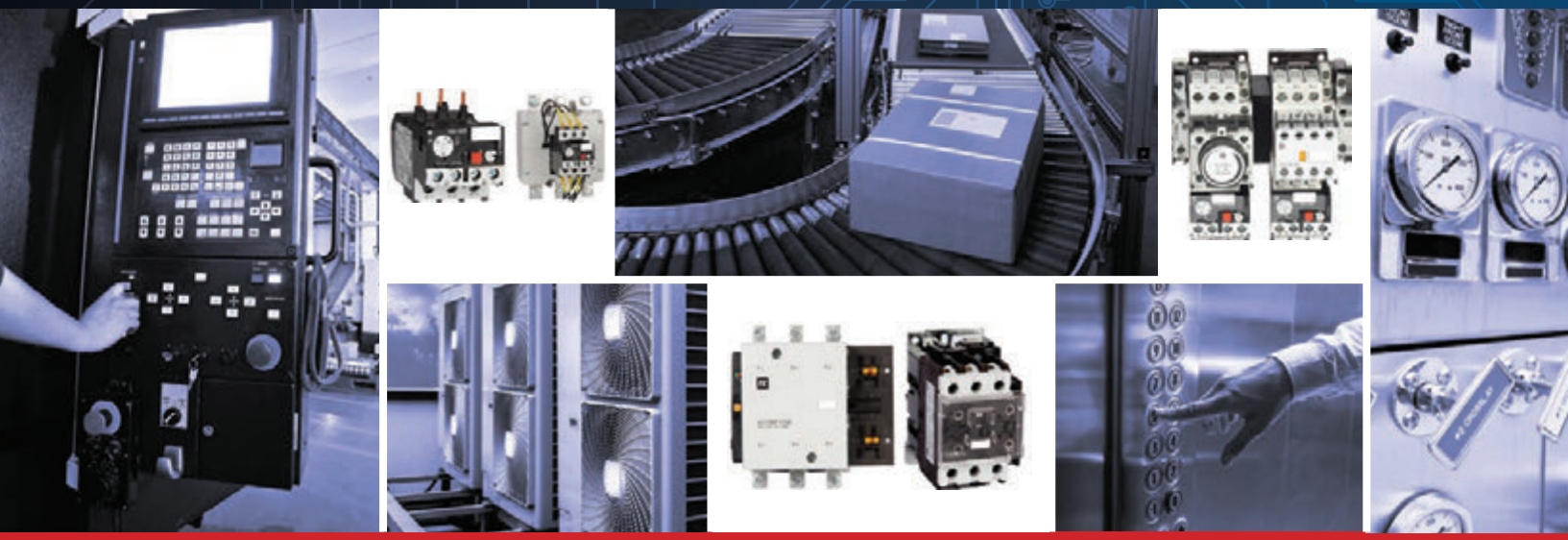
TC ELECTRIC CONTROLS

ENERGIZING YOUR WORLD



IEC Contactors & Overloads

3 & 4 Pole IEC Contactors • Overloads • Accessories

ABOUT US

TC Electric Controls LLC is a US based privately held joint venture with a world class manufacturer of Industrial controls, designed and built for the HVAC, Commercial, Industrial and OEM markets. Our product scope includes, but is not limited to IEC Contactors & Overloads, Manual Motor Controllers & Starters, Control & Signaling Devices and Circuit Breakers.

Our Corporate Headquarters is in Schaumburg, Illinois with warehousing locations in Melbourne Florida, Rockford Illinois and Phoenix Arizona. Our partner has over 50 years' history in the electrical industry, including 17 World Class Manufacturing Facilities that are ISO-9001 / ISO-14000 certified at premier locations in India, China and Belgium. We have over 2 million square-feet of manufacturing facilities, and four Government Accredited R&D centers including a UL Certified Test Lab.

Our vertically integrated manufacturing facilities assure strict quality control and flexibility to adapt to customer needs. TC Electric Controls can enhance your position through industry leading designs, quality, manufacturing and competitiveness.

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IEC Contactors Overload Relays & Accessories

3 & 4 Pole Contactors with AC operating coil

Characteristics

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General Characteristics

Type		Unit	TC1-D09 ~ TC1-D95
Rated insulation voltage (Ui)	IEC 60947-4-1	V	1000
Conforming to standards			NFC EN 60947, VDE0660, BSEN60947 , IEC 60947 & IS 13947
Approvals			UL, CSA
Degree of Protection	Conforming to VDE 0106		Protection against direct finger contacts
Protective treatment	Standard version		"TH"
Ambient air temperature	Storage	°C	-60 to +80
(around the device)	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	D09	D12	D18	D22	D25	D32	D38	D40	D50	D65	D80	D95
Number of poles (Power)			3 or 4	3 or 4	3	3	3 or 4	3	3	3 or 4	3 or 4	3 or 4	3 or 4	3 or 4
Power + Auxiliary			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)	AC3 up to 440V @ 55°C	A	9	12	18	22	25	32	38	40	50	65	80	95
Rated opeating Voltage	Up to	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 impedence per pole	At Ith and 50Hz Milli Ω	Max.	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	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

3 & 4 Pole Contactors with DC operating coil

Characteristics

General Characteristics

Type		Unit	TP1-D09 ~ TP1-D80
Rated insulation voltage (Ui)	IEC 60947-4-1	V	1000
Conforming to standards			NFC EN 60947, VDE0660, BSEN60947, IEC 60947 & IS 13947
Approvals			UL, CSA
Degree of Protection	Conforming to VDE 0106		Protection against direct finger contacts
Protective treatment	Standard version		"TH"
Ambient air temperature	Storage	°C	-60 to +80
(around the device)	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)				3 or 4	3 or 4	3	3	3 or 4	3	3	3 or 4	3 or 4	3 or 4	3 or 4
Power + Auxiliary				3+1	3+1	3+1	3+1	3+1	3+1	3+1	3+2	3+2	3+2	3+2
Rated current (Ie)	AC3 up to 440V @ 55°C		A	9	12	18	22	25	32	38	40	50	65	80
Rated opeating 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)	θ < 40°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
	IEC-60947-4	500V	A	175	175	250	250	400	450	450	800	900	1000	1000
		660-690V	A	85	85	120	120	180	180	180	400	500	630	640
Average impedence per pole	At Ith and 50Hz Milli Ω		Max.	2.5	2.5	2.5	2.5	2	2	2	1.5	1.5	1	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

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 (θ < 55°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	
	Drop out			0.1 - 0.25 Uc		0.1 - 0.3 Uc	
Average consumption DC at 20°C and at Uc	DC	Inrush	W	9	11	22	22
		Sealed	W	9	11	22	22
Average operating time at Uc	Closing time "C"		msec	40-48	52-64	85-110	95-130
	Opening time "O"		msec	6-14	8-14	20-35	20-35
Mechanical life Uc (mechanical durability)	In millions of operating cycles			30	25	20	20
Maximum operating rate (at ambient temp. of θ < 55°C)	In operating cycle/hour			3600	3600	3600	3600

Integral Auxiliary Contact Characteristics

Type		Unit	TP1- D09 ~ TP1- D80
Rated thermal current (Ith)	θ < 40°C	A	10
Rated operational voltage (Ue)	Upto	V	660

Contactors' Selection Guide
(according to the required electrical life)

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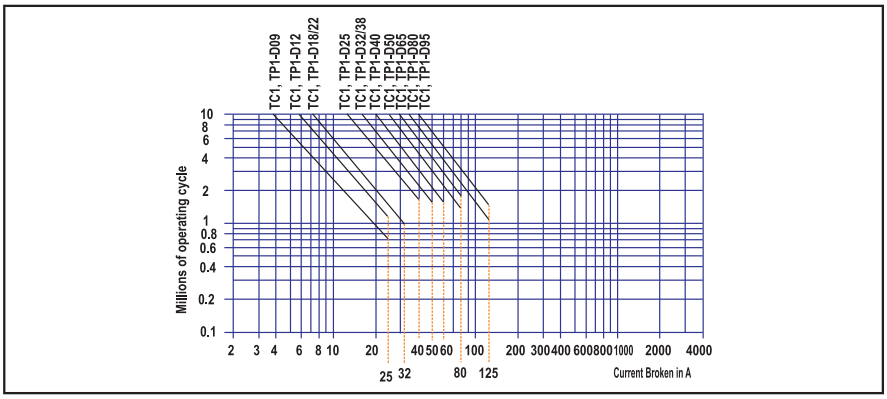
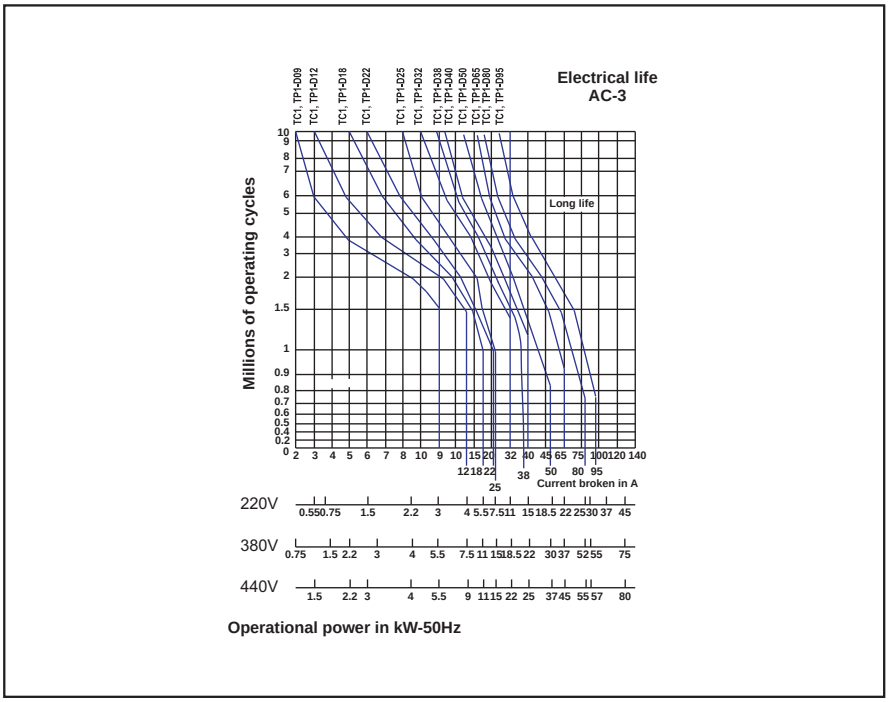
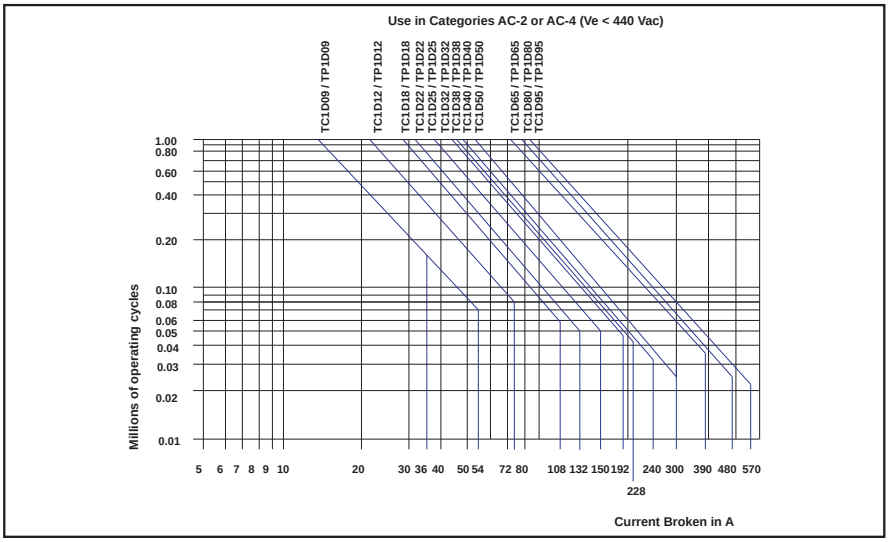
Use in Category AC-1 (Ue < 440V). Control of resistive circuits (cos ϕ > 0.95). The current broken (I_c) in category AC-1 is equal to the current (Ie) normally drawn by the load.



Use in Category AC-3 (Ue < 440V). Control of 3-phase asynchronous squirrel cage motors with breaking while 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 (Ue < 440V). Control of 3-phase asynchronous squirrel cage (AC-4) or slip ring (AC-2) motors with breaking while motor stalled. The current broken in category AC-4 is equal to 6xI_e. (I_e=rated operational current of the motor).



3 & 4 Pole Contactors with AC operating coil

Specifications

TC1-D65●●-XX

3 Pole Contactor with AC operating coil

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

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

TC1-D09004

4 Pole Contactor with AC operating coil

Maximum Current		Maximum HP						Main Pole Configuration		Catalog Number
Inductive	Resistive	Single Phase		Three Phase						
AC-3 A	AC-1 A	120V	230V	200V	230V	480V	600V	NO	NC	
9	25	0.5	1	2	2	5	7.5	4	0	TC1-D09004-XX
		0.5	1	2	2	5	7.5	0	4	TC1-D09006-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	3	3	7.5	10	0	4	TC1-D12006-XX
		1	2	-	-	-	-	2	2	TC1-D12008-XX
25	40	2	3	5	7.5	15	20	4	0	TC1-D25004-XX
		2	3	5	7.5	15	20	0	4	TC1-D25006-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
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

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

Maximum Current		Maximum HP 3 Phase				Aux. Contacts Built-in per contactor		Catalog Number
Inductive AC-3 A	Resistive AC-1 A	200V	230V	480V	600V	NO	NC	
9	25	2	2	5	7.5	0	1	TC2-D0901-XX
						1	0	TC2-D0911-XX
12	25	3	3	7.5	10	0	1	TC2-D1201-XX
						1	0	TC2-D1211-XX
18	32	5	5	10	15	0	1	TC2-D1801-XX
						1	0	TC2-D1811-XX
22	32	5	5	10	15	0	1	TC2-D2201-XX
						1	0	TC2-D2211-XX
25	40	5	7.5	15	20	0	1	TC2-D2501-XX
						1	0	TC2-D2511-XX
32	50	10	10	20	25	0	1	TC2-D3201-XX
						1	0	TC2-D3211-XX
38	50	10	10	20	25	0	1	TC2-D3801-XX
						1	0	TC2-D3811-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

TC2-D09●●-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	-	-	-

3 & 4 Pole Contactors with DC operating coil
Specifications

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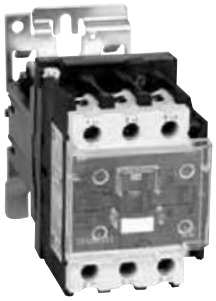


TP1-D40●●-XX

3 Pole Contactor with DC operating coil

Maximum Current		Maximum HP						Aux. Contacts Built-in per contactor		Catalog Number
Inductive	Resistive	Single Phase		Three Phase						
AC-3 A	AC-1 A	120V	230V	200V	230V	480V	600V	NO	NC	
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
22	32	1	3	5	5	10	15	1	0	TP1-D2210-XX
								0	1	TP1-D2201-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
38	50	2	5	10	10	20	25	1	0	TP1-D3810-XX
								0	1	TP1-D3801-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) (CSA) High Fault Ratings (UL) (100kA with Fuse of class J/CC)

TP1-D2500●-XX

4 Pole Contactor with DC operating coil

Maximum Current		Maximum HP						Main Pole Configuration		Catalog Number
Inductive	Resistive	Single Phase		Three Phase						
AC-3 A	AC-1 A	120V	230V	200V	230V	480V	600V	NO	NC	
9	25	0.5	1	2	2	5	7.5	4	0	TP1-D09004-XX
		0.5	1	2	2	5	7.5	0	4	TP1-D09006-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	3	3	7.5	10	0	4	TP1-D12006-XX
		1	2	-	-	-	-	2	2	TP1-D12008-XX
25	40	2	3	5	7.5	15	20	4	0	TP1-D25004-XX
		2	3	5	7.5	15	20	0	4	TP1-D25006-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
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)

Low Height DC Contactor : 9A ~ 25A *

Maximum Current		Maximum HP 1 Phase		Maximum HP 3 Phase				Catalog Number
Inductive AC-3 A	Resistive AC-1 A	120V	230V	200V	230V	480V	600V	
9	25	0.5	1.0	2	2	5	7.5	TP1-DC09-XX
12	25	1.0	2.0	3	3	7.5	10	TP1-DC12-XX
25	40	2.0	3.0	5	7.5	15	20	TP1-DC25-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

*Under UL approval

Accessories, Spare Coils

TA9-D1269

Power Connectors Wire Sets for Reversing Contactors

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 / Electric Interlocks Horizontally Mounted

Use for Contactor	Mechanical	Electromechanical
TCA2DN, TCA3DN	LA9D09978	ELA9D09978
TC1D09 ~ D32, TP1D09 ~ D32		
TC1D40 ~ D65, TP1D40 ~ D65	LA9D50978	ELA9D50978
TC1D80 ~ D95, TP1D80	LA9D80978	ELA9D80978

TA9RC980U

Coil Suppressor

Description	Voltage Ratings	Catalog Number
Varistor (AC/DC)	24 ~ 48V AC/DC	TA9AMOV980E
Clip-on mounting for 9~95A Contactor	110 ~ 240V AC/DC	TA9AMOV980U
RC Circuit (AC)	24 ~ 48V AC	TA9RC980E
Clip-on mounting for 9A~95A Contactor	110 ~ 240V AC	TA9RC980U
	380 ~ 440V AC	TA9RC980N

LA9-D09978

Spare Coils (AC)

Use for contactor AC	Catalog Number
TC1-D09~D22	TX1-D2-XX
TC1-D25~D38	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)

Use for contactor DC	Catalog Number
TP1-D09 ~ TP1-D22	TX4-D2-XX
TP1-D25 ~ TP1-D38	TX4-D4-XX
TP1-D40 ~ TP1-D65	TX4-D40-XX
TP1-D80	TX4-D80-XX
TP1-DC09 ~ TP1-DC12	TX4-DC2-XX *available coil voltage
TP1-DC25	TX4-DC4-XX *available coil voltage

TX1-D●-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

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

LA6-DK01

Replace XX with voltage code from table - 5 / 6

For Mechanical Latching Block	Table-5: For AC Voltage										
	24	48	110-115	120-127	220-225	230-240	380	400-415	440	500	660
LA6-DK01	B	E	F	G	M	U	Q	N	R	S	Y

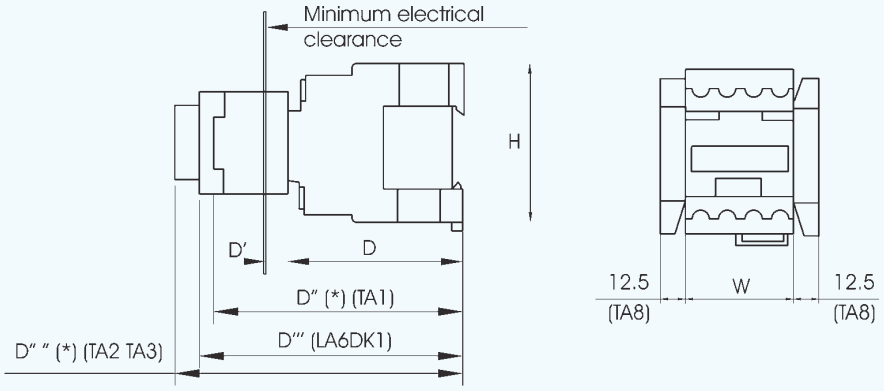
For Mechanical Latching Block	Table-6: For DC Voltage						
	24	48	72	110-115	120-127	220-225	230-240
LA6-DK01	BD	ED	SD	FD	GD	MD	UD

Contactors' Dimensions with AC operating coil

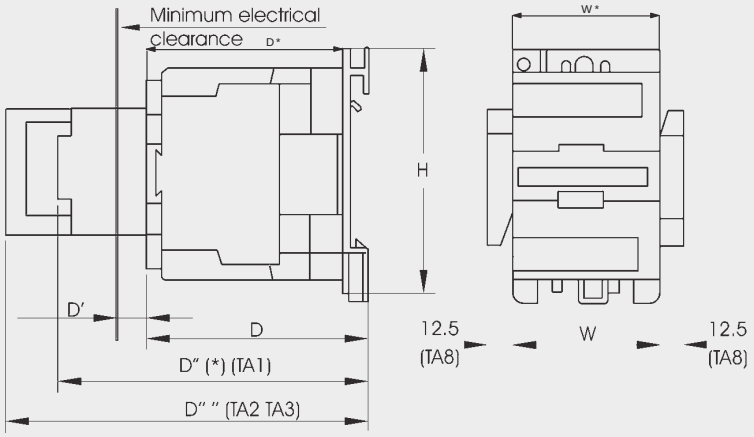
(All Dimensions in mm)

B

Product Dimensions
TC1-D09~D38
TP1-DC09/DC12/DC25



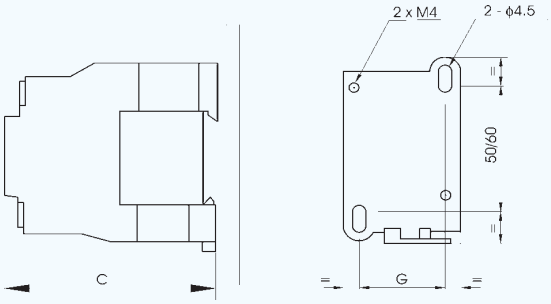
TC1-D40 ~D95



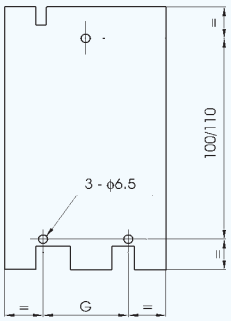
TC1-	D09	D12	D18	D22	D25	D32	D38	D40	D50	D65	D80~D95
TP1-	DC09	DC12	-	-	DC25	-	-	-	-	-	- -
W (3 Pole)	45	45	45	45	56	56	56	75	75	75	85
W* (4 Pole)	45	45	-	-	56	-	-	85	85	85	96
H (3/4 Pole)	74	74	74	74	84	84	84	127	127	127	127
D (3/4 Pole)	80	80	85	85	94	99	99	114	114	114	120
D' (3/4 Pole)	10	10	10	10	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

Panel Mounting Reference
TC1-D09~D95
TP1-DC09/DC12/DC25

TC1-D09~D38
TP1-DC09/DC12/DC25



TC1-D40~D95

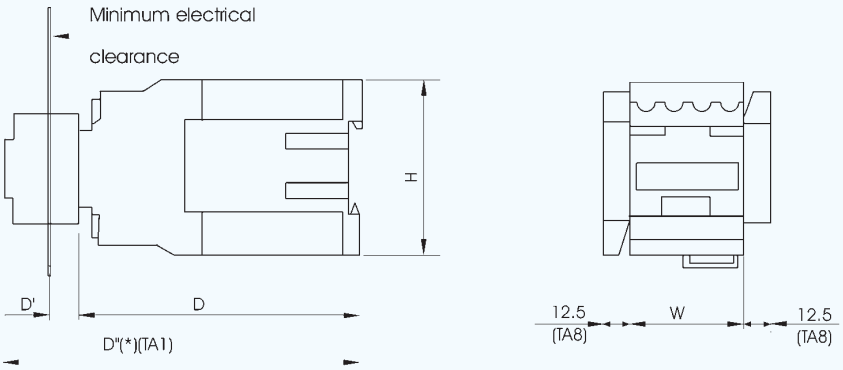


TC1-	D09	D12	D18	D22	D25	D32	D38	D40	D50	D65	D80	D95
TP1-	DC09	DC12	-	-	DC25	-	-	-	-	-	-	-
C	80	80	85	85	93	98	98	114	114	114	125	125
G	35	35	35	35	44	44	44	40	40	40	40	40

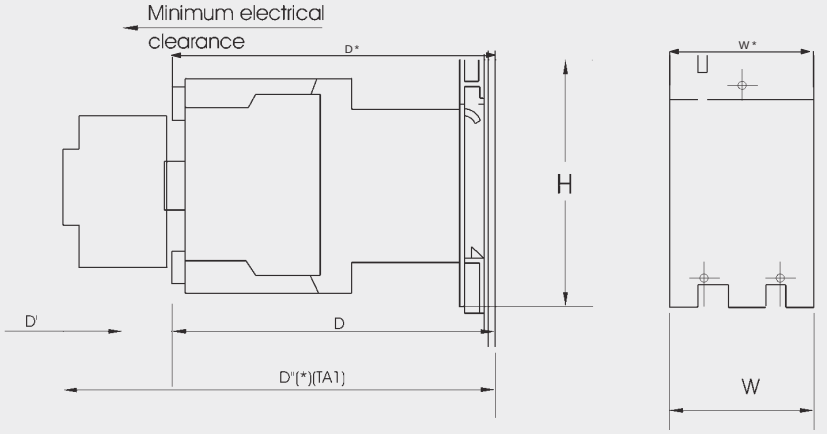
Contactors' Dimensions with DC operating coil

(All Dimensions in mm)

Product Dimensions TP1-D09~D3810



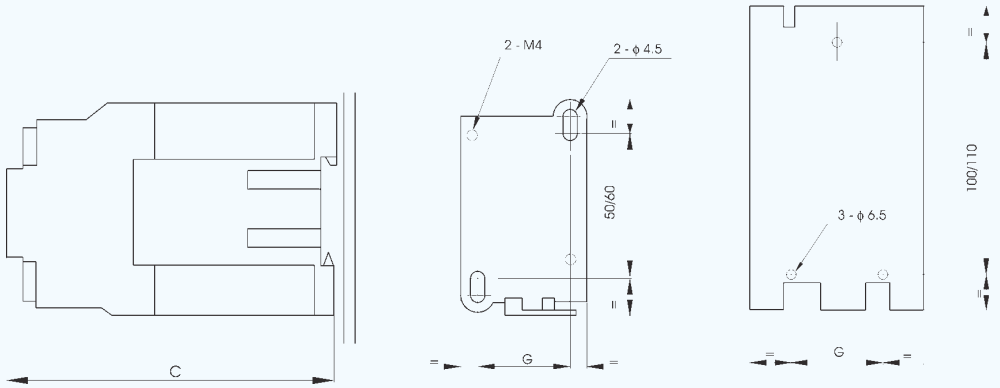
TP1-D4011~D80



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

Panel Mounting Reference

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

Control Relays
Characteristics

B

Environment

Type			TCA2DN	TCA3DN
Conforming to Standards			IEC 60947-1, 60947-5, VDE 0660	
Approvals			UL,CSA	
Degree of Protection	Protection against direct finger contact		Conforming to VDE 0106	
Ambient air Temperature around the device	Storage	°C	-40....+80	
	Operation	°C	-5....+55	
	Permissible for operation at Uc	°C	-25....+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
1/2 sine wave for 11 ms	Control relay closed		12g	11g
Vibration Resistance	Control relay open		5g	2g
5.....300Hz	Control relay closed		10g	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 (Uc)		V	12...600	
Permissible voltage variation	Operational		With 50 or 60 Hz coil: 0.8 ... 1.1 Uc With 50/60Hz coil: 0.85 ... 1.1 Uc	With standard Hz coil: 0.85 ... 1.1 Uc With wide range coil: 0.7 ...1.25 Uc
Voltage limits	Drop-out		0.3 .. 0.6 Uc	0.1 .. 0.65 Uc
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 Uc (mechanical durability)	In millions of operating cycles With: 50 or 60 Hz coil		20	-
	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

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

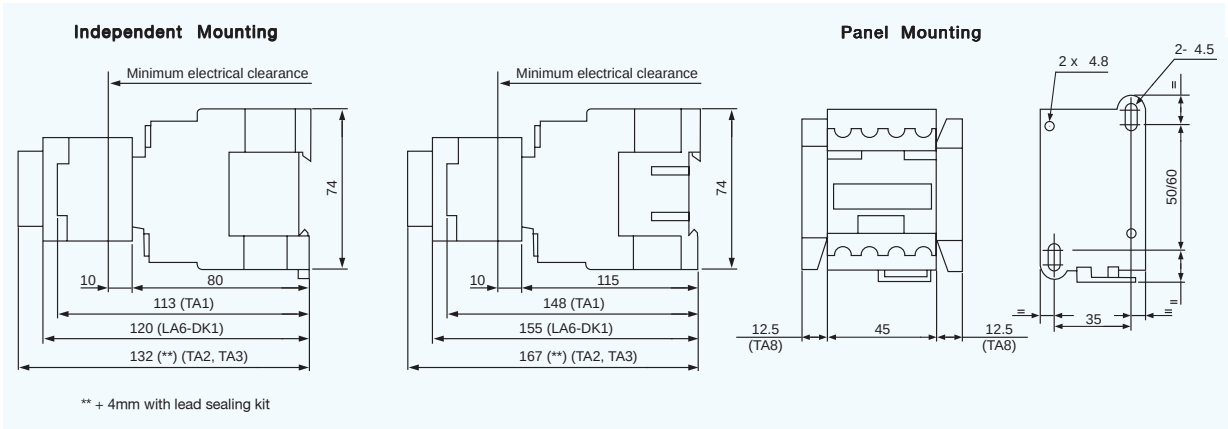
Replace XX with voltage code from table - 8

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

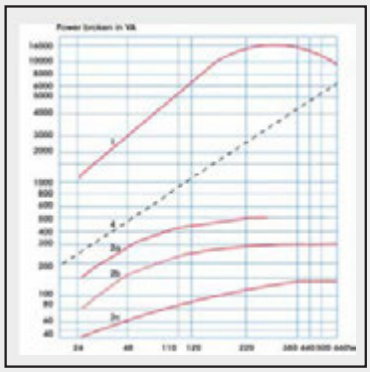
B

(All Dimensions in mm)

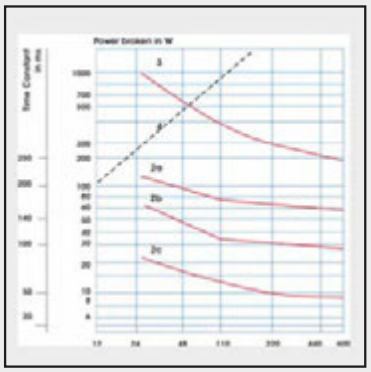


** + 4mm with lead sealing kit

AC Supply categories AC-14 & AC-15



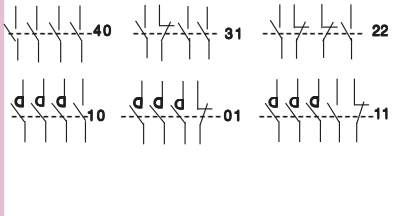
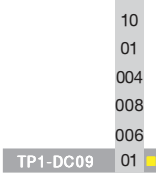
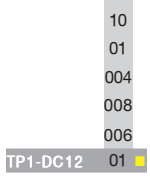
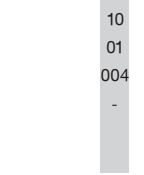
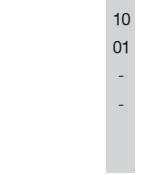
DC Supply categories DC-13



Synopsis - Contactors / Control Relays

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

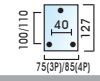
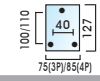
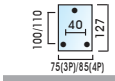
B

Code	AC / DC	TCA2-DN / TCA3-DN	TC1-D09 / TP1-D09	TC1-D12 / TP1-D12	TC1-D18 / TP1-D18	TC1-D22 / 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 θ < 55°C, 415V			Kw / hp	Kw / hp	Kw / hp	Kw / hp
			4 / 5.5	5.5 / 7.5	9 / 12.5	11/15
3 phase AC3 UL-Continuous Current	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)*		+ 30 °	+ 30°	+ 30°	+ 30°	+ 30°
Maximum thermal current Ith (θ < 40°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)	TC1-D 50 Hz	60 / 7 VA	60 / 7 VA	60 / 7 VA	60 / 7 VA	60 / 7 VA
	TC1-D 60 Hz	70/7.5 VA	70/7.5 VA	70/7.5 VA	70 / 7.5 VA	70 / 7.5 VA
	TC1-D 50 / 60 Hz	70 / 8 VA	70 / 8 VA	70 / 8 VA	70 / 8 VA	70 / 8 VA
	TP1-D TP1-DC DC	9 / 9W	9/9W 150/2.75W	9/9W 150/2.75W	9 / 9W	9 / 9W
Power dissipation per pole at	AC1	1.56W	1.56W	1.56W	2.5W	2.5W
	AC3	0.20W	0.20W	0.36W	0.80W	0.80W
Mechanical life (in millions of operations)	TC1-D 50 or 60 Hz	30	20	20	20	20
	TC1-D (50/60Hz)/TP1-DC	20	15/15	15/15	15/-	15/-
	TP1-D	30	30	30	30	30
Power contact terminal capacity mm²		2.5	4	4	6	6
Overall dimensions in mm	TC1-D					
	TP1-DC					
Projection (TCA2-D/TC1-D/TP1-DC)		80mm	80mm	80mm	85mm	85mm
Over-all dimensions in mm	TP1-D					
Projection (TCA3-D/TP1-D)		115mm	115mm	115mm	120mm	120mm
Weight (TC1-D/TP1-D/TP1-DC)	kg		0.32/0.58/0.32	0.32/0.60/0.32	0.35/0.85/-	0.35/0.85/-
Weight (TCA2/TCA3)	kg	0.32/0.58				

Coil Selection Chart

For Contactor Type	Coil Reference	Replace with ■ or ■ following codes																			
		Volts →	12	24	48	72	110	120	125	208	220	230	240	250	277	380	400	415	440	480	575	600
TC1-D09-22	TX1-D2 ■	50 Hz		B5	E5		F5				M5	P5	U5			Q5	V5	N5	R5			
TC1-D25-38	TX1-D4 ■	60 Hz		B6	E6		F6	G6		L6	M6		U6		W6	Q6			R6	T6	S6	X6
TC1-D40-95	TX1-D6 ■	50/60 Hz		B7	E7		F7	G7			M7	P7	U7			Q7	V7	N7	R7			
TP1-D09-22	TX4-D2 ■			BD	ED	SD	FD		GD		MD	PD		UD		QD	VD	ND	RD			
TP1-D25-38	TX4-D4 ■			BD	ED	SD	FD		GD		MD	PD		UD		QD	VD	ND	RD			
TP1-D40-80	TX4-D6 ■			BD	ED	SD	FD		GD		MD	PD		UD		QD	VD	ND	RD			
TP1-DC09-12	TX4-DC2 ■			BD	ED		FD				MD											
TP1-DC25	TX4-DC4 ■			BD	ED		FD				MD											

B

TC1-D25 ● ■ / TP1-D25 ● ■	TC1-D32 ● ■ / TP1-D32 ● ■	TC1-D38 ● ■ / TP1-D38 ● ■	TC1-D40 ● ■ / TP1-D40 ● ■	TC1-D50 ● ■ / TP1-D50 ● ■	TC1-D65 ● ■ / TP1-D65 ● ■	TC1-D80 ● ■ / TP1-D80 ● ■	TC1-D95 ● ■
10	10	10	-	-	-	-	-
01	01	01	11	11	11	11	11
004	-	-	004	-	004	004	-
008	-	-	008	-	008	008	-
006							
TP1-DC25 01 ■							
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
100 / 8.5 VA	100 / 8.5 VA	100 / 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 250/3.5W	11 / 11W	11 / 11W	22 / 22W	22 / 22W	22 / 22W	-	-
3.2W	5W	5W	5.4W	9.6W	6.4W	12.5W	12.5W
1.25W	2W	2W	2.4W	3.7W	4.2W	5.1W	7.2
16	16	16	16	16	16	10	10
12/12	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	
0.505/0.88/0.505	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 / - /-

3 & 4 Pole Contactors
Characteristics

B

General Characteristics

Type		Unit	LC1-FDP115A-800A, LC1FDP1154A-8004A
Rated Insulation Voltage (Ui)			
	IEC 60947-4-1	V	1500
Conforming to Standards			NFCEN60947, VDE0660, BSEN60947, JEM1038, IEC60947-1 & IEC60947-4
Approvals			UL*, CSA, IEC
Protective treatment	Standard Version		"TH"
Ambient air temperature	Storage	°C	-60 to +80
(around the device)	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 UL approval

Pole Characteristics

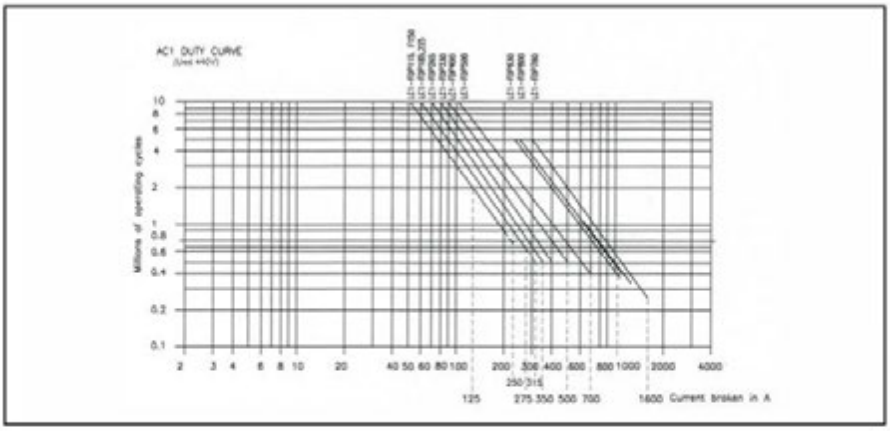
TYPE	LC1-FDP	UNIT	115A	150A	185A	225A	265A	330A	400A	500A	630A	780A	800A
Number of Poles (Power)			3 or 4	3 or 4	3 or 4	3 or 4	3 or 4	3 or 4	3 or 4	3 or 4	3 or 4	3 or 4	3 or 4
Rated current (Ie) in AC-3 θ< 55°c		A	115	150	185	225	265	330	400	500	630	780	800
Rated operating voltage upto		V	1000	1000	1000	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	25-200
Rated thermal current (Ith) θ< 40°C		A	200	250	275	315	350	400	500	700	1000	1600	1000
Rated making capacity Irms 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	-
Irms 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	0.12
Power dissipation per pole for above operational current AC-3		W	6	9	12	18	22	31	45	45	48	60	48
Tightening Torque	Power Circuit	Nm	10	18	18	35	35	35	35	35	58	58	58
Cabling			Maximum CSA										
No. of Bars			2	2	2	2	2	2	2	2	2	2	2
Bar		mm	20x3	25x3	25x3	32x4	32x4	30x5	30x5	40s5	60x5	100x5	60x5
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	12

Control Circuit Characteristics

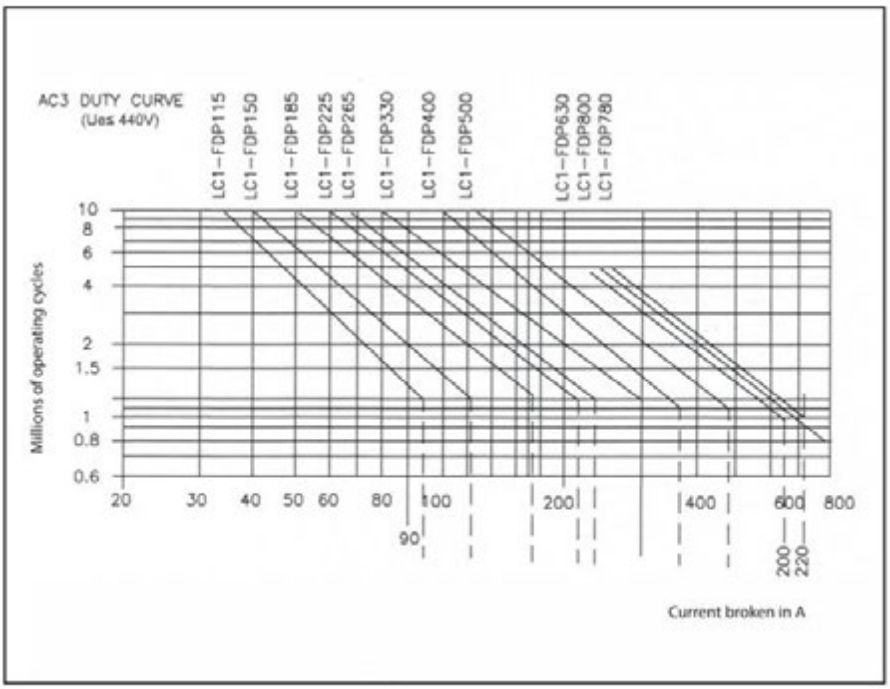
TYPE (LC1-F)		UNIT	115A	150A	185A	225A	265A	330A	400A	500A	630A	780A	800A
Rated control circuit voltage (Uc)	50 or 60 Hz	V	24...600						48...600		48...600	110...500	48...600
Control voltage limits	Operational		0.85 - 1.10Uc						0.85-1.10Uc		0.85-1.10Uc	0.85-1.10Uc	0.85-1.10Uc
Temperature θ<55°C	Drop out		0.35 - 0.55Uc						0.3-0.5Uc		0.25-0.5Uc	0.2-0.4Uc	0.25-0.5Uc
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	1200	700	1075	1100	1650	2100	1900
	In rush 60 Hz coil	VA	660	660	970	970	1445	700	1075	1100	1650	2100	1900
	In rush 40 - 400 Hz coil	VA	-	-	-	-	700	700	1075	1100	1650	2100	1900
	In rush Cosϕ		0.28	0.28	0.3	0.3	0.9	0.9	0.9	0.9	0.9	0.9	0.9
	Sealed 50 Hz coil	VA	45	45	55	55	95	10	15	18	22	50	15
	Sealed 60 Hz coil	VA	55	55	66	66	110	10	15	18	22	50	15
	Sealed 40 - 400 Hz coil	VA	-	-	-	-	10	10	15	18	22	50	22
	Sealed Cosf		0.28	0.28	0.3	0.3	0.9	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	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	100-200
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	5
	50/60 Hz coil	Cycles	10	10	10	10	10	10	10	10	5	5	5
Maximum operating rate	In operating cycle/hour		2400	2400	2400	2400	2400	2400	2400	2400	1200	600	1200
Tightening Torque	Control Circuit Connection	Nm	1.2	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	1or 2 Conductors	Sqmm	1/4	1/4	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	1/4
Flexible Cable wiht 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	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	1/4

Contactors' Selection Guide
(according to the required electrical life)

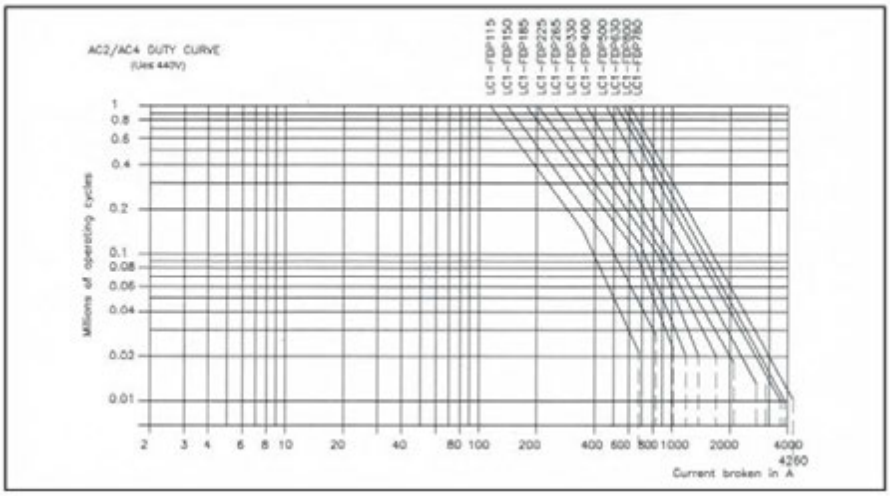
Use in Category AC-1 (Ue < 440V). Control of resistive circuits (cos ϕ > 0.95). The current broken (I_c) in category AC-1 is equal to the current (Ie) normally drawn by the load.



Use in Category AC-3 (Ue < 440V). Control of 3-phase asynchronous squirrel cage motors with breaking while 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 (Ue < 440V). Control of 3-phase asynchronous squirrel cage (AC-4) or slip ring (AC-2) motors with breaking while motor stalled. The current broken in category AC-4 is equal to 6xI_e. (I_e=rated operational current of the motor).



Product innovation is a continuous process, hence data given is subject to change without notice.

Contactors' Specifications, Spare Coils

B

LC1-FDP115A-XX

3 Pole Contactor (without AC or DC* operating coil)

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-FDP115A-■
150	250	40	50	100	125	3	-	LC1-FDP150A-■
185	275	50	60	125	150	3	-	LC1-FDP185A-■
225	315	50	65	130	155	3	-	LC1-FDP225A-■
265	350	60	75	150	200	3	-	LC1-FDP265A-■
330	400	75	100	200	250	3	-	LC1-FDP330A-■
400	500	100	125	250	300	3	-	LC1-FDP400A-■
500	700	150	200	400	500	3	-	LC1-FDP500A-■
630	1000	250	300	600	800	3	-	LC1-FDP630A-■
780	1600	Current rated				3	-	LC1-FDP780A-■
800	1000	Current rated				3	-	LC1-FDP800A-■

Note : 115A - 630A (UL) & 115A - 780A (CSA) approved (only for Standard Fault Ratings) AC coil only

LC1-FDP1154A-XX

4 Pole Contactor (without AC or DC operating coil)*

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-FDP1154A■
150	250	40	50	100	125	4	-	LC1-FDP1504A■
185	275	50	60	125	150	4	-	LC1-FDP1854A■
225	315	50	65	130	155	4	-	LC1-FDP2254A■
265	350	60	75	150	200	4	-	LC1-FDP2654A-■
330	400	75	100	200	250	4	-	LC1-FDP3304A-■
400	500	100	125	250	300	4	-	LC1-FDP4004A-■
500	700	150	200	400	500	4		LC1-FDP5004A■
630	1000	250	300	600	800	4	-	LC1-FDP6304A■
780	1600	Current Rated				4	-	LC1-FDP7804A■

- If Contactors are required with coil replace ■ with coil codes given below
- ★ Contactors' (UL)/(CSA) listing under process

Coils (Replace ■ with coil code)

For Contactors	Catalog Number	
	AC	DC
F115A - F150	LX1FFXX	LX4FFXX
F185 - F225	LX1FGXX	LX4FGXX
F265 - F330	LX1FH.2XX	LX4FHXX
F400	LX1FJXX	LX4FJXX
F500	LX1FKXX(3P)LX1FLXX(4P)	LX4FKXX(3P)LX4FLXX(4P)
F630	LX1FLXX	LX4FLXX
F780	LX1FXXX	LX4FXXX
F800	LX4F8XX	LX4F8XX

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	600	660
F115, F150	50 Hz	✓	✓	✓	×	×	✓	×	×	✓	✓	✓	×	✓	✓	✓	✓	×	✓	✓	×
F185, F225	60 Hz	✓	✓	✓	✓	✓	×	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	×	✓	✓
F265, F330	40-400Hz	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	×	✓	×	✓	×	✓	✓	✓	×
F400,F500,F630	40-400Hz	×	✓	✓	×	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	×	✓	✓	×
F780	40-400Hz	×	✓	×	×	✓	×	×	×	✓	×	✓	×	×	×	✓	×	✓	×	×	×
F800	40-400Hz	×	✓	✓	×	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	×	✓	✓	×

- 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	✓	✓	✓	×	✓	✓	×	✓	✓
F225, F265, F330	✓	✓	✓	×	✓	✓	×	✓	✓
F115, F150, F185	✓	✓	✓	×	✓	✓	×	✓	✓
F400,F500	✓	✓	✓	×	✓	✓	×	✓	✓
F630	×	✓	✓	×	✓	✓	×	✓	✓
F780	×	×	✓	✓	×	✓	✓	✓	✓
F800	×	×	✓	✓	×	✓	✓	✓	✓

Note : Protected shrouds for main poles available & to be ordered seperately from page B-25

LA9-FF970

Mechanical Interlocks Horizontally Mounted

For Contactor Type	Catalog Number
LC1-FDP115A	LA9-FF970
LC1-FDP150A	
LC1-FDP185A	LA9-FG970
LC1-FDP225A	
LC1-FDP265A	LA9-FJ970
LC1-FDP330A	
LC1-FDP400A	
LC1-FDP500A	
LC1-FDP630A / LC1-FDP800A	LA9-FL970

Mechanical Interlocks Vertically Mounted

For Contactor Type	Catalog Number
LC1-FDP115A	LA9-FF4F
LC1-FDP150A	
LC1-FDP185A	LA9-FG4G
LC1-FDP225A	
LC1-FDP265A	LA9-FH4H
LC1-FDP330A	LA9-FJ4J
LC1-FDP400A	
LC1-FDP500A	LA9-FK4K
LC1-FDP630A / LC1-FDP800A	LA9-FL4L
LC1-FDP780A	LA9-FX970*

LA9-FX970***

Main Contact Sets** for 3 Pole Contactor

For Contactor Type	Catalog Number
LC1-FDP115A	LA5-FF431 (F115)
LC1-FDP150A	LA5-FF431 (F150)
LC1-FDP185A	LA5-FG431 (F185)
LC1-FDP225A	LA5-FG431 (F225)
LC1-FDP265A	LA5-FH431 (F265)
LC1-FDP330A	LA5-F400803 (F330)
LC1-FDP400A	LA5-F400803 (F400)
LC1-FDP500A	LA5-F500803 (F500)
LC1-FDP630A	LA5-F630803 (F630)
LC1-FDP780A	LA5-F780801 (F780)***
LC1-FDP800A	LA5-F800803 (F800)

Main Contact Sets** for 4 Pole Contactor

For Contactor Type		Catalog Number
LC1-FDP1154A		LA5-FF441 (F1154)
LC1-FDP1504A		LA5-FF441 (F1504)
LC1-FDP1854A		LA5-FG441 (F1854)
LC1-FDP2254A		LA5-FG441 (F2254)
LC1-FDP2654A		LA5-FH441 (F2654)
LC1-FDP3304A		LA5-F400804 (F3304)
LC1-FDP4004A		LA5-F400804 (F4004)
LC1-FDP5004A		LA5-F500804 (F5004)
LC1-FDP6304A		LA5-F630804 (F6304)
LC1-FDP7804A		LA5-F780801 (F7804)***

* 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).

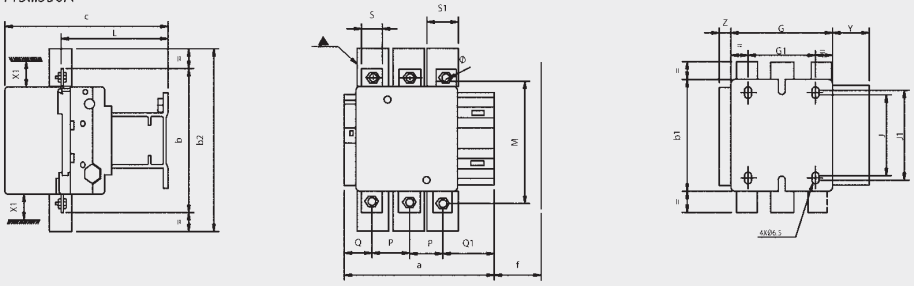
*** Set of main contacts provided is 1 set of 2 blocks for one pole

Contactors' Dimensions with AC/DC operating coil

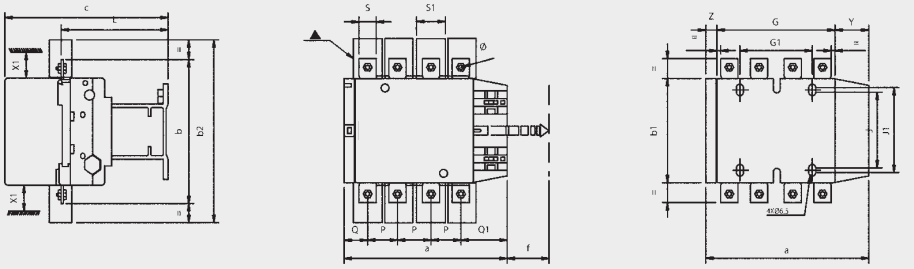
(All Dimensions in mm)

B

LC1-FDP115...330A

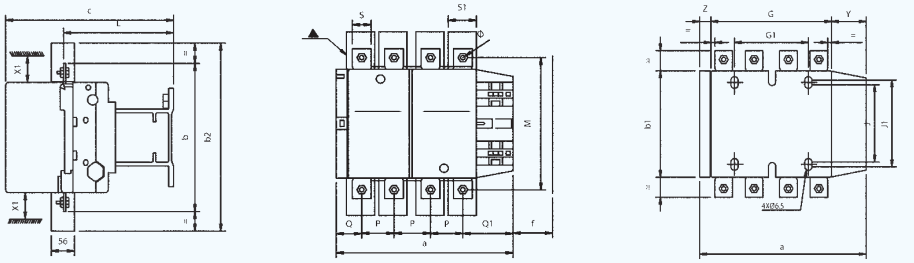


LC1-FDP1154...2654A



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

LC1-FDP3304A



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

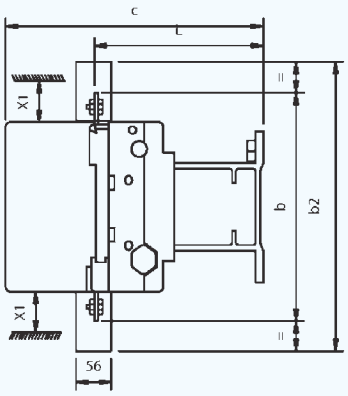
LC1-	a	b	b1	b2	c	f	G	G1	J	J1	L	M	P	Q	Q1	S	S1	Y	Z	Ø
FDP115A	163.5	162	137	265	172	131	106	80	106	120	107	147	37	29.5	60	15	27	44	13.5	M6
FDP1154A	200.5	162	137	265	172	131	143	80	106	120	107	147	37	29.5	60	15	27	44	13.5	M6
FDP150A	163.5	171	137	301	172	131	106	80	106	120	107	150	40	26.5	57.5	20	34	44	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

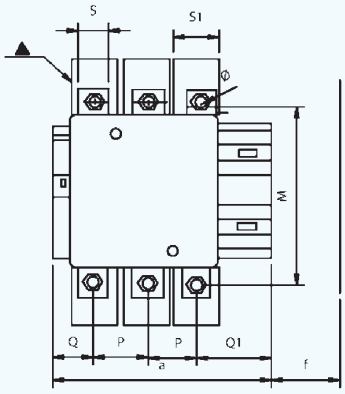
X1(mm) = Minimum electrical clearance according to operating voltage & breaking capacity		
LC1-	200 to 500V	600 to 1000V
FDP115A/1154A	10	15
FDP150A/1504A	10	15
FDP185A/1854A	10	15
FDP225A/2254A	10	15
FDP265A/2654A	10	15
FDP330A/3304A	10	15

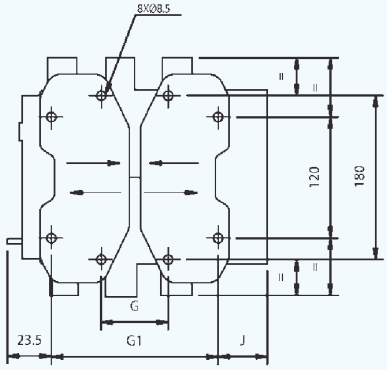
Contactors' Dimensions with AC/DC operating coil

(All Dimensions in mm)

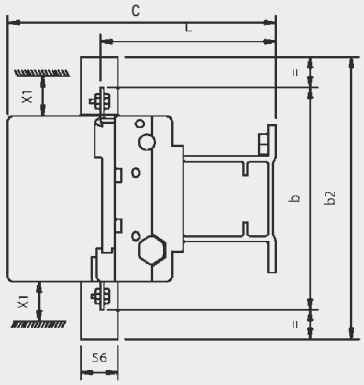
LC1-FDP400A/LC1-FDP500A

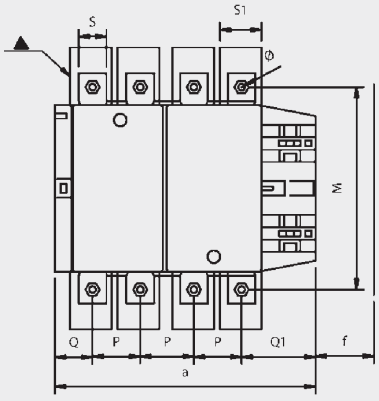


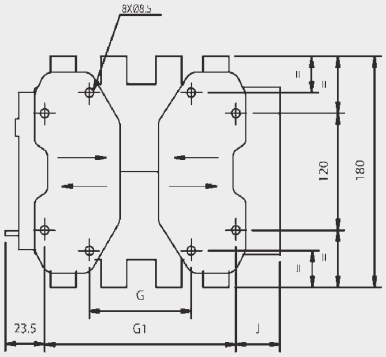




LC1-FDP4004A







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

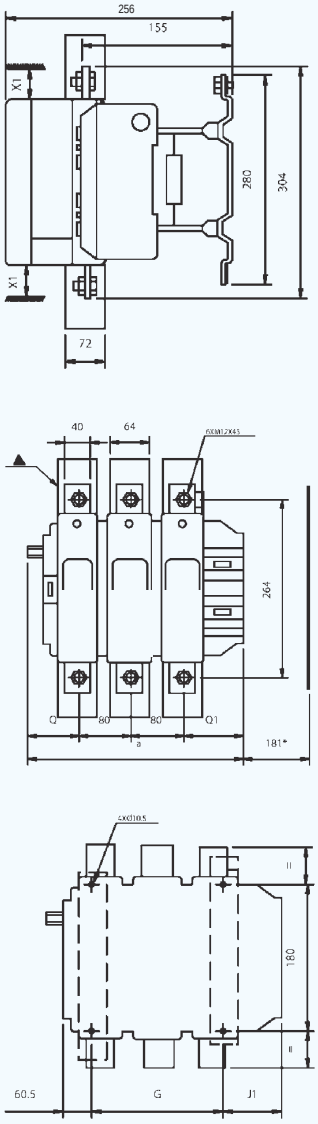
X1(mm) = Minimum electrical clearance according to operating voltage & breaking capacity		
LC1-	200 to 500V	600 to 1000V
FDP400A	15	20
FDP500A	15	20

Contactors' Dimensions with AC/DC operating coil

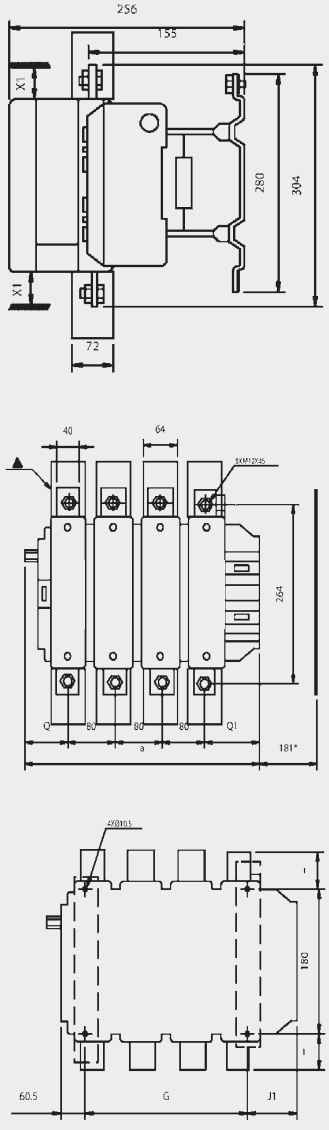
(All Dimensions in mm)

B

LC1-FDP630A



LC1-FDP5004A/LC1-FDP6304A



* - minimum distance required for coil removal

▲ Power terminal protection shroud

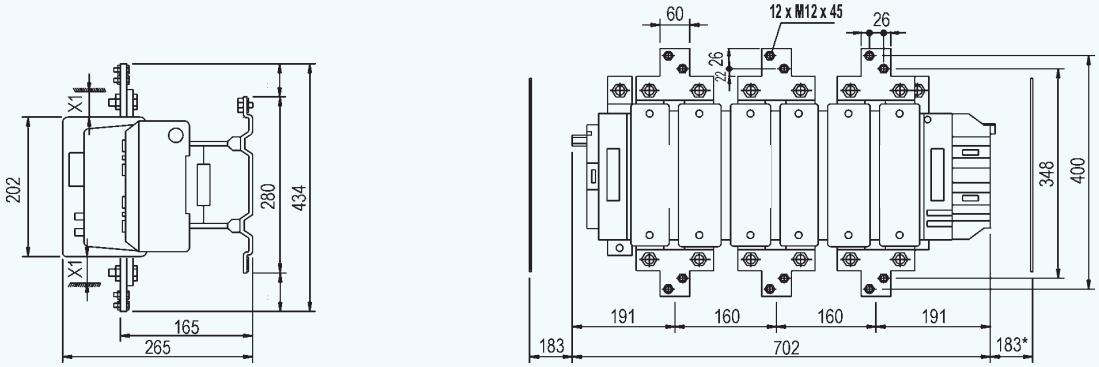
LC1-	a	b2	G*	Gmin	Gmax	J1	Q	Q1	S	S1
FDP5004A	389	464	240	150	275	68.5	60	89	25	64
FDP630A	306	464	180	100	195	68.5	60	89	25	64
FDP6304A	389	464	240	150	275	68.5	60	89	30	64
FDP800A	306	464	180	100	195	68.5	60	89	25	64
FDP8004A	389	464	240	150	275	68.5	60	89	30	64

X1(mm) = Minimum electrical clearance according to operating voltage & breaking capacity		
LC1-	200 to 500V	600 to 1000V
FDP630A	20	30
FDP5004A	15	20

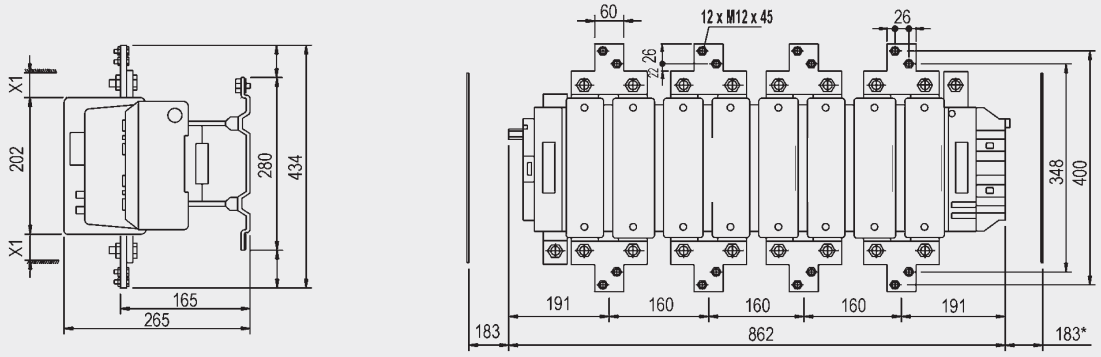
Contactors' Dimensions with AC/DC operating coil

(All Dimensions in mm)

LC1-FDP780A



LC1-FDP7804A



* - minimum distance required for coil removal

X1(mm) = Minimum electrical clearance according to operating voltage & breaking capacity		
LC1-FDP780A/7804A	200 to 500V	600 to 1000V
	30	35

robusTa (115A ~ 800A)

Synopsis - Contactors

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

Coil Reference (AC)

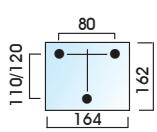
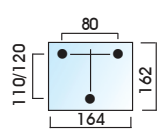
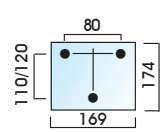
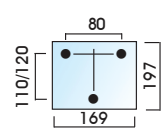
Contactor	Volts AC	24	48	110	115	120	127	200	208	220	230	240	277	380	400	415	440	480	500	660
F115, F150	50 Hz	✓	✓	✓	×	×	✓	×	×	✓	✓	✓	×	✓	✓	✓	✓	×	✓	×
F185, F225	60 Hz	✓	✓	✓	✓	✓	×	✓	✓	✓	✓	✓	✓	✓	×	✓	✓	✓	×	✓
F265, F330	40-400Hz	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	×	✓	×	✓	×	✓	✓	×
F400,F500,F630	40-400Hz	×	✓	✓	×	✓	✓	✓	✓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

Coil Reference (DC)

Volt DC	24	48	110	120	125	220	240	250	440
F115, F150, F185	✓	✓	✓	×	✓	✓	×	✓	✓
F225, F265, F330	✓	✓	✓	×	✓	✓	×	✓	✓
F115, F150, F185	✓	✓	✓	×	✓	✓	×	✓	✓
F400,F500	✓	✓	✓	×	✓	✓	×	✓	✓
F630	×	✓	✓	×	✓	✓	×	✓	✓
F780	×	×	✓	✓	×	✓	✓	✓	✓

3 Pole

4 Pole

Code		AC / DC	LC1-FDP115A+❶	LC1-FDP150A+❶	LC1-FDP185A+❷	LC1-FDP225A+❷
			LC1-FDP1154A+❶	LC1-FDP1504A+❶	LC1-FDP1854A+❷	LC1-FDP2254A+❷
Maximum rated operational voltage			690V	690V	690V	690V
Maximum rated current for motor control (3 phase 440V, 50-60Hz, for AC3 Duty)			115A	150A	185A	225A
Maximum standard power rating for motor control for AC3 Duty θ < 55°C, 415V			Kw / hp	Kw / hp	Kw / hp	Kw / hp
			59 / 80	80 / 108	100 / 136	110 / 148
3 phase AC3	230V	HP	40	50	60	75
	460/480V	HP	75	100	125	130
	575/600V	HP	100	125	150	150
Mounting position (w.r.t. normal vertical mounting plane)*			+ 30 °	+ 30°	+ 30°	+ 30°
Maximum thermal current Ith (θ < 40°C)			200A	250A	275A	315A
Maximum operating rate (operations / hr)		AC	2400	2400	2400	2400
		DC	2400	2400	2400	2400
Average coil consumption (inrush / sealed)		50 Hz	550 / 45 VA	550 / 45 VA	805 / 55 VA	805 / 55 VA
		60 Hz	660 / 55 VA	660 / 55 VA	970 / 66 VA	970 / 66 VA
		40 -400 Hz	-	-	-	-
		DC	560 / 4.5W	560 / 4.5W	800 / 5W	800 / 5W
Heat dissipation at		AC	12 to 16W	12 to 16W	18 to 24W	18 to 24W
		DC	4.5W	4.5W	5W	5W
Mechanical life (in millions of operations)		50 or 60 Hz	10	10	10	10
		50 / 60 Hz	-	-	-	-
Power contact terminal capacity mm²			95	120	150	185
Over-all dimensions in mm						
Projection (LC1-F)			165mm	165mm	176mm	176mm

Note: 4P F-Range Contactor (UL) under proces .

Coil Reference	AC ■	DC ■		
❶	❷	❸	❹	
LX1FF ■	LX1FG ■	LX1FH-2 ■	LX1FJ ■	
LX4FF ■	LX4FG ■	LX4FH-2 ■	LX4FJ ■	
❺	❻	❼		
LX1FK ■	LX1FL ■	LX1FX ■		
LX4FK ■	LX4FL ■	LX4FX ■		

❼ - 2 coils in series

❽

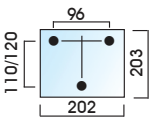
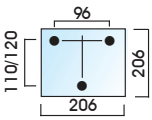
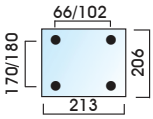
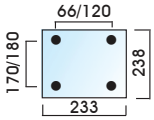
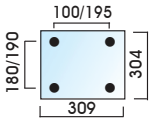
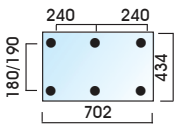
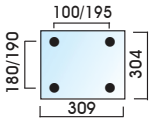
DC Coil reference for LC1F800A Contactor		
Control Circuit Voltage	Voltage Code	Reference*
110/120	FW	LX4F8FW
220/240	MW	LX4F8MW
380/400	QW	LX4F8QW

* For AC - Coil will be supplied with rectifier
add suffix DRTE4U in case of FW (110/120) & MW (220/240)
add suffix DRTE4S in case of QW (380/400)

B

LC1-FDP265A+❸	LC1-FDP330A+❸	LC1-FDP400A+❹	LC1-FDP500A+❻	LC1-FDP630A+❻	LC1-FDP780A+❼	LC1-FDP800A+❽
LC1-FDP2654A+❸	LC1-FDP3304A+❸	LC1-FDP4004A+❹	LC1-FDP5004A+❻	LC1-FDP6304A+❻	LC1-FDP7804A+❼	

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

690V	690V	690V	690V	690V	690V	690V
265A	**330A**	**400A**	**500A**	**630A**	**780A***	**800A**
Kw / hp	**Kw / hp**	**Kw / hp**	**Kw / hp**	**Kw / hp**	**Kw / hp**	**Kw / hp**
140 / 190	**180 / 240**	**220 / 300**	**280 / 380**	**375 / 500**	**425 / 580**	**450 / 610**
75	100	125	200	300	-	-
150	200	250	400	600	-	-
200	250	300	500	800	-	-
+ 30°	+ 30°	+ 30°	+ 30°	+ 30°	+ 30°	+ 30°
350A	**400A**	**500A**	**700A**	**1000A**	**1600A**	**1000A**
2400	2400	2400	2400	1200	600	1200
2400	2400	2400	2400	1200	600	1200
1200 / 95 VA	700 / 10 VA	1075 / 15 VA	1100 / 18 VA	1650 / 22 VA	2100 / 50 VA	1900 / 15 VA
1445 / 110 VA	700 / 10 VA	1075 / 15 VA	1100 / 18 VA	1650 / 22 VA	2100 / 50 VA	1900 / 15 VA
-	700 / 10 VA	1075 / 15 VA	1100 / 18 VA	1650 / 22 VA	2100 / 50 VA	1900 / 15 VA
750 / 5W	750 / 5W	1000 / 6W	1100 / 6W	1600 / 9W	2 x 1000 / 2 x 21W	1900 / 15W
30 to 40W	12W	14W	18W	20W	2 x 22W	25W
5W	-	6W	6W	9W	2 x 21W	25W
10	10	10	10	5	5	5
-	10	10	10	5	5	5
240	240	2 x 150	2 x 240	2 x 60 x 5	2 x 60 x 5	2 x 60 x 5
						
207mm	213mm	181mm	213mm	226mm	250mm	226mm

* LC1F 780/ only (SP) listing

B

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 <40°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		MΩ		>10		
Time Delay	Ambient air temperature for operation°C			-40...+70		
(TA2D & TA3D contact blocks)	Repeat accuracy		-	± 5%	± 5%	
Accuracy only valid for setting range	Drift upto 0.5 million operating cycles			+ 15%	+ 15%	
indicated on the front face	Drift depending on ambient air temp.	-		0.25% per°C	0.25% per °C	-
Mechanical Life	In millions of operating cycles		30	5	5	30

TA1-DN22

TA8-DN11

TA1-DN20

TA2-DT2

Standard, instantaneous auxilliary contact blocks

No. of Contacts	Contacts NO	Contacts NC	Snap-On Mounting	Catalog Number
4	2	2	To the front of TC1D09~D95 LC1F115A~800A TP1D09~D80 TP1-DC09/12/25 TCA2DN/TCA3DN	TA1DN22
	1	3		TA1DN13
	4	0		TA1DN40
	0	4		TA1DN04
	3	1		TA1DN31
	1	1		TA1DN11
2	2	0		TA1DN20
	0	2		TA1DN02
1	1	0	To the front of TC1D09~D95 TP1D09~D80 TP1DC09/12/25	TA1DN10
	0	1		TA1DN01
2	1	1	To the side of TC1D09~D95 TP1D09~D80 TP1DC09/12/25 TCA2DN / TCA3DN	TA8DN11
	2	0		TA8DN20

Pneumatic Timer Block (Front Mounted)

Description	Contacts NO	Contacts NC	Range	Catalog Number
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 + 15 msec between the opening of NC contact to the closing of NO contact (for Star Delta application)

Shrouds, Connectors, Mechanical Interlocks

TCET030SD

LA9-F701

Electronic Timer

Description	Contacts		Range	Catalog Number
	NO	NC		
Star Delta Timer	1	1	0 ... 30s	TCET030SD415VAC

Protective Shroud Covers for 115A ~ 800A Contactors

For 3P Contactor Type	Catalogue Number		
LC1-F115A	LA9-F701	LC1-F115 4A	LA9-F706
LC1-F150A	LA9-F702	LC1-F150 4A	LA9-F707
LC1-F185A		LC1-F185 4A	
LC1-F225A	LA9-F703	LC1-F225 4A	LA9-F708
LC1-F265A		LC1-F265 4A	
LC1-F330A		LC1-F330 4A	
LC1-F400A		LC1-F400 4A	
LC1-F500A		LC1-F500 4A	
LC1-F630A	LA9-F704	LC1-F630 4A	LA9-F709
LC1-F800A		LC1-F800 4A	

Coil Suppressor

Description	Voltage Ratings	Catalog Number
Wire mounting 250VAC/400VDC max	LC1F115~330	LA9F980(BR)
	LC1F400~780	LA9DO9980(BR)

Power Connectors Wire Sets for Reversing Contactors

Catalog Number	With two identical contactors
LC1-FDP115A	LA9-FF976
LC1-FDP150A	LA9-F15076
LC1-FDP185A	LA9-FG976
LC1-FDP225A	LA9-F22576
LC1-FDP265A	LA9-FH976
LC1-FDP330A	LA9-FJ976
LC1-FDP400A	LA9-FJ976
LC1-FDP500A	LA9-FK976
LC1-FDP630A	LA9-FL976
LC1-FDP800A	LA9-F80076

Set of Power Connections - 3 Pole Changeover Contactor Pair - On Request

Contactor Type	With two identical contactors
LC1-F115A	LA9-F11582
LC1-F150A	LA9-F15082
LC1-F185A	LA9-F18582
LC1-F225A	LA9-F22582
LC1-F265A	LA9-F26582
LC1-F330A	LA9-F33082
LC1-F400A	LA9-F40082
LC1-F500A	LA9-F50082
LC1-F630A	LA9-F60082

3 Pole Mechanically Interlocked 115A ~ 800A Contactors - On Request

Contactor Type	Catalog Number
LC1-F115A	LC2-F115A
LC1-F150A	LC2-F150A
LC1-F185A	LC2-F185A
LC1-F225A	LC2-F225A
LC1-F265A	LC2-F265A
LC1-F330A	LC2-F330A
LC1-F400A	LC2-F400A
LC1-F500A	LC2-F500A
LC1-F630A	LC2-F630A

1 "*" Reversers assembled using two contactors of identical rating type etc.

2 Replace "**" with available coils BD for 24V DC, ED for 48V DC and EED for 54V DC

Overload Relays
Characteristics

B

Environment

Conforming to standards			IEC 60947-1, IEC 60947-4-1, NFCEN 60947-4-1, VDE 0660, BSEN 60947
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
Shock resistance	Premissible acceleration		15gn - 11ms, comforming 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			10	10	10	10
Rated insulation Voltage (Ui)	Conforming to IEC 60947-4-1	V	TR2-D09301~D32355:690V		TR2D40355~D95365:1000V	
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	16...18	17...70	63...193
Connecting to screw clamp terminal			Minimum / Maximum CSA			
Flexible cable without cable end	1 conductor	mm²	1.5 / 10	1.5 / 10	4 / 35	4 / 50
Flexible cable with cable end	1 conductor	mm²	1 / 4	1 / 6	4 / 35	4 / 50
Solid cable without cable end	1 conductor	mm²	1 / 6	1.5 / 4	4 / 35	4 / 50
Tightening torque		Nm	1.7	2.5	9	9
Connection to spring terminals			Mimimum / Maximum CSA			
Flexible cable without cable end	1 conductor	mm²	1.5 / 4	1.5 / 4	-	-
SolidCable without cable end	1 conductor	mm²	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 Curent		A			5			
Maximum consumption of operating	AC Supply	V	24	48	110	220	380	600
coil of controlled contactors (Occassional		VA	100	200	400	600	600	600
operating cycles of contact 95 - 96)		V	24	48	110	220	440	-
		W	100	100	50	45	25	-
Short circuit protection	By gG or BS fuse Max. rating or by GB2 circuit-breaker	A	5					
Connection to screw clamp terminal			Minimum / Maximum CSA					
Flexible cable without cable end	1 or 2 conductors	mm²	1 / 2.5					
Flexible cable withcable end	1 or 2 conductors	mm²	1 / 2.5					
Solid cable without cable end	1 or 2 conductors	mm²	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	mm²	1 / 2.5					
Solid cable without cable end	1 or 2 conductors	mm²	1 / 2.5					

Overload Relays - Specifications

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

RELAY REFERENCE	RELAY SETTING RANGE (A)	STANDARD POWER RATINGS OF 3-PHASE MOTORS 50/60Hz, AC3 CATEGORY					BACK UP FUSE RATING		BASE PLATE* REFERENCE
		220V KW	380V KW	415V KW	440V KW	660V KW	aM(A)	g1 (A)	
TR2-D09301	0.1 to 0.16	-	-	-	-	-	0.25	2	
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	TA7D0964
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-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	TA7D4064*
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	
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	

TR2-D25322

LR1-F105

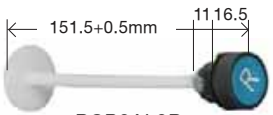
Notes : 1. Protected shrouds for main poles or power poles to be ordered seperately for LR1 Relays

2. Standard Fault Ratings with TR2 Relay.

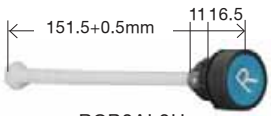
*Under UL/CSA approval

Reset Extended Push Button

Description	Reference
Reset Extended Push Button (Round Type)	RCB2AL8R
Reset Extended Push Button (Hex Type)	RCB2AL8H



RCB2AL8R



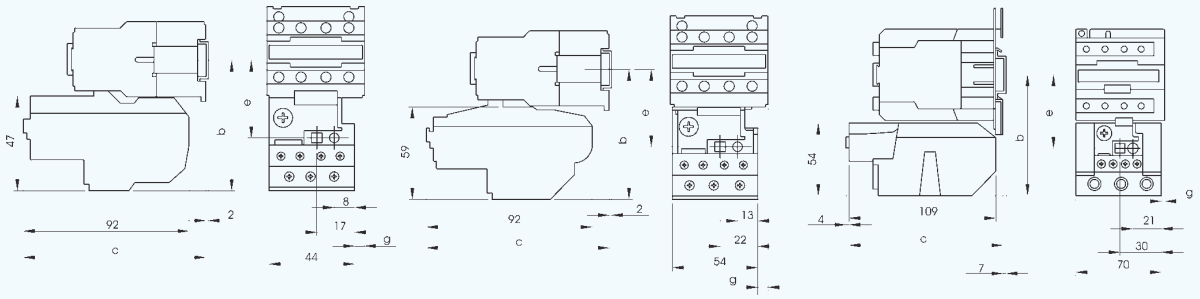
RCB2AL8H

Overload Relays

Dimensions, Tripping Curves

(All Dimensions in mm)

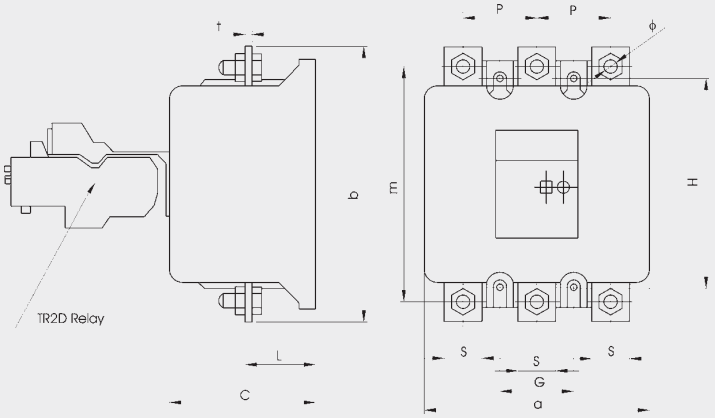
B



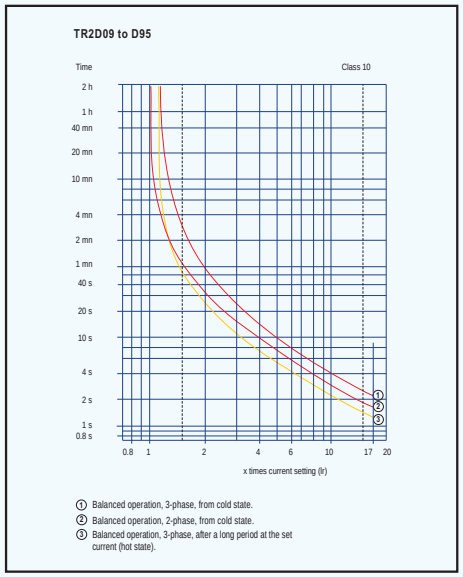
TR2D09301~D25322				
Mounting With	b	c	e	g
TC1D09, D12, D18 TP1DC09, DC12	81	98	50	0
TC1D25 / TP1DC25	86	108	55	10.7
TC1D32	86	109	55	8.1
TP1D09, D12, D18	81	133	50	0
TP1D25	86	152	55	10.7
TP1D32	86	153	55	8.1

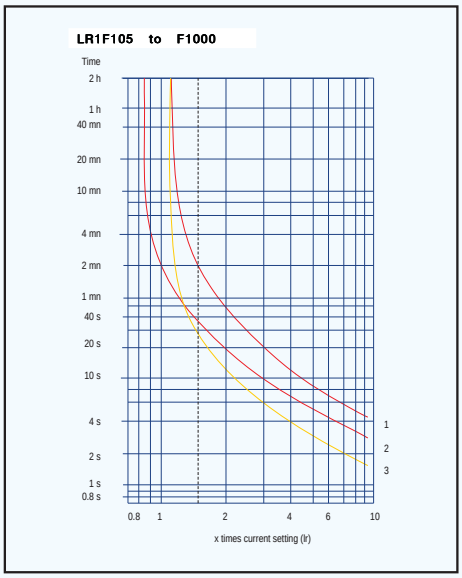
TR2D32353~32355				
Mounting With	b	c	e	g
TC1D25/TP1DC25	97.5	98	60	1.5
TC1D32	97.5	98	60	0.5
TP1D25	97.5	155	60	1.5
TP1D32	97.5	155	60	0.5

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





C

Capacitor Duty Contactors

Capacitor Duty Contactors

Characteristics, Specifications & Dimensions

C

TC1-D12K02XX

TC1-D20K11XX

TC1-D60K12XX

Why special Capacitor Duty Contactor

Product Range

415V AC rating 10kVAR thru 60 kVAR, available in eight ratings, conforming to IEC - 60947, IS 13947-4-1

Benefits

- Conforms to utilization category AC6b as per IS 13947-4-1/IEC 60947-4-1
- Saves cost of expensive replacements
- High electrical life
- Reduced watt loss during 'ON' condition, saves energy
- High Safety
- No risk of dangerous voltage
- Switching of Capacitor bank in parallel without de-rating
- Less maintenance & down-time

Specifications

KVAR* rating at 50/60 Hz θ < 55°C (3)			Instantaneous Auxiliary Contacts		Maximum Operating Rate	Electrical Life at rated load	Catalog Number
200V 240V	400V 440V	660V 690V	NO	NC	Operations hour	Operations	
5.5	10.0		1	1	240	200000	TC1-D10K11XX
			0	2			TC1-D10K02XX
6.7	12.5	18	1	1	240	200000	TC1-D12K11XX
			0	2			TC1-D12K02XX
8.5	16.7	25	1	1	240	200000	TC1-D16K11XX
			0	2			TC1-D16K02XX
10.0	20.0	30	1	1	240	100000	TC1-D20K11XX
			0	2			TC1-D20K02XX
15.0	25.0	36	1	1	240	100000	TC1-D25K11XX
			0	2			TC1-D25K02XX
20.0	33.3	48	1	2	240	100000	TC1-D33K12XX
25.0	40.0	58	1	2	100	100000	TC1-D40K12XX
40.0	60.0	92	1	2	100	100000	TC1-D60K12XX

Notes

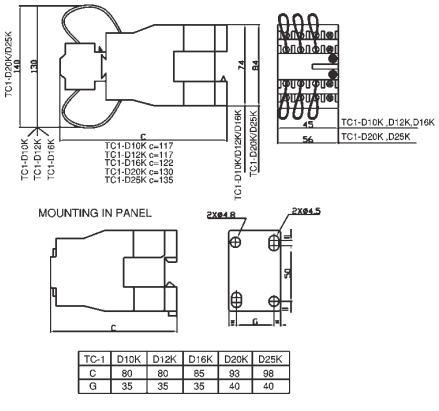
(1) Additional Aux. Contact block (Side mounted) type TA8DN11 or TA8DN20 can be mounted, if required
(2) Contactor Type TC1D12K - TC1D25K : Suitable type clip-on mounting into 35mm DIN rail
Contactor Type TC1D33K-TC1D60K : Suitable type clip-on mounting into 35mm & 75mm DIN rail
(3) Average temperature over a 24-hour period, in accordance with IEC 70 and 831

Replace XX with voltage code from table - 1

Table-1 : XX-AC Coil Voltages

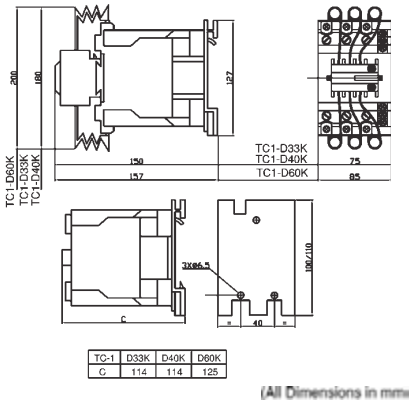
Volts AC	24	48	110	120	208	220	230	240	277	380	400	415	440	480	575	600
50 Hz	B5	E5	F5			M5	P5	U5		Q5	V5	N5	R5			
60 Hz	B6	E6	F6	G6	L6	M6		U6	W6	Q6			R6	T6	S6	X6
50/60 Hz	B7	E7	F7	G7		M7	P7	U7		Q7	V7	N7	R7			

TC1-D10K ,D12K,D16K,D20K,D25K



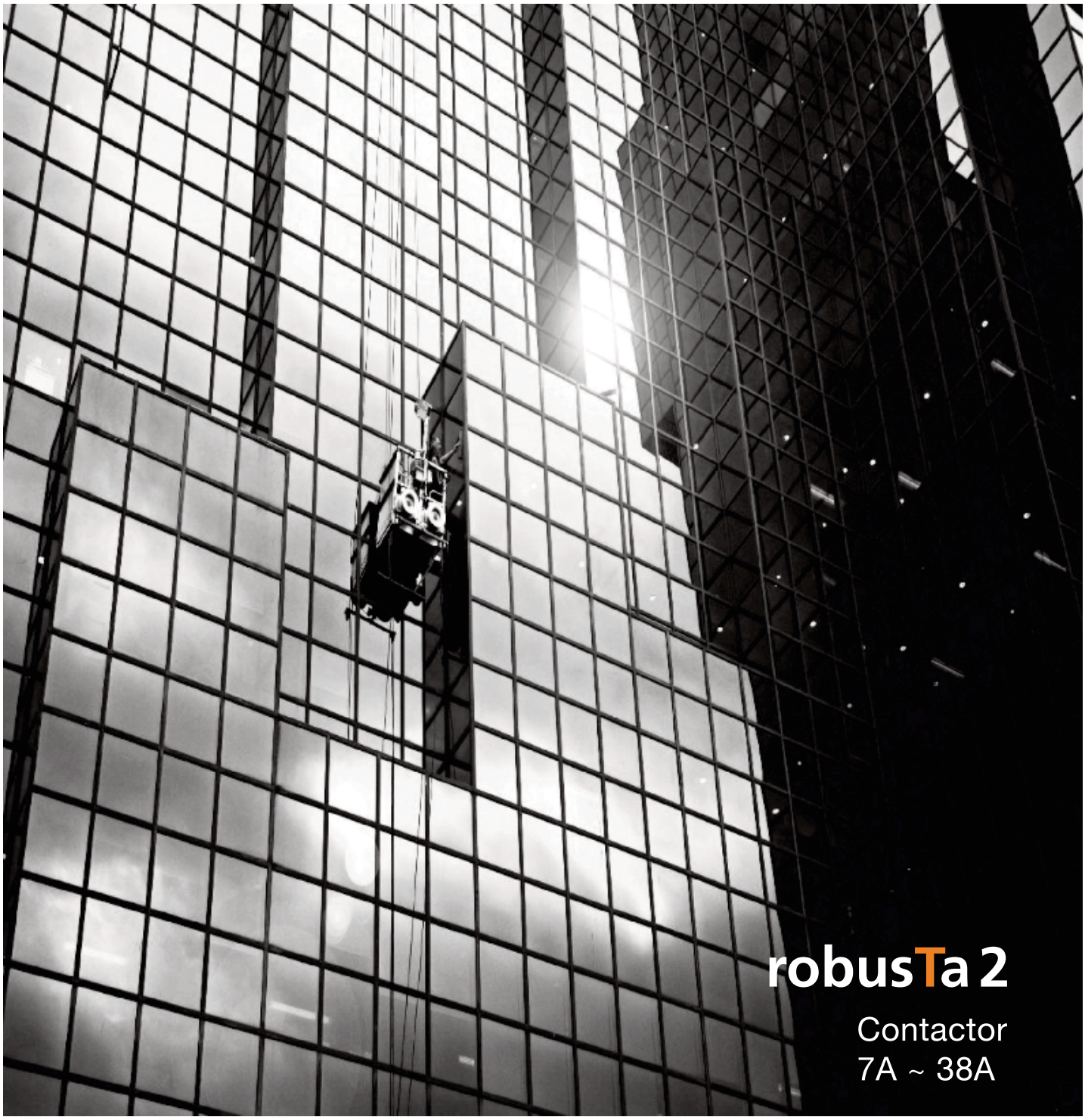
TC-1	D10K	D12K	D16K	D20K	D25K
C	80	80	85	93	98
G	35	35	35	40	40

TC1-D33K, D40K, D60K



TC-1	D33K	D40K	D60K
C	114	114	125

(All Dimensions in mm)



robusTa 2

Contactor
7A ~ 38A

c UL US LISTED CE RoHS Compliant

TC ELECTRIC CONTROLS

ENERGIZING YOUR WORLD

The future is here

Contactor 7A ~ 38A

TC Electric robusTa 2 Contactors are designed with several unique features and advantages. robusTa 2 offers high electrical and mechanical life with reliable performance. Compactness, design flexibility, safety and efficient solutions make robusTa 2 Contactors a preferred choice among customers.

It's unique design with in-built 1NO+1NC auxiliary contacts & common accessories assures reliability, space saving and optimum inventory costs.

robusTa 2 Contactors are manufactured in State-of-the-Art fully integrated ISO 9001 certified plant, equipped with world class designing, tooling, component manufacturing, assembling and testing facilities.

The new range of robusTa 2 Contactors conforms to IEC60947-4-1 standards & meets the latest globally acknowledged standards : UL & CE.

robusTa 2

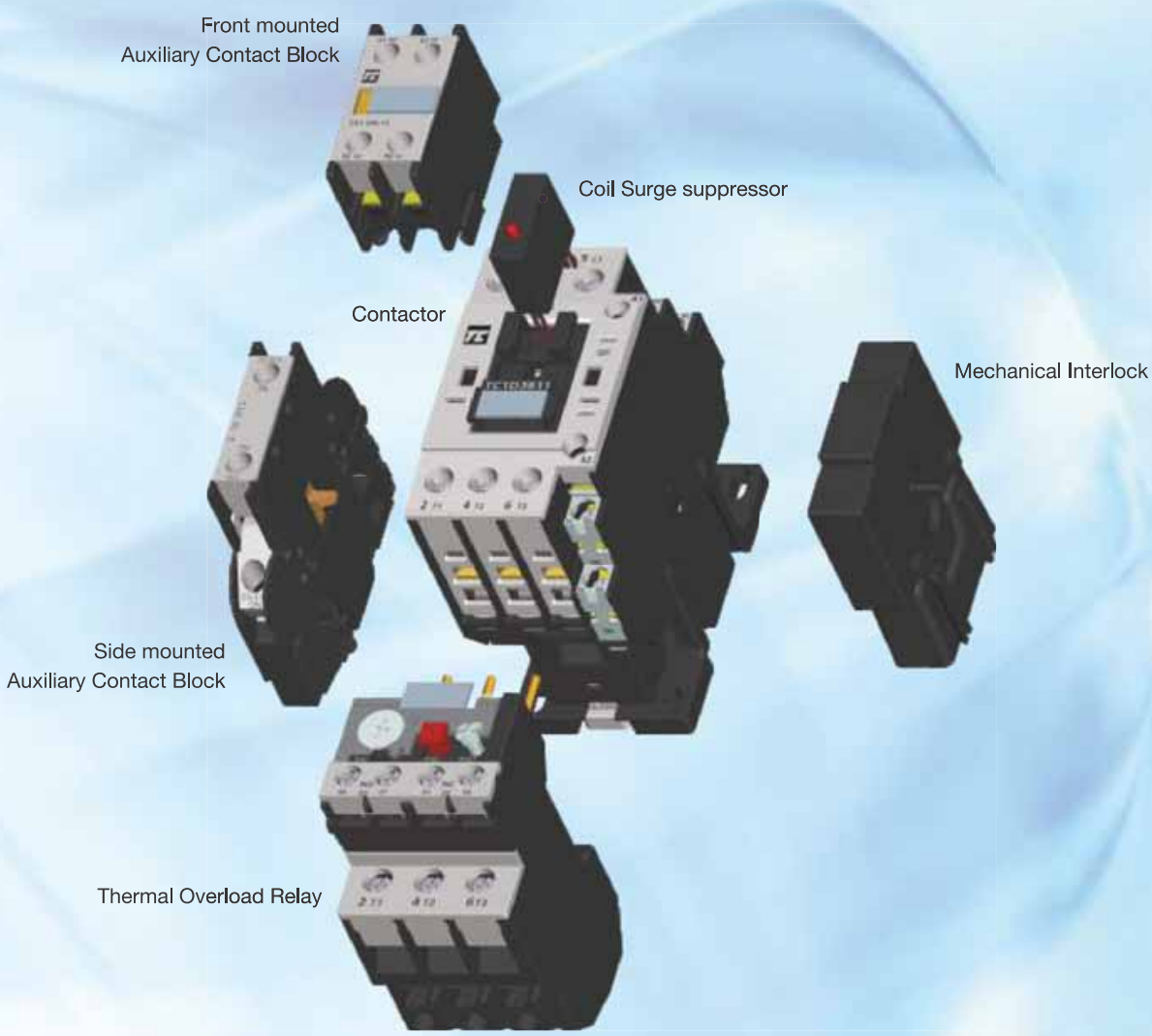
At a glance

Motor control ~ starting solutions advantages

- Top-notch functional aesthetics
- 3P coordinated Contactor range
  - 3P Contactor 45 mm frame, AC3 rating 7 Amps ~ 38 Amps
- In-built- 1NO + 1NC auxiliary contact
- Saves inventory cost - Common Add -On Accessories
- Compact Modular design for flexibility
- Snap fit design -Easy coil replacement
- Safety first - Power & Control terminals are IP 20 finger touch proof
- Energy Saving magnet coils
- High Mechanical & Electrical life

Industrial Applications

- Motor Controls
- Machine Tools
- Hoists
- Elevator & Escalators
- Power Supply Solutions
- Printing & Packaging Machines
- HVAC
- Solar systems
- Control valves
- Pumps


Front mounted
Auxiliary Contact Block
Coil Surge suppressor
Contactor
Mechanical Interlock
Side mounted
Auxiliary Contact Block
Thermal Overload Relay

robusTa 2

Technical Characteristics

Description	Reference / Condition	Unit	
Environment			
Rated Insulation Voltage (Ui)	Conforming to IEC 60947-4-1 Over Voltage category III, Degree of Pollution: 3	V	
Rated Impulse withstand Voltage (Uimp)	Conforming to IEC 60947	kV	
Degree of Protection	IEC 60529		
Ambient Temperature around device	Storage	°C	
	Operation (0.85 -1.1 Uc)	°C	
	Permissible (at Uc)	°C	
Flame Resistance	UL 94	°C	
Pole Characteristics			
Rated Operational Current (Ie) (Ue≤440V)	In AC-3, ø ≤ 40°	A	
	In AC-1, ø ≤ 40°	A	
Rated Operational Voltage (Ue)		V	
Frequency Limits	Of the operational current	Hz	
Conventional Thermal Current (Ith)	ø ≤ 40°	A	
Rated Making Capacity (440 V)	Conforming to IEC 60947	A	
Rated Breaking Capacity (440 V)	Conforming to IEC 60947	A	
Average Impedance per pole(max)	at Ith and 50 Hz.	mΩ	
Electrical Durability (millions of operating cycles)		Million	
Maximum operating rate (on load)AC3		Op. Cycles / Hr	
Control Circuit Characteristics			
Rated control circuit voltage (Uc)	50/60 Hz.	V	
Control Voltage Limits	Operation at 50 Hz		
	Operation at 60 Hz		
	Drop out		
Average Consumption 50 Hz at 20° and at Uc	Inrush	VA	
	Sealed	VA	
Average Consumption 60 Hz at 20° and at Uc	Inrush	VA	
	Sealed	VA	
Operating Time	Closing	ms	
	Opening	ms	
Mechanical Durability		Million	
Maximum Operating Rate		Op. Cycles / Hr	
Power Circuit Connections			
Flexible Cable without cable end	1 conductor	mm^2	
	2 conductors	mm^2	
Flexible Cable with cable end	1 conductor	mm^2	
	2 conductors	mm^2	
Solid Cable without cable end	1 conductor	mm^2	
	2 conductors	mm^2	
Tightening Torque		N-m	
Dimensions			
Height x Width x Depth		mm	
Mounting			
Length x Width		mm	

	TC1D0711	TC1D0911	TC1D1211	TC1D1811	TC1D2511	TC1D3211	TC1D3811
	1000	1000	1000	1000	1000	1000	1000
	6	6	6	6	6	6	6
	IP 20	IP 20	IP 20	IP 20	IP 20	IP 20	IP 20
	-60 to +80	-60 to +80	-60 to +80	-60 to +80	-60 to +80	-60 to +80	-60 to +80
	-5 to +60	-5 to +60	-5 to +60	-5 to +60	-5 to +60	-5 to +60	-5 to +60
	-40 to +70	-40 to +70	-40 to +70	-40 to +70	-40 to +70	-40 to +70	-40 to +70
	V0	V0	V0	V0	V0	V0	V0
	7	9	12	18	25	32	38
	25	25	25	32	40	50	50
	up to 690	up to 690	up to 690	up to 690	up to 690	up to 690	up to 690
	25-400	25-400	25-400	25-400	25-400	25-400	25-400
	25	25	25	32	40	50	50
	250	250	250	300	450	550	550
	250	250	250	300	450	550	550
	2.5	2.5	2.5	2.5	2	2	2
	1.8	1.8	1.7	1.5	1.4	1.6	1.6
	600	600	600	600	600	600	600
	24 – 690	24 – 690	24 – 690	24 – 690	24 – 690	24 – 690	24 – 690
	0.65 to 1.2 Uc	0.65 to 1.2 Uc	0.65 to 1.2 Uc	0.65 to 1.2 Uc	0.65 to 1.2 Uc	0.65 to 1.2 Uc	0.65 to 1.2 Uc
	0.85 to 1.1 Uc	0.85 to 1.1 Uc	0.85 to 1.1 Uc	0.85 to 1.1 Uc	0.85 to 1.1 Uc	0.85 to 1.1 Uc	0.85 to 1.1 Uc
	0.3 to 0.6 Uc	0.3 to 0.6 Uc	0.3 to 0.6 Uc	0.3 to 0.6 Uc	0.3 to 0.6 Uc	0.3 to 0.6 Uc	0.3 to 0.6 Uc
	70	70	70	70	70	70	70
	7	7	7	7	7	7	7
	70	70	70	70	70	70	70
	7.5	7.5	7.5	7.5	7.5	7.5	7.5
	12 to 22	12 to 22	12 to 22	12 to 22	12 to 22	12 to 22	12 to 22
	4 to 19	4 to 19	4 to 19	4 to 19	4 to 19	4 to 19	4 to 19
	15	15	15	15	15	15	15
	3600	3600	3600	3600	3600	3600	3600
	0.75 - 10	0.75 - 10	0.75 - 10	0.75 - 10	0.75 – 16	0.75 – 16	0.75 – 16
	0.75 - 10	0.75 - 10	0.75 - 10	0.75 - 10	0.75 – 16	0.75 – 16	0.75 – 16
	0.75 - 10	0.75 - 10	0.75 - 10	0.75 - 10	0.75 – 16	0.75 – 16	0.75 – 16
	0.75 - 10	0.75 - 10	0.75 - 10	0.75 - 10	0.75 – 16	0.75 – 16	0.75 – 16
	0.75 - 10	0.75 - 10	0.75 - 10	0.75 - 10	0.75 – 16	0.75 – 16	0.75 – 16
	0.75 - 10	0.75 - 10	0.75 - 10	0.75 - 10	0.75 – 16	0.75 – 16	0.75 – 16
	1.8	1.8	1.8	1.8	2.5	2.5	2.5
	85 x 45 x 90	85 x 45 x 90	85 x 45 x 90	85 x 45 x 90	85 x 45 x 95	85 x 45 x 95	85 x 45 x 95
	60/70 x 35	60/70 x 35	60/70 x 35	60/70 x 35	60/70 x 35	60/70 x 35	60/70 x 35

Common Add-on Accessories

Auxiliary Contact Block
(Side mounted) **TA8-DN**

NO	NC	
2	0	**TA8-DN20**
1	1	**TA8-DN11**

Coil Suppressor
TAD4VN

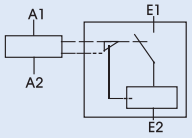
Auxiliary Contact Block (Front mounted) **TA1-DN**

NO	NC	
0	1	**TA1-DN01**
1	0	**TA1-DN10**

NO	NC	
1	1	**TA1-DN11**
0	2	**TA1-DN02**
2	0	**TA1-DN20**

NO	NC	
4	0	**TA1-DN40**
3	1	**TA1-DN31**
2	2	**TA1-DN22**
1	3	**TA1-DN13**
0	4	**TA1-DN04**

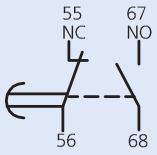
Latch Add-on Block (Front mounted) **LA6-DK01**



LA6-DK01

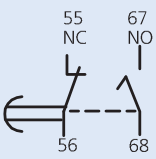
Mechanical Interlock
LA9D09978

On Delay Timer Block
(Front mounted) **TA2-DT2**



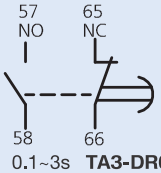
0.1~3s	**TA2-DT0**
0.1~30s	**TA2-DT2**
0.1~180s	**TA2-DT4**

On Delay Star Delta Timer Block
(Front Mounted) **TA2-DS2**



1~30s **TA2-DS2**

Off Delay Timer Block
(Front mounted) **TA3-DR2**



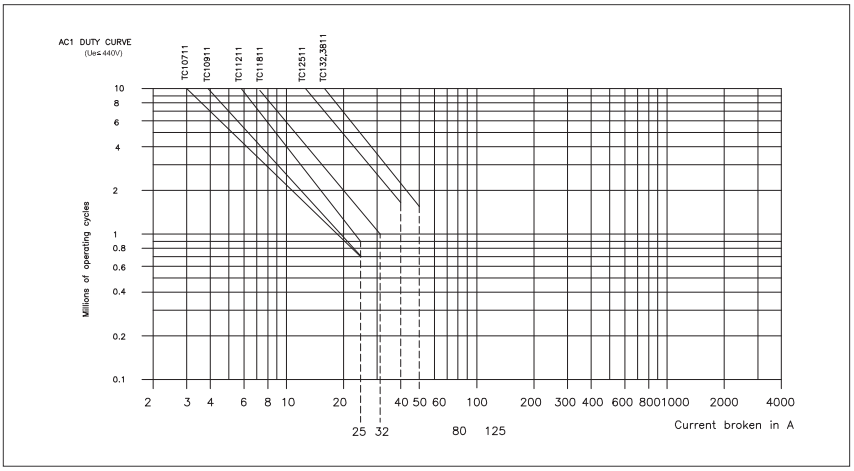
0.1~3s	**TA3-DR0**
0.1~30s	**TA3-DR2**
0.1~180s	**TA3-DR4**

Overload Relay fixing attachment for Contactor

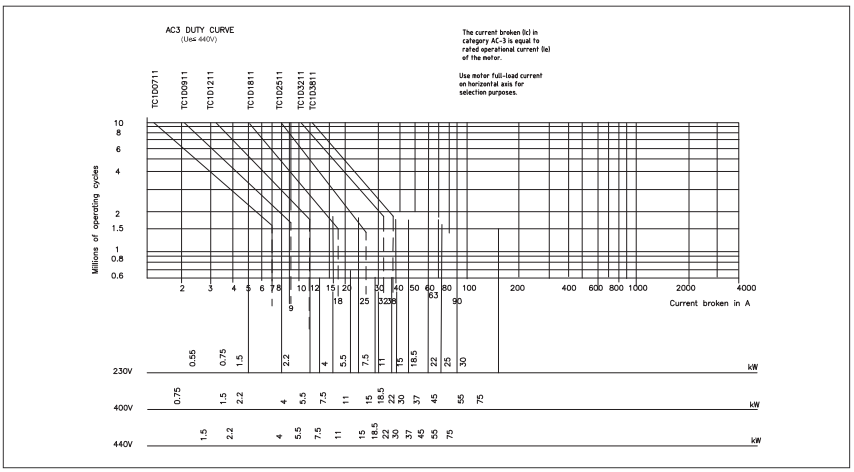
TA7D0765 for TC1D07-TC1D18
TA7D2565 for TC1D25-TC1D38

Characteristic Curve

The current broken (Ic) in category AC1 is equal to current (Ie) normal drawn by the load.

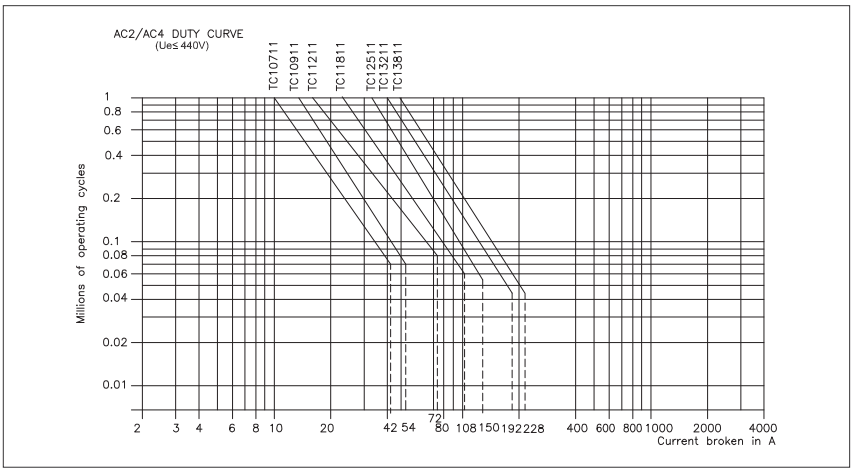


The current broken (Ic) in category AC3 is equal to rated operational current (Ie) of the motor



The current broken (Ic) in category AC4 is equal to 6 times Ie. Where Ie is the operational current of the motor

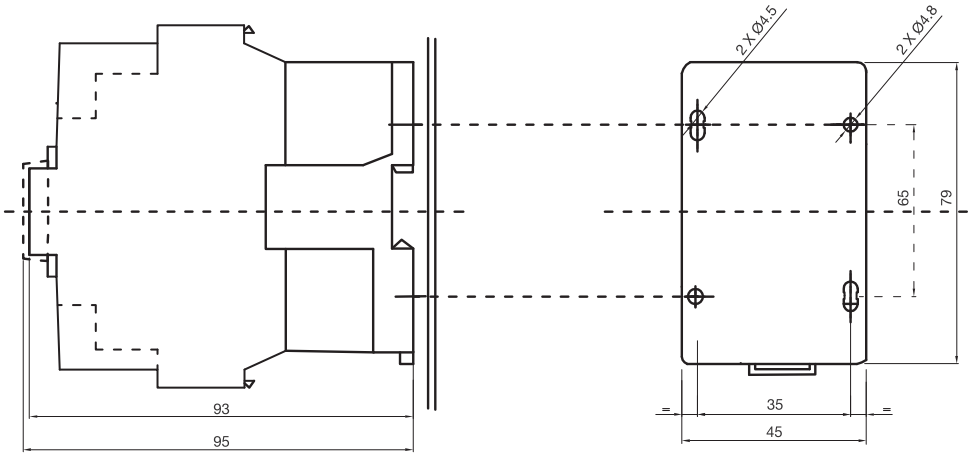
Use motor locked rotor current (6 times full load current) on horizontal axis for selection purposes.



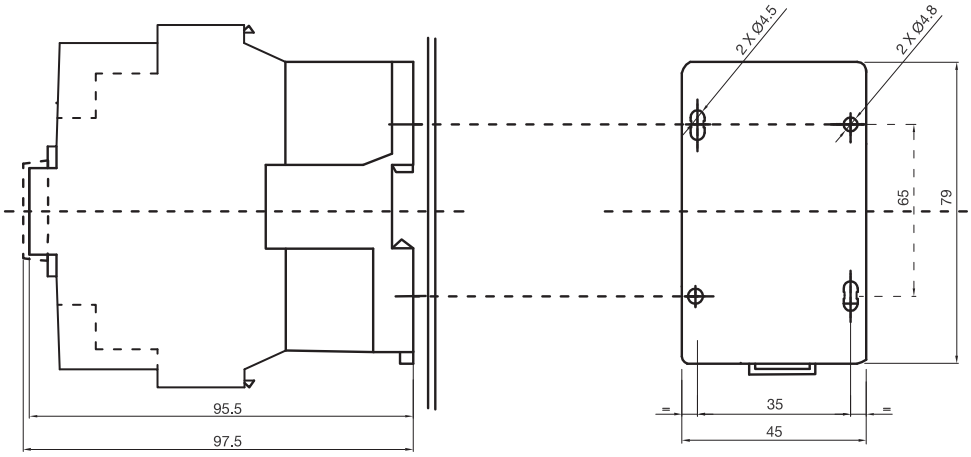
Dimensions

(All Dimensions in mm

TC1D0711
TC1D0911
TC1D1211
TC1D1811



TC1D2511
TC1D3211
TC1D3811



Thermal Overload Relay

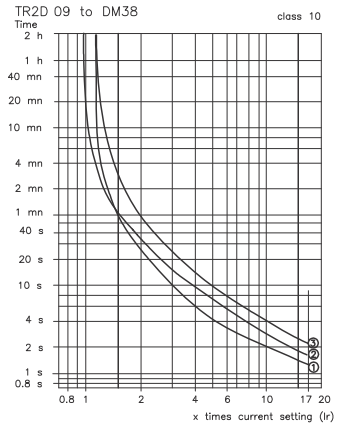
robusTa 2 Thermal Overload Relay provides protection against operational overload & single phasing having prior of site selectable auto or manual facility

Silent Features

- Built-in single phase protection
- Potential free 1NO and 1NC contacts
- Yellow flag indicator for indication of relay tripping
- Auto / Manual reset facility
- IP 20 finger touch proof

Relay Reference	Relay setting range (A)	Standard power ratings of 3-Phase Motors 50/60Hz, AC3 Category					Back Up Fuse Rating		Independent Mounting Kit
		220V	380V	415V	440V	660V			
		KW	KW	KW	KW	KW	aM (A)	gL (A)	
TR2D09301	0.10-0.16	-	-	-	-	-	0.25	2	TA7D0964
TR2D09302	0.16-0.25	-	-	-	-	-	0.25	2	
TR2D09303	0.25-0.40	-	-	-	-	-	1	2	
TR2D09304	0.40-0.63	-	-	-	-	0.37	1	2	
TR2D09305	0.63-1.00	-	-	-	-	0.55	2	4	
TR2D09306	1.0-1.6	-	0.37	-	0.55	1.1	2	4	
TR2D093X6	1.25-2.0		0.55	0.75	0.75	1.3	4	6	
TR2D09307	1.6-2.5	0.37	0.75	1.1	1.1	1.5	4	6	
TR2D09308	2.5-4	0.75	1.5	1.5	1.5	3	6	10	
TR2D09310	4-6	1.1	2.2	2.2	2.2	4	8	16	
TR2D09312	5.5-8	1.5	3	3.7	3.7	5.5	12	20	
TR2D09314	7-10	2.2	4	4	4	7.5	12	20	
TR2D12316	9-13	3	5.5	5.5	5.5	10	16	25	
TR2D18321	12-18	4	7.5	9	9	15	20	35	
TR2D25322	17-25	5.5	11	11	11	18.5	25	50	
TR2DM32353	23-32	7.5	15	15	15	-	40	63	
TR2DM38355	30-38	10	18.5	22	22	30	40	100	

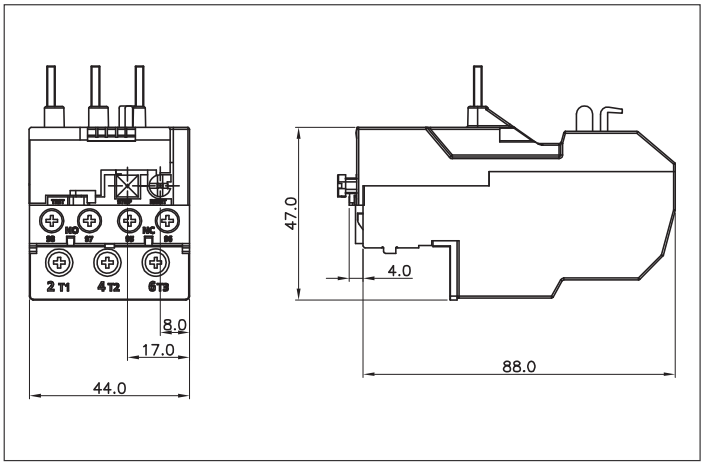
Tripping Curve



3 —— Balanced operation, 3-phase, from cold state.
1 —— Balanced operation, 3-phase, after a prolonged period at the set current (hot state).
2 —— Operation, 2-phase, following the loss of one phase, from cold state.

NOTE: Tolerance on operating times ± 30%

Dimensions mm



Note: Relay fixing attachment for Contactor, Refer page no. 8

Coordination between protection & control components

Coordination: safety and restart after a short circuit

This benefit is obtained by choosing contactors with TC Electric Controls guaranteed coordination.

What is coordination?

A contactor is said to be “coordinated” with the upstream protection device when its behavior is controlled in the event of a short circuit.

This behavior can be:

- Type1: guaranteed not to pose a danger to the work force and not to damage the installation. It is accepted the contactor should be destroyed or repaired.
- Type2: type1 + put back into service possible after any maintenance operation (contact separation, for example).

Selection Chart : Fuse Protected Feeders

Type-2 Co-ordination Iq=50kA @ 400/440V Confirming To IS / IEC 60947-4-1; IEC 60947-4-1

1. The full load current (FLC) Iindicated for 3 Phase motors are of ' Squirrel cage induction motors' at full load
2. Contactors / SCPD s indicated are of minimum ratings. Higher rating of these can be used.
3. Selection chart is for standard 3-phase, squirrel cage motor with average power factor and efficiency.
4. Selection is valid for complete TC Electric Combinations only. In case these are changed to accommodate another brand / rating of other make, then this Type 2 coordination combination is not assured.
5. All SCPD - fuse ratings are AC-23 A as per IS/IEC 60947-3 & IEC 269 (part 1 & 2)
6. Normal motor starting time (<=5 Sec) is assumed.

DOL Starter Feeders

Standard Power Rating of 3 Phase Motor 50/60 Hz, AC3 Category (400/440V)			Contactor		Overload Relay		SCPD (Fuse Details)	
KW	HP	Full Load Current (A)	Type	AC3 Rating @ 440V	Type	Setting Current (A)	Type	Rating
0.37	0.5	0.88	TC1D0711	07A	TR2-D09305	0.63...1	CHF	4 A
0.55	0.75	1.1	TC1D0711	07A	TR2-D09306	1...1.6	CHF	4 A
0.75	1	1.5	TC1D0711	07A	TR2-D093X6	1.25...2	CDFL00 6A	6 A
1.1	1.5	1.9	TC1D0711	07A	TR2-D09307	1.6...2.5	CDFL00 6A	6 A
1.5	2	3.6	TC1D0711	07A	TR2-D09308	2.5...4	CDFL00 10A	10 A
2.2	3	4.9	TC1D0711	07A	TR2-D09310	4...6	CDFL00 16A	16 A
3.7	5	6.5	TC1D0911	09A	TR2-D09312	5.5...8	CDFL00 20A	20 A
4	5.5	8.5	TC1D0911	09A	TR2-D09314	7...10	CDFL00 20A	20 A
5.5	7.5	11.5	TC1D1211	12A	TR2-D12316	9...13	CDFL00 25A	25 A
9	12	15.5	TC1D1811	18A	TR2-D18321	12...18	CDFL00 35A	35 A
11	15	22	TC1D2511	25A	TR2-D25322	17...25	CDFL00 50A	50 A
15	20	29	TC1D3211	32A	TR2-DM32353	23...32	CDFL00 63A	63 A
18.5	20	35	TC1D3811	38A	TR2-DM32355	28...36	CDFL00 50A	100 A

Star Delta Starter Feeders

Standard Power Rating for 3Ø motor at 415V AC		FLC (Phase Current)	Contactor			Ac3 rating at 440V	Overload Relay		Recommended Back-up HRC Fuse Rating (A)		
KW	HP	I(A)	Main	Star	Delta		Type	Range (A)	Type	Rating	Make
1.5	2	2.3	TC1D0711	TC1D0711	TC1D0711	07A	TR2D09307	1.6 -2.5	CDFL00 6A	6A	TC Electric Controls
3	4	4	TC1D0711	TC1D0711	TC1D0711	07A	TR2D09308	2.5-4	CDFL00 10A	10A	TC Electric Controls
4	5.5	5	TC1D0711	TC1D0711	TC1D0711	07A	TR2D09310	4-6	CDFL00 16A	16A	TC Electric Controls
5.5	7.5	6	TC1D0911	TC1D0911	TC1D0911	09A	TR2D09312	5.5-8	CDFL00 20A	20A	TC Electric Controls
9	12	10	TC1D1211	TC1D1211	TC1D1211	12A	TR2D09314	7-10	CDFL00 20A	20A	TC Electric Controls
11	15	12	TC1D1211	TC1D1211	TC1D1211	12A	TR2D12316	9-13	CDFL00 25A	25A	TC Electric Controls
15	20	16	TC1D1811	TC1D1811	TC1D1811	18A	TR2D18321	12-18	CDFL00 35A	35A	TC Electric Controls
18	25	21	TC1D2511	TC1D2511	TC1D2511	25A	TR2D25322	17-25	CDFL00 50A	50A	TC Electric Controls
22	30	24	TC1D2511	TC1D2511	TC1D2511	25A	TR2D25322	17-25	CDFL00 50A	50A	TC Electric Controls
25	35	30	TC1D3211	TC1D3211	TC1D3211	32A	TR2DM32353	23-32	CDFL00 63A	63A	TC Electric Controls
30	40	33	TC1D3811	TC1D3811	TC1D3811	38A	TR2DM38355	28-36	CDFL00 100A	100A	TC Electric Controls

Glossary

Altitude

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

No derating is necessary up to 3000 m.

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

Altitude	3500 m	4000 m	4500 m	5000 m
Rated operetional voltage	0.90	0.80	0.70	0.60
Rated operational current	0.92	0.90	0.88	0.86

Ambient air temperature

The temperature of the air surrounding the device, measured near to the device.
The operating characteristics are given :
- with no restriction for temperatures between - 5 and + 55 C,
- with restrictions, if necessary, for temperatures between - 50 and + 70 C.

Rated operational current (Ie)

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

Rated conventional thermal current (Ith) *(1)*

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

Permissible short time rating

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

Rated operational voltage (Ue)

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

Rated control circuit voltage (Uc)

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

Rated insulation voltage (Ui)

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

Rated impulse withstand voltage (Uimp)

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

Rated operational power (expressed in kW)

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

Rated breaking capacity *(2)*

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

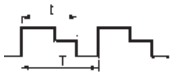
Rated making capacity *(2)*

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

On-load factor (m)

This is the ratio between the time the current flows (t) and the duration of the cycle (T)

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



Cycle duration: duration of current flow + time at zero current

Pole impedance

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

Electrical durability

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

Mechanical durability

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

(1) Conventional thermal current, in free air, conforming to IEC standards.
(2) For AC applications, the breaking and making capacities are expressed by the rms value of the symmetrical component of the short-circuit current. Taking into account the maximum asymmetry which may exist in the circuit, the contacts therefore have to withstand a peak asymmetrical current which may be twice the rms symmetrical component.
***Note** : these definitions are extracted from standard IEC 60947-4-1.*

Definitions

Contactor utilisation categories conforming to IEC 60947-4

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

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

AC Applications

Category AC-1

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

Application examples: heating, distribution.

Category AC-2

This category applies to starting, plugging and inching of slip ring motors.
On closing, the contactor makes the starting current, which is about 2.5 times the rated current of the motor.
On opening, it must break the starting current, at a voltage less than or equal to the mains supply voltage.

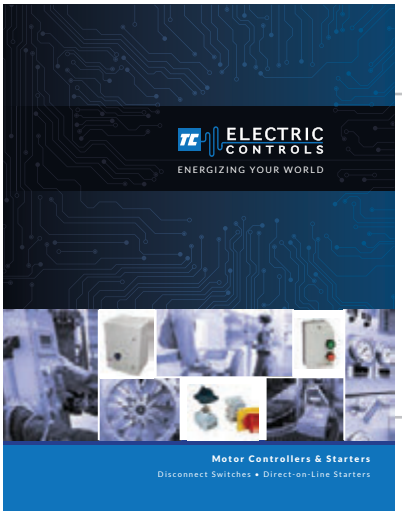
Category AC-3

This category applies to squirrel cage motors with breaking during normal running of the motor.
On closing, the contactor makes the starting current, which is about 5 to 7 times the rated current of the motor.
On opening, it breaks the rated current drawn by the motor; at this point, the voltage at the contactor terminals is about 20% of the mains supply voltage. Breaking is light.
Application examples: all standard squirrel cage motors: lifts, escalators, conveyor belts, bucket elevators, compressors, pumps, mixers, air conditioning units, etc... .

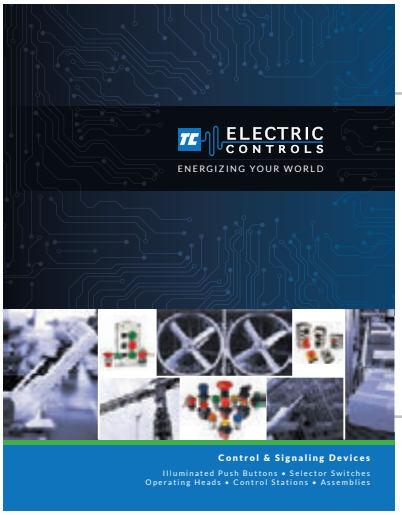
Category AC-4

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

OTHER TC ELECTRIC CONTROLS PRODUCT LINE CATALOGS



TC Electric Controls - Manual Motor Controllers & Starters



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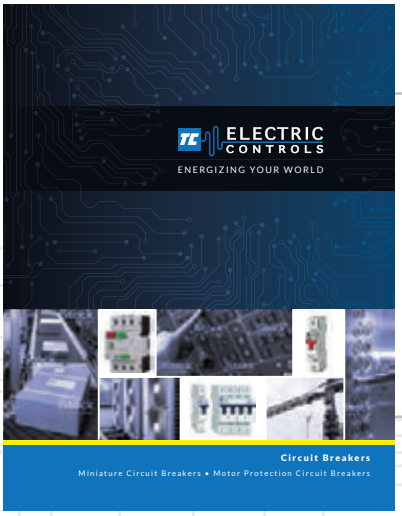

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