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## IEC Contactors Overload Relays & Accessories

# robusta (9A ~ 95A)

## 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, VDE 0660, BSEN 60947, 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 (around the device)	Storage	°C	-60 to +80
	Operation	°C	-5 to +55 (0.8 to 1.1Uc)
	Permissible	°C	-40 to +70, for operation at Uc
Maximum operating altitude	Without derating	Mtr.	3000
Operating Position	Without derating		+30° possible, in relation to normal vertical mounting plane

### Pole Characteristics

Type	TC1-	Unit	D 09	D 12	D 18	D 22	D 25	D 32	D 38	D 40	D 50	D 65	D 80	D 95															
Number of poles (Power)			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 operating 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 impedance 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					
		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)	Up to	V	660

# robusta (9A ~ 95A)

## 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 (around the device)	Storage	°C	-60 to +80
	Operation	°C	-5 to +55 (0.8 to 1.1Uc)
	Permissible	°C	-40 to +70, for operation at Uc
Maximum operating altitude	Without derating	Mtr.	3000
Operating Position	Without derating		+30° possible, in relation to normal vertical mounting plane

### Pole Characteristics

Type	TP1-	Unit	D09	D12	D18	D22	D25	D32	D38	D40	D50	D65	D80
Number of poles (P0wer)			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 operating Voltage (Ue)	Upto	V	690	690	690	690	690	690	690	690	690	690	690
Frequency limits	Of the operational current	Hz	25-400										
Rated thermal current (Ith)	$\theta < 40^\circ\text{C}$	A	25	25	32	32	45	50	50	60	80	80	125
Rated making capacity	Irms conforming to IEC-60947-4	A	250	250	300	300	450	550	550	800	900	1000	1100
Rated breaking capacity	Irms conforming to	A	250	250	300	300	450	550	550	800	900	1000	1100
	IEC-60947-4	A	175	175	250	250	400	450	450	800	900	1000	1000
	500V	A	85	85	120	120	180	180	180	400	500	630	640
	660-690V	A	85	85	120	120	180	180	180	400	500	630	640
Average impedance per pole	At Ith and 50Hz Milli $\Omega$	Max.	2.5	2.5	2.5	2.5	2	2	2	1.5	1.5	1	0.8
Power dissipation per pole for	AC-3	W	0.2	0.36	0.8	0.8	1.25	2	2	2.4	3.7	4.2	5.1
	the above operational currents												

### Control Circuit Characteristics

Type		Unit	TP1-D09-D22	TP1-D25-D38	TP1-D4011-D65	TP1-D80				
Rated control circuit voltage (Uc)	DC	V	12 to 660		12 to 660					
Control voltage limits ( $\theta < 55^\circ\text{C}$ )	Operational	Standard Coil	0.8 - 1.1 Uc		0.85 - 1.1 Uc					
		Wide Range Coil	0.7 - 1.25 Uc		0.75 - 1.25 Uc					
Average consumption DC at 20°C and at Uc	Drop out		0.1 - 0.25 Uc							
		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 $\theta < 55^\circ\text{C}$ )	In operating cycle/hour		3600		3600		3600		3600	

### Integral Auxiliary Contact Characteristics

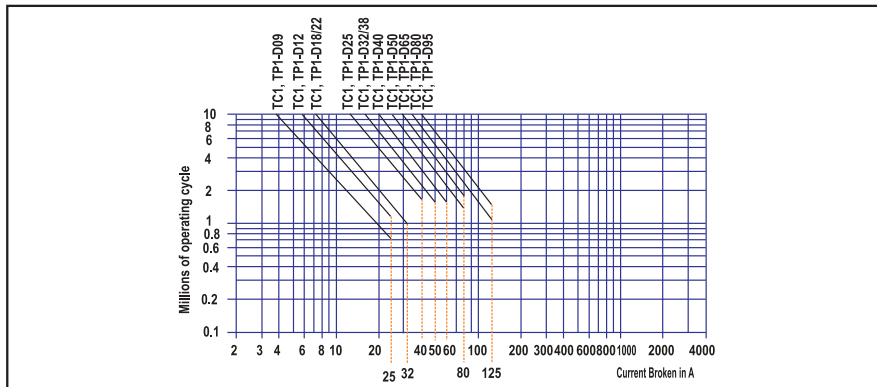
Type		Unit	TP1- D09 ~ TP1- D80
Rated thermal current (Ith)	$\theta < 40^\circ\text{C}$	A	10
Rated operational voltage (Ue)	Upto	V	660

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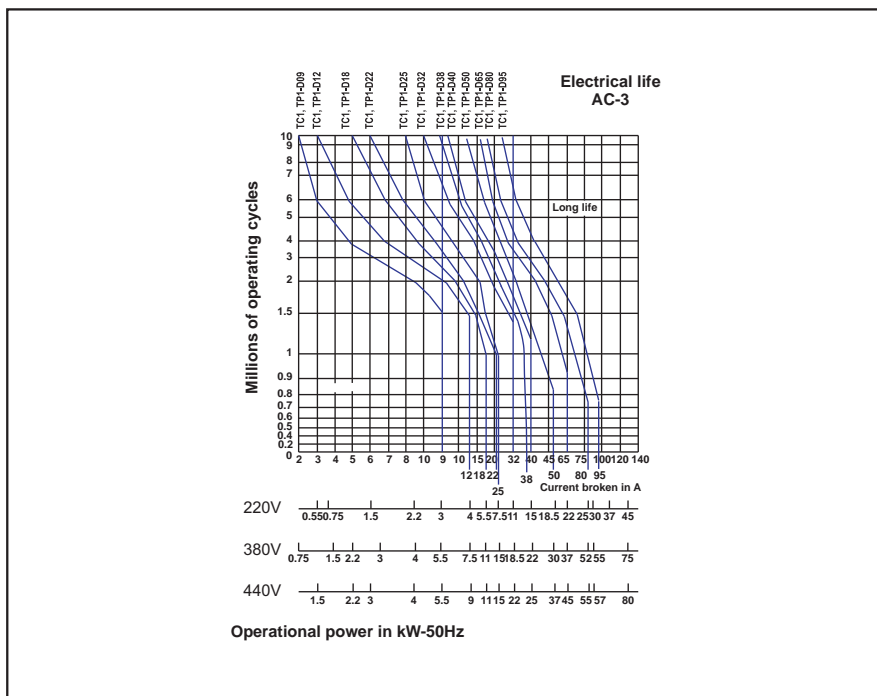
# robusta (9A ~ 95A)

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

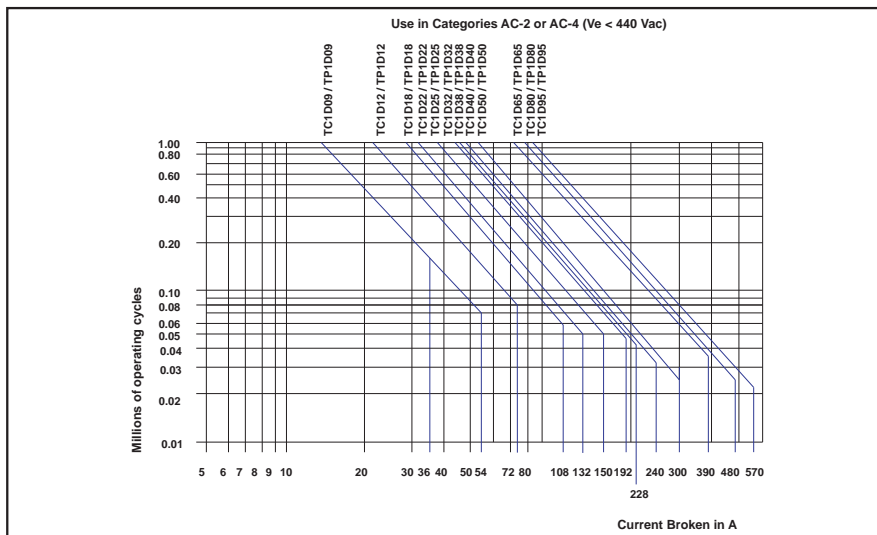
**Use in Category AC-1 ( $U_e < 440V$ ).** Control of resistive circuits ( $\cos \phi > 0.95$ ). The current broken ( $I_b$ ) in category AC-1 is equal to the current ( $I_e$ ) normally drawn by the load.



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



**Use in Categories AC-2, AC-4 ( $U_e < 440V$ ).** 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  $6 \times I_e$  ( $I_e$ =rated operational current of the motor).



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# robusta (9A ~ 95A)

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

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

### 4 Pole Contactor with AC operating coil

Maximum Current		Maximum HP						Main Pole Configuration		Catalog Number
Inductive AC-3 A	Resistive AC-1 A	Single Phase		Three Phase				NO	NC	
		120V	230V	200V	230V	480V	600V			
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



TC1-D09004

### 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	
						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

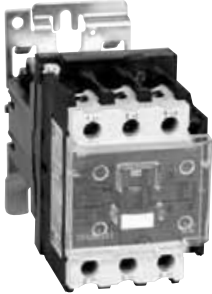
Volts AC	24	48	110	120	208	220	230	240	277	380	400	415	440	480	575	600
50 Hz	B5	E5	F5	-	-	M5	P5	U5	-	Q5	V5	N5	R5	-	-	-
60 Hz	B6	E6	F6	G6	L6	M6	-	U6	W6	Q6	-	-	R6	T6	S6	X6
50/60 Hz	B7	E7	F7	G7	-	M7	P7	U7	-	Q7	V7	N7	R7	-	-	-

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# robusta (9A ~ 95A)

## 3 & 4 Pole Contactors with DC operating coil Specifications

B



TP1-D4000-XX



TP1-D25000-XX

### 3 Pole Contactor with DC operating coil

Maximum Current		Maximum HP						Aux. Contacts Built-in per contactor		Catalog Number
Inductive AC-3 A	Resistive AC-1 A	Single Phase		Three Phase				NO	NC	
		120V	230V	200V	230V	480V	600V			
9	25	0.5	1	2	2	5	7.5	1	0	TP1-D0910-XX
12	25	1	2	3	3	7.5	10	1	0	TP1-D0901-XX
		0	1					1	0	TP1-D1210-XX
18	32	1	3	5	5	10	15	1	0	TP1-D1201-XX
		0	1					1	0	TP1-D1810-XX
22	32	1	3	5	5	10	15	0	1	TP1-D1801-XX
		1	0					1	0	TP1-D2210-XX
25	40	2	3	5	7.5	15	20	0	1	TP1-D2201-XX
		1	0					1	0	TP1-D2510-XX
32	50	2	5	10	10	20	25	0	1	TP1-D2501-XX
		1	0					1	0	TP1-D3210-XX
38	50	2	5	10	10	20	25	0	1	TP1-D3201-XX
		1	0					1	0	TP1-D3810-XX
40	60	3	5	10	10	30	30	0	1	TP1-D3801-XX
		1	1					1	1	TP1-D4011-XX
50	80	3	7.5	15	15	40	40	1	1	TP1-D5011-XX
65	80	5	10	20	20	50	50	1	1	TP1-D6511-XX
80	125	7.5	15	20	25	60	60	1	1	TP1-D8011-XX

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

### 4 Pole Contactor with DC operating coil

Maximum Current		Maximum HP						Main Pole Configuration		Catalog Number
Inductive AC-3 A	Resistive AC-1 A	Single Phase		Three Phase				NO	NC	
		120V	230V	200V	230V	480V	600V			
9	25	0.5	1	2	2	5	7.5	4	0	TP1-D09004-XX
		0.5	1	2	2	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-D12008-XX
		2	3	5	7.5	15	20	0	4	TP1-D25004-XX
		2	3	-	-	-	-	2	2	TP1-D25006-XX
40	60	3	5	10	10	30	30	4	0	TP1-D25008-XX
		3	5	-	-	-	-	2	2	TP1-D40004-XX
65	80	5	10	20	20	50	50	4	0	TP1-D40008-XX
		5	10	-	-	-	-	2	2	TP1-D65004-XX
80	125	7.5	15	20	25	60	60	4	0	TP1-D65008-XX
		7.5	15	-	-	-	-	2	2	TP1-D80004-XX
										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

# robusta (9A ~ 95A)

## Accessories, Spare Coils



TA9-D1269



TA9RC980U



LA9-D09978



TX1-D-XX



LA6-DK01

### 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

### Coil Suppressor

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

### 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

### 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

### 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	

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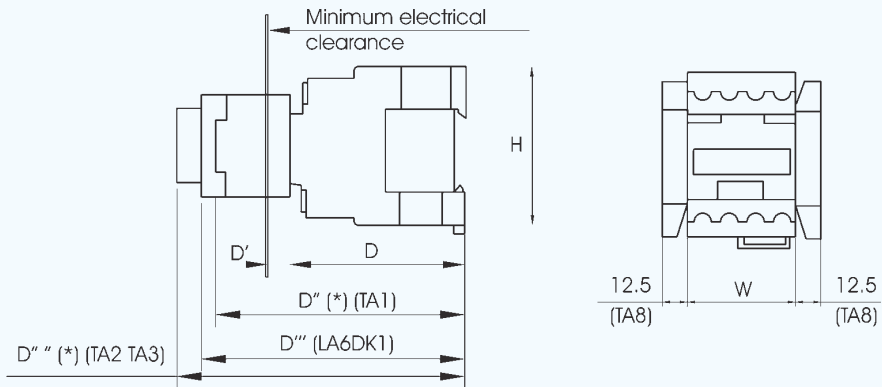
# robusta (9A ~ 95A)

## Contactors' Dimensions with AC operating coil

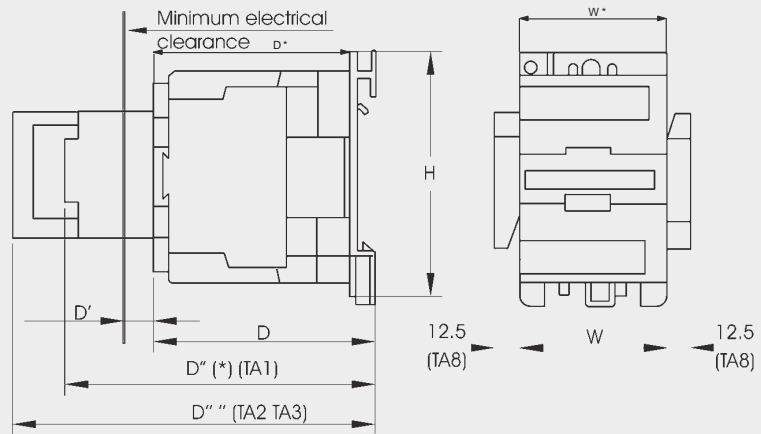
(All Dimensions in mm)

B

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



### TC1-D40 ~D95

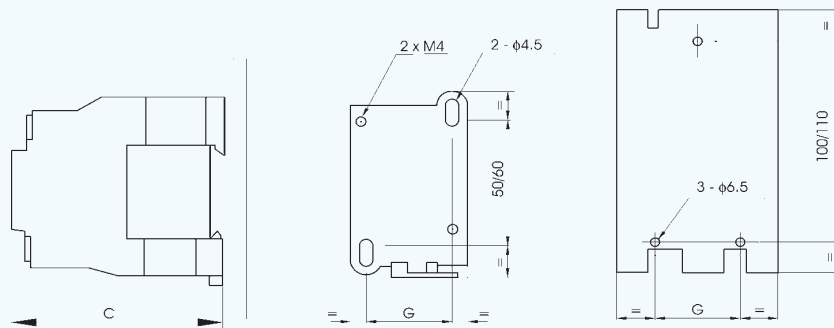


TC1-	D09	D12	D18	D22	D25	D32	D38	D40	D50	D65	D80-D95
TP1-	DC09	DC12	-	-	DC25	-	-	-	-	-	-
W (3 Pole)	45	45	45	45	56	56	56	75	75	75	85
W* (4 Pole)	45	45	-	-	56	-	-	85	85	85	96
H (3/4 Pole)	74	74	74	74	84	84	84	127	127	127	127
D (3/4 Pole)	80	80	85	85	94	99	99	114	114	114	120
D' (3/4 Pole)	10	10	10	10	10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

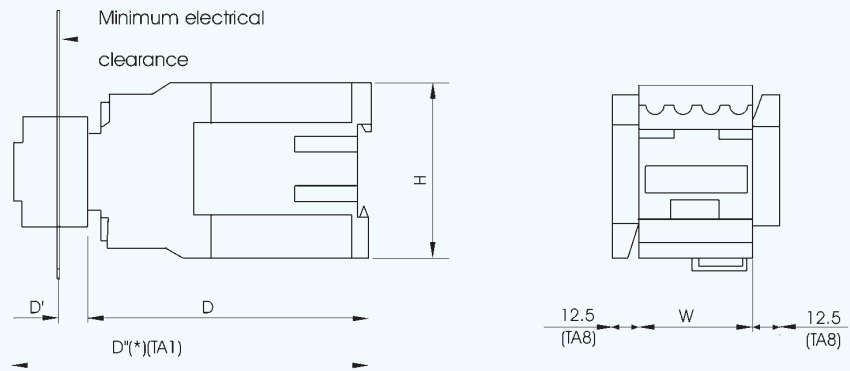


# robusta (9A ~ 95A)

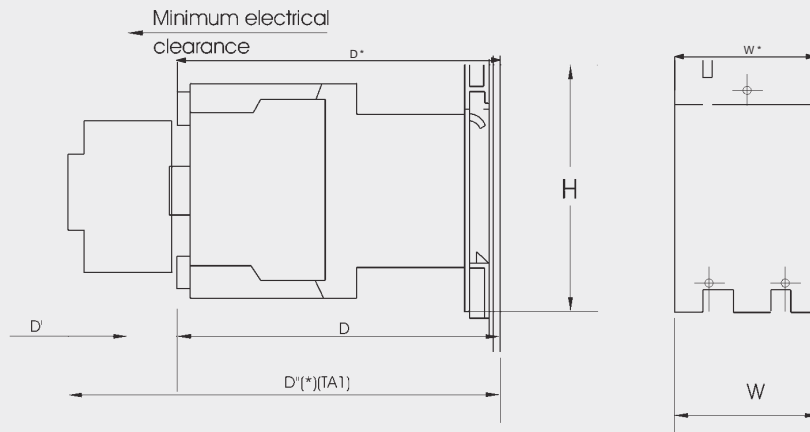
## Contactors' Dimensions with DC operating coil

(All Dimensions in mm)

### Product Dimensions TP1-D09~D3810



### TP1-D4011~D80



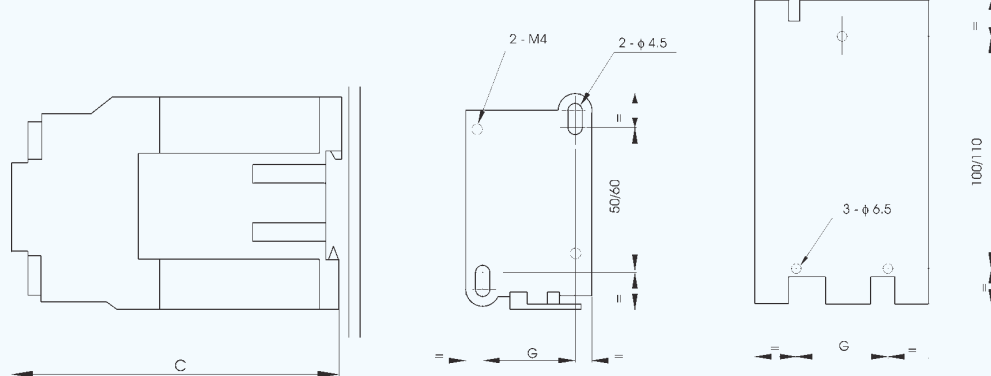
TP1-	D09	D12	D18	D22	D25	D32	D38	D40	D50	D65	D80
W (3 Pole)	45	45	45	45	56	56	56	75	75	75	85
W* (4 Pole)	45	45	-	-	56	-	-	85	85	85	96
H (3/4 Pole)	74	74	74	74	84	84	84	127	127	127	127
D (3/4 Pole)	115	115	120	120	130	135	135	171	171	171	181
D' (3/4 Pole)	10	10	10	10	10	10	10	12	12	12	12
D" (3/4 Pole)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

B

# robusta (Control Relays)

## 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
	Control relay closed		12g	11g
Vibration Resistance	Control relay open		5g	2g
	Control relay closed		10g	3g
Cabling	Flexible or solid cable with or without cable end	mm <sup>2</sup>	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 standard Hz coil: 0.85 ... 1.1 Uc
			With 50/60Hz 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		20	-
	With: 50 or 60 Hz coil			
	50/60 Hz coil (at 50 Hz)		30	-
	Standard coil		-	30
	Wide band coil		-	30

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

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

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

- Breaking limit of contacts valid for maximum of 50 operating cycles at 10s intervals (breaking power=making power x cosφ 0.7)
- Electrical life of Contacts:
  - for 1 million operating cycles (2a);
  - for 3 million operating cycles (2b);
  - for 10 million operating cycles (2C)
- 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

- Electrical life of Contacts:
  - for 1 million operating cycles (2a)
  - for 3 million operating cycles (2b)
  - for 10 million operating cycles (2C)
- Breaking limit of contacts valid for maximum of 20 operating cycles at 10s intervals and with current passing for 0.5s per operating cycle.
- Thermal limit

# robusta (Control Relays)

## 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

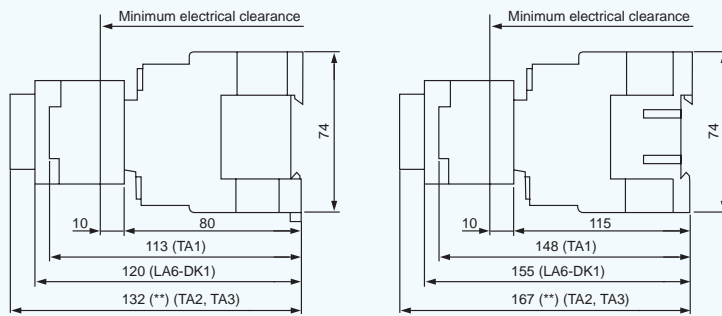
Replace XX with voltage code from table - 8

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

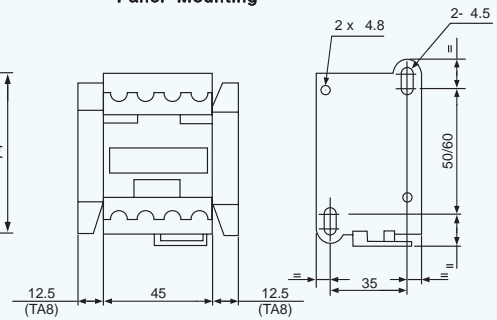
B

### Independent Mounting

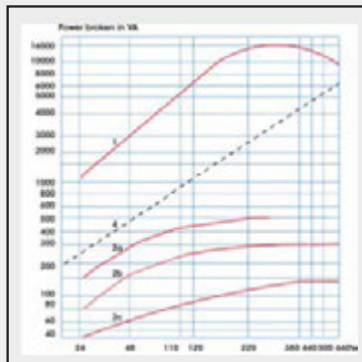


\*\* + 4mm with lead sealing kit

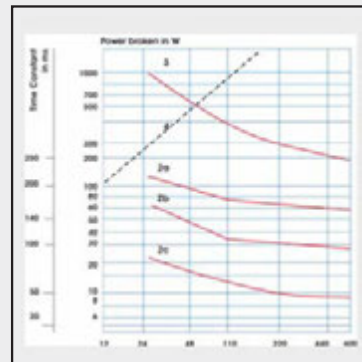
### Panel Mounting



### AC Supply categories AC-14 & AC-15



### DC Supply categories DC-13

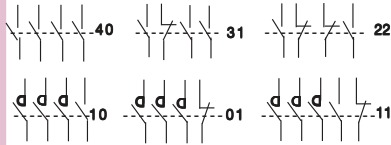
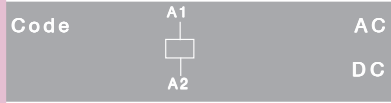


# robusta (9A ~ 95A) / Control Relays

## Synopsis - Contactors / Control Relays

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

**B**



<b>Maximum rated operational voltage</b>	660V
<b>Maximum rated current for motor control</b> (3 phase 440V, 50-60Hz, for AC3 Duty)	AC 15 duty (IEC 60947-5-1) AC 11 duty (IEC 851) 6A at 500V
<b>Maximum standard power rating</b> for motor control for AC3 Duty $\theta < 55^{\circ}\text{C}$ , 415V	
<b>3 phase AC3</b>	230V HP
	460/480V HP
UL-Continuous Current	575/600V HP
<b>Mounting position</b> (w.r.t. normal vertical mounting plane)*	+ 30°
<b>Maximum thermal current</b> I <sub>th</sub> ( $\theta < 40^{\circ}\text{C}$ )	10 A
<b>Maximum operating rate</b>	AC 10800
<b>(operations / hr)</b>	DC 3600
<b>Average coil consumption</b>	50 Hz 60 / 7 VA
	60 Hz 70 / 7.5 VA
(inrush / sealed)	50 / 60 Hz 70 / 8 VA
	TP1-D [TP1-DC] DC 9 / 9W
<b>Power dissipation per pole at</b>	AC1 1.56W
	AC3 0.20W
<b>Mechanical life</b>	TC1-D 50 or 60 Hz 30
(in millions of operations)	TC1-D (50/60Hz)/TP1-DC 20
	TP1-D 30
<b>Power contact terminal capacity</b> mm <sup>2</sup>	2.5
<b>Overall dimensions in mm</b>	TC1-D
	TP1-DC
<b>Projection</b> (TCA2-D/TC1-D/TP1-DC)	80mm
<b>Over-all dimensions in mm</b>	TP1-D
<b>Projection</b> (TCA3-D/TP1-D)	115mm
<b>Weight</b> (TC1-D/TP1-D/TP1-DC)	kg 0.32/0.58/0.32
<b>Weight</b> (TCA2/TCA3)	kg 0.32/0.58

Code	AC	DC	Terminal Config	Rated Voltage	Rated Current	Power Rating	UL Current	Mounting	Thermal Current	Operating Rate	Coil Consumption	Power Dissipation	Mechanical Life	Contact Capacity	Dimensions	Weight
TCA2-DN	●	●	40, 31, 22, 10, 01, 11	660V	-	-	-	+ 30°	10 A	10800	60/7 VA	1.56W	30	2.5	80mm	0.32/0.58
TCA3-DN	●	●	40, 31, 22, 10, 01, 11, 004, 008, 006	660V	-	-	-	+ 30°	10 A	3600	70/7.5 VA	0.20W	20	2.5	115mm	0.32/0.58
TC1-D09	●	●	10, 01, 004, 008, 006	690V	9 A	4 / 5.5 Kw / hp	7.5	+ 30°	10 A	3600	70/7.5 VA	1.56W	20	4	80mm	0.32/0.58/0.32
TP1-D09	●	●	10, 01, 004, 008, 006, TP1-DC09 01	690V	9 A	4 / 5.5 Kw / hp	7.5	+ 30°	10 A	3600	70/7.5 VA	1.56W	20	4	80mm	0.32/0.58/0.32
TC1-D12	●	●	10, 01, 004, 008, 006	690V	12 A	5.5 / 7.5 Kw / hp	10	+ 30°	10 A	3600	70/7.5 VA	0.36W	20	4	80mm	0.32/0.60/0.32
TP1-D12	●	●	10, 01, 004, 008, 006, TP1-DC12 01	690V	12 A	5.5 / 7.5 Kw / hp	10	+ 30°	10 A	3600	70/7.5 VA	0.36W	20	4	80mm	0.32/0.60/0.32
TC1-D18	●	●	10, 01, 004	690V	18 A	9 / 12.5 Kw / hp	15	+ 30°	10 A	3600	70/7.5 VA	2.5W	20	6	85mm	0.35/0.85/-
TP1-D18	●	●	10, 01, 004	690V	18 A	9 / 12.5 Kw / hp	15	+ 30°	10 A	3600	70/7.5 VA	2.5W	20	6	85mm	0.35/0.85/-
TC1-D22	●	●	10, 01	690V	22 A	11/15 Kw / hp	-	+ 30°	10 A	3600	70/7.5 VA	0.80W	20	6	85mm	0.35/0.85/-
TP1-D22	●	●	10, 01	690V	22 A	11/15 Kw / hp	-	+ 30°	10 A	3600	70/7.5 VA	0.80W	20	6	85mm	0.35/0.85/-

For Contactor Type		Coil Reference	Replace with <span style="color:red">■</span> or <span style="color:yellow">■</span> following codes																															
			Volts →																															
			12	24	48	72	110	120	125	208	220	230	240	250	277	380	400	415	440	480	575	600												
			50 Hz								60 Hz								50/60 Hz															
			B5	E5	F5	G6	L6	M6	P5	U5	W6	Q5	V5	N5	F5	R6	T6	S6	X6															
			B7	E7	F7	G7	M7	P7	U7	Q7	V7	N7	R7																					
			BD	ED	SD	FD	GD	MD	PD	UD	OD	VD	ND	RD																				
			BD	ED	SD	FD	GD	MD	PD	UD	OD	VD	ND	RD																				
			BD	ED	SD	FD	GD	MD	PD	UD	OD	VD	ND	RD																				
			BD	ED	SD	FD	GD	MD	PD	UD	OD	VD	ND	RD																				
			BD	ED	SD	FD	GD	MD	PD	UD	OD	VD	ND	RD																				
			BD	ED	SD	FD	GD	MD	PD	UD	OD	VD	ND	RD																				

TC1-D25	●	■	TC1-D32	●	■	TC1-D38	●	■	TC1-D40	●	■	TC1-D50	●	■	TC1-D65	●	■	TC1-D80	●	■	TC1-D95	●	■
TP1-D25	●	■	TP1-D32	●	■	TP1-D38	●	■	TP1-D40	●	■	TP1-D50	●	■	TP1-D65	●	■	TP1-D80	●	■			
	10		10		10		-		11		-		11		11		11		11		-		
	01		01		01				004				004		004		004		004				
	004		-		-				008				-		008		008		008				
	008		-		-								-										
	006		-		-								-										
TP1-DC25	01	■																					

B

690V	690V	690V	690V	690V	690V	690V	690V
<b>25 A</b>	<b>32 A</b>	<b>38 A</b>	<b>40 A</b>	<b>50 A</b>	<b>65 A</b>	<b>80 A</b>	<b>95 A</b>
<b>Kw / hp</b> <b>11 / 15</b>	<b>Kw / hp</b> <b>15 / 20</b>	<b>Kw / hp</b> <b>18.5/25</b>	<b>Kw / hp</b> <b>22 / 30</b>	<b>Kw / hp</b> <b>25 / 35</b>	<b>Kw / hp</b> <b>37 / 50</b>	<b>Kw / hp</b> <b>45 / 60</b>	<b>Kw / hp</b> <b>45 / 60</b>
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°
<b>40 A</b>	<b>50 A</b>	<b>50 A</b>	<b>60 A</b>	<b>80 A</b>	<b>80 A</b>	<b>125 A</b>	<b>125 A</b>
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 <u>250/3.5W</u>	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 / - /-

# robusta (115A ~ 800A)

## 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 (around the device)	Storage	°C	-60 to +80
	Operation	°C	-5 to +55 (0.8 to 1.1 Uc)
	Permissible	°C	-50 to +70, for operation at Uc
Maximum operating altitude	Without derating	Mtr.	3000
Operating position	Without derating		+30° possible, in relation to normal vertical mounting plane

\* 4 Pole contactor under  $U_L$  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 $\theta < 55^\circ\text{C}$		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) $\theta < 40^\circ\text{C}$		A	200	250	275	315	350	400	500	700	1000	1600	1000
Rated making capacity I <sub>ms</sub> conforming to IEC-60947-4		A	1300	1700	2100	2460	2940	3600	4500	5550	6740	8550	-
Rated breaking capacity	220-440V	A	1300	1500	1800	2050	2450	3000	4000	5000	6300	7100	-
I <sub>ms</sub> 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 $\Omega$	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
<b>Cabling</b>			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	40x5	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

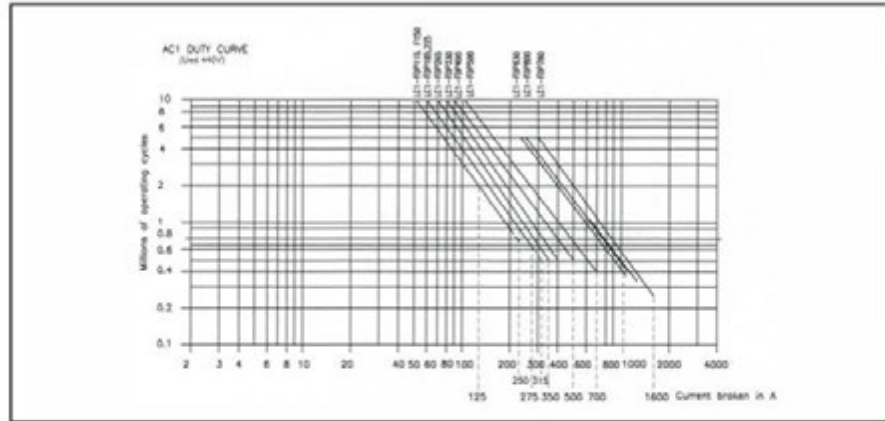
### Control Circuit Characteristics

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 $\theta < 55^\circ\text{C}$	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 Cos $\phi$		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 Cos $\phi$		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 Connector	Nm	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
<b>Cabling</b>			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 with end	2 Conductors	Sqmm	1/2.5	1/2.5	1/2.5	1/2.5	1/2.5	1/2.5	1/2.5	1/2.5	1/2.5	1/2.5	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

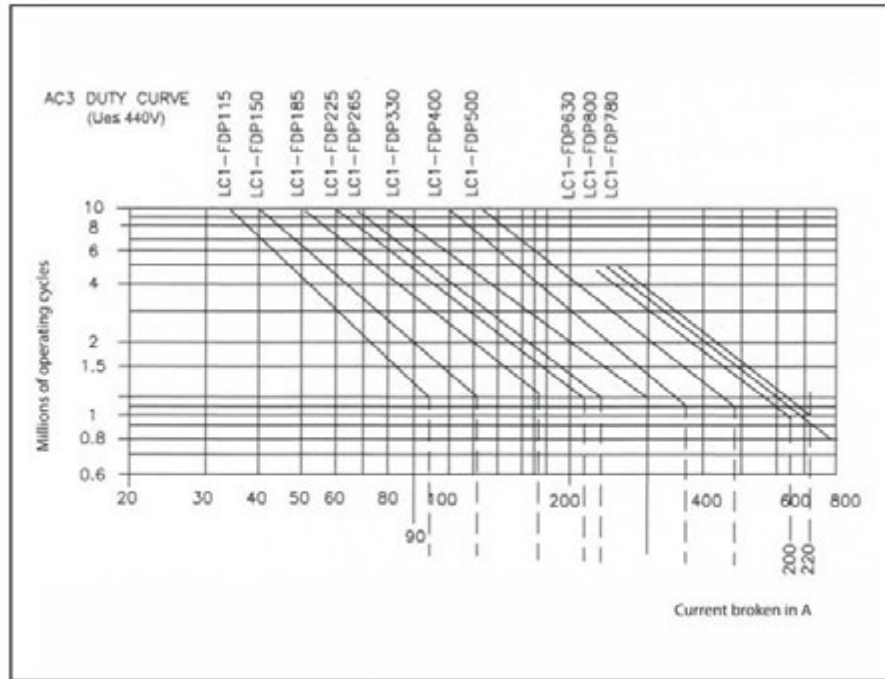
# robusta (115A ~ 800A)

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

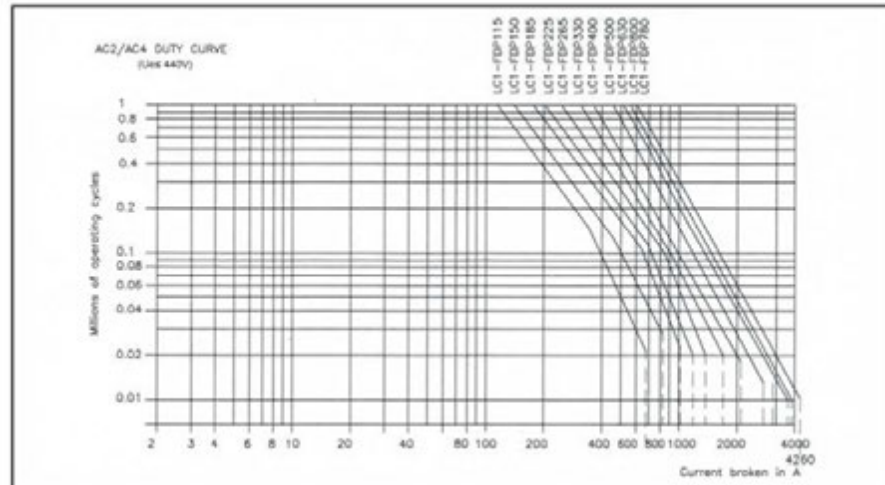
**Use in Category AC-1 ( $U_e < 440V$ ).** Control of resistive circuits ( $\cos \phi > 0.95$ ). The current broken ( $I_b$ ) in category AC-1 is equal to the current ( $I_e$ ) normally drawn by the load.



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



**Use in Categories AC-2, AC-4 ( $U_e < 440V$ ).** 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  $6 \times I_e$ , ( $I_e$ =rated operational current of the motor).



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

B

# robusta (115A ~ 800A)

## Contactors' Specifications, Spare Coils

B



LC1-FDP115A-XX



LC1-FDP1154A-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

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

Maximum Current		Maximum HP Rating 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

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	✓	✓	✓	x	x	✓	x	x	✓	✓	✓	x	✓	✓	✓	✓	x	✓	✓	x
F185, F225	60 Hz	✓	✓	✓	✓	✓	x	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	x	✓	✓
F265, F330	40-400Hz	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	x	✓	x	✓	x	✓	✓	✓	x
F400, F500, F630	40-400Hz	x	✓	✓	x	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	x	✓	✓	x
F780	40-400Hz	x	✓	x	x	✓	x	x	x	✓	x	✓	x	x	x	✓	x	✓	x	x	x
F800	40-400Hz	x	✓	✓	x	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	x	✓	✓	x

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

Table-10: XX-DC Coil Voltages

Volt DC	24	48	110	120	125	220	240	250	440
F115, F150, F185	✓	✓	✓	x	✓	✓	x	✓	✓
F225, F265, F330	✓	✓	✓	x	✓	✓	x	✓	✓
F115, F150, F185	✓	✓	✓	x	✓	✓	x	✓	✓
F400, F500	✓	✓	✓	x	✓	✓	x	✓	✓
F630	x	✓	✓	x	✓	✓	x	✓	✓
F780	x	x	✓	✓	x	✓	✓	✓	✓
F800	x	x	✓	✓	x	✓	✓	✓	✓

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



LX1-FF-XX



# robusta (115A ~ 800A)

## Accessories, Spares



LA9-FF970



LA9-FX970\*\*\*

### Mechanical Interlocks Horizontally Mounted

For Contactor Type	Catalog Number
LC1-FDP115A	LA9-FF970
LC1-FDP150A	
LC1-FDP185A	
LC1-FDP225A	LA9-FG970
LC1-FDP265A	
LC1-FDP330A	
LC1-FDP400A	LA9-FJ970
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	
LC1-FDP225A	LA9-FG4G
LC1-FDP265A	
LC1-FDP330A	LA9-FH4H
LC1-FDP400A	
LC1-FDP500A	LA9-FJ4J
LC1-FDP630A / LC1-FDP800A	
LC1-FDP780A	LA9-FK4K
	LA9-FL4L
	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

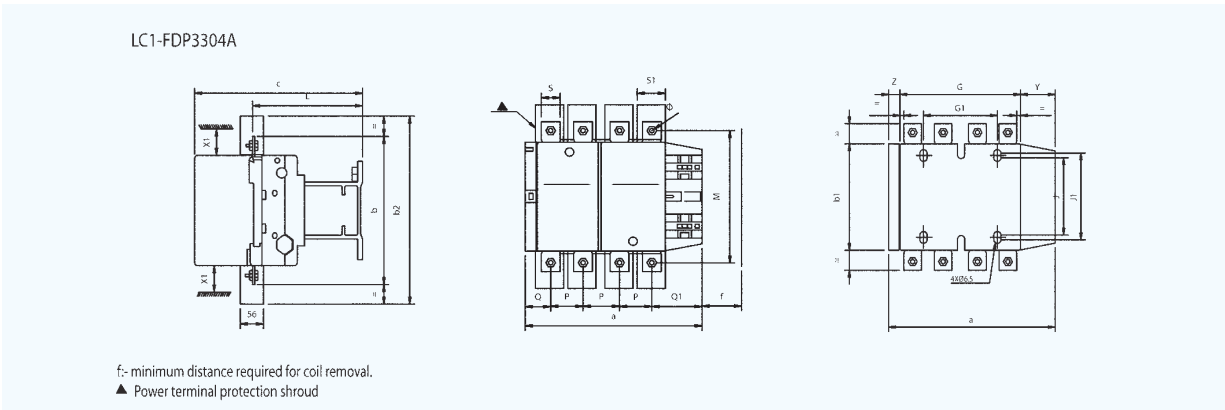
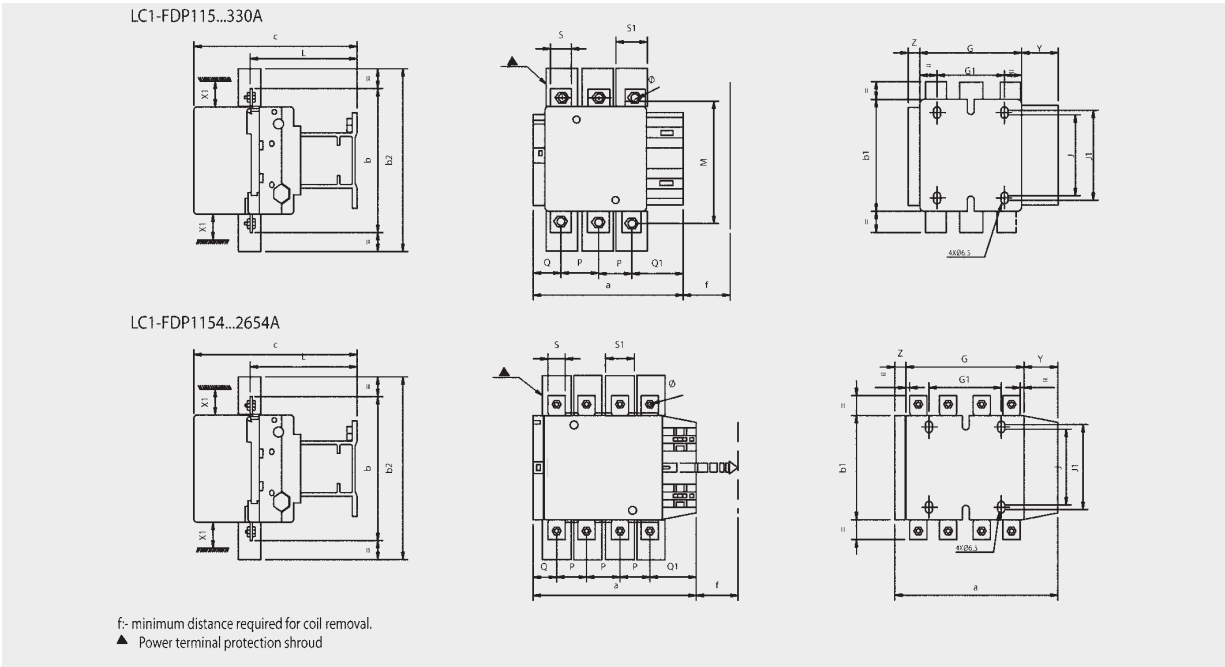
B

# robusta (115A ~ 800A)

## Contactors' Dimensions with AC/DC operating coil

(All Dimensions in mm)

B



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

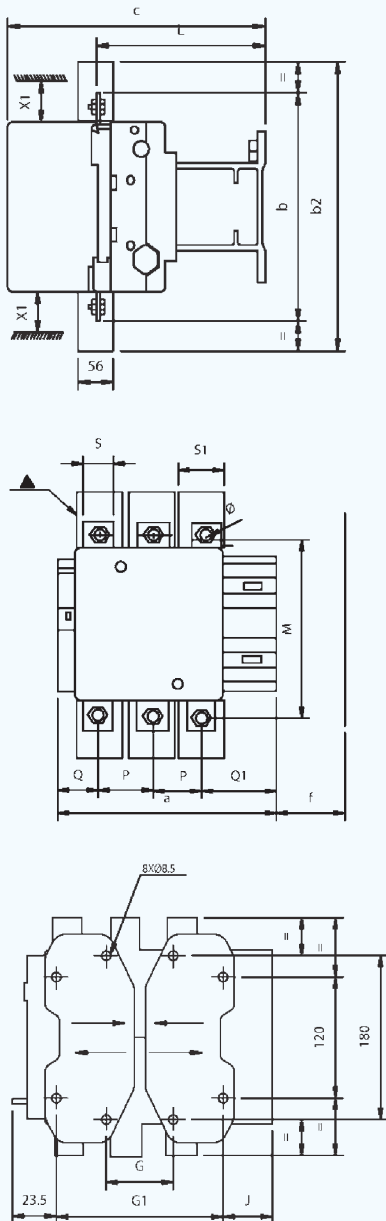
X1(mm) = Minimum electrical clearance according to operating voltage & breaking capacity		
LC1-	200 to 500V	600 to 1000V
FDP115A/1154A	10	15
FDP150A/1504A	10	15
FDP185A/1854A	10	15
FDP225A/2254A	10	15
FDP265A/2654A	10	15
FDP330A/3304A	10	15

# robusta (115A ~ 800A)

## Contactors' Dimensions with AC/DC operating coil

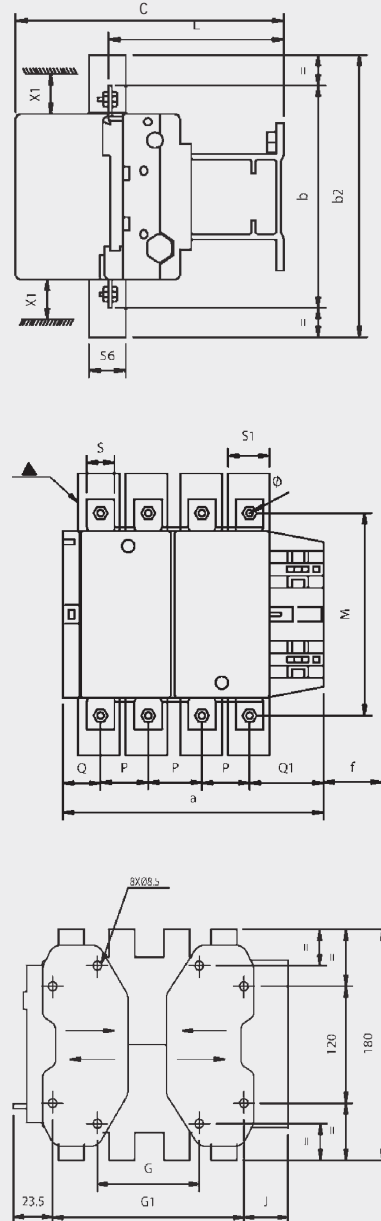
(All Dimensions in mm)

LC1-FDP400A/LC1-FDP500A



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

LC1-FDP4004A



B

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

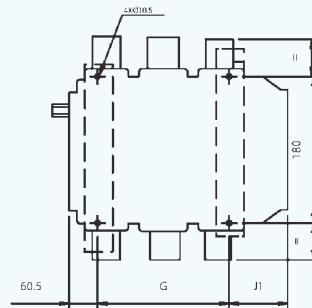
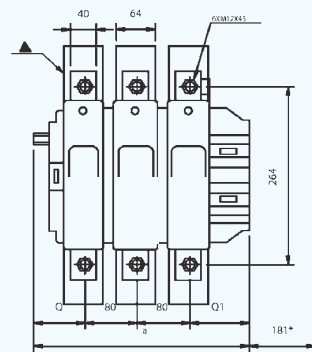
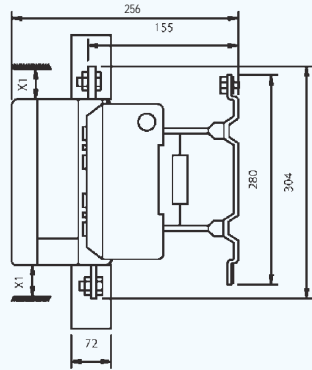
# robusta (115A ~ 800A)

## Contactors' Dimensions with AC/DC operating coil

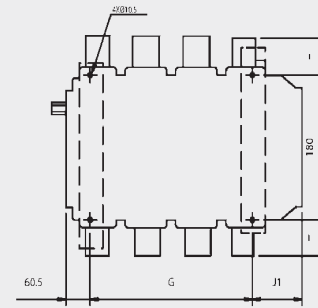
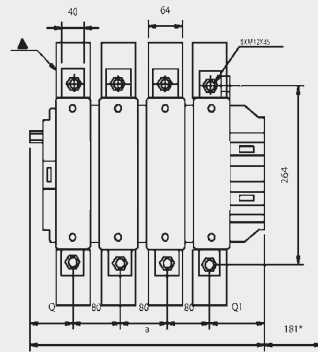
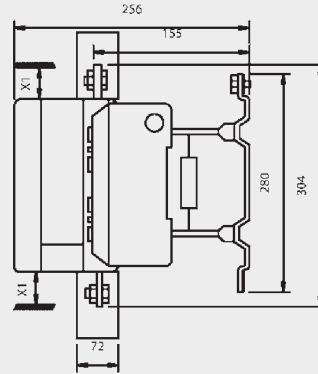
(All Dimensions in mm)

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

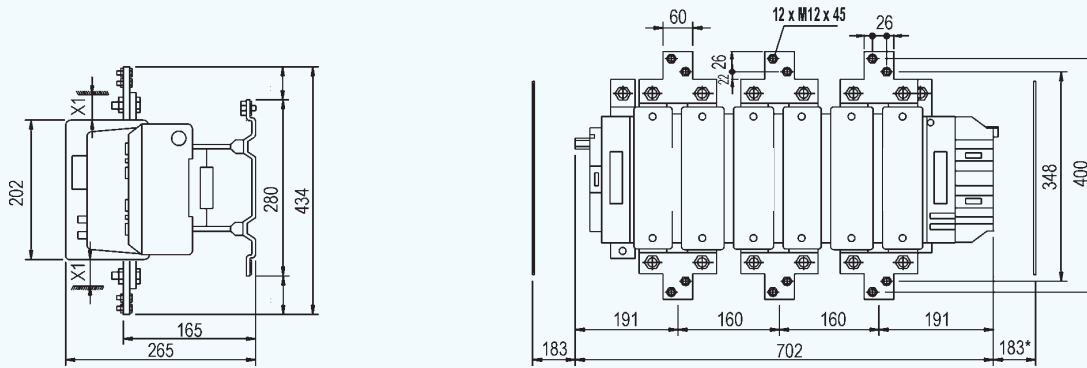
X1(mm) = Minimum electrical clearance according to operating voltage & breaking capacity		
LC1-	200 to 500V	600 to 1000V
FDP630A	20	30
FDP5004A	15	20

# robusta (115A ~ 800A)

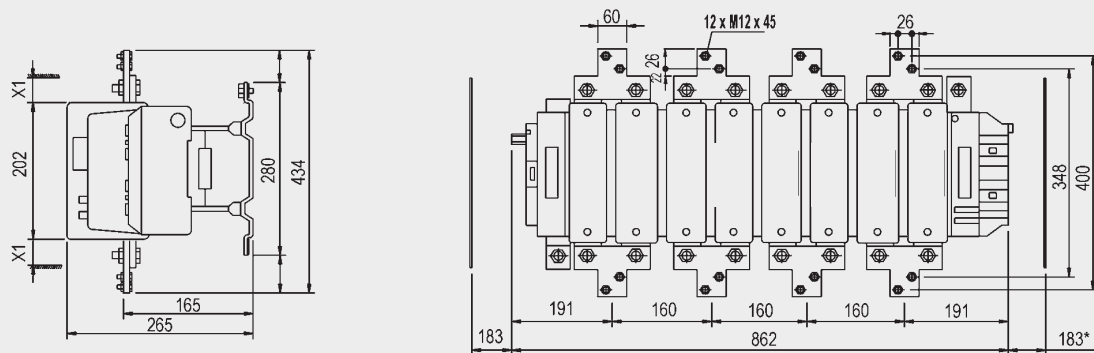
## Contactors' Dimensions with AC/DC operating coil

(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

B

# robusta (115A ~ 800A)







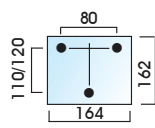
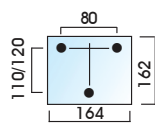
## Synopsis - Contactors


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

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

Coil Reference (DC) ■		24	48	110	120	125	220	240	250	440
Contactor	Volts DC									
F115, F150, F185	✓	✓	✓	x	✓	✓	✓	x	✓	✓
F225, F265, F330	✓	✓	✓	x	✓	✓	x	✓	✓	✓
F115, F150, F185	✓	✓	✓	x	✓	✓	x	✓	✓	✓
F400, F500	✓	✓	✓	x	✓	✓	x	✓	✓	✓
F630	x	✓	x	✓	✓	✓	x	✓	✓	✓
F780	x	x	✓	✓	x	✓	✓	✓	✓	✓

**B**

Code		AC	LC1-FDP115A+0	LC1-FDP150A+0	LC1-FDP185A+0	LC1-FDP225A+0
		DC				
			LC1-FDP115A+0	LC1-FDP150A+0	LC1-FDP185A+0	LC1-FDP225A+0
						
<b>Maximum rated operational voltage</b>			690V	690V	690V	690V
<b>Maximum rated current for motor control</b> (3 phase 440V, 50-60Hz, for AC3 Duty)			115A	150A	185A	225A
<b>Maximum standard power rating</b> for motor control for AC3 Duty $\theta < 55^{\circ}\text{C}$ , 415V			<b>Kw / hp</b> 59 / 80	<b>Kw / hp</b> 80 / 108	<b>Kw / hp</b> 100 / 136	<b>Kw / hp</b> 110 / 148
<b>3 phase AC3</b>	 <b>230V HP</b>		40	50	60	75
	 <b>460/480V HP</b>		75	100	125	130
	 <b>575/600V HP</b>		100	125	150	150
<b>Mounting position</b> (w.r.t. normal vertical mounting plane)*			+ 30°	+ 30°	+ 30°	+ 30°
<b>Maximum thermal current</b> I <sub>th</sub> ( $\theta < 40^{\circ}\text{C}$ )			200A	250A	275A	315A
<b>Maximum operating rate</b> (operations / hr)	AC		2400	2400	2400	2400
	DC		2400	2400	2400	2400
<b>Average coil consumption</b> (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
<b>Heat dissipation at</b>	AC		12 to 16W	12 to 16W	18 to 24W	18 to 24W
	DC		4.5W	4.5W	5W	5W
<b>Mechanical life</b> (in millions of operations)	50 or 60 Hz		10	10	10	10
	50 / 60 Hz		-	-	-	-
<b>Power contact terminal capacity</b> mm <sup>2</sup>			95	120	150	185
<b>Over-all dimensions in mm</b>			165mm	165mm	176mm	176mm
						
<b>Projection (LC1-F)</b>			165mm	165mm	176mm	176mm

Note: 4P F-Range Contactor  under process.

Coil Reference		AC	DC
①	LX1FF	■	■
②	LX1FG	■	■
③	LX1FH-2	■	■
④	LX1FJ	■	■
⑤	LX4FF	■	■
⑥	LX4FG	■	■
⑦	LX4FH-2	■	■
⑧	LX4FJ	■	■
⑨	LX1FK	■	■
⑩	LX1FL	■	■
⑪	LX1FX	■	■
⑫	LX4FK	■	■
⑬	LX4FL	■	■
⑭	LX4FX	■	■

⑫ - 2 coils in series

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

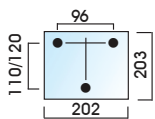
\* For AC - Coil will be supplied with rectifier  
add suffix DRE4U in case of FW (110/120) & MW (220/240)  
add suffix DRE4S in case of QW (380/400)

B

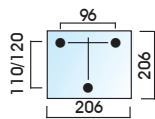
LC1-FDP265A+⑩	LC1-FDP330A+⑩	LC1-FDP400A+⑩	LC1-FDP500A+⑩	LC1-FDP630A+⑩	LC1-FDP780A+⑩	LC1-FDP800A+⑩
LC1-FDP2654A+⑩	LC1-FDP3304A+⑩	LC1-FDP4004A+⑩	LC1-FDP5004A+⑩	LC1-FDP6304A+⑩	LC1-FDP7804A+⑩	

If Contactors are required with DUST COVERS, replace ⑩ with 'DP' e.g. LC1-FDP115A

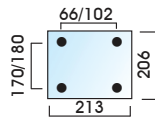
690V	690V	690V	690V	690V	690V	690V
265A	330A	400A	500A	630A	780A*	800A
Kw / hp	Kw / hp	Kw / hp	Kw / hp	Kw / hp	Kw / hp	Kw / hp
140 / 190	180 / 240	220 / 300	280 / 380	375 / 500	425 / 580	450 / 610
75	100	125	200	300	-	-
150	200	250	400	600	-	-
200	250	300	500	800	-	-
+ 30°	+ 30°	+ 30°	+ 30°	+ 30°	+ 30°	+ 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



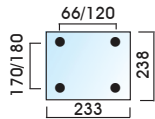
207mm



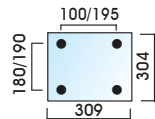
213mm



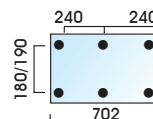
181mm



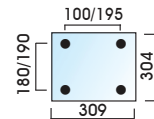
213mm



226mm



250mm



226mm

\* LC1F 780, only Ⓢ listing

## Auxilliary Contacts, Time Delay Blocks, Mechanical Latching Blocks

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 indicated on the front face	Drift upto 0.5 million operating cycles			+ 15%	+ 15%	
	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		Snap-On Mounting	Catalog Number
	NO	NC		
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		Range	Catalog Number
	NO	NC		
ON Delay	1	1	0.1 ... 3s	TA2-DT0
ON Delay	1	1	0.1 ... 30s	TA2-DT2
ON Delay	1	1	10 ... 180s	TA2-DT4
OFF Delay	1	1	0.1 ... 3s	TA3-DR0
OFF Delay	1	1	0.1 ... 30s	TA3-DR2
OFF Delay	1	1	10 ... 180s	TA3-DR4
On Delay	1	1	1 ... 30s*	TA2-DS2

\* With switching time of 40msec + 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	Permissible acceleration		15gn - 11ms, conforming to IEC 68-2-7
Vibration resistance	Permissible acceleration		6gn, conforming to IEC 68-2-6
Dielectric strength at 50 Hz	Conforming to IEC 255-5	kV	6
Impulse withstand voltage	Conforming to IEC 801-5	kV	6

### Electrical Characteristics of Power Circuit

TYPE	TR2-D	UNIT	09301-12316	18321	25322-65361	80363-95365
Tripping class			10	10	10	10
Rated insulation Voltage (Ui)	Conforming to IEC 60947-4-1	V	<b>TR2-D09301~D32355:690V</b>		<b>TR2D40355~D95365:1000V</b>	
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	mm <sup>2</sup>	1.5 / 10	1.5 / 10	4 / 35	4 / 50
Flexible cable with cable end	1 conductor	mm <sup>2</sup>	1 / 4	1 / 6	4 / 35	4 / 50
Solid cable without cable end	1 conductor	mm <sup>2</sup>	1 / 6	1.5 / 4	4 / 35	4 / 50
Tightening torque		Nm	1.7	2.5	9	9
Connection to spring terminals			Minimum / Maximum CSA			
Flexible cable without cable end	1 conductor	mm <sup>2</sup>	1.5 / 4	1.5 / 4	-	-
SolidCable without cable end	1 conductor	mm <sup>2</sup>	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 coil of controlled contactors (Occasional operating cycles of contact 95 - 96)	AC Supply	V	24	48	110	220	380	600
		VA	100	200	400	600	600	600
		V	24	48	110	220	440	-
		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	mm <sup>2</sup>	1 / 2.5					
Flexible cable withcable end	1 or 2 conductors	mm <sup>2</sup>	1 / 2.5					
Solid cable without cable end	1 or 2 conductors	mm <sup>2</sup>	1 / 2.5					
Tightening torque	1 or 2 conductors	Nm	1.85					
Connecting to spring terminal			Minimum / Maximum CSA					
Flexible cable without cable end	1 or 2 conductors	mm <sup>2</sup>	1 / 2.5					
Solid cable without cable end	1 or 2 conductors	mm <sup>2</sup>	1 / 2.5					

## Overload Relays - Specifications



TR2-D25322



LR1-F105

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

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

B

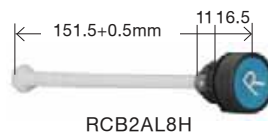
Notes : 1. Protected shrouds for main poles or power poles to be ordered seperately for LR1 Relays

2. Standard Fault Ratings   with TR2 Relay.

\*Under UL/CSA approval

### Reset Extended Push Button

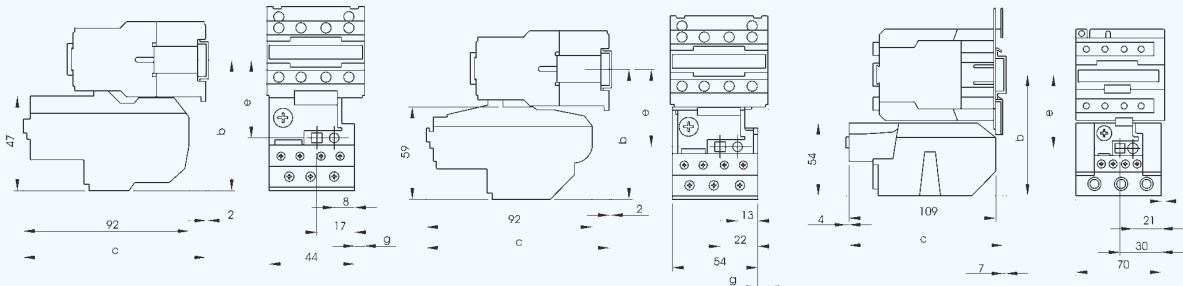
Description	Reference
Reset Extended Push Button (Round Type)	RCB2AL8R
Reset Extended Push Button (Hex Type)	RCB2AL8H



## Overload Relays Dimensions, Tripping Curves

(All Dimensions in mm)

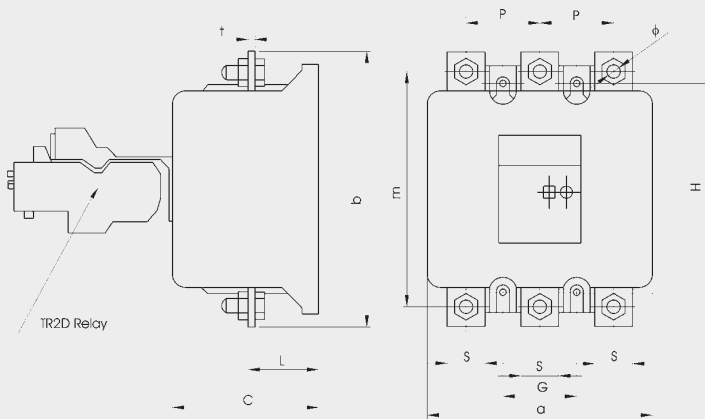
B



TR2D09301-D25322				
Mounting With	b	c	e	g
TC1D09, D12, D18	81	98	50	0
TP1DC09, DC12				
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	56	140	40	20	9	3
125	126	160	81	40	110	56	140	40	20	9	3
160	126	160	81	40	110	56	140	140	20	9	3
200	126	160	81	40	110	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

