-	-
-	-	-	-	-	-	450	*	740	475	*	730	-	-	-	-	-
250	*	800	425	*	760	475	*	780	500	*	780	CR1BM33	-	500...800	800	1000
257	*	826	445	*	790	500	*	820	530	*	825	CR1BM33	-	630...1000	1000	1250
280	*	900	450	*	800	530	*	870	560	*	870	-	-	-	-	-
295	*	948	475	*	850	560	*	920	600	*	920	-	-	-	-	-
300	*	980	500	*	900	600	*	978	630	*	965	-	-	-	-	-
315	*	990	530	*	950	-	-	-	-	-	-	-	-	-	-	-

(1) The ratings are for standard 220/230 V, 380/400 V, 415 or 440 V motors. The overload relays should preferably be set to the motor full-load current shown on the motor rating plate. For other power ratings, select the overload relay with the appropriate range; the associated contactor and fuses must have ratings equal to or immediately greater than In.

(2) Reference to be completed, see page B9/79.

* There are no standard power ratings for these motors.

High power contactors

TeSys contactors

Magnetic latching contactors

Selection guide for utilisation category AC-3

TeSys F

Rated operational current in AC-3 ($\theta \leq 55^\circ\text{C}$)

Contactor size		CR1	CR1	CR1	CR1	CR1	CR1	CR1	CR1	CR1	CR1
		F150	F185	F265	F400	F500	F630	BL	BM	BP	BR
440 V	A	150	185	265	400	500	630	750	1000	1500	1800
500 V	A	135	175	245	385	500	540	750	900	1200	1500
660/690 V	A	130	140	230	365	435	470	700	800	900	1100
1000 V	A	47	73	95	135	270	330	400	400	500	600

Rated operational power (standard motor power ratings)

220...240 V	kW	40	55	75	110	147	200	220	280	425	500
	HP	54	75	100	150	200	270	300	380	580	680
380...400 V	kW	75	90	132	200	250	335	400	500	750	900
	HP	100	185	180	270	340	450	545	680	1000	1220
415 V	kW	80	100	140	220	280	375	425	530	800	900
	HP	110	136	180	300	380	500	580	720	1100	1220
440 V	kW	80	100	140	250	295	400	450	560	800	900
	HP	110	136	190	340	400	545	610	760	1100	1220
500 V	kW	90	110	160	257	355	400	500	600	750	900
	HP	125	150	220	350	480	545	680	810	1000	1220
660/690 V	kW	100	110	160	280	335	450	560	670	750	900
	HP	–	–	–	–	–	610	760	910	1000	1220
1000 V	kW	65	100	147	185	335	450	530	530	670	750
	HP	–	136	200	250	–	610	720	720	910	1000

Maximum operating rate in operating cycles/hour, at rated operational power with an on-load factor = 85 %: 750 for CR1 F150 to F265, 500 for CR1 F400 to F630 and 120 for CR1 B.

TeSys contactors

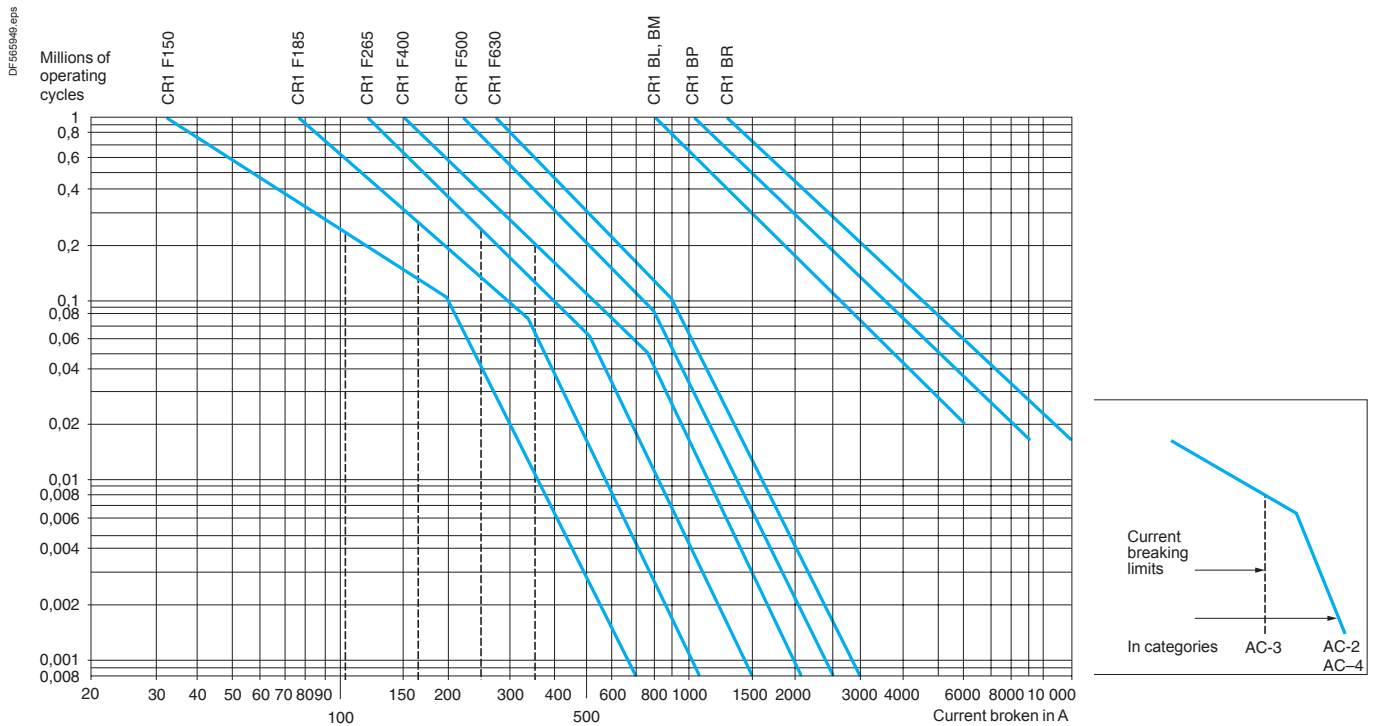
Magnetic latching contactors

Selection according to required electrical durability

TeSys F

Use in category AC-3 ($U_e \leq 440 \text{ V}$) ⁽¹⁾ ($\theta \leq 55 \text{ °C}$)

The current (I_c) in AC-3 is equal to the rated operational current (I_e) drawn by the motor.



Example:

Asynchronous motor with $P = 50 \text{ kW}$, $U_e = 380 \text{ V}$, $I_e = 100 \text{ A}$, $I_c = I_e = 100 \text{ A}$, or asynchronous motor with $P = 55 \text{ kW}$, $U_e = 415 \text{ V}$, $I_e = 100 \text{ A}$, $I_c = I_e = 100 \text{ A}$. 600000 operating cycles required.

The above selection curves show the contactor rating needed, CR1 F185.

⁽¹⁾ For 660 V, multiply the number of operating cycles by 0.8.

TeSys contactors

Magnetic latching contactors

Selection guide for utilisation category AC-1 and according to required electrical durability

TeSys F

Maximum operational current (on-load factor ≥ 0.95)

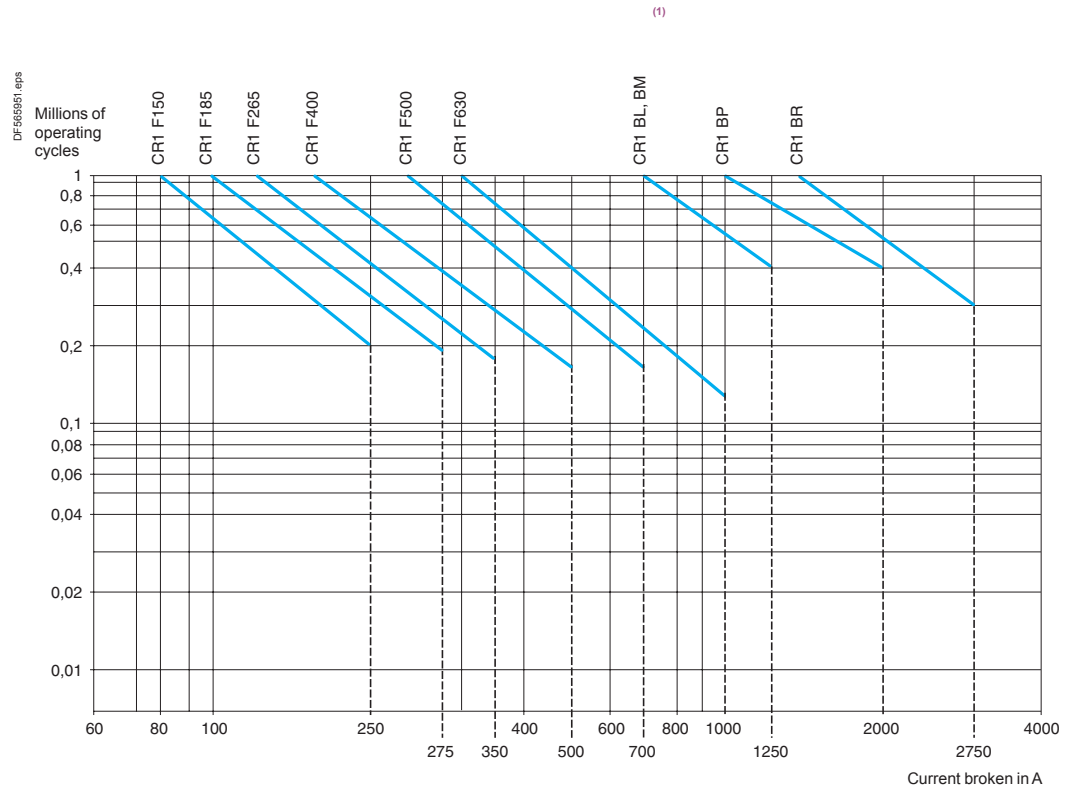
Maximum operating rate: 120 operating cycles/hour

Contactor size		CR1 F150	CR1 F185	CR1 F265	CR1 F400	CR1 F500	CR1 F630	CR1 BL	CR1 BM	CR1 BP	CR1 BR	
Cable c.s.a.	mm ²	120	150	185	-	-	-	-	-	-	-	
Number of bars		-	-	-	2	2	2	2	2	3	4	
Bar c.s.a.	mm	-	-	-	30 x 5	40 x 5	60 x 5	50 x 5	80 x 5	100 x 5	100 x 5	
Operational current in category AC-1 at ambient temperature	$\leq 40\text{ °C}$	A	250	275	350	500	700	1000	800	1250	2000	2750
	$\leq 55\text{ °C}$	A	250	275	300	430	580	850	700	1100	1750	2400
	$\leq 70\text{ °C}$	A	170	180	250	340	500	700	600	900	1500	2000

Increase in operational current by parallel connection 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 = 1.6
- 3 poles in parallel: K = 2.25
- 4 poles in parallel: K = 2.8.



Example:

Ue = 220 V - Ie = 200 A - $\theta = 40\text{ °C}$ - Ic = Ie = 200 A

600000 operating cycles required.

The above selection curves show the contactor rating needed, CR1 F400.

(1) For 660 V, multiply the number of operating cycles by 0.8.

TeSys contactors

Magnetic latching contactors

Selection guide for switching the primaries of 3-phase transformers

Operating conditions

Maximum ambient temperature: 55 °C.

Maximum operational voltage: 1000 V, 50...60 Hz.

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

The value of this current depends on:

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

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

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

Contactor selection											
Maximum operating rate: 120 operating cycles/hour											
Contactor size		CR1 F150	CR1 F185	CR1 F265	CR1 F400	CR1 F500	CR1 F630	CR1 BL	CR1 BM	CR1 BP	CR1 BR
Maximum permissible current peak at switch-on	A	1700	2800	3500	5500	6800	9000	18 000	18 000	24 000	30 000
Maximum operational power ⁽¹⁾	220...230 V	kVA 25	40	50	75	100	140	230	230	300	380
	380...400 V	kVA 50	75	90	130	170	225	400	400	530	660
	415...440 V	kVA 55	80	100	140	190	250	450	450	560	700
	500 V	kVA 65	95	110	170	225	280	480	480	600	750
	660 V	kVA 80	120	140	200	270	315	600	600	800	950
	1000 V	kVA 100	150	200	250	375	470	700	700	1000	1200

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

TeSys F

Environment						
Contactor type			CR1 F150	CR1 F185	CR1 F265	
Rated insulation voltage (Ui)	Conforming to IEC 60158-1, BS 775, 60947-4	V	1000	1000	1000	
	Conforming to VDE 0110 grC	V	1500	1500	1500	
Protective treatment	Standard version		"TH"			
	Special version		-			
Ambient air temperature around the device	Storage	°C	-60...+80			
	For operation at Uc	°C	-15...+70			
Maximum operating altitude	Without derating	m	3000			
Operating positions	Without derating		±5 °			
Pole characteristics						
Number of poles			3 or 4	3 or 4	3 or 4	
Rated operational current (Ie) (Ue ≤ 440 V)	In AC-3, θ ≤ 40 °C	A	150	185	265	
	In AC-1, θ ≤ 40 °C	A	250	275	350	
	In AC-4, θ ≤ 40 °C	A	138	170	245	
Rated operational voltage (Ue)	Up to	V	1000	1000	1000	
Frequency limits (sine wave)	Of the operational current	Hz	25...200	25...200	25...200	
Rated making capacity	I rms	A	1700	2100	2940	
Rated breaking capacity	I rms	220...440 V	A	1500	1800	2450
		500 V	A	1200	1600	2200
		660/690 V	A	1100	1200	1700
		1000 V	A	450	600	800
Permissible short time rating from cold state, with no current flowing for previous 60 minutes at θ ≤ 40 °C	For 1 s	A	1200	1500	2200	
	For 5 s	A	1200	1500	2200	
	For 10 s	A	1200	1500	2200	
	For 30 s	A	700	920	1230	
	For 1 min	A	600	740	950	
	For 3 min	A	450	500	620	
	For 10 min	A	350	400	480	
Short-circuit protection by fuses θ ≤ 440 V	Motor circuit AC-3 (type aM)	A	160	200	315	
	AC-1 circuit (type gG, BS 88)	A	250	315	400	
Average impedance per pole	At Ith and 50 Hz	mΩ	0.45	0.36	0.32	
Power dissipated per pole for the above operational currents	AC-3	W	6	12	22	
	AC-1	W	18	26	39	
Connection	Number of conductors		1	1	1	
	Cable with lugs	mm ²	120	150	240	
	Cable with connector	mm ²	120	150	240	
	Number of bars		2	2	2	
	Bar c.s.a.	mm	25 x 3	25 x 3	32 x 4	
	Bolt diameter		Ø8	Ø8	Ø10	
	Tightening torque	N.m	18	18	35	

TeSys contactors

Magnetic latching contactors

TeSys F

CR1 F400	CR1 F500	CR1 F630	CR1 BL	CR1 BM	CR1 BP	CR1 BR
1000	1000	1000	1000	1000	1000	1000
1500	1500	1500	1500	1500	1500	1500
"TH"			"TC"			
-			"TH"			
-60...+80			-60...+80			
-15...+70			-15...+60			
3000			3000			
±5 ° in relation to normal vertical mounting plane			±5 ° in relation to normal vertical mounting plane			
3 or 4	3 or 4	3 or 4	1, 2, 3 or 4	1, 2, 3 or 4	1, 2, 3 or 4	1, 2, 3 or 4
400	500	630	750	1000	1500	1800
500	700	1000	800	1250	2000	2750
370	460	560	700	800	1250	1500
1000	1000	1000	1000	1000	1000	1000
25...200	25...200	25...200	50...60	50...60	50...60	50...60
4500	5000	6740	10 000	10 000	15 000	18 000
4000	5000	6300	10 000	10 000	15 000	18 000
3500	4500	5400	9000	9000	12 000	15 000
3000	3560	4600	8000	8000	9000	11 000
1200	2500	3200	4000	4000	5000	6000
3600	4200	5050	9600	9600	12 000	15 000
3600	4200	5050	9600	9600	12 000	15 000
3600	4200	5050	7000	8000	9600	12 000
2400	3200	4400	4800	5200	6400	8000
1700	2400	3400	3500	3800	5200	6300
1200	1500	2200	2100	2400	3600	4400
1000	1200	1600	1200	1800	2800	3600
400	500	630	800	1200	800 x 2 ⁽¹⁾	1000 x 2 ⁽¹⁾
500	800	1000	800	1200	1000 x 2 ⁽¹⁾	1200 x 2 ⁽¹⁾
0.28	0.18	0.12	0.18	0.18	0.13	0.09
45	45	48	88	180	290	360
70	88	120	115	280	520	680
2	2	-	-	-	-	-
150	240	-	-	-	-	-
-	-	-	-	-	-	-
2	2	2	2	2	3	4
30 x 5	40 x 5	60 x 5	50 x 5	80 x 5	100 x 5	100 x 10
Ø10	Ø10	Ø12	4 x Ø8	4 x Ø10	4 x Ø10	4 x Ø10
35	35	58	21	35	35	35

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

TeSys F

Control circuit characteristics				CR1 F150	CR1 F185	CR1 F265	
Contactors type			V				
Rated control circuit voltage (Uc)	~ 50 or 60 Hz		V	48...415			
	~ 400 Hz		V	48...220			
	---		V	48...220			
	--- low consumption		V	48...220			
Control voltage limits ~ and ---	Latching			0.85...1.1 Uc			
	Unlatching			0.85...1.1 Uc			
Maximum operating rate at ambient temperature ≤ 40 °C	In operating cycles per hour			120			
Mechanical durability	In millions of operating cycles			1			
Average consumption 50/60 Hz	Latching	1-pole	VA	–	–	–	
		2-pole	VA	–	–	–	
		3-pole	VA	1100	1600	1650	
		4-pole	VA	100	1600	1650	
	Unlatching	1-pole	VA	–	–	–	
		2-pole	VA	–	–	–	
		3-pole	VA	7.3	8	9	
		4-pole	VA	7.3	8	9	
	400 Hz and ---	Latching	1-pole	VA	–	–	–
			2-pole	VA	–	–	–
			3-pole	VA	1260	1750	1800
			4-pole	VA	1260	1750	1800
		Unlatching	1-pole	VA	–	–	–
			2-pole	VA	–	–	–
			3-pole	VA	10	11	12
			4-pole	VA	10	11	12
--- low consumption	Latching	3/4-pole	W	500	500	500	
	Unlatching	3/4-pole	W	15	20	40	
Average operating time at Uc ⁽¹⁾	Latching		ms	35...40	35...40	45...50	
	Unlatching		ms	50...100	50...100	50...100	

(1) The closing time is measured from the moment the closing coil is energised to initial contact of the main poles. The opening time is measured from the moment the opening coil is energised to the moment the main poles separate.

Note: the arcing time depends on the circuit switched by the main poles. For 3-phase applications the arcing time is usually 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.

Auxiliary contact characteristics			
Type of contacts		LAD N for contactors CR1 F	
Conventional thermal current	A	10	
Rated insulation voltage (Ui)	Conforming to IEC 60947-5-1	V	690
Connection	Flexible or solid conductor with or without cable end	mm²	1 x 1 min; 2 x 2.5 max
Operational power of contacts LAD N for contactors CR1 F		a.c. supply	d.c. supply
		Electrical durability (valid for up to 3600 operating cycles/hour) on an inductive load such as the coil of an electromagnet: making current (cos φ 0.7) = 10 times the power broken (cos φ 0.4).	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 48 115 230 400 600	V 48 125 250 440
1 million operating cycles		VA 120 280 560 960 1440	W 90 75 68 61
Occasional making capacity		VA 2600 7000 13 000 15 000 9000	W 700 400 260 220

TeSys contactors

Magnetic latching contactors

TeSys F

CR1 F400	CR1 F500	CR1 F630	CR1 BL	CR1 BM	CR1 BP	CR1 BR
48...415			110...500			
48...220			110...500			
48...220			110...500			
48...220			–			
0.85...1.1 Uc			0.85...1.1 Uc			
0.85...1.1 Uc			0.85...1.1 Uc			
120			120			
1			1			
–	–	–	650	650	650	650
–	–	–	1100	1100	1100	1100
1450	1650	2100	1650	1650	1650	1650
1450	1650	2100	1850	1850	1850	1850
–	–	–	110	110	110	110
–	–	–	125	125	125	125
12	9.5	8	165	165	165	165
12	9.5	8	175	175	175	175
–	–	–	600	600	600	600
–	–	–	1000	1000	1000	1000
1600	1800	2300	1500	1500	1500	1500
1600	1800	2300	1700	1700	1700	1700
–	–	–	100	100	100	100
–	–	–	115	115	115	115
16	13	11	150	150	150	150
16	13	11	160	160	160	160
500	550	620	–	–	–	–
70	60	45	–	–	–	–
40...75	40...80	40...80	100...150	100...150	100...150	100...150
50...100	50...100	50...100	20...40	20...40	20...40	20...40

(1) The closing time is measured from the moment the closing coil is energised to initial contact of the main poles. The opening time is measured from the moment the opening coil is energised to the moment the main poles separate.

Note: the arcing time depends on the circuit switched by the main poles. For 3-phase applications the arcing time is usually 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.

LAD N for contactors CR1 F	ZC4 GM for contactors CR1 B
10	20
690	660
1 x 1 min; 2 x 2.5 max	2 min; 4 max

Operational power of contacts
ZC4 GM for contactors CR1 B

a.c. supply

Electrical durability (valid for up to 2400 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	110	220	380	415	500
	127			440	
VA	2000	4000	4000	4000	3500
VA	14000	23000	35000	45000	35000

d.c. supply

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	110	120	440	500
W	250	250	230	200
W	1600	800	400	360

1 million operating cycles

Occasional making capacity

TeSys contactors

Magnetic latching contactors CR1 F

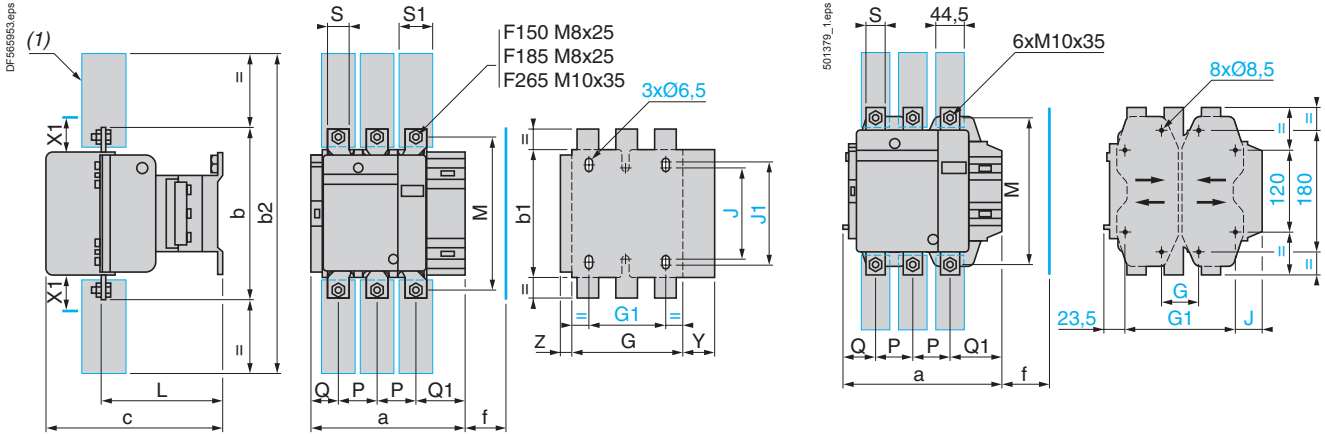
TeSys F

CR1 F150 to F500

Common side view

CR1 F150, F185, F265

CR1 F400, F500



CR1	F150		F185		F265	
	3P	4P	3P	4P	3P	4P
a	163.5	201.5	168.5	208.5	201.5	244.5
b	170	170	174	174	203	203
b1	137	137	137	137	145	145
b2	301	301	305	305	370	370
c	171	171	181	181	213	213
f	131	131	130	130	147	147
G	106	143	111	151	142	190
G1	80	80	80	80	96	96
J	106	106	106	106	106	106
J1	120	120	120	120	120	120
L	107	107	113.5	113.5	141	141
M	150	150	154	154	178	178
P	40	40	40	40	48	48
Q	26	26	29	29	39	34
Q1	57.5	55.5	59.5	59.5	66.5	66.5
S	20	20	20	20	25	25
S1	27	27	34	34	38	38
Y	44	44	38.5	30.5	30.5	21.5
Z	13.5	13.5	13.5	13.5	15.5	15.5

f = minimum distance required for coil removal.

X1: Minimum electrical clearance according to operational voltage and breaking capacity.

Voltage in V	200...500		660...1000	
	CR1 F150	CR1 F185	CR1 F265	
	10	10	15	15

(1) Power terminal protection shroud (see page B9/14).

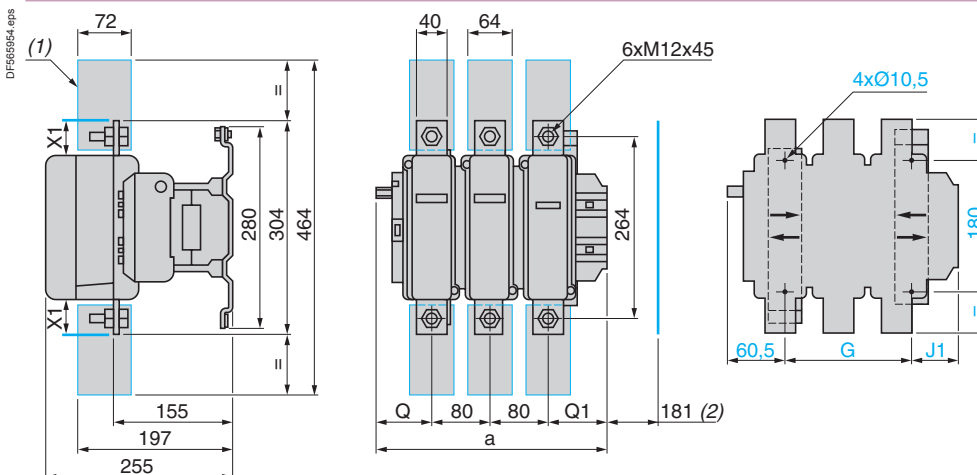
CR1	F400		F500	
	3P	4P	3P	4P
a	213	261	233	288
b	206	206	238	238
b2	375	375	400	400
c	219	219	232	232
f	146	146	150	150
G supplied	80	80	80	140
G min.	66	66	66	66
G max.	102	150	120	175
G1 supplied	170	170	170	230
G1 min.	156	156	156	156
G1 max.	192	240	210	265
J	12	60	32	27
L	145	145	146	146
M	181	181	208	208
P	48	48	55	55
Q	43	43	47	47
Q1	74	74	77	77
S	25	25	30	30

f = minimum distance required for coil removal.

X1: Minimum electrical clearance according to operational voltage and breaking capacity.

Voltage in V	200...500		660...1000	
	CR1 F400	CR1 F500		
	15	20		

CR1 F630



CR1 F630	3P		4P	
a	309	389		
G supplied	180	240		
G min.	100	150		
G max.	195	275		
J1	61	81		
Q	60	60		
Q1	89	89		
X1: Min. electrical clearance according to operational voltage and breaking capacity.				
Voltage in V		X1		
200...500		20		
690...1000		30		

(1) Power terminal protection shroud.
(2) Minimum distance required for coil removal.

TeSys contactors

Magnetic latching contactors CR1 F

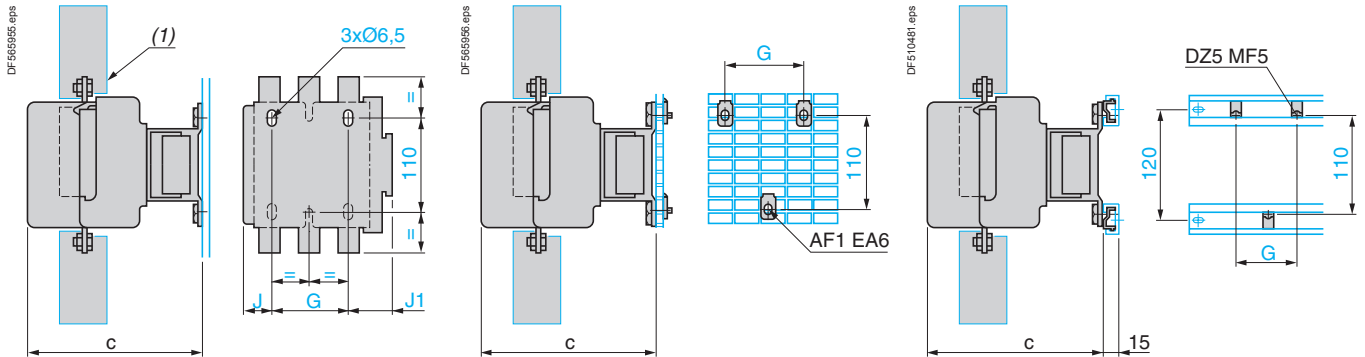
TeSys F

CR1 F150...F265

Panel mounted

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

On rails DZ5 MB on 120 mm centres



CR1	F150	F185	F265
c	3P 171	181	213
	4P 171	181	213
G	3P 80	80	96
	4P 80	80	96
J	3P 26.5	29	44.5
	4P 45	49	68.5
J1	3P 57	59.5	61.5
	4P 75.5	79.5	85.5

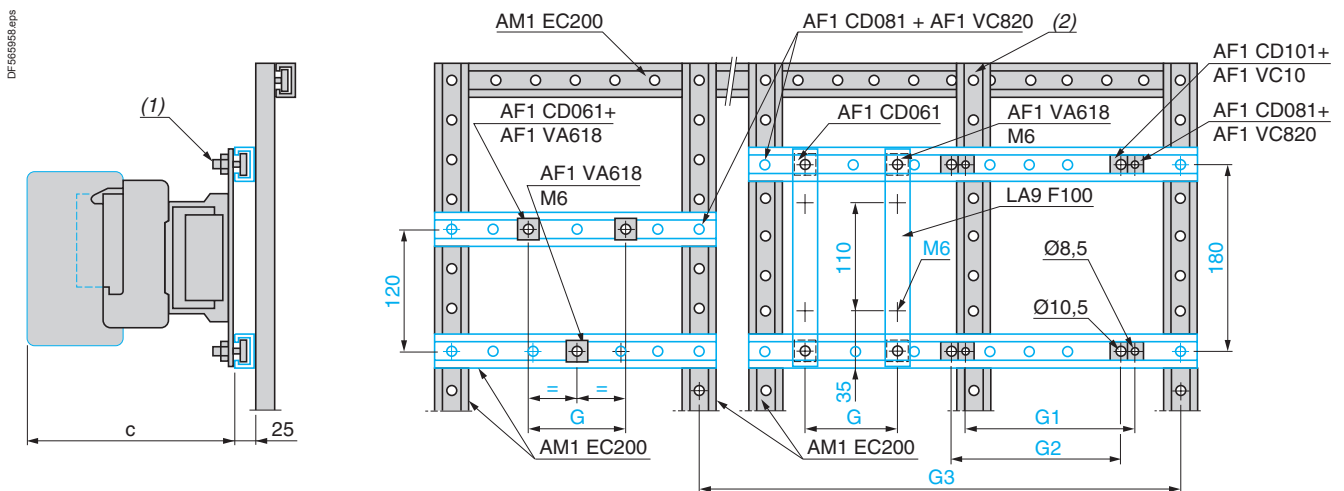
CR1	F150	F185	F265
c	3P 171	181	213
	4P 171	181	213
G	3P 80	80	96
	4P 80	80	96

CR1	F150	F185	F265
c	3P 171	181	213
	4P 171	181	213
G	3P 80	80	96
	4P 80	80	96

(1) Power terminal protection shroud (see page B9/14).

CR1 F150...F650

On 2 notched uprights AM1 EC...



CR1	F150	F185	F265	F400	F500	F630
c	3P 171	181	213	213	226	250
	4P 171	181	213	213	226	250
G (M6)	3P 80	80	96	-	-	-
	4P 80	80	96	-	-	-
G1 (Ø 8.5)	3P -	-	-	80	80	-
	4P -	-	-	80	140	-
G2 (Ø 10.5)	3P -	-	-	-	-	180
	4P -	-	-	-	-	240

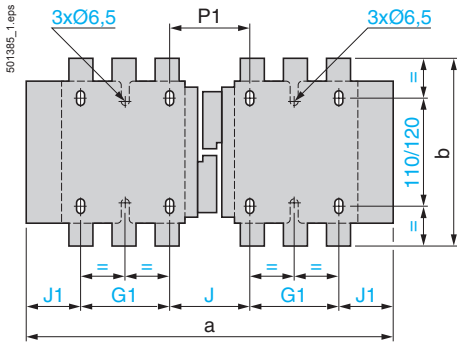
(1) AF1 CD... or AF1 VA...

(2) This AM1 EC200 upright is required when G2 or G3 is greater than 700 mm (please consult your Regional Sales Office).

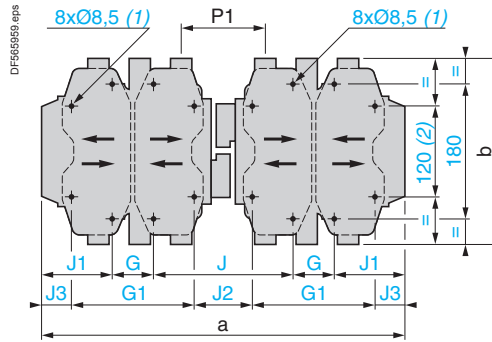
TeSys F

Reversing contactors 2 x CR1 F150...F265

Horizontally mounted



Reversing contactors 2 x CR1 F400...F630



2 x CR1		F150	F185	F265
a	3P	345	357	425
	4P	422	437	521
b	3P	170	174	203
	4P	170	174	203
G1	3P	80	80	96
	4P	80	80	96
J	3P	71	78	109
	4P	111	118	157
J1	3P	57	59.5	61.5
	4P	75.5	79.5	85.5
P1	3P	71	78	100
	4P	71	78	100

2 x CR1		F400	F500	F630
a	3P	446	485	636
	4P	542	595	796
b	3P	206	238	304
	4P	206	238	304
G	3P	80	80	180
	4P	80	140	240
G1	3P	170	170	—
	4P	170	230	—
J	3P	157	156	139
	4P	157	156	139
J1	3P	64.5	84.5	68.5
	4P	112.5	79.5	68.5
J2	3P	67	66	—
	4P	67	66	—
J3	3P	19.5	39.5	—
	4P	67.5	34.5	—
P1	3P	107	112	137
	4P	107	112	137

(1) Except F630: 4 x Ø 10.5.
 (2) Except F630: 180.

TeSys F

Reversing contactors

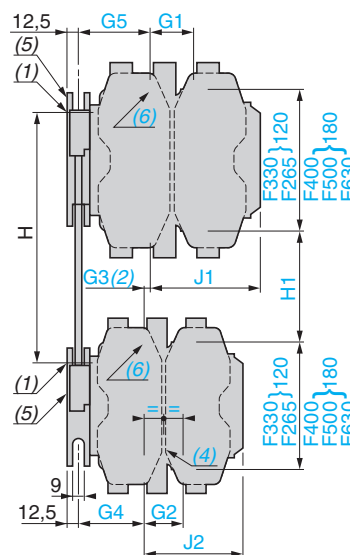
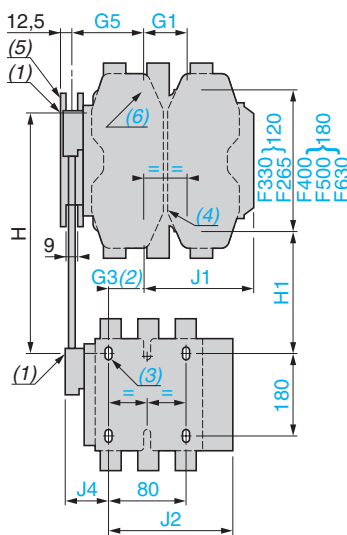
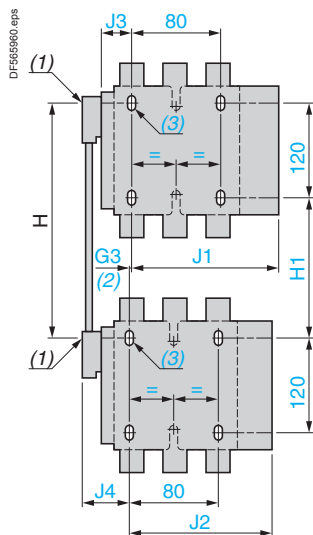
Vertically mounted with mechanical interlock **LA9 F...**

2 contactors **CR1 F** of identical or different ratings (CR1 F150...F630), see pages B9/81 and B9/81.

Assembly A

Assembly B

Assembly C



- (1) Mechanical interlock shaft.
- (2) For assembly of contactors of different ratings only.
- (3) 3 x Ø6.5 mm for CR1 F150...F265.
- (4) 3 x Ø6.5 mm for CR1 F265.
- (5) Mechanical interlock guide bracket.
- (6) 4 x Ø8.5 mm for CR1 F400, F500 or 4 x Ø10.5 mm.

Assembly type LA9 F	A			B								C									
	F4F	G4F	G4G	H4F	J4F	K4F	L4F	H4G	J4G	K4G	L4G	H4H	J4H	K4H	L4H	J4J	K4J	L4J	K4K	L4K	L4L
G1	3P	-	-	96	80	80	180	96	80	80	180	96	80	80	180	80	80	180	80	180	180
	4P	-	-	96	80	140	240	96	80	140	240	96	80	140	240	80	140	240	140	240	240
G2	3P	-	-	-	-	-	-	-	-	-	-	96	96	96	96	80	80	80	80	80	180
	4P	-	-	-	-	-	-	-	-	-	-	96	96	96	96	80	80	80	140	140	240
G3	3P	0	3	0	21	45	45	35	19	42	42	0	23	23	14	0	0	9 ⁽⁷⁾	0	9 ⁽⁷⁾	0
	4P	0	4	0	27	26	26	17	23	22	22	0	0	0	9 ⁽⁷⁾	0	0	9 ⁽⁷⁾	0	9 ⁽⁷⁾	0
G4	3P	-	-	-	-	-	-	-	-	-	-	60	60	60	60	83	83	83	83	83	74
	4P	-	-	-	-	-	-	-	-	-	-	83	83	83	83	83	83	83	83	83	74
G5	3P	-	-	-	60	83	83	74	60	83	83	60	83	83	74	83	74	83	74	83	74
	4P	-	-	-	83	83	83	74	83	83	83	83	83	83	74	83	83	74	83	74	74
H	min.	200	210	220	240	250	270	310	250	250	270	250	260	280	330	260	280	325	300	345	380
	max.	310	300	310	380	380	380	380	380	380	380	380	380	380	380	380	380	380	380	380	380
H1	min.	80	90	100	110	80	100	140	120	90	110	130	110	130	170	60	100	140	120	160	200
	max.	190	180	190	250	210	210	210	250	220	220	260	230	230	220	200	200	195	200	195	200
J1	3P	133	134	134	149.5	137	157	241	149.5	137	157	149.5	137	157	24	137	157	241	157	244	241
	4P	145	146	146	164.5	185	212	321	164.5	185	212	164.5	185	212	321	185	212	321	212	321	321
J2	3P	133	133	134	183	133	183	133	134	134	134	142.5	149.5	149.5	149.5	137	137	137	157	157	241
	4P	145	145	146	145	145	145	146	146	146	146	164.5	164.5	164.5	164.5	185	185	185	212	212	312
J3	3P	48.5	53	53	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	4P	67	73	73	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
J4	3P	48.5	54	53	48.5	48.5	48.5	48.5	53	53	53	-	-	-	-	-	-	-	-	-	-
	4P	67	69	73	67	67	67	67	73	73	73	-	-	-	-	-	-	-	-	-	-

(7) In this case, G4 is greater than G5.

High power contactors

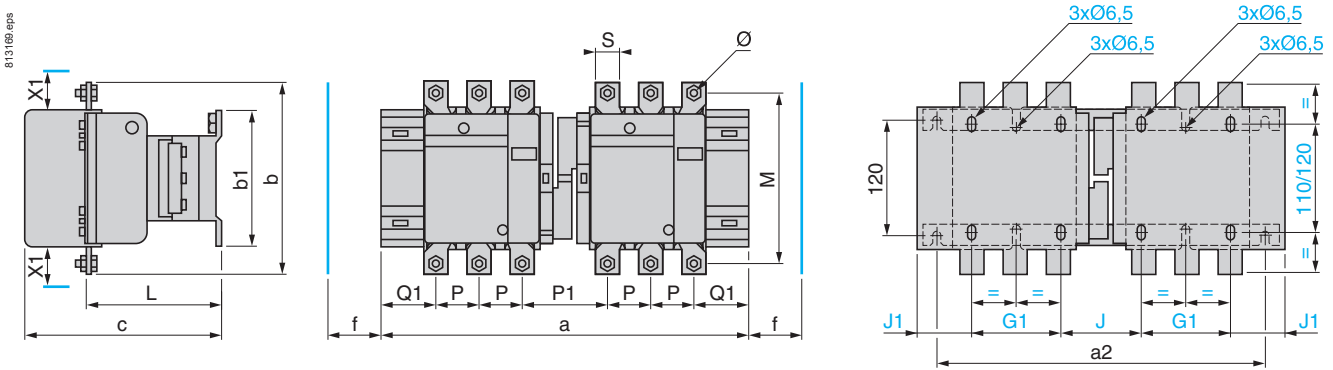
TeSys contactors

TeSys F reversing contactors and changeover contactor pairs Horizontally mounted

TeSys F

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.

Bar fixing centres
Vertical: 120 mm
Horizontal: a2 see table

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

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

TeSys contactors

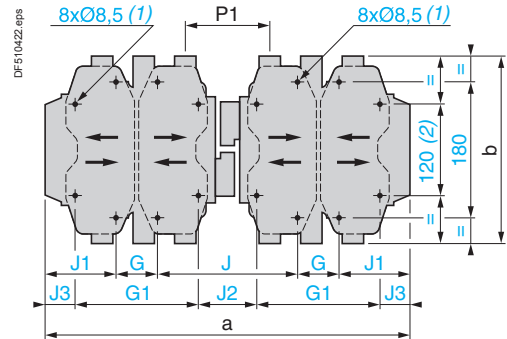
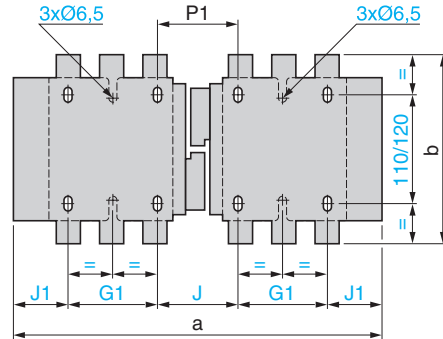
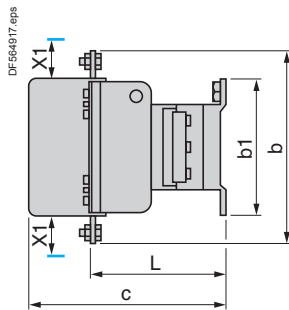
TeSys F reversing contactors and changeover contactor pairs Horizontally mounted

TeSys F

For customer assembly, fixing recommended on AM1 EC uprights, please consult your Regional Sales Office.

2 x LC1 F115 to F330

2 x LC1 F400, F500, F630, F800



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 Ø10.5.

(2) Except LC1 F630 and F800.

For other dimensions: see pages B9/54 and B9/55.

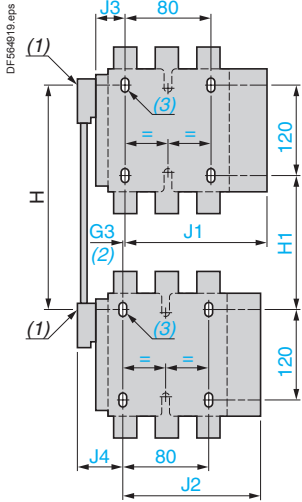
TeSys contactors

TeSys F reversing contactors and changeover contactor pairs Vertically mounted

TeSys F

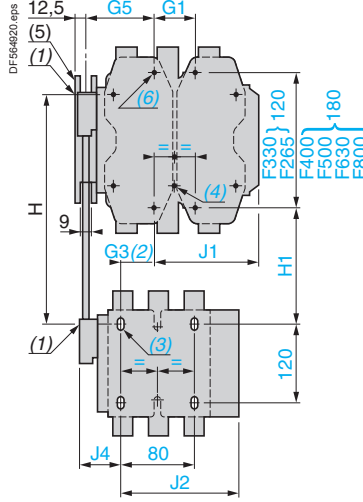
For customer assembly, with mechanical interlock (MI) **LA9 F**, fixing recommended on AM1 EC uprights (please consult your Regional Sales Office). 2 x **LC1** identical or different ratings (**LC1 F115 to F630 and F800**). See pages B9/36 to B9/39.

Assembly A



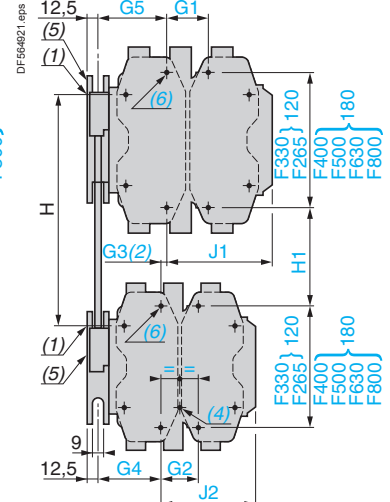
- (1) Mechanical interlock shaft.
- (2) For assembly of contactors of different ratings only.
- (3) 4 x Ø6.5 for LC1 F115 to F225.

Assembly B



- (4) 4 x Ø6.5 for LC1 F265.
- (5) Mechanical interlock guide bracket.

Assembly C



- (6) 4 x Ø8.5 for LC1 F400, F500 or 4 x Ø10.5 for LC1 F630 and F800.

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.
2 x LC1 F780

Assembly B⁽⁷⁾ - Mechanical interlock reference

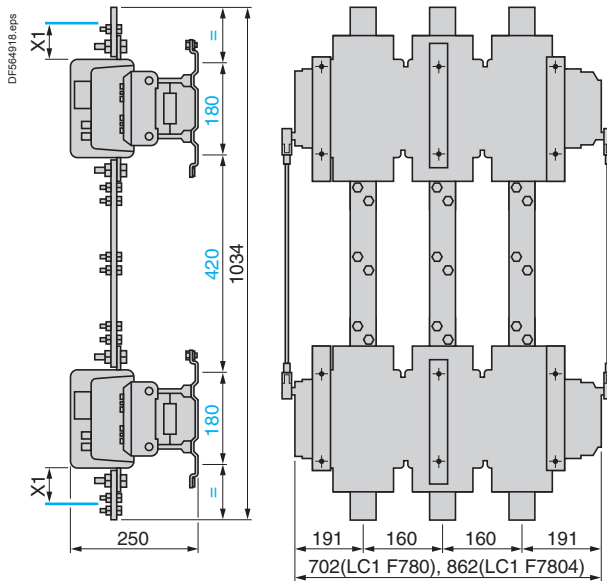
	G1 3P	G1 4P	G3 3P	G3 4P	G5 3P	G5 4P	H min.	H max.
LA9 FH4F	96	96	21	27	60	83	240	380
LA9 FJ4F	80	80	45	26	83	83	250	380
LA9 FK4F	80	140	45	26	83	83	270	380
LA9 FL4F	180	240	35	17	74	74	310	380
LA9 FH4G	96	96	19	23	60	83	250	380
LA9 FJ4G	80	80	42	22	83	83	250	380
LA9 FK4G	80	140	42	22	83	83	270	380
LA9 FL4G	180	240	33	13	74	74	310	380

	H1 min.	H1 max.	J1 3P	J1 4P	J2 3P	J2 4P	J4 3P	J4 4P
LA9 FH4F	110	250	157.5	181.5	137	155.5	48.5	67
LA9 FJ4F	80	210	144.5	192.5	137	155.5	48.5	67
LA9 FK4F	100	210	164.5	219.5	137	155.5	48.5	67
LA9 FL4F	140	210	248.5	328.5	137	155.5	48.5	67
LA9 FH4G	120	250	157.5	181.5	139.5	159.5	53	73
LA9 FJ4G	90	220	144.5	192.5	139.5	159.5	53	73
LA9 FK4G	110	220	164.5	219.5	139.5	159.5	53	73
LA9 FL4G	150	220	248.5	328.5	139.5	159.5	53	73

Assembly C⁽⁷⁾

	G1 3P	G1 4P	G2 3P	G2 4P	G3 3P	G3 4P	G4 3P	G4 4P	G5 3P	G5 4P
LA9 FH4H	96	96	96	96	0	0	60	83	60	83
LA9 FJ4H	80	80	96	96	23	0	60	83	83	83
LA9 FK4H	80	140	96	96	23	0	60	83	83	83
LA9 FL4H	180	240	96	96	14	9 ⁽⁸⁾	60	83	74	74
LA9 FJ4J	80	80	80	80	0	0	83	83	83	83
LA9 FK4J	80	140	80	80	0	0	83	83	83	83
LA9 FL4J	180	240	80	80	9 ⁽⁸⁾	9 ⁽⁸⁾	83	83	74	74
LA9 FK4K	80	140	80	140	0	0	83	83	83	83
LA9 FL4K	180	240	80	140	9 ⁽⁸⁾	9 ⁽⁸⁾	83	83	74	74
LA9 FL4L	180	240	180	240	0	0	74	74	74	74

	H min.	H max.	H1 min.	H1 max.	J1 3P	J1 4P	J2 3P	J2 4P
LA9 FH4H	250	380	130	260	157.5	181.5	157.5	181.5
LA9 FJ4H	260	380	110	230	144.5	192.5	157.5	181.5
LA9 FK4H	280	380	130	230	164.5	219.5	157.5	181.5
LA9 FL4H	330	380	170	220	248.5	328.5	157.5	181.5
LA9 FJ4J	260	380	60	200	144.5	192.5	144.5	192.5
LA9 FK4J	280	380	100	200	164.5	219.5	144.5	192.5
LA9 FL4J	325	380	140	195	248.5	329.5	144.5	192.5
LA9 FK4K	300	380	120	200	164.5	329.5	164.5	219.5
LA9 FL4K	345	380	160	195	248.5	328.5	164.5	219.5
LA9 FL4L	380	380	200	200	248.5	328.5	248.5	328.5



X1 and fixings, see page B9/84.

- (7) Only 3P for F800.
- (8) In this case, G4 is greater than G5.

TeSys contactors

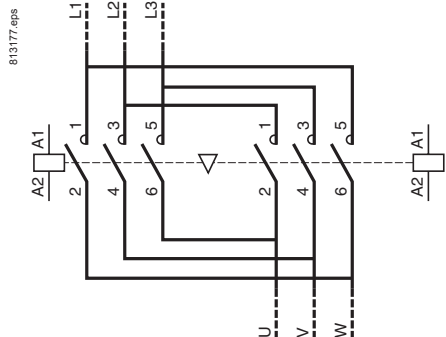
TeSys F reversing contactors and changeover contactor pairs

TeSys F

Reversing contactors for motor control LC2 F

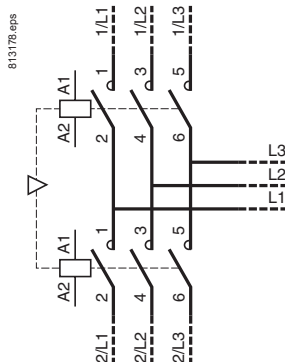
2 x LC1 F

Horizontally mounted



2 x LC1 F

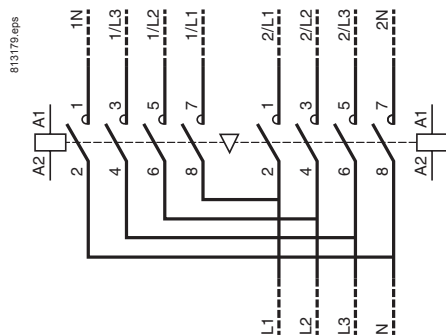
Vertically mounted



Changeover contactor pairs for distribution LC2 F

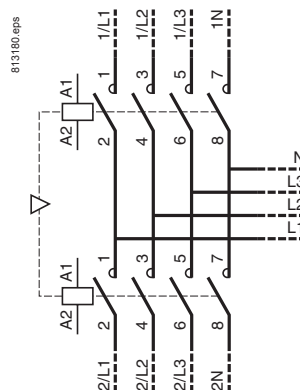
2 x LC1 F

Horizontally mounted



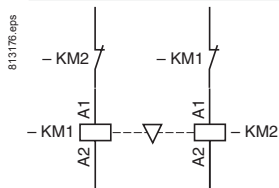
2 x LC1 F

Vertically mounted



Electrical interlocking of reversers fitted with mechanical interlock without integral electrical contacts

LA9 F



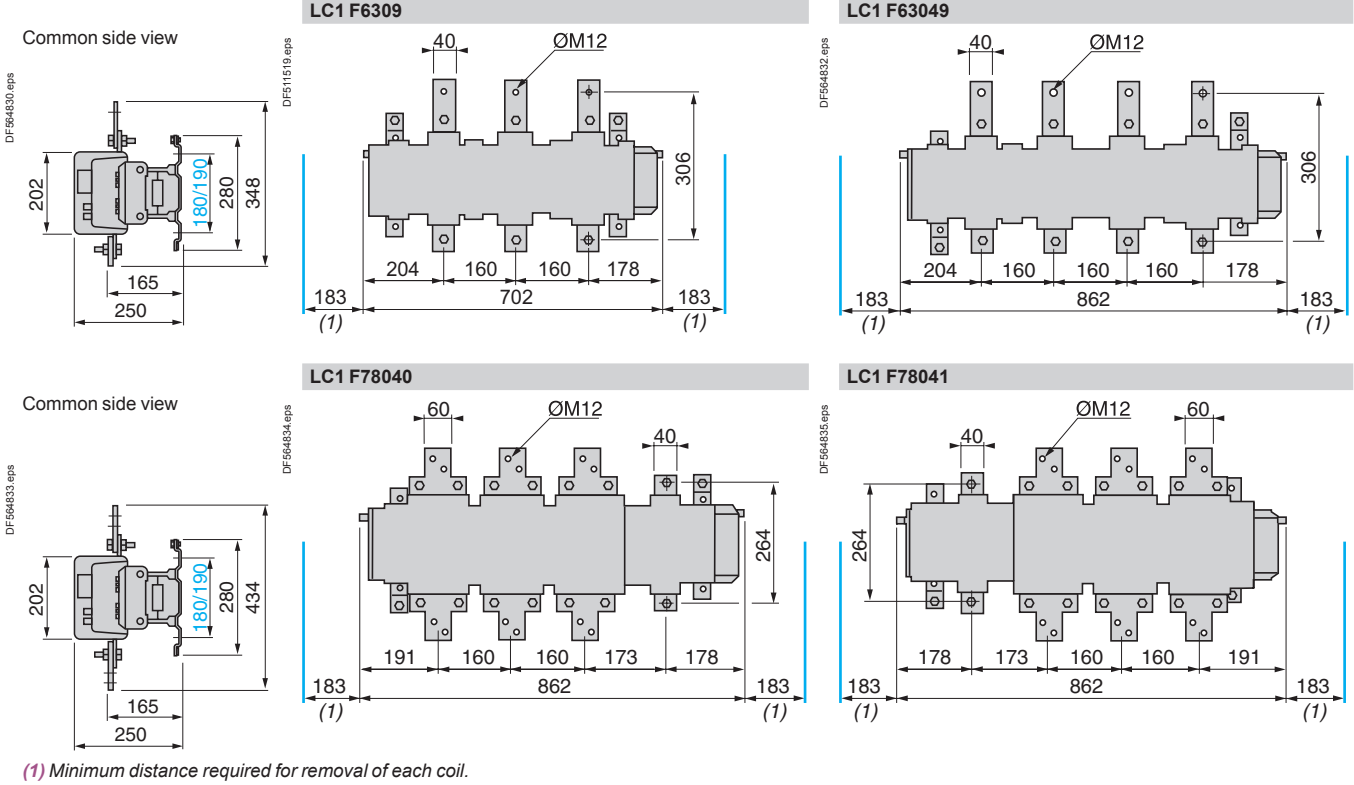
TeSys contactors

High power changeover contactor pairs for distribution

TeSys F

Dimensions

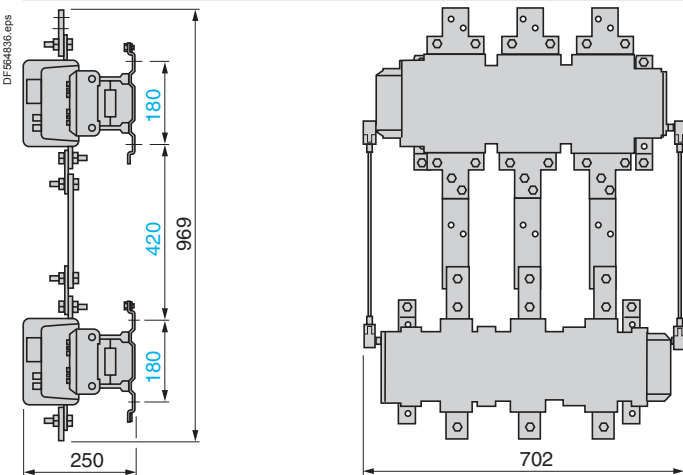
Contactor used to assemble high power changeover contactor pairs LC1 F780: see page B9/43



3-phase changeover contactor pairs

LC1 F780 + LC1 F780 + LA9 FX970: see page B9/43

LC1 F780 + LC1 F6309 + LA9 FX970



TeSys contactors

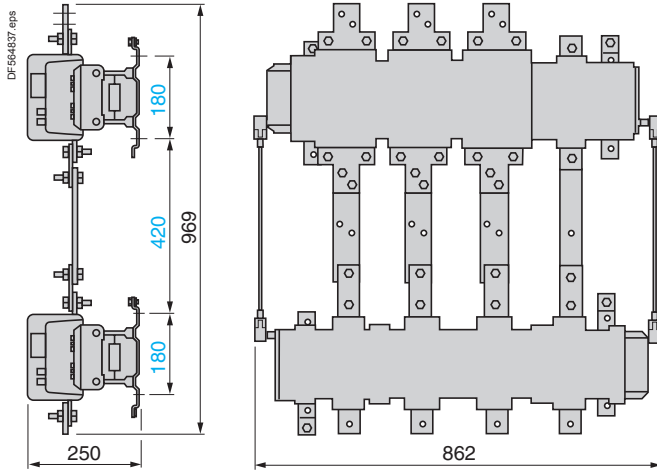
High power changeover contactor pairs
for distribution

TeSys F

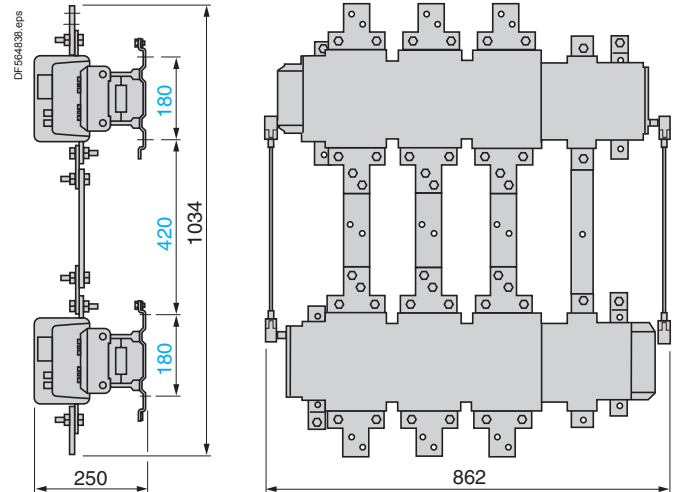
Dimensions

3-phase + neutral changeover contactor pairs

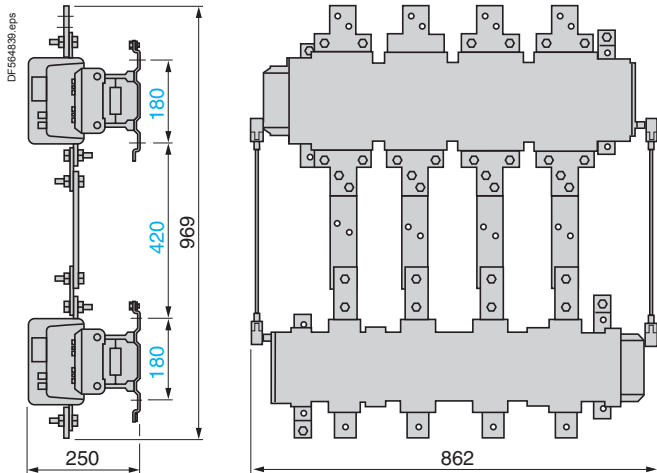
LC1 F78041 + LC1 F63049 + LA9 FX970



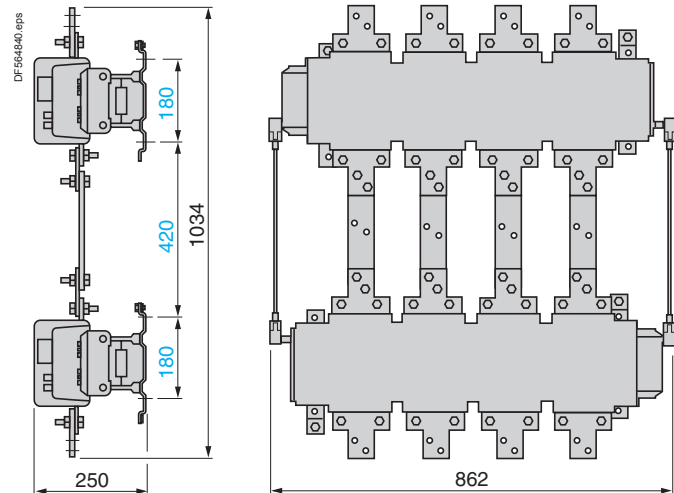
LC1 F78041 + LC1 F78040 + LA9 FX970



LC1 F7804 + LC1 F63049 + LA9 FX971

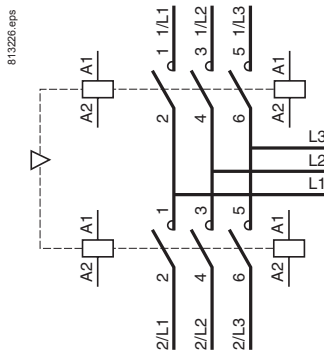


LC1 F7804 + LC1 F7804 + LA9 FX971



Schemes

3-phase changeover contactor pairs



3-phase + neutral changeover contactor pairs

