

Contactors Overload Relays & Accessories



SHAMROCK CONTROLS

RoHS
Compliant

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Contents

T - Range

3 & 4 Pole Contactors with AC/DC operating coil - Characteristics ..	2-3
Contactor Selection Guide	4
3 & 4 Pole Contactors with AC operating coil - Specifications	5
3 & 4 Pole Contactors with DC operating coil - Specifications	6
Accessories, Spare Coils	7
Contactors' Dimensions with AC operating coil	8
Contactors' Dimensions with DC operating coil	9
Control Relays - Characteristics	10
Control Relays - Selection / Dimensions	11
Synopsis - Contactors	12-13

F - Range

3 & 4 Pole Contactors - Characteristics	14
Contactor Selection Guide	15
Contactors' Specifications, Spare Coils	16
Accessories, Spares	17
Contactors' Dimensions with AC/DC operating coil.....	18-21
Synopsis - Contactors	22-23

T & F - Range

Auxiliary Contacts, Time Delay Blocks & Accessories, Spares	24-25
T-Range Overload Relays - Characteristics.....	26
Overload Relays - Specifications	27
Overload Relays Dimensions, Tripping Curves	28

T - Range

3 & 4 Pole Contactors with AC operating coil Characteristics

General Characteristics

Type	Unit	TC1-D09 ~ TC1-D95
Rated insulation voltage (Ui)	(Conforming to IEC 158-1)	V 750
	VDEO 110grC/IEC 60947-4	V 1000
Conforming to standards		NFC63-110, VDE0660, BS5424, JEM1038 & IEC60947-4
Approvals		UL, CSA
Degree of Protection	Conforming to VDE 0106	Protection against direct finger contacts
Protective treatment	Standard version	"TH"
Ambient air temperature (around the device)	Storage	°C -60 to +80
	Operation	°C -5 to +55 (0.8 to 1.1Uc)
	Permissible	°C -40 to +70, for operation at Uc
Maximum operating altitude	Without derating	Mtr. 3000
Operating Position	Without derating	±30° possible, in relation to normal vertical mounting plane

Pole Characteristics

Type	TC1-	Unit	D 09	D 12	D 18	D 22	D 25	D 32	D 38	D 40	D 50	D 65	D 80	D 95			
Number of poles																	
Power + Auxiliary			4	4	-	-	4	-	-	4	-	4	4	4			
			α	α	-	-	α	-	-	α	-	α	α	α			
			3+1	3+1	3+1	3+1	3+1	3+1	3+1	3+2	3+2	3+2	3+2	3+2			
Rated current (Ie)	In AC-3 θ ≤ 55°C	A	9	12	18	22	25	32	38	40	50	65	80	95			
Rated operating Voltage	Upto	V	690	690	690	690	690	690	690	690	690	690	690	690			
Frequency limits	Of the operational current	Hz	25-400														
Rated thermal current (Ith)	θ ≤ 40°C	A	25	25	32	32	45	50	50	60	80	80	125	125			
Rated making capacity	Irms conforming to IEC-60947-4	A	250	250	300	300	450	550	550	800	900	1000	1100	1200			
Rated breaking capacity	Irms conforming to 220-440V	A	250	250	300	300	450	550	550	800	900	1000	1100	1100			
			IEC-60947-4	500V	A	175	175	250	250	400	450	450	800	900	1000	1000	1100
			660-690V	A	85	85	120	120	180	180	180	400	500	630	640	640	
Average impedance per pole	At Ith and 50Hz	Milli Ω	2.5	2.5	2.5	2.5	2	2	2	1.5	1.5	1	0.8	0.8			
Power dissipation per pole for the above operational currents	AC-3	W	0.2	0.36	0.8	0.8	1.25	2	2	2.4	3.7	4.2	5.1	7.2			

Control Circuit Characteristics

Type	Unit	TC1- D09-D22	TC1- D25-D38	TC1- D40-D65	TC1- D80-D95			
Rated control circuit voltage (Uc)	50 or 60 Hz	V	12 to 660					
Control voltage limits (θ ≤ 55°C)	50 or 60Hz Coil	Operational	0.8 - 1.1 Uc					
		Drop out	0.3 - 0.6 Uc					
		50/60Hz Coil	Operational 0.85 - 1.1 Uc at 60Hz					
Average consumption at 20°C and at Uc	AC 50 Hz	Inrush	50 Hz Coil	VA	60	90	200	200
			50/60 Hz Coil	VA	70	100	245	245
			COS φ		0.75	0.75	0.75	0.75
		Sealed	50 Hz Coil	VA	7	7.5	20	20
			50/60 Hz Coil	VA	8	8.5	26	26
			COS φ		0.3	0.3	0.3	0.3
	AC 60 Hz	Inrush	60 Hz Coil	VA	70	100	220	220
			50/60 Hz Coil	VA	70	100	245	245
			COS φ		0.75	0.75	0.75	0.75
		Sealed	60 Hz Coil	VA	7.5	8.5	22	22
			50/60 Hz Coil	VA	8	8.5	26	26
			COS φ		0.3	0.3	0.3	0.3
Average operating time at Uc	Closing time "C"	msec	12-22	15-24	20-26	20-35		
	Opening time "O"	msec	04-12	05-19	8-12	6-20		
Mechanical life Uc (mechanical durability) in millions of operating cycles	50 or 60 Hz Coil		20(16 for TC1D18)		16	10		
	50/60 Hz Coil or 50 Hz		15	12	6	4		
Maximum operating rate	In operating cycle/hour		3600	3600	3600	3600		

Integral Auxiliary Contact Characteristics

Type	Unit	TC1- D09 ~ TC1- D95
Rated thermal current (Ith)	θ ≤ 55°C	A 10
Rated operational voltage (Ue)	Upto	V 660

T - Range

3 & 4 Pole Contactors with DC operating coil Characteristics

General Characteristics

Type	Unit	TP1-D09 ~ TP1-D80
Rated insulation voltage (Ui)	(Conforming to IEC 158-1)	V 750
	VDEO 110grC/IEC 60947-4	V 1000
Conforming to standards		NFC63-110, VDE0660, BS5424, JEM1038 & IEC60947-4
Approvals		CSA, IEC
Degree of Protection	Conforming to VDE 0106	Protection against direct finger contacts
Protective treatment	Standard version	"TH"
Ambient air temperature (around the device)	Storage	°C -60 to +80
	Operation	°C -5 to +55 (0.8 to 1.1Uc)
	Permissible	°C -40 to +70, for operation at Uc
Maximum operating altitude	Without derating	Mtr. 3000
Operating Position	Without derating	±30° possible, in relation to normal vertical mounting plane

Pole Characteristics

Type	TP1-	Unit	D09	D12	D18	D22	D25	D32	D38	D40	D50	D65	D80
Number of poles													
Power + Auxiliary			4	4	-	-	4	-	-	4	-	4	4
			or 3+1	or 3+1	-	-	or 3+1	-	-	or 3+2	-	or 3+2	or 3+2
Rated current (Ie)	In AC-3 $\theta \leq 55^\circ\text{C}$	A	9	12	18	22	25	32	38	40	50	65	80
Rated operating Voltage (Ue)	Upto	V	690	690	690	690	690	690	690	690	690	690	690
Frequency limits	Of the operational current	Hz	25-400										
Rated thermal current (Ith)	$\theta \leq 40^\circ\text{C}$	A	25	25	32	32	45	50	50	60	80	80	125
Rated making capacity	Irms conforming to IEC-60947-4	A	250	250	300	300	450	550	550	800	900	1000	1100
Rated breaking capacity	Irms conforming to 220-440V	A	250	250	300	300	450	550	550	800	900	1000	1100
		A	175	175	250	250	400	450	450	800	900	1000	1000
		A	85	85	120	120	180	180	180	400	500	630	640
Average impedance per pole	At Ith and 50Hz	Milli Ω	2.5	2.5	2.5	2.5	2	2	2	1.5	1.5	1	0.8
Power dissipation per pole for AC-3 the above operational currents		W	0.2	0.36	0.8	0.8	1.25	2	2	2.4	3.7	4.2	5.1

Control Circuit Characteristics

Type	Unit	TP1-D09~D22	TP1-D25~D38	TP1-D4011~D65	TP1-D80	
Rated control circuit voltage (Uc)	DC	V	12 to 660	12 to 660		
Control voltage limits ($\theta \leq 55^\circ\text{C}$)	Operational	Standard Coil	0.8 - 1.1 Uc	0.85 - 1.1 Uc		
		Wide Range Coil	0.7 - 1.25 Uc	0.75 - 1.25 Uc		
Average consumption DC at 20°C and at Uc	Drop out		0.1 - 0.25 Uc	0.1 - 0.3 Uc		
		DC	Inrush	W 9	11	22
			Sealed	W 9	11	22
Average operating time at Uc	Closing time "C"	msec	40-48	52-64	85-110	
	Opening time "O"	msec	6-14	8-14	20-35	
Mechanical life Uc (mechanical durability)	In millions of operating cycles		30	25	20	
Maximum operating rate (at ambient temp. of $\theta \leq 55^\circ\text{C}$)	In operating cycle/hour		3600	3600	3600	

Integral Auxiliary Contact Characteristics

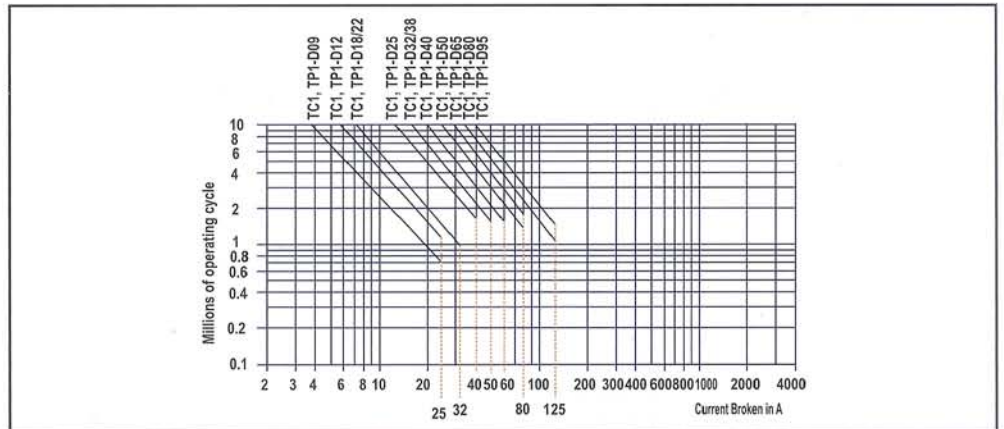
Type	Unit	TP1- D09 ~ TP1- D80
Rated thermal current (Ith)	$\theta \leq 40^\circ\text{C}$	A 10
Rated operational voltage (Ue)	Upto	V 660

T - Range

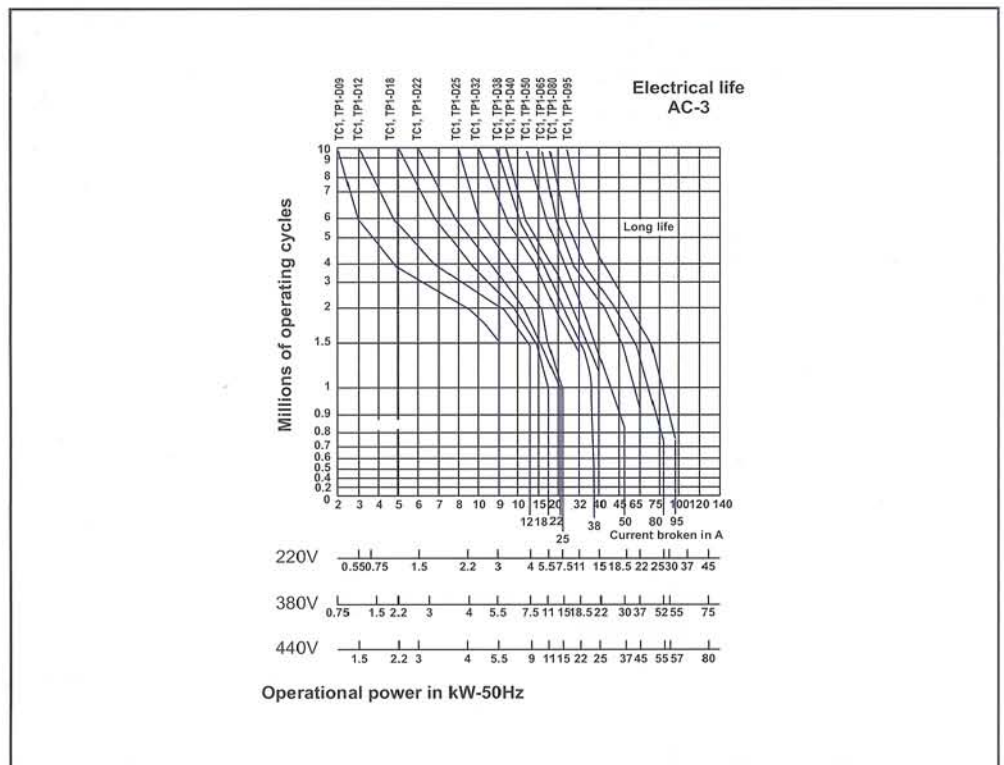
Contactors Selection Guide

(according to the required electrical life)

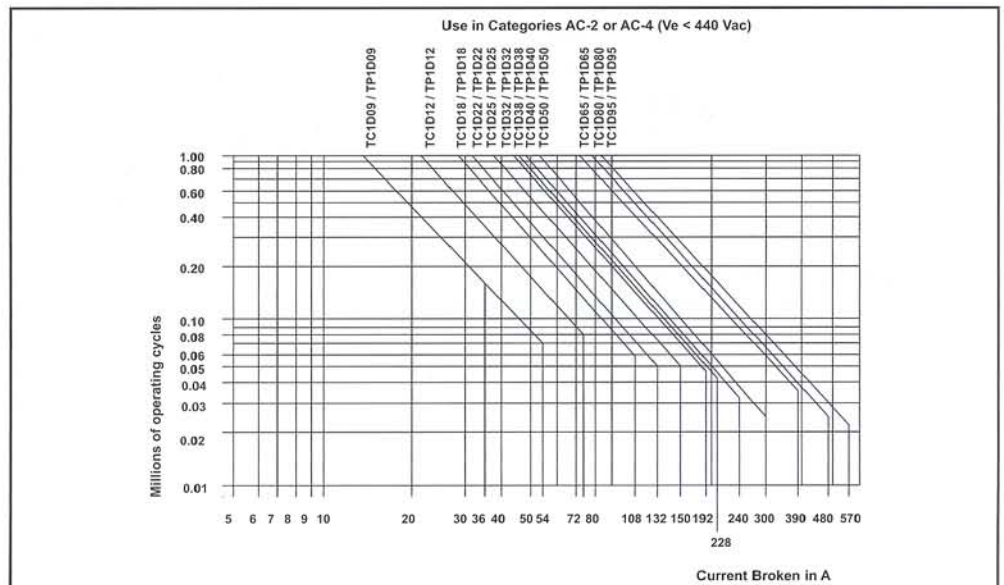
Use in Category AC-1 ($U_e \leq 440V$). Control of resistive circuits ($\cos \phi \geq 0.95$). The current broken (I_b) in category AC-1 is equal to the current (I_e) normally drawn by the load.



Use in Category AC-3 ($U_e \leq 440V$). Control of 3-phase asynchronous squirrel cage motors with breaking whilst motor running. The current broken (I_b) in category AC-3 is equal to the current (I_e) normally drawn by the load.



Use in Categories AC-2, AC-4 ($U_e \leq 440V$). Control of 3-phase asynchronous squirrel cage (AC-4) or slip ring (AC-2) motors with breaking whilst motor stalled. The current broken in category AC-4 is equal to $6 \times I_e$. (I_e =rated operational current of the motor).



T - Range

3 & 4 Pole Contactors with AC operating coil Specifications

3 Pole Contactor with AC operating coil



TC1-D32●●-XX

Maximum Current		Maximum HP						Aux. Contacts Built-in per contactor		Catalog Number
Inductive	Resistive	Single Phase		Three Phase				NO	NC	
		120V	230V	200V	230V	480V	600V			
AC-3 A	AC-1 A									
9	25	0.5	1	2	2	5	7.5	1	0	TC1-D0910-XX
12	25	1	2	3	3	7.5	10	0	1	TC1-D0901-XX
18	32	1	3	5	5	10	15	0	1	TC1-D1210-XX
22	32	1	3	5	5	10	15	1	0	TC1-D1201-XX
25	40	2	3	5	7.5	15	20	0	1	TC1-D1810-XX
32	50	2	5	10	10	20	25	1	0	TC1-D1801-XX
38	50	2	5	10	10	20	25	0	1	TC1-D2210-XX
40	60	3	5	10	10	30	30	1	0	TC1-D2201-XX
50	80	3	7.5	15	15	40	40	1	1	TC1-D2510-XX
65	80	5	10	20	20	50	50	0	1	TC1-D2501-XX
80	125	7.5	15	20	25	60	60	1	0	TC1-D3210-XX
95	125	7.5	15	20	25	60	60	0	1	TC1-D3201-XX
								1	0	TC1-D3810-XX
								0	1	TC1-D3801-XX
								1	1	TC1-D4011-XX
								1	1	TC1-D5011-XX
								1	1	TC1-D6511-XX
								1	1	TC1-D8011-XX
								1	1	TC1-D9511-XX

Note : Standard Fault Ratings (UL) (SP) High Fault Ratings (UL) (100kA with class J/CC Fuse)

4 Pole Contactor with AC operating coil



TC1-D09008

Maximum Current		Maximum HP						Main Pole Configuration		Catalog Number
Inductive	Resistive	Single Phase		Three Phase				NO	NC	
		120V	230V	200V	230V	480V	600V			
AC-3 A	AC-1 A									
9	25	0.5	1	2	2	5	7.5	4	0	TC1-D09004-XX
		0.5	1	-	-	-	-	2	2	TC1-D09008-XX
12	25	1	2	3	3	7.5	10	4	0	TC1-D12004-XX
		1	2	-	-	-	-	2	2	TC1-D12008-XX
25	40	2	3	5	7.5	15	20	4	0	TC1-D25004-XX
		2	3	-	-	-	-	2	2	TC1-D25008-XX
40	60	3	5	10	10	30	30	4	0	TC1-D40004-XX
		3	5	-	-	-	-	2	2	TC1-D40008-XX
50	80	3	7.5	15	15	40	40	4	0	TC1-D50004-XX
		3	7.5	-	-	-	-	2	2	TC1-D50008-XX
65	80	5	10	20	20	50	50	4	0	TC1-D65004-XX
		5	10	-	-	-	-	2	2	TC1-D65008-XX
80	125	7.5	15	20	25	60	60	4	0	TC1-D80004-XX
		7.5	15	-	-	-	-	2	2	TC1-D80008-XX
95	125	7.5	15	20	25	60	60	4	0	TC1-D95004-XX
		7.5	15	-	-	-	-	2	2	TC1-D95008-XX

3 Pole Mechanically Interlocked Contactor with AC coil (Pre-wired)



TC2-D09●●-XX

Maximum Current		Maximum HP 3 Phase				Aux. Contacts Built-in per contactor		Catalog Number
Inductive	Resistive	3 Phase				NO	NC	
		200V	230V	480V	600V			
AC-3 A	AC-1 A							
9	25	2	2	5	7.5	0	1	TC2-D0901-XX
						1	0	TC2-D0910-XX
12	25	3	3	7.5	10	0	1	TC2-D1201-XX
						1	0	TC2-D1210-XX
18	32	5	5	10	15	0	1	TC2-D1801-XX
						1	0	TC2-D1810-XX
25	40	5	7.5	15	20	0	1	TC2-D2501-XX
						1	0	TC2-D2510-XX
32	50	10	10	20	25	0	1	TC2-D3201-XX
						1	0	TC2-D3210-XX
40	60	10	10	30	30	1	1	TC2-D4011-XX
50	80	15	15	40	40	1	1	TC2-D5011-XX
65	80	20	20	50	50	1	1	TC2-D6511-XX
80	125	20	25	60	60	1	1	TC2-D8011-XX
95	125	20	25	60	60	1	1	TC2-D9511-XX

Replace XX with voltage code from table - 1

Table-1 : XX-AC Coil Voltages

Volts AC	24	48	110	120	208	220	230	240	277	380	400	415	440	480	575	600
50 Hz	B5	E5	F5	-	-	M5	P5	U5	-	Q5	V5	N5	R5	-	-	-
60 Hz	B6	E6	F6	G6	L6	M6	-	U6	W6	Q6	-	-	R6	T6	S6	X6
50/60 Hz	B7	E7	F7	G7	-	M7	P7	U7	-	Q7	V7	N7	R7	-	-	-

T - Range

3 & 4 Pole Contactors with DC operating coil Specifications

3 Pole Contactor with DC operating coil



TP1-D32●●-XX

Maximum Current		Maximum HP						Aux. Contacts Built-in per contactor		Catalog Number
Inductive	Resistive	Single Phase		Three Phase				NO	NC	
AC-3 A	AC-1 A	120V	230V	200V	230V	480V	600V			
9	25	0.5	1	2	2	5	7.5	1	0	TP1-D0910-XX
								0	1	TP1-D0901-XX
12	25	1	2	3	3	7.5	10	1	0	TP1-D1210-XX
								0	1	TP1-D1201-XX
18	32	1	3	5	5	10	15	1	0	TP1-D1810-XX
								0	1	TP1-D1801-XX
25	40	2	3	5	7.5	15	20	1	0	TP1-D2510-XX
								0	1	TP1-D2501-XX
32	50	2	5	10	10	20	25	1	0	TP1-D3210-XX
								0	1	TP1-D3201-XX
40	60	3	5	10	10	30	30	1	1	TP1-D4011-XX
50	80	3	7.5	15	15	40	40	1	1	TP1-D5011-XX
65	80	5	10	20	20	50	50	1	1	TP1-D6511-XX
80	125	7.5	15	20	25	60	60	1	1	TP1-D8011-XX

Note : Standard Fault Ratings (UL) (SF) High Fault Ratings (UL) (100kA with Fuse of class J/CC)

4 Pole Contactor with DC operating coil



TP1-D0900●-XX

Maximum Current		Maximum HP						Main Pole Configuration		Catalog Number
Inductive	Resistive	Single Phase		Three Phase				NO	NC	
AC-3 A	AC-1 A	120V	230V	200V	230V	480V	600V			
9	25	0.5	1	2	2	5	7.5	4	0	TP1-D09004-XX
		0.5	1	-	-	-	-	2	2	TP1-D09008-XX
12	25	1	2	3	3	7.5	10	4	0	TP1-D12004-XX
		1	2	-	-	-	-	2	2	TP1-D12008-XX
25	40	2	3	5	7.5	15	20	4	0	TP1-D25004-XX
		2	3	-	-	-	-	2	2	TP1-D25008-XX
40	60	3	5	10	10	30	30	4	0	TP1-D40004-XX
		3	5	-	-	-	-	2	2	TP1-D40008-XX
50	80	3	7.5	15	15	40	40	4	0	TP1-D50004-XX
		3	7.5	-	-	-	-	2	2	TP1-D50008-XX
65	80	5	10	20	20	50	50	4	0	TP1-D65004-XX
		5	10	-	-	-	-	2	2	TP1-D65008-XX
80	125	7.5	15	20	25	60	60	4	0	TP1-D80004-XX
		7.5	15	-	-	-	-	2	2	TP1-D80008-XX

Note : Standard & High Fault Ratings (UL) (100kA with Fuse of class J/CC)

3 Pole Mechanically Interlocked Contactor with DC coil (Pre-wired)



TP1-D12●●-XX

Maximum Current		Maximum HP 3 Phase				Aux. Contacts Built-in per contactor		Catalog Number
Inductive	Resistive					NO	NC	
AC-3 A	AC-1 A	200V	230V	480V	600V			
9	25	2	2	5	7.5	0	1	TP2-D0901-XX
						1	0	TP2-D0910-XX
12	25	3	3	7.5	10	0	1	TP2-D1201-XX
						1	0	TP2-D1210-XX
18	32	5	5	10	15	0	1	TP2-D1801-XX
						1	0	TP2-D1810-XX
25	40	5	7.5	15	20	0	1	TP2-D2501-XX
						1	0	TP2-D2510-XX
32	50	10	10	20	25	0	1	TP2-D3201-XX
						1	0	TP2-D3210-XX
40	60	10	10	30	30	1	1	TP2-D4011-XX
50	80	15	15	40	40	1	1	TP2-D5011-XX
65	80	20	20	50	50	1	1	TP2-D6511-XX
80	125	20	25	60	60	1	1	TP2-D8011-XX

Replace XX with voltage code from table - 2

Table - 2: XX-DC Coil Voltages

Volts DC	12	24	48	72	110	125	220	250	440
	JD	BD	ED	SD	FD	GD	MD	UD	RD

T - Range

Accessories, Spare Coils

Power Connectors Wire Sets for Reversing Contactors



TA9-D1269

With Two Identical Contactors	Catalog Number
TC1-D09, TC1-D12, TP1-D09, TP1-D12	TA9-D1269
TC1-D18, TP1-D18	TA9-D1869
TC1-D25, TP1-D25	TA9-D2569
TC1-D32, TP1-D32	TA9-D3269
TP1-D40, TP1-D65, TC1-D40, TC1-D50, TC1-D65	TA9-D6569
TC1-D80, TP1-D80, TC1-D 95	TA9-D8069

Mechanical Interlocks Horizontally Mounted



LA9-D09978

Use for Contactor	Catalog Number
TCA2-DN, TCA3-DN	LA9-D09978
TC1-D09 ~ D32, TP1-D09 ~ D32	
TC1-D40 - D65, TP1-D40 - D65	LA9-D50978
TC1-D80 ~ D95, TP1-D80	LA9-D80978

Spare Coils (AC)

Use for contactor AC	Catalog Number
TC1-D09-D18	TX1-D2-XX
TC1-D25-D32	TX1-D4-XX
TC1-D40-D95	TX1-D6-XX

Replace XX with voltage code from table - 3

Table-3: XX-AC Coil Voltages

Volts AC	24	48	110	120	208	220	240	277	380	415	440	480	575	600
50 Hz	B5	E5	F5			M5	U5		Q5	N5	R5			
60 Hz	B6	E6	F6	G6	L6	M6	U6	W6	Q6		R6	T6	S6	X6
50/60 Hz	B7	E7	F7	G7		M7	U7		Q7	N7	R7			

Spare Coils (DC)



TX1-D-XX

Use for contactor DC	Catalog Number
TP1-D09 ~ TP1-D18	TX4-D2-XX
TP1-D25 ~ TP1-D32	TX4-D4-XX
TP1-D40 ~ TP1-D65	TX4-D40-XX
TP1-D80	TX4-D80-XX

Replace XX with voltage code from table - 4

Table-4: XX-DC Coil Voltages

Volts DC	12	24	48	72	110	125	220	250	440
	JD	BD	ED	SD	FD	GD	MD	UD	RD

Mechanical Latching Blocks



LA6-DK01

Description of Contactors	Catalog Number
For Contactors up to 32 Amps	LA6DK01-XX

Replace XX with voltage code from table - 5 / 6

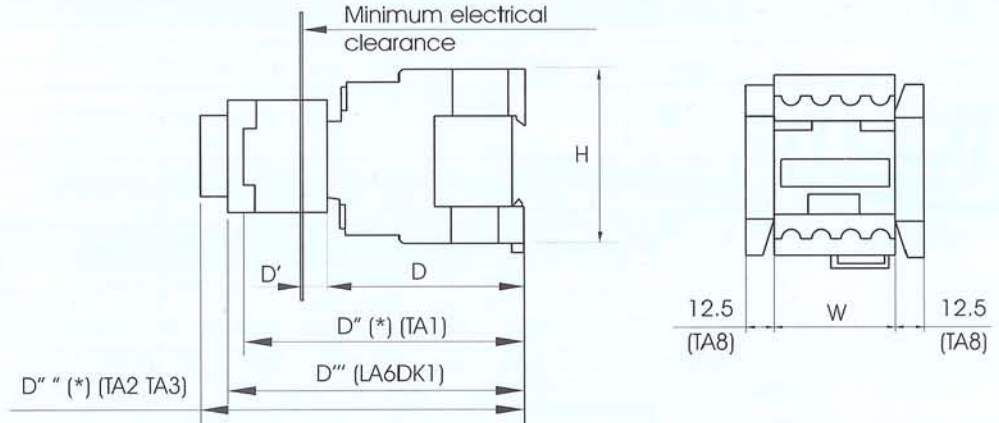
For Mechanical Latching Block	Table-5: For AC Voltage								
	24	48	110	120	220	240	380	415	440
LA6-DK01	B	E	F	G	M	U	Q	N	R

For Mechanical Latching Block	Table-6: For DC Voltage					
	24	48	72	110	220	250
LA6-DK01	BD	ED	SD	FD	MD	UD

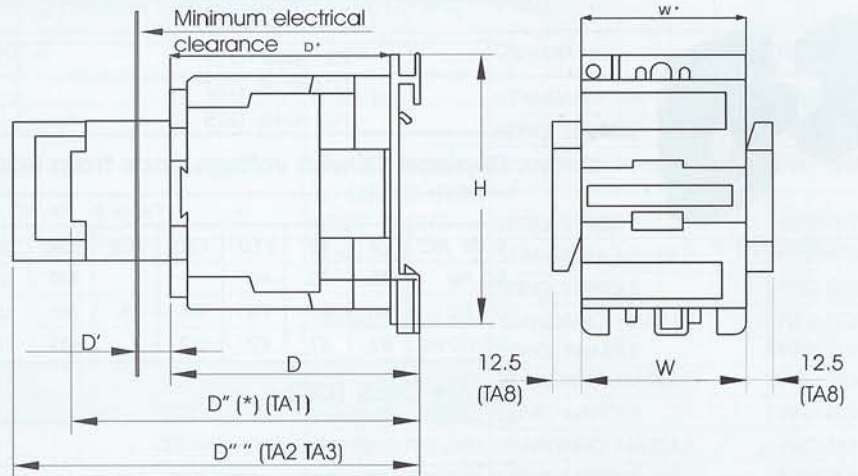
T - Range

Contactors' Dimensions with AC operating coil

TC1-D09~D38



TC1-D40 ~D95

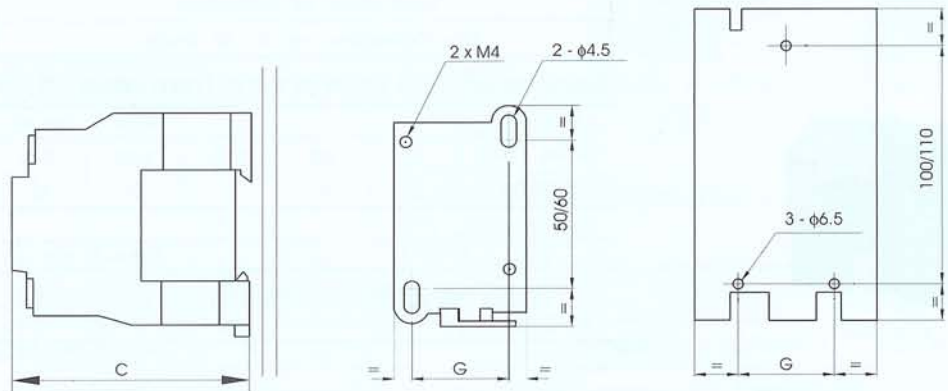


TC1-	D09	D12	D18	D22	D25	D32	D38	D40	D50	D65	D80-D95
W (3 Pole)	45	45	45	45	56	56	56	75	75	75	85
W* (4 Pole)	45	45	-	-	56	-	-	85	85	85	96
H (3/4 Pole)	74	74	74	74	84	84	84	127	127	127	127
D (3/4 Pole)	80	80	85	85	94	99	99	114	114	114	120
D' (3/4 Pole)	10	10	10	10	10	10	10	12	12	12	12
D'' (3/4 Pole)	113	113	118	118	126	131	131	145	145	145	153
D''' (3/4 Pole)	120	120	125	125	135	140	140	-	-	-	-
D'''' (3/4 Pole)	133	133	138	138	147	152	152	166	166	166	173
D*(008)	-	-	-	-	-	-	-	124	124	124	140

TC1-D09~D95 Panel mounting

TC1-D09~D38

TC1-D40~D95

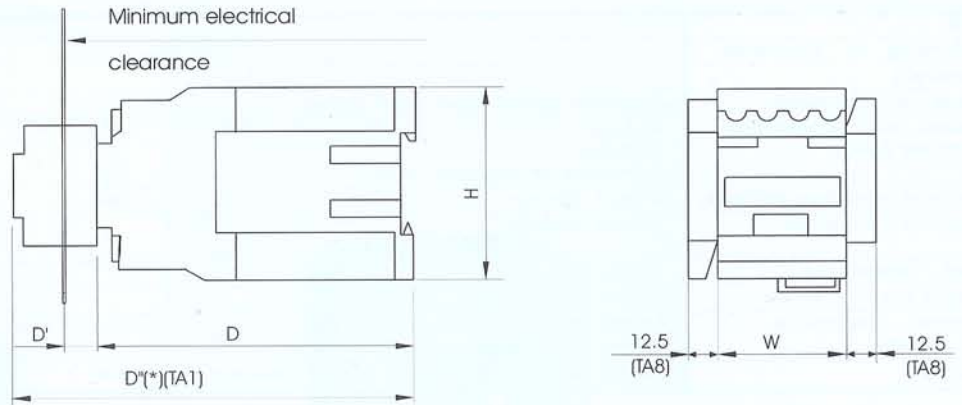


TC1-	D09	D12	D18	D22	D25	D32	D38	D40	D50	D65	D80	D95
C	80	80	85	85	94	99	99	114	114	114	120	120
G	35	35	35	35	40	40	40	40	40	40	40	40

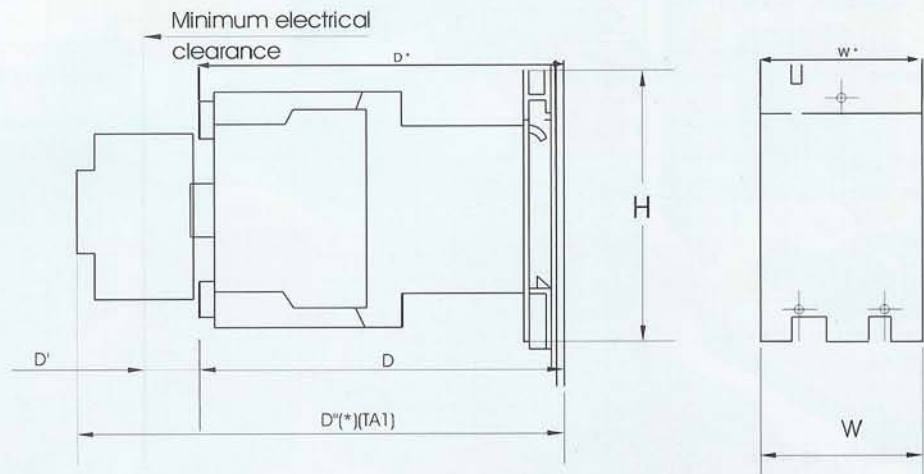
T - Range

Contactors' Dimensions with DC operating coil

TP1-D09~D3810



TP1-D4011~D80

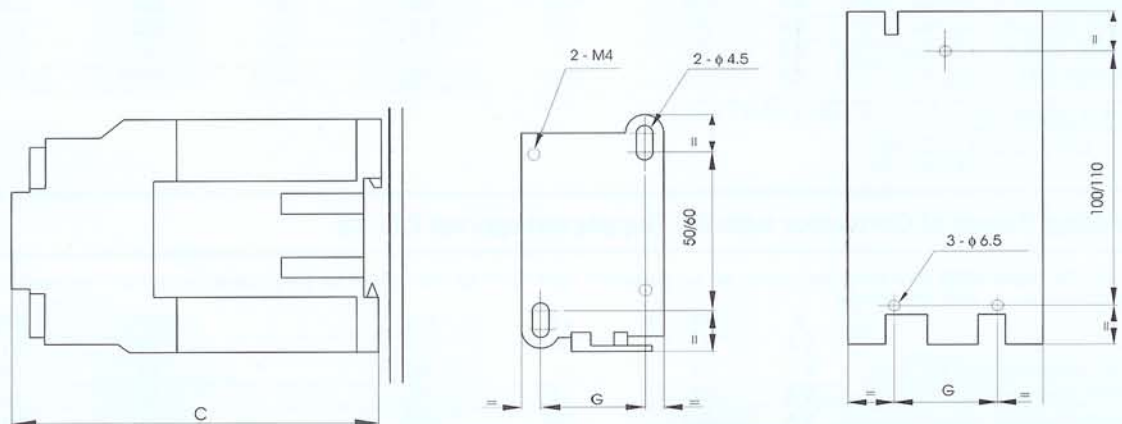


TP1 -	D09	D12	D18	D22	D25	D32	D38	D40	D50	D65	D80
W (3 Pole)	45	45	45	45	56	56	56	75	75	75	85
W* (4 Pole)	45	45	-	-	56	-	-	85	85	85	96
H (3/4 Pole)	74	74	74	74	84	84	84	127	127	127	127
D (3/4 Pole)	115	115	120	120	130	135	135	171	171	171	181
D' (3/4 Pole)	10	10	10	10	10	10	10	12	12	12	12
D'' (3/4 Pole)	148	148	153	153	163	168	168	202	202	202	210
D*(008)	-	-	-	-	-	-	-	181	181	181	191

TP1-D09~D38

TP1-D40~D80

Mounting



TP1 -	D09	D12	D18	D22	D25	D32	D38	D40	D50	D65	D80
C	115	115	120	120	130	135	135	171	171	171	181
G	35	35	35	35	40	40	40	40	40	40	40

T - Range

Control Relays Characteristics

Environment

Type			TCA2DN	TCA3DN
Conforming to Standards			IEC 60947-1, 60947-5	
Approvals			UL,CSA	
Degree of Protection	Protection against direct finger contact		Conforming to VDE 0106	
Ambient air Temperature around the device	Storage	°C	-60...+80	
	Operation	°C	-5...+55	
	Permissible for operation at U _c	°C	-40...+70	
Maximum operating altitude	Without derating	m	3000	
Operating positions	Without derating		±30° possible, in relation to normal vertical mounting plane	
Shock Resistance	Control relay open		10g	8g
	Control relay closed		15g	11g
Vibration Resistance 5.....300Hz	Control relay open		2g	2g
	Control relay closed		4g	3g
Cabling	Flexible or solid cable with or without cable end	mm ²	Min: 1x1;	Max.: 2x2.5

Control Circuit Characteristics

Type			TCA2DN	TCA3DN
Rated Insulation Voltage (Ui)	Conforming to IEC 947-1& IEC 947-5	V	690	
	Conforming to CSA C22-2 no. 14	V	600	
Rated control circuit voltage (U _c)	V		12...600	
Permissible voltage variation	Operational		With 50 or 60 Hz coil: 0.8 ... 1.1 U _c	With standard Hz coil: 0.85 ... 1.1 U _c
			With 50/60Hz coil: 0.85 ... 1.1 U _c	With wide range coil: 0.7 ...1.25 U _c
Voltage limits	Drop-out		0.3 .. 0.6 U _c	0.1 .. 0.65 U _c
	Average consumption at 20°C			
Average consumption at 20°C	~ 50 Hz	VA	Inrush: 60, Sealed:7	-
	~ 60 Hz	VA	Inrush: 70, Sealed:7.5	-
	~ 50/60 Hz	VA	Inrush: 70, Sealed:8	-
	With standard coil	W	-	Inrush or Sealed: 9
	With wide band coil	W	-	Inrush or Sealed: 11
Operating Time (at rated control circuit voltage and at 20°C)	Between coil energisation and opening of the NC contacts	ms	6...20	35...43
	- closing of the NO contacts	ms	12...22	40...48
	Between coil de-energisation and opening of the NO contacts	ms	4...12	6...14
	closing of the NC contacts	ms	6...17	11...19
Short supply failures	Max. duration without affecting hold-in of device	ms	2	2
Maximum operating rate	In operating cycles per second		3	3
Mechanical Life at U _c (mechanical durability)	In millions of operating cycles		20	-
	With: 50 or 60 Hz coil			
	50/60 Hz coil (at 50 Hz)		30	-
	Standard coil		-	30
	Wide band coil		-	30

Operating Power of Contactor with AC Supply categories AC-14 & AC-15

Electrical life (upto 3600 operating cycles/hr) on an inductive load such as the coil of an electromagnet: making power (cosφ 0.7)
- 10 times the power broken (cos φ 0.4)

	V	24	48	110/127	220/230	380/400	440	600
1 million operating cycles	VA	150	300	400	480	500	500	500
3 million operating cycles	VA	80	170	250	290	320	320	320
10 million operating cycles	VA	30	65	90	120	130	130	130
Occasional making capacity	VA	1200	2600	7000	13000	15000	13000	9000

1. Breaking limit of contacts valid for maximum of 50 operating cycles at 10s intervals (breaking power=making power x cosφ 0.7)

2. Electrical life of Contacts:
- for 1 million operating cycles (2a);
- for 3 million operating cycles (2b);
- for 10 million operating cycles (2C)

4. Thermal limit

Operating Power of Contactor with DC Supply categories DC-13

Electrical life (upto 1200 operating cycles/hr) on an inductive load such as the coil of an electromagnet without economy resistor, the time constant increasing with the power.

	V	24	48	110	220	440	600
1 million operating cycles	VA	120	90	75	68	61	58
3 million operating cycles	VA	70	50	38	33	28	27
10 million operating cycles	VA	25	18	14	12	10	9
Occasional making capacity	VA	1000	700	400	260	220	170

2. Electrical life of Contacts:
- for 1 million operating cycles (2a)
- for 3 million operating cycles (2b)
- for 10 million operating cycles (2C)

3. Breaking limit of contacts valid for maximum of 20 operating cycles at 10s intervals and with current passing for 0.5s per operating cycle.

4. Thermal limit

T - Range

Control Relays Selection / Dimensions



TCA2-DN●●-XX



TCA3-DN●●-XX

Control Relays (AC)

Contacts		Catalog Number
NO	NC	
2	2	TCA2-DN22-XX
3	1	TCA2-DN31-XX
4	0	TCA2-DN40-XX

Replace XX with voltage code from table - 7

Table-7 : XX-AC Coil Voltages

Volts AC	24	48	110	120	208	220	230	240	277	380	400	415	440	480	575	600
50 Hz	B5	E5	F5			M5	P5	U5		Q5	V5	N5	R5			
60 Hz	B6	E6	F6	G6	L6	M6		U6	W6	Q6			R6	T6	S6	X6
50/60 Hz	B7	E7	F7	G7		M7	P7	U7		Q7	V7	N7	R7			

Control Relays (DC)

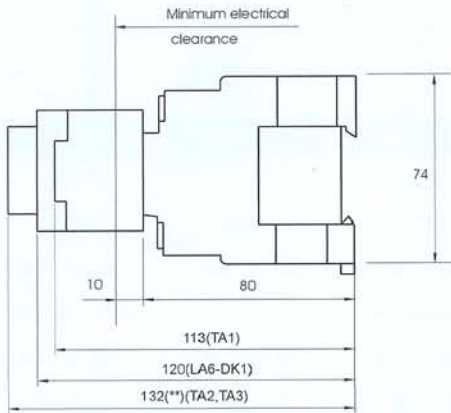
Contacts		Catalog Number
NO	NC	
2	2	TCA3-DN22-XX
3	1	TCA3-DN31-XX
4	0	TCA3-DN40-XX

Replace XX with voltage code from table - 8

Table - 8: XX-DC Coil Voltages

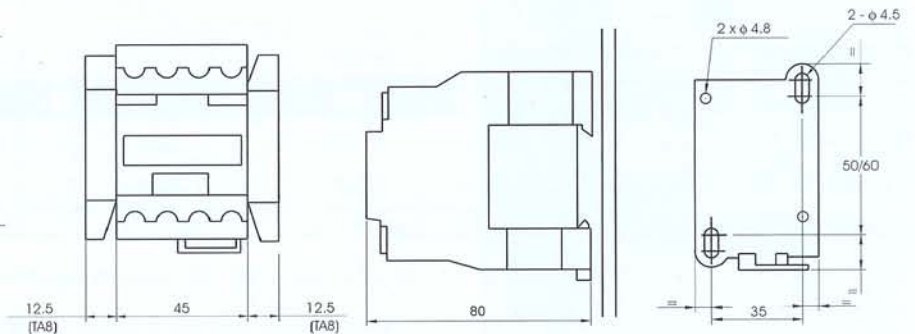
Volts DC	12	24	48	72	110	125	220	250	440
	JD	BD	ED	SD	FD	GD	MD	UD	RD

Independent Mounting

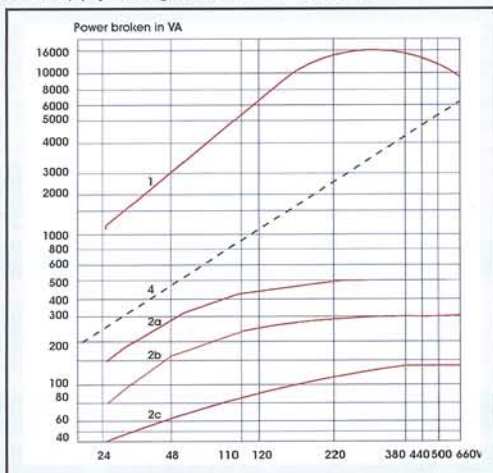


** + 4mm with lead sealing kit

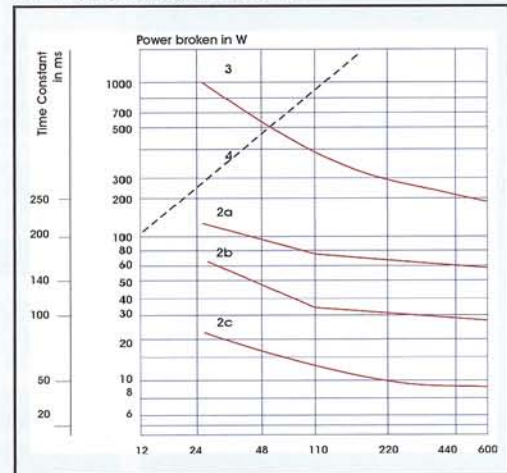
Panel Mounting



AC Supply categories AC-14 & AC-15



DC Supply categories DC-13



T - Range

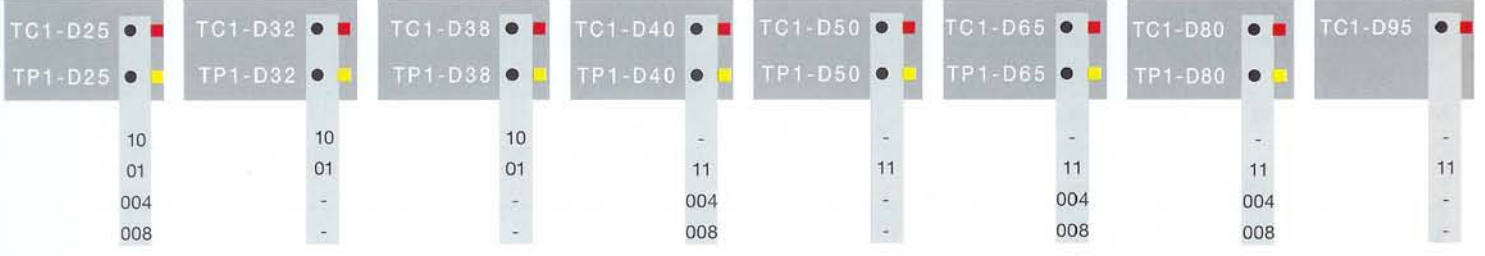
Synopsis - Contactors / Control Relays

Conforming to
IEC-VDE-BS-IS
For other standards, please refer to us

Code	AC	DC	TCA2-DN	TC1-D09	TC1-D12	TC1-D18	TC1-D22
			TCA3-DN	TP1-D09	TP1-D12	TP1-D18	TP1-D22
Maximum rated operational voltage			660V	690V	690V	690V	690V
Maximum rated current for motor control (3 phase 440V, 50-60Hz, for AC3 Duty)			AC 15 duty (IEC 60947-5-1) AC 11 duty (IEC 851) 6A at 500V	9A	12A	18A	22A
Maximum standard power rating for motor control for AC3 Duty $\theta \leq 55^\circ\text{C}$, 415V				Kw / hp 4 / 5.5	Kw / hp 5.5 / 7.5	Kw / hp 9 / 12.5	Kw / hp 11 / 15
3 phase AC3		230V HP	-	2	3	5	-
		460/480V HP	-	5	7.5	10	-
		575/600V HP	-	7.5	10	15	-
Mounting position (w.r.t. normal vertical mounting plane)*			$\pm 30^\circ$	$\pm 30^\circ$	$\pm 30^\circ$	$\pm 30^\circ$	$\pm 30^\circ$
Maximum thermal current I _{th} ($\theta \leq 40^\circ\text{C}$)			10A	25A	25A	32A	32A
Maximum operating rate (operations / hr)	AC		10800	3600	3600	3600	3600
	DC		3600	3600	3600	3600	3600
Average coil consumption (inrush / sealed)	50 Hz		60 / 7 VA	60 / 7 VA	60 / 7 VA	60 / 7 VA	60 / 7 VA
	60 Hz		60 / 7.5 VA	60 / 7.5 VA	60 / 7.5 VA	60 / 7.5 VA	60 / 7.5 VA
	50 / 60 Hz		70 / 8 VA	70 / 8 VA	70 / 8 VA	70 / 8 VA	70 / 8 VA
	DC		9 / 9W	9 / 9W	9 / 9W	9 / 9W	9 / 9W
Heat dissipation at	AC		2 to 3W	2 to 3W	2 to 3W	2 to 3W	2 to 3W
	DC		9W	9W	9W	9W	9W
Mechanical life (in millions of operations)	TC1	50 or 60 Hz	30	20	20	20	20
		50 / 60 Hz	20	15	15	15	15
	TP1		30	30	30	30	30
Power contact terminal capacity mm ²			2.5	4	4	6	6
Over-all dimensions in mm	AC						
	DC						
Projection (TCA2-D/TC1-D)			80mm	80mm	80mm	85mm	85mm
Projection (TCA3/TP1-D)			115mm	115mm	115mm	120mm	120mm
Weight (TC1-D/TP1-D)			0.32 / 0.58	0.32 / 0.58	0.32 / 0.60	0.35 / 0.85	0.35 / 0.85

T - Range

Coil Reference		Volts	12	24	48	72	110	120	125	208	220	230	240	250	277	380	400	415	440	480	575	600	
AC	50 Hz		B5	E5		F5				M5	P5	U5				Q5	V5	N5	R5				
	60 Hz		B6	E6		F6	G6		L6	M6	U6		W6		Q6			R6	T6		S6	X6	
	50/60 Hz		B7	E7		F7	G7			M7	P7	U7				Q7	V7	N7	R7				
DC		JD	BD	ED	SD	FD		GD		MD			UD						RD				



690V	690V	690V	690V	690V	690V	690V	690V
25A	32A	38A	40A	50A	65A	80A	95A
Kw / hp	Kw / hp	Kw / hp	Kw / hp	Kw / hp	Kw / hp	Kw / hp	Kw / hp
11 / 15	15 / 20	18.5/25	22 / 30	25 / 35	37 / 50	45 / 60	45 / 60
7.5	10	-	10	15	20	25	25
15	20	-	30	40	50	60	60
20	25	-	30	40	50	60	60
± 30°	± 30°	± 30°	± 30°	± 30°	± 30°	± 30°	± 30°
40A	50A	50A	60A	80A	80A	125A	125A
3600	3600	3600	3600	3600	3600	3600	3600
3600	3600	3600	3600	3600	3600	3600	-
90 / 7.5 VA	90 / 7.5 VA	90 / 7.5 VA	200 / 20 VA	200 / 20 VA	200 / 20 VA	200 / 20 VA	200 / 20 VA
90 / 8.5 VA	90 / 8.5 VA	90 / 8.5 VA	200 / 22 VA	200 / 22 VA	200 / 22 VA	200 / 22 VA	200 / 22 VA
100 / 8.5 VA	100 / 8.5 VA	100 / 8.5 VA	245 / 26 VA	245 / 26 VA	245 / 26 VA	245 / 26 VA	245 / 26 VA
11 / 11W	11 / 11W	11 / 11W	22 / 22W	22 / 22W	22 / 22W	-	-
2.5 to 3.5W	2.5 to 3.5W	2.5 to 3.5W	6 to 10W	6 to 10W	6 to 10W	6 to 10W	6 to 10W
11W	11W	11W	22W	22W	22W	22W	-
16	16	16	16	16	16	10	10
12	12	12	6	6	6	4	4
25	25	25	20	20	20	20	-
10	10	10	25	25	25	50	50
93mm	98mm	98mm	114mm	114mm	114mm	125mm	125mm
130mm	135mm	135mm	171mm	171mm	171mm	181mm	
0.505 / 0.88	0.525 / 0.88	0.525 / 0.88	1.15 / 2.1	1.15 / 2.12	1.15 / 2.16	1.5 / 2.22	1.5 (TC1-D)

F - Range

3 & 4 Pole Contactors Characteristics

General Characteristics

Type	Unit	LC1-FDP115A-780A, LC1FDP1154A-7804A
Rated Insulation Voltage (Ui)	(Conforming to IEC 158-1)	V 1500
	VDEO 110GRC/IEC 60947-4	V 1500
Conforming to Standards		NFC63-110, VDEO660, BS5424, JEM1038, IEC60947-1 & IEC60947-4
Approvals		UL*, CSA, IEC
Protective treatment	Standard Version	"TH"
Ambient air temperature (around the device)	Storage	°C -60 to +80
	Operation	°C -5 to +55 (0.8 to 1.1 Uc)
	Permissible	°C -50 to +70, for operation at Uc
Maximum operating altitude	Without derating	Mtr. 3000
Operating position	Without derating	±30° possible, in relation to normal vertical mounting plane

* 4 Pole contactor under ψ_L approval

Pole Characteristics

TYPE	LC1-F	UNIT	115A	150A	185A	225A	265A	330A	400A	500A	630A	780A
Number of Poles (Power)			3 or 4	3 or 4	3 or 4	3 or 4	3 or 4	3 or 4	3 or 4	3 or 4	3 or 4	3 or 4
Rated current (Ie) in AC-3 $\theta \leq 55^\circ\text{C}$		A	115	150	185	225	265	330	400	500	630	780
Rated operating voltage upto		V	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Frequency limits of the operating current		Hz	25-200	25-200	25-200	25-200	25-200	25-200	25-200	25-200	25-200	25-200
Rated thermal current (Ith) $\theta \leq 40^\circ\text{C}$		A	200	250	275	315	350	400	500	700	1000	1600
Rated making capacity I _{ms} conforming to IEC-60947-4		A	1300	1700	2100	2460	2940	3600	4500	5550	6740	8550
Rated breaking capacity	220-440V	A	1300	1500	1800	2050	2450	3000	4000	5000	6300	7100
I _{ms} conforming to IEC-60947-4	500V	A	1100	1200	1600	1850	2200	2810	3500	4500	5400	6100
	690V	A	900	1100	1200	1350	1700	2350	3050	3560	4600	5200
Average impedance per pole at Ith & 50 Hz		MILLI Ω	0.4	0.4	0.36	0.36	0.32	0.28	0.28	0.18	0.12	0.1
Power dissipation per pole for above operational current AC-3		W	6	9	12	18	22	31	45	45	48	60
Tightening Torque	Power Circuit	Nm	10	18	18	35	35	35	35	35	58	58
Cabling			Maximum CSA									
	No. of Bars		2	2	2	2	2	2	2	2	2	2
Bar		mm	20x3	25x3	25x3	32x4	32x4	30x5	30x5	40x5	60x5	100x5
Cable with Lug		mm	95	120	150	185	240	240	2x150	2x240	-	-
Cable with connector		Sqmm	95	120	150	185	240	-	-	-	-	-
Bolt Diameter		Sqmm	6	8	8	10	10	10	10	10	12	2xDia 14

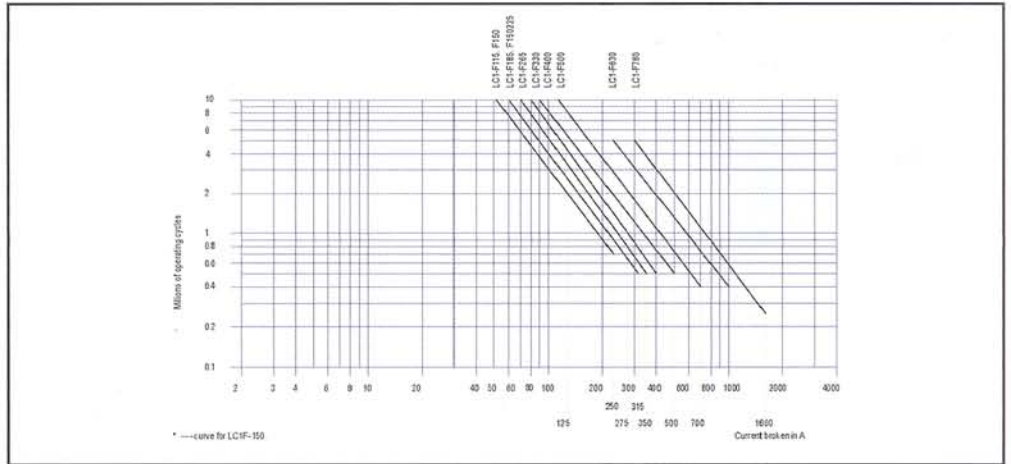
Control Circuit Characteristics

TYPE (LC1-F)	UNIT	115A	150A	185A	225A	265A	330A	400A	500A	630A	780A	
Rated control circuit voltage (Uc)	50 or 60 Hz	V	24...600						48...600	48...600	110...500	
Control voltage limits	Operational		0.85 - 1.10Uc						0.85-1.10Uc	0.85-1.10Uc	0.85-1.10Uc	
Temperature $\theta \leq 55^\circ\text{C}$	Drop out		0.35 - 0.55Uc						0.3-0.5Uc	0.25-0.5Uc	0.2-0.4Uc	
Average consumption at 20 °C and at Uc, 50/60 Hz coil	Operational											
Average consumption at 20 °C and at Uc, AC 50 / 60hz	In rush 50 Hz coil	VA	550	550	805	805	-	-	-	-	-	-
	In rush 60 Hz coil	VA	660	660	970	970	-	-	-	-	-	-
	In rush 40 - 400 Hz coil	VA	-	-	-	-	700	700	1075	1100	1650	2100
	In rush Cos ϕ		0.28	0.28	0.3	0.3	0.9	0.9	0.9	0.9	0.9	0.9
	Sealed 50 Hz coil	VA	45	45	45	45	-	-	-	-	-	-
	Sealed 60 Hz coil	VA	55	55	55	55	-	-	-	-	-	-
	Sealed 40 - 400 Hz coil	VA	-	-	-	-	10	10	15	18	22	50
	Sealed Cos ϕ		0.28	0.28	0.3	0.3	0.9	0.9	0.9	0.9	0.9	0.9
Average operating time at Uc	Closing time "C"	msec	23-35	23-35	20-35	20-35	30-65	30-65	40-75	40-75	40-80	40-80
	Opening time "O"	msec	5-15	5-15	7-15	7-15	100-170	100-170	100-170	100-170	100-200	130-230
Mechanical life Uc (Mechanical durability) in millions of operating cycles	50 or 60 Hz coil	Cycles	10	10	10	10	10	10	10	10	5	5
	50/60 Hz coil	Cycles	10	10	10	10	10	10	10	10	5	5
Maximum operating rate	In operating cycle/hour		2400	2400	2400	2400	2400	2400	2400	2400	1200	600
Tightening Torque	Power Circuit Connection	Nm	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Cabling			Minimum / Maximum C.S.A									
	Flexible Cable without cable end	1 or 2 Conductors	Sqmm	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4
Flexible Cable with end	1 Conductor	Sqmm	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4
Flexible Cable with end	2 Conductors	Sqmm	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
Solid Cable without cable end	1 or 2 Conductors	Sqmm	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4

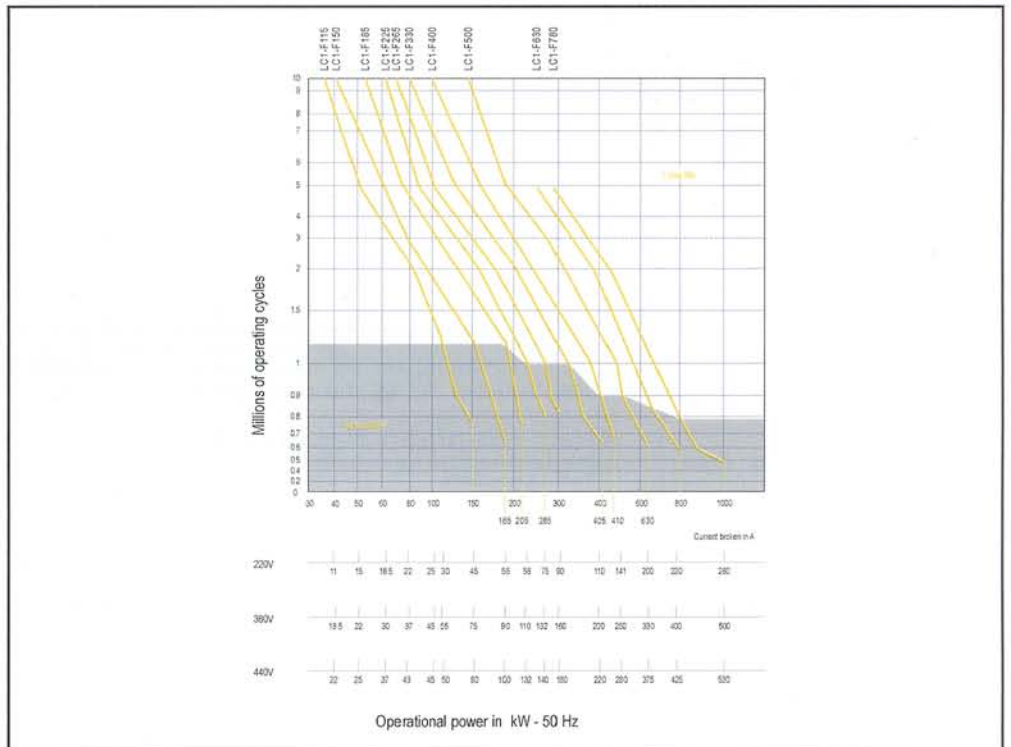
F - Range

Contactors Selection Guide (according to the required electrical life)

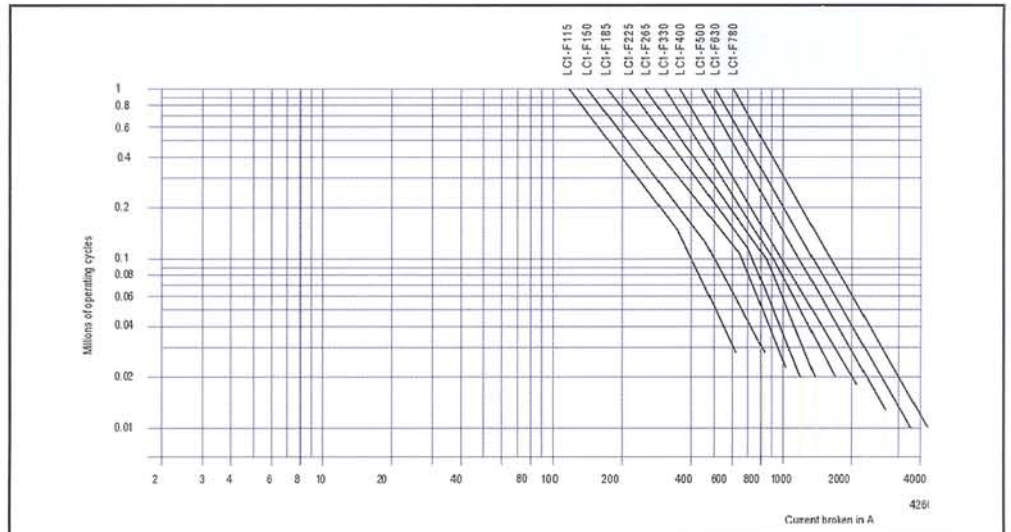
Use in Category AC-1 ($U_e \leq 440V$). Control of resistive circuits ($\cos \phi \geq 0.95$). The current broken (I_c) in category AC-1 is equal to the current (I_e) normally drawn by the load.



Use in Category AC-3 ($U_e \leq 440V$). Control of 3-phase asynchronous squirrel cage motors with breaking whilst motor running. The current broken (I_c) in category AC-3 is equal to the current (I_e) normally drawn by the load.



Use in Categories AC-2, AC-4 ($U_e \leq 440V$). Control of 3-phase asynchronous squirrel cage (AC-4) or slip ring (AC-2) motors with breaking whilst motor stalled. The current broken in category AC-4 is equal to $6xI_e$, (I_e =rated operational current of the motor).



F - Range

Contactors' Specifications, Spare Coils

3 Pole Contactor (without AC or DC operating coil)

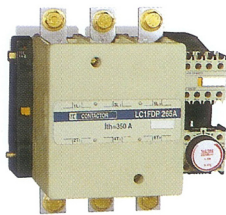


LC1-F185A-XX

Maximum Current		Maximum HP Rating				Main Pole Configuration		Catalog Number
Inductive AC-3 A	Resistive AC-1 A	200V	230V	480V	600V	NO	NC	
115	200	30	40	75	100	3	-	LC1-F●115A-■
150	250	40	50	100	125	3	-	LC1-F●150A-■
185	275	50	60	125	150	3	-	LC1-F●185A-■
225	315	50	65	130	155	3	-	LC1-F●225A-■
265	350	60	75	150	200	3	-	LC1-F●265A-■
330	400	75	100	200	250	3	-	LC1-F●330A-■
400	500	100	125	250	300	3	-	LC1-F●400A-■
500	700	150	200	400	500	3	-	LC1-F●500A-■
630	1000	250	300	600	800	3	-	LC1-F●630A-■
800	1000	Current rated				3	-	LC1-F●800A-■

Note : 115A - 630A (UL) & 115A - 800A (SP) approved (only for Standard Fault Ratings)

4 Pole Contactor (without AC or DC operating coil)



LC1-FDP265A-XX

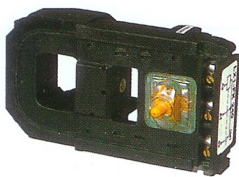
Maximum Current		Maximum HP 3 Phase				Main Pole Configuration		Catalog Number
Inductive AC-3 A	Resistive AC-1 A	200V	230V	480V	600V	NO	NC	
115	200	30	40	75	100	4	-	LC1-F●1154A■
150	250	40	50	100	125	4	-	LC1-F●1504A■
185	275	50	60	125	150	4	-	LC1-F●1854A■
225	315	50	65	130	155	4	-	LC1-F●2254A■
265	350	60	75	150	200	4	-	LC1-F●2654A-■
330	400	75	100	200	250	4	-	LC1-F●3304A-■
400	500	100	125	250	300	4	-	LC1-F●4004A-■
500	700	150	200	400	500	4	-	LC1-F●5004A■
630	1000	250	300	600	800	4	-	LC1-F●6304A■

- If Contactor is required with Dust Cover, replace ● with 'DP' e.g. LC1-FDP115A
- If Contactors are required with coil replace ■ with coil codes given below
- 4P Contactors' (UL)/(SP) listing under process

Coils (Replace ■ with coil code)

For Contactors	Catalog Number	
	AC	DC
F115A - F150	LX1-FF-XX	LX4-FF-XX
F185 - F225	LX1-FG-XX	LX4-FG-XX
F265 - F330	LX1FH.2-XX	LX4-FH-XX
F400	LX1-FJ-XX	LX4-FJ-XX
F500	LX1-FK-XX	LX4-FK-XX
F630	LX1-FL-XX	LX4-FL-XX
F800	LX1-F8-XX	-----

Replace XX with voltage rating from Table -9 for AC Coil & from table 10 for DC Coil



LX1-FF-XX

Table-9: XX-AC Coil Voltages

Contactor	Volts AC	24	48	110	115	120	127	200	208	220	230	240	277	380	400	415	440	480	500	660
F115, F150	50 Hz	✓	✓	✓	x	x	✓	x	x	✓	✓	✓	x	✓	✓	✓	✓	x	✓	x
F185, F225	60 Hz	✓	✓	✓	✓	✓	x	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	x	✓
F265, F330	40-400Hz	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	x	✓	✓	✓	✓	x	✓	x
F400, F500, F630	40-400Hz	x	✓	✓	x	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	x	✓	x
F780	40-400Hz	x	✓	x	x	✓	x	x	x	✓	x	✓	x	x	x	✓	x	✓	x	x

- If 24V, 50Hz Coil is required, replace XX with 24V, 50Hz

Table-10: XX-DC Coil Voltages

Volt DC	24	48	110	120	125	220	240	250	440
F115, F150, F185	✓	✓	✓	x	✓	✓	x	✓	✓
F225, F265, F330	✓	✓	✓	x	✓	✓	x	✓	✓
F115, F150, F185	✓	✓	✓	x	✓	✓	x	✓	✓
F400, F500	✓	✓	✓	x	✓	✓	x	✓	✓
F630	x	✓	✓	x	✓	✓	x	✓	✓
F800	x	x	✓	✓	x	✓	✓	x	✓

Note : Protected shrouds for main poles or power poles to be ordered separately.

F - Range

Accessories, Spares



LA9-FF970

Mechanical Interlocks Horizontally Mounted

For Contactor Type	Catalog Number
LC1-F115A	LA9-FF970
LC1-F150A	
LC1-F185A	
LC1-F225A	LA9-FG970
LC1-F265A	
LC1-F330A	LA9-FJ970
LC1-F400A	
LC1-F500A	
LC1-F630A	
LC1-F630A	LA9-FL970

Mechanical Interlocks Vertically Mounted

For Contactor Type	Catalog Number
LC1-F115A	LA9-FF4F
LC1-F150A	
LC1-F185A	LA9-FG4G
LC1-F225A	
LC1-F265A	LA9-FH4H
LC1-F330A	LA9-FJ4J
LC1-F400A	
LC1-F500A	LA9-FK4K
LC1-F630A	LA9-FL4L



LA9-FX970***

Power Connectors Wire Sets for Reversing Contactors

Catalog Number	With two identical contactors
LC1-F115A	LA9-FF976
LC1-F150A	LA9-F15076
LC1-F185A	LA9-FG976
LC1-F225A	LA9-F22576
LC1-F265A	LA9-FH976
LC1-F330A	LA9-FJ976
LC1-F400A	LA9-FJ976
LC1-F500A	LA9-FK976
LC1-F630A	LA9-FL976

Main Contact Sets**

For Contactor Type	Catalog Number
LC1-F115A	LA5-FF431 (F115)
LC1-F150A	LA5-FF431 (F150)
LC1-F185A	LA5-FG431 (F185)
LC1-F225A	LA5-FG431 (F225)
LC1-F265A	LA5-FH431 (F265)
LC1-F330A	LA5-F400803 (F330)
LC1-F400A	LA5-F400803 (F400)
LC1-F500A	LA5-F500803 (F500)
LC1-F630A	LA5-F630803 (F630)
LC1-F780A	LA5-F780801 (F780)***

* Double mechanical interlock mechanism with 2 interlock, connecting roads and 3 power connecting links

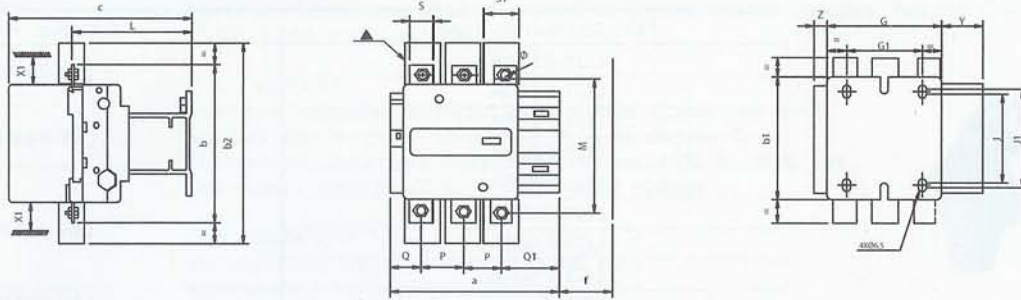
** For 3-pole contact (per pole: 2 fixed contacts and moving contacts, 2 deflectors, 1 back plate, fixing screws and washers).

*** Set of main contacts provided is 1 set of 2 blocks for one pole

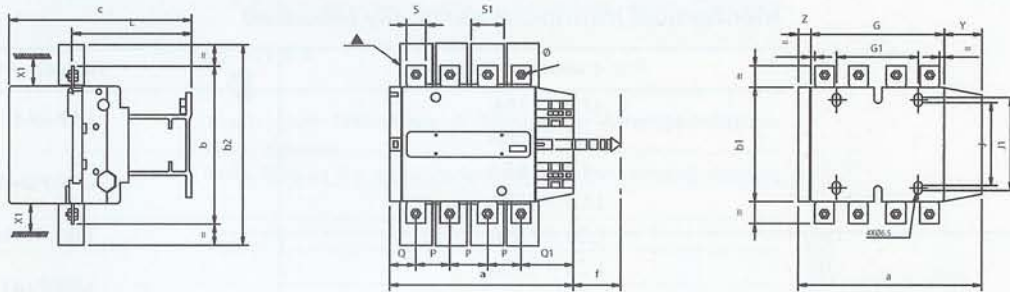
F - Range

Contactors' Dimensions with AC/DC operating coil

LC1-FDP115...330A

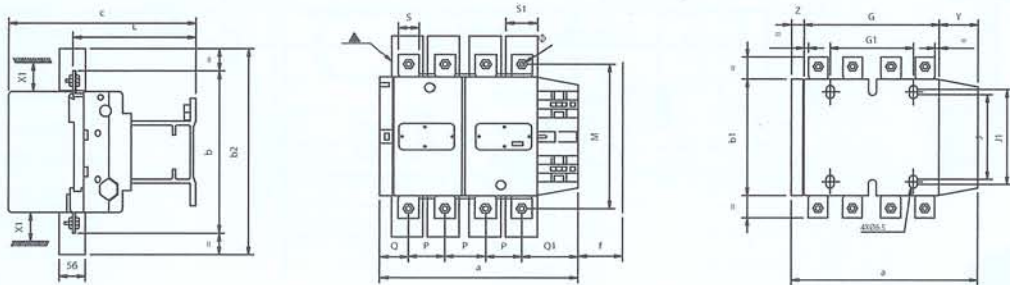


LC1-FDP1154...2654A



f:- minimum distance required for coil removal.
▲ Power terminal protection shroud

LC1-FDP3304A



f:- minimum distance required for coil removal.
▲ Power terminal protection shroud

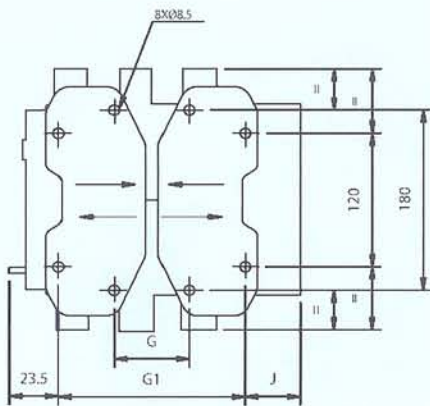
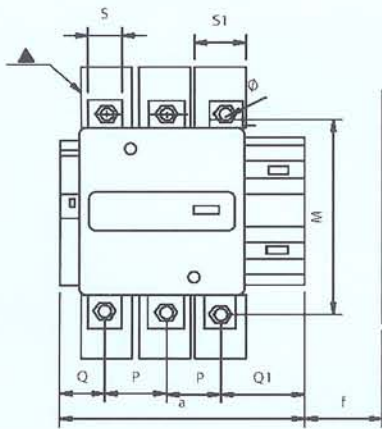
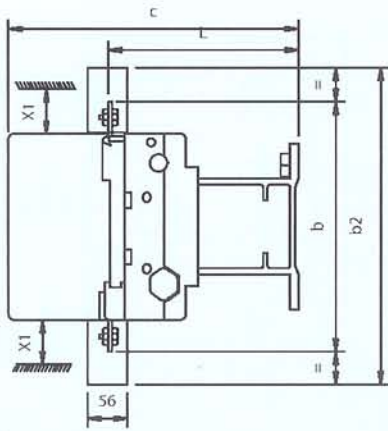
LC1 -	a	b	b1	b2	c	f	G	G1	J	J1	L	M	P	Q	Q1	S	S1	Y	Z	⊙
FDP115A	163.5	162	137	265	172	131	106	80	106	120	107	147	37	29.5	60	15	27	44	13.5	M6
FDP1154A	200.5	162	137	265	172	131	143	80	106	120	107	147	37	29.5	60	15	27	44	13.5	M6
FDP150A	163.5	171	137	301	172	131	106	80	106	120	107	150	40	26.5	57.5	20	34	44	13.5	M8
FDP1504A	200.5	171	137	301	172	131	143	80	106	120	107	150	40	25.5	55.5	20	34	44	13.5	M8
FDP185A	168.5	174	137	305	181	130	111	80	106	120	113.5	154	40	29	59.5	20	34	44	13.5	M8
FDP1854A	208.5	174	137	305	181	130	151	80	106	120	113.5	154	40	29	59.5	20	34	44	13.5	M8
FDP225A	168.5	197	137	364	181	130	111	80	106	120	113.5	172	48	20	51.5	25	44.5	44	13.5	M10
FDP2254A	208.5	197	137	364	181	130	151	80	106	120	113.5	172	48	17	47.5	25	44.5	44	13.5	M10
FDP265A	201.5	203	145	370	214	147	142	96	106	120	141	178	48	39	66.5	25	44.5	38	21.5	M10
FDP2654A	244.5	203	145	370	214	147	190	96	106	120	141	178	48	34	66.5	25	44.5	38	21.5	M10
FDP330A	206	206	145	375	220	147	154.5	96	106	120	147	181	48	43	74	25	44.5	38	20.5	M10
FDP3304A	254	206	145	375	220	147	202.5	96	106	120	147	181	48	43	74	25	44.5	38	20.5	M10

X1(mm) = Minimum electrical clearance according to operating voltage & breaking capacity		
LC1-	200 to 500V	600 to 1000V
FDP115A/1154A	10	15
FDP150A/1504A	10	15
FDP185A/1854A	10	15
FDP225A/2254A	10	15
FDP265A/2654A	10	15
FDP330A/3304A	10	15

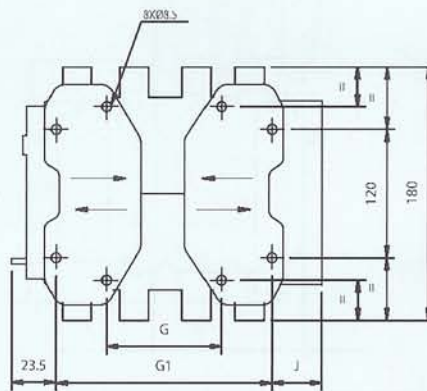
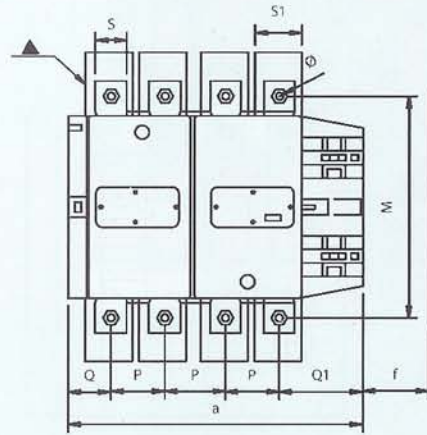
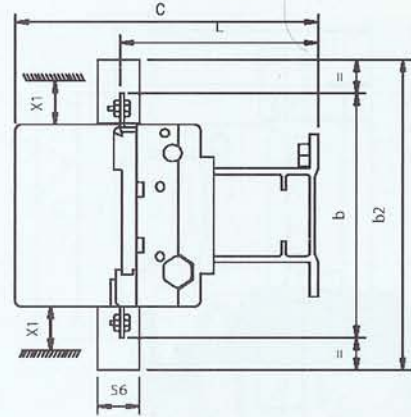
F - Range

Contactors' Dimensions with AC/DC operating coil

LC1-FDP400A/LC1-FDP500A



LC1-FDP4004A



f: minimum distance required for coil removal.
 ▲ Power terminal protection shroud

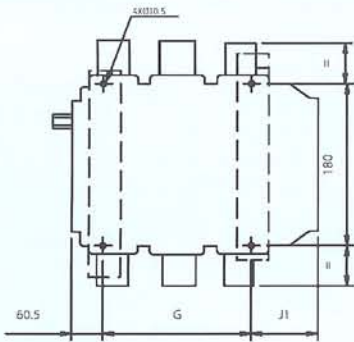
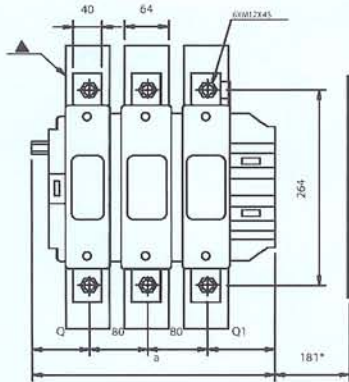
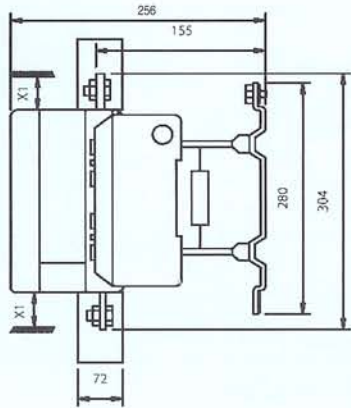
LC1-	a	b	b1	b2	c	f	G*	Gmin	Gmax	G1*	G1min	G1max	J	L	M	P	Q	Q1	S	S1
FDP400A	211	206	209	375	220	119	170	66	102	170	156	192	19.5	145	181	48	43	74	25	44.5
FDP4004A	261	206	209	375	220	119	170	66	150	170	156	240	67.5	145	181	48	43	74	25	44.5
FDP500A	231	238	209	400	235	141	170	66	120	170	156	210	39.5	146	205	55	46	77	30	44.5

X1(mm) = Minimum electrical clearance according to operating voltage & breaking capacity		
LC1-	200 to 500V	600 to 1000V
FDP400A	15	20
FDP500A	15	20

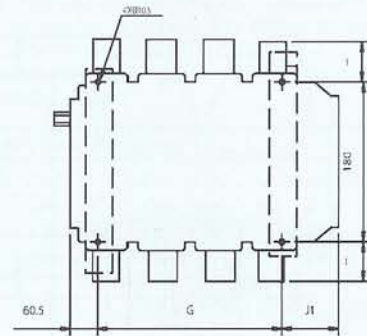
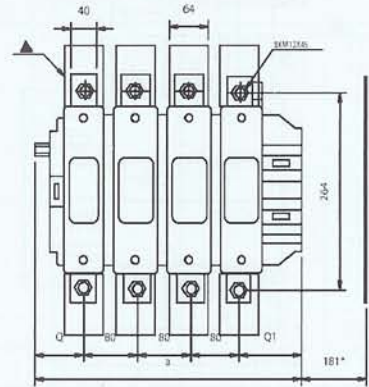
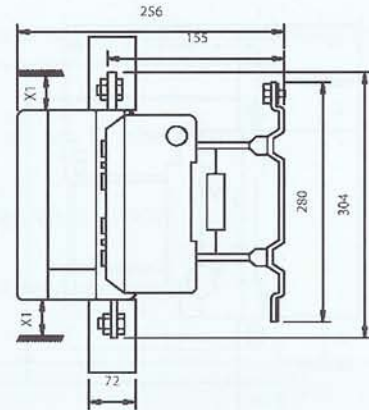
F - Range

Contactors' Dimensions with AC/DC operating coil

LC1-FDP630A



LC1-FDP5004A/LC1-FDP6304A



* - minimum distance required for coil removal

▲ Power terminal protection shroud

LC1-	a	b2	G*	Gmin	Gmax	J1	Q	Q1	S	S1
FDP5004A	389	464	240	150	275	68.5	60	89	25	64
FDP630A	306	464	180	100	195	68.5	60	89	25	64
FDP6304A	389	464	240	150	275	68.5	60	89	30	64

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

LC1-	200 to 500V	600 to 1000V
FDP630A	20	30
FDP5004A	15	20



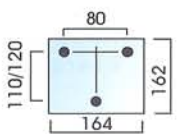
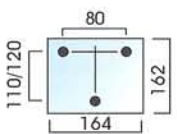
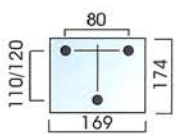
F - Range

Synopsis - Contactors

Conforming to
IEC-VDE-BS-IS
For other standards, please refer to us

Coil Reference	F - Range (AC)	24	48	110	115	120	127	200	208	220	230	240	277	380	400	415	440	480	500	660
F115, F150	50 Hz	✓	✓	✓	x	x	✓	x	x	✓	✓	✓	x	✓	✓	✓	✓	x	x	x
F185, F225	60 Hz	✓	✓	✓	✓	✓	x	✓	✓	✓	✓	✓	✓	✓	x	✓	✓	✓	✓	✓
F265, F330	40-400Hz	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
F400, F500, F630	40-400Hz	x	✓	x	x	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
F780	40-400Hz	x	✓	x	x	✓	x	x	x	✓	x	✓	x	x	x	✓	x	✓	x	x

Code		AC	LC1-F* 115A+①	LC1-F* 150A+①	LC1-F* 185A+②
		DC	LC1-F* 1154A+①	LC1-F* 1504A+①	LC1-F* 1854A+②
	 3 Pole				
	 4 Pole				

Maximum rated operational voltage		690V	690V	690V
Maximum rated current for motor control (3 phase 440V, 50-60Hz, for AC3 Duty)		115A	150A	185A
Maximum standard power rating for motor control for AC3 Duty $\theta \leq 55^\circ\text{C}$, 415V		Kw / hp 59 / 80	Kw / hp 80 / 108	Kw / hp 100 / 136
3 phase AC3	 230V HP	40	50	60
	 460/480V HP	75	100	125
	575/600V HP	100	125	150
Mounting position (w.r.t. normal vertical mounting plane)*		$\pm 30^\circ$	$\pm 30^\circ$	$\pm 30^\circ$
Maximum thermal current I _{th} ($\theta \leq 40^\circ\text{C}$)		200A	250A	275A
Maximum operating rate AC (operations / hr)		2400	2400	2400
Average coil consumption (inrush / sealed)	50 Hz	550 / 45 VA	550 / 45 VA	805 / 55 VA
	60 Hz	660 / 55 VA	660 / 55 VA	970 / 66 VA
	40-400 Hz	-	-	-
	DC	560 / 4.5W	560 / 4.5W	800 / 5W
Heat dissipation at	AC	12 to 16W	12 to 16W	18 to 24W
	DC	4.5W	4.5W	5W
Mechanical life (in millions of operations)	50 or 60 Hz	10	10	10
	50 / 60 Hz	-	-	-
Power contact terminal capacity mm ²		95	120	150
Over-all dimensions in mm				
Projection (LC1-F)		165mm	165mm	176mm

Note: 4P F-Range Contactor  under process.

DC Coil reference for LC1 F800A Contactor		
Control Circuit Voltage	Voltage Code	Reference*
110/120	PW	LX4 F8PW
220/240	MW	LX4 F8MW
380/400	GW	LX4 F8GW

* For AC - Coil will be supplied with rectifier
add suffix DR1E4U in case of PW (110/120) & MW (220/240)
add suffix DR1E4S in case of GW (380/400)



Coil Reference			
①	②	③	④
LX1FF	LX1FG	LX1FH-2	LX1FJ
LX4FF	LX4FG	LX4FH-2	LX4FJ
LX1FK	LX1FL	LX1FX	
LX4FK	LX4FL	LX4FX	

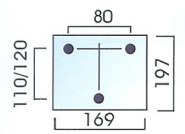
⑦ - 2 coils in series

Coil Reference	F - Range (DC)								
Volt DC	24	48	110	120	125	220	240	250	440
F115, F150, F185	✓	✓	✓	x	✓	✓	x	✓	✓
F225, F265, F330	✓	✓	✓	x	✓	✓	x	✓	✓
F115, F150, F185 F400, F500	✓	✓	✓	x	✓	✓	x	✓	✓
F630	x	✓	✓	x	✓	✓	x	✓	✓
F780	x	x	✓	✓	x	✓	✓	✓	✓

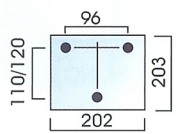
LC1-F❖ 225A+②	LC1-F❖ 265A+③	LC1-F❖ 330A+③	LC1-F❖ 400A+④	LC1-F❖ 500A+⑤	LC1-F❖ 630A+⑥	LC1-F❖ 800A+⑦
LC1-F❖ 225A+②	LC1-F❖ 265A+③	LC1-F❖ 330A+③	LC1-F❖ 400A+④	LC1-F❖ 500A+⑤	LC1-F❖ 630A+⑥	LC1-F❖ 800A+⑦

If Contactors are required with DUST COVERS, replace ❖ with 'DP' e.g. LC1-FDP115A

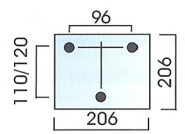
690V	690V	690V	690V	690V	690V	1000V
225A	265A	330A	400A	500A	630A	800A
Kw / hp	Kw / hp	Kw / hp	Kw / hp	Kw / hp	Kw / hp	Kw / hp
110 / 148	140 / 190	180 / 240	220 / 300	280 / 380	375 / 500	450 / 610
75	75	100	125	200	300	-
130	150	200	250	400	600	-
150	200	250	300	500	800	-
± 30°	± 30°	± 30°	± 30°	± 30°	± 30°	+ 30°
315A	350A	400A	500A	700A	1000A	1000A
2400	2400	2400	2400	2400	1200	1200
2400	2400	2400	2400	2400	1200	1200
805 / 55 VA	1200 / 95 VA	700 / 10 VA	1075 / 15 VA	1100 / 18 VA	1650 / 22 VA	1900 / 15 VA
970 / 66 VA	1445 / 110 VA	700 / 10 VA	1075 / 15 VA	1100 / 18 VA	1650 / 22 VA	1900 / 15 VA
-	-	700 / 10 VA	1075 / 15 VA	1100 / 18 VA	1650 / 22 VA	1900 / 15 VA
800 / 5W	750 / 5W	750 / 5W	1000 / 6W	1100 / 6W	1600 / 9W	1900 / 15W
18 to 24W	30 to 40W	12	14W	18W	20W	25W
5W	5W	-	6W	6W	9W	25W
10	10	10	10	10	5	5
-	-	10	10	10	5	5
185	240	240	2 x 150	2 x 240	2 x 60 x 5	2 x 60 x 5



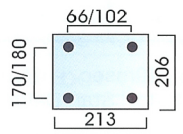
176mm



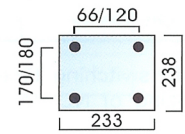
207mm



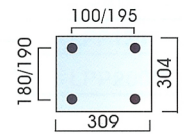
213mm



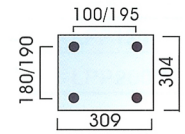
181mm



213mm



226mm



226mm

* LC1F 780A only listing

T & F - Range

Auxiliary Contacts, Time Delay Blocks, Mechanical Latching Blocks

Instantaneous Time Delay Contact Characteristics

Type		UNIT	TA1D	TA2D	TA3D	TA8D
Number of contacts			2 or 4	2	2	2
Rated operational Voltage (Ue)	Upto	V		660		
Rated Insulation Voltage (Ui)	Conforming to IEC 60947-1	V		690		
	Conforming to CSA C22-2 No. 14	V	6 00	-	-	-
Rated Thermal current (Ith)	For ambient temperature $\leq 40^{\circ}\text{C}$	A	10			
Frequency of operational current		Hz	25...400			
Minimum switching capacity	U min	V	17			
	I min	mA	5			
Short time rating	Permissible for	1s	A	100		
		500ms	A	120		
		100 ms	A	140		
Insulation resistance		M Ω	>10			
Time Delay	Ambient air temperature for operation $^{\circ}\text{C}$		-40...+70	-40...+70		
(TA2D & TA3D contact blocks)	Repeat accuracy		-	$\pm 5\%$	$\pm 5\%$	
Accuracy only valid for setting range indicated on the front face	Drift upto 0.5 million operating cycles		+ 15%	+ 15%		
	Drift depending on ambient air temp.	-	0.25% per $^{\circ}\text{C}$	0.25% per $^{\circ}\text{C}$	-	
Mechanical Life	In millions of operating cycles		30	5	5	30



TA1-DN22



TA8-DN



TA1-DN20



TA2-DT2

Standard, instantaneous auxiliary contact blocks

No. of Contacts	Contacts		Snap-On Mounting	Catalog Number	
	NO	NC			
4	2	2	To the front of TC1D09 to D80 LC1F115A-780A TP1D09 to D32 & TCA2DN / TCA3DN	TA1DN22	
	1	3		TA1DN13	
	4	0		TA1DN40	
	0	4		TA1DN04	
	3	1		TA1DN31	
2	1	1		TA1DN11	
	2	0		TA1DN20	
	0	2		TA1DN02	
1	1	0		To the front of TC1D40 to D95 TP1D40 to D80	TA1DN10
	0	1		TA1DN01	
2	1	1	To the side of TC1D09 to D95 TP1D09 to D32 & TCA2DN / TCA3DN	TA8DN11	
	2	0	TA8DN20		

Pneumatic Timer Block (Front Mounted)

Description	Contacts		Range	Catalog Number
	NO	NC		
ON Delay	1	1	0.1 ... 3s	TA2-DT0
ON Delay	1	1	0.1 ... 30s	TA2-DT2
ON Delay	1	1	10 ... 180s	TA2-DT4
OFF Delay	1	1	0.1 ... 3s	TA3-DR0
OFF Delay	1	1	0.1 ... 30s	TA3-DR2
OFF Delay	1	1	10 ... 180s	TA3-DR4
On Delay	1	1	1 ... 30s*	TA2-DS2

* With switching time of 40msec \pm 15 msec between the opening of NC contact to the closing of NO contact (for Star Delta application)

T & F - Range

Accessories, Spares



LA9-F701

Protective Shroud Covers for F-Range Contactors

For 3P Contactor Type	Catalogue Number	For 4P Contactor Type	Catalogue Number
LC1-F115A	LA9-F701	LC1-F115 4A	LA9-F706
LC1-F150A LC1-F185A	LA9-F702	LC1-F150 4A LC1-F185 4A	LA9-F707
LC1-F225A LC1-F265A LC1-F330A LC1-F400A LC1-F500A	LA9-F703	LC1-F225 4A LC1-F265 4A LC1-F330 4A LC1-F400 4A LC1-F500 4A	LA9-F708
LC1-F630A	LA9-F704	LC1-F630 4A	LA9-F709

T & F - Range

Overload Relays Characteristics

Environment

Conforming to standards	IEC 60947-1, IEC 60947-4-1, NFC 63-650, VDE 0660, BS 4941		
Approvals	UL*, CSA, IEC		
Degree of protection	Conforming to VDE 0106	Protection against direct finger contact IP 2X	
Protective treatment	Conforming to IEC 68	"TH"	
Ambient air temperature (around the device)	Storage	°C	-60 to +70
	Operation, without derating	°C	-25 to +60
	Max. & Min. operating temp.	°C	-40 to +70
Operating position	Without derating	Any Position, in relation to normal vertical mounting plane	
Shock resistance	Permissible acceleration	15gn - 11ms, conforming to IEC 68-2-7	
Vibration resistance	Permissible acceleration	6gn, conforming to IEC 68-2-6	
Dielectric strength at 50 Hz	Conforming to IEC 255-5	KV	6
Impulse withstand voltage	Conforming to IEC 801-5	KV	6

Electrical Characteristics of Power Circuit

TYPE	TR2-D	UNIT	09301-12316	18321	25322-65361	80363-95365
Tripping class		A	10	10	10	10
Rated insulation Voltage (Ui)	Conforming to IEC 60947-4-1	V	690	690	690	690
Rated operating voltage upto	Conforming to UL, CSA	V	600	600	600	600
Rated impulse withstand voltage (Uimp)		KV	6	6	6	6
Frequency limits	Of the operational current	Hz	0... 400	0...400	0...400	0...400
Setting range	Depending on model	A	0.1...13	12...38	17...104	63...140
Connecting to screw clamp terminal	Minimum / Maximum CSA					
Flexible cable without cable end	1 conductor	mm ²	1.5 / 10	1.5 / 10	4 / 35	4 / 50
Flexible cable with cable end	1 conductor	mm ²	1 / 4	1 / 6	4 / 35	4 / 50
Solid cable without cable end	1 conductor	mm ²	1 / 6	1.5 / 4	4 / 35	4 / 50
				except TR2 21:1/4		
Tightening torque		Nm	1.7	2.5	9	9
			except TR2 21:1/6			
Connection to spring terminals	Minimum / Maximum CSA					
Flexible cable without cable end	1 conductor	mm ²	1.5 / 4	1.5 / 4	-	-
SolidCable without cable end	1 conductor	mm ²	1.5 / 4	1.5 / 4	-	-

Operating Characteristics

TYPE	TR2-D	UNIT	09301-12316	18321	25322-65361	80363-95365
Temperature Compensation		°C	-20...+60	-30...+60	-30...+60	-20...+60
Tripping Threshold	Conforming to IEC 6047-4-1	A	1.14 ± 0.06In			
Sensitivity to phase failure	Conforming to IEC 60947-4-1	Tripping current 25% above In				

Auxiliary Contact Characteristics

Conventional thermal Current		A	5					
Maximum consumption of operating coil of controlled contactors (Occasional operating cycles of contact 95 - 96)	AC Supply	V	24	48	110	220	380	600
		VA	100	200	400	600	600	600
		V	24	48	110	220	440	-
Short circuit protection	By gG or BS fuse Max. rating or by GB2 circuit-breaker	W	100	100	50	45	25	-
		A	5					
Connection to screw clamp terminal	Minimum / Maximum CSA							
Flexible cable without cable end	1 or 2 conductors	mm ²	1 / 2.5					
Flexible cable withcable end	1 or 2 conductors	mm ²	1 / 2.5					
Solid cable without cable end	1 or 2 conductors	mm ²	1 / 2.5					
Tightening torque	1 or 2 conductors	Nm	1.85					
Connecting to spring terminal	Minimum / Maximum CSA							
Flexible cable without cable end	1 or 2 conductors	mm ²	1 / 2.5					
Solid cable without cable end	1 or 2 conductors	mm ²	1 / 2.5					

T & F - Range

Overload Relays - Specifications

T - Range Overload Relay (Class 10), Base Plate for Independent Mounting



TR2-D25322

RELAY REFERENCE	RELAY SETTING RANGE (A)	STANDARD POWER RATINGS OF 3-PHASE MOTORS 50/60Hz ACB CATEGORY					BACK UP		BASE PLATE* REFERENCE
		220V KW	380V KW	415V KW	440V KW	660V KW	FUSE RATING aM(A)	g1 (A)	
TR2-D09301	0.1 to 0.16	-	-	-	-	-	0.25	2	TA7D0964
TR2-D09302	0.16 to 0.25	-	-	-	-	-	0.5	2	
TR2-D09303	0.25 to 0.4	-	-	-	-	-	1	2	
TR2-D09304	0.4 to 0.63	-	-	-	-	0.37	1	2	
TR2-D09305	0.63 to 1	-	-	-	-	0.55	2	4	
TR2-D09306	1 to 1.6	-	0.37	-	0.55	1.1	2	4	
TR2-D093X6	1.25 to 2	-	0.55	0.75	0.75	1.3	4	6	
TR2-D09307	1.6 to 2.5	0.37	0.75	1.1	1.1	1.5	4	6	
TR2-D09308	2.5 to 4	0.75	1.5	1.5	1.5	3	6	10	
TR2-D09310	4 to 6	1.1	2.2	2.2	2.2	4	8	16	
TR2-D09312	5.5 to 8	1.5	3	3.7	3.7	5.5	12	20	
TR2-D09314	7 to 10	2.2	4	4	4	7.5	12	20	
TR2-D12316	9 to 13	3	5.5	5.5	5.5	10	16	25	
TR2-D18321	12 to 18	4	7.5	9	9	15	20	35	
TR2-D25322	17 to 25	5.5	11	11	11	18.5	25	50	
TR2-D32353	23 to 32	7.5	15	15	15	-	40	63	TA7D3264
TR2-D32355	28 to 36	9	15	18.5	18.5	-	40	80	
TR2-D40353	23 to 32	7.5	15	15	15	22	40	63	TA7D4064
TR2-D40355	30 to 40	10	18.5	22	22	30	40	100	
TR2-D65357	37 to 50	11	22	25	25	37	63	100	
TR2-D65359	48 to 65	18.5	25	30	30	50	63	100	
TR2-D65361	55 to 70	20	30	37	37	55	80	125	
TR2-D80363	63 to 80	22	33	40	40	59	80	125	
TR2-D95365	80 to 93	25	45	49	50	80	100	160	

Note : Standard Fault Ratings U_L SB High Fault Ratings U_L

F - Range Overload Relays (Independent Mounting)



LR1-F105

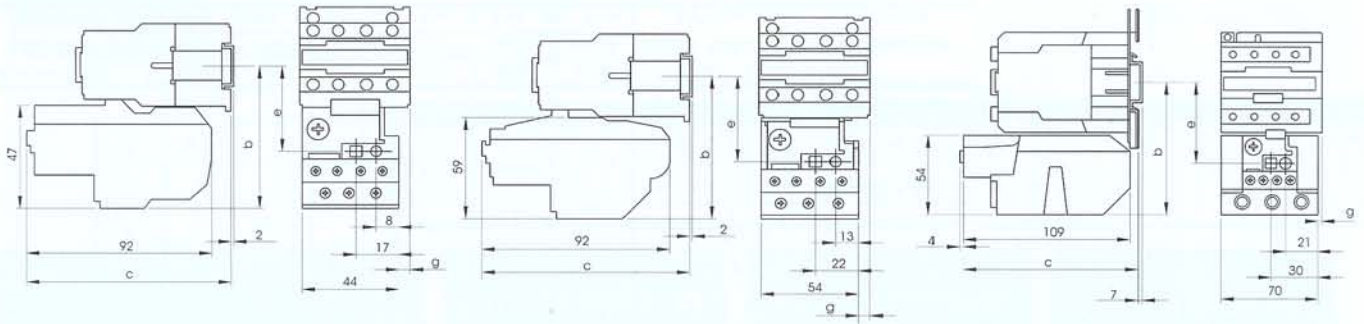
RELAY REFERENCE	RELAY SETTING RANGE (A)	STANDARD POWER RATINGS OF 3-PHASE MOTORS 50/60Hz ACB CATEGORY					BACK UP	
		220V KW	380V KW	415V KW	440V KW	660V KW	FUSE RATING aM (A)	g1 (A)
LR1-F105	65 to 105	25	51	55	59	90	0.25	160
LR1-F125	80 to 125	30	59	59	63	110	125	200
LR1-F160	100 to 160	45	80	80	90	140	160	250
LR1-F200	125 to 200	55	90	100	110	160	200	315
LR1-F250	160 to 250	63	110	129	140	200	250	400
LR1-F315	200 to 315	80	150	160	160	257	315	500
LR1-F400	250 to 400	110	185	200	220	335	400	630
LR1-F500	315 to 500	140	250	257	280	445	500	800
LR1-F630	400 to 630	180	315	355	375	500	630	800
LR1-F800	500 to 800	220	400	425	450	-	-	1000
LR1-F1000	630 to 1000	295	500	500	500	-	-	1250

Notes : 1. Protected shrouds for main poles or power poles to be ordered separately.

2. Standard Fault Ratings U_L SB with T-Range Relay.

T & F - Range

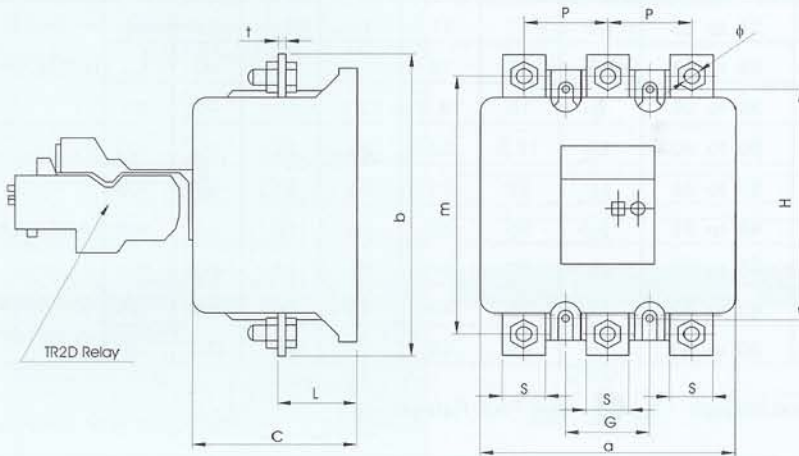
Overload Relays Dimensions, Tripping Curves



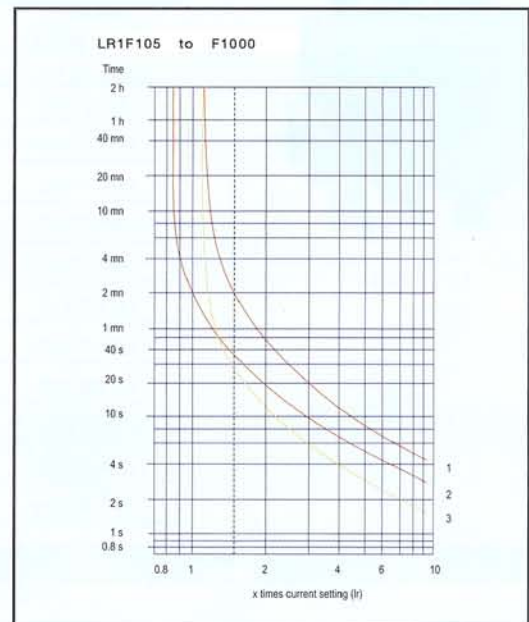
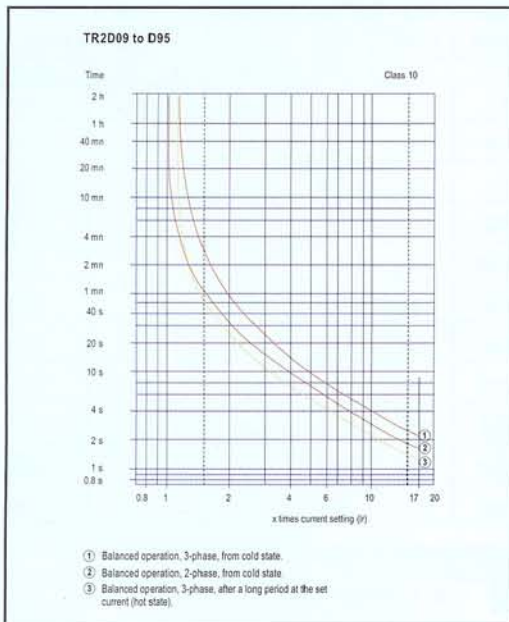
TR2D09301 - D25322				
Mounting With	b	c	e	g
TC1D09, D12, D18	81	98	50	0
TC1D25	86	108	55	10.7
TC1D32	86	109	55	8.1
TP1D09, D12, D18	81	133	50	0
TP1D25	86	152	55	10.7
TP1D32	86	153	55	8.1

TR2D32353 - 32355				
Mounting With	b	c	e	g
TC1D25	97.5	98	60	1.5
TC1D32	97.5	98	60	0.5
TP1D25	97.5	155	60	1.5
TP1D32	97.5	155	60	0.5

TR2D40355 - D95365				
Mounting With	b	c	e	g
TC1D40	111	119	72.4	4.5
TC1D50	111	119	72.4	4.5
TC1D65	111	119	72.4	4.5
TC1D80	115.5	123.4	76.9	9.5
TC1D95	115.5	123.4	76.9	9.5
TP1D40	111	176	72.4	4.5
TP1D50	111	176	72.4	4.5
TP1D65	111	176	72.4	4.5
TP1D80	115.5	179.4	76.9	9.5



LR1-F	a	b	C	G	H	L	M	P	S	φ	t
105	126	160	81	40	110 120	56	140	40	20	9	3
125	126	160	81	40	110 120	56	140	40	20	9	3
160	126	160	81	40	110 120	56	140	140	20	9	3
200	126	160	81	40	110 120	56	140	140	20	9	3
250	171	182	120	49	140	44.5	157	48	25	11	4
315	171	182	120	49	140	44.5	157	48	25	11	4
400	171	182	120	49	140	44.5	157	48	25	11	4
500	171	194	120	49	140	45.5	164	55	25	11	5
630	171	194	120	49	140	45.5	164	55	30	11	5





Local Distributor



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