

# Contactors and Overload Relays



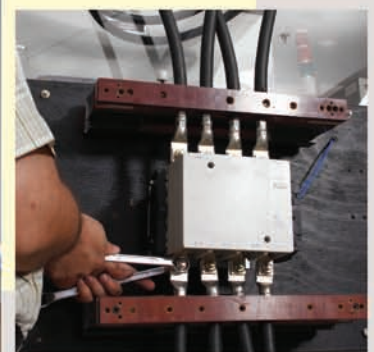
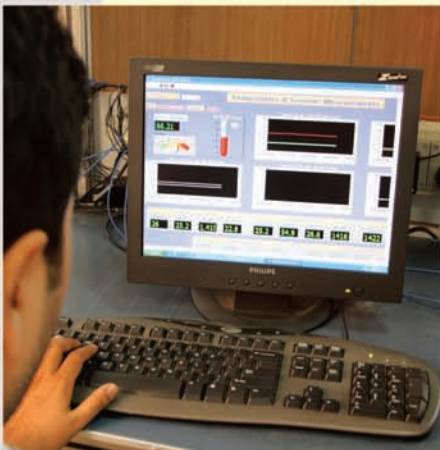
**COSMIC**  
STAR

Catalogue 2011

**QRG**  
GROUP



**HAVELLS**  
INDUSTRIAL



# CONTENT

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The “Cosmic Star” series of contactor and thermal overload relay are designed and manufactured to world class standards.

A perfect blend of aesthetics, features and performance.

The Cosmic Star Series covers contactor range from 9A – 630A in 3P & 4P execution and overload relays 0.1A – 93A in direct version and 30A – 630A in electronic version. These fully conform to both national & international standards namely IS/IEC-60947-4 - 1

The contactors provide reliable and safe switching and the thermal relays offer close & accurate protection against overload

The user friendly series comes with a wide range of add-on / optional accessories to meet varied application needs in motor, distribution circuits and automation systems.



**COSMIC**  
STAR

- C**ontrolgear - a new generation range.
- O**ptimum size for system design & application - a versatile range.
- S**election & Choice of Contactors , O/L relays, MPCBs,Accessories.
- M**aintenance free, ease of fitment -- More reliable.
- I**nnovative, geometrical, precision & aesthetics.
- C**omplete, Range for worldwide, Replacement & Usage.

.... a Star product line from HAVELLS



### Features

- Latest : Fully application oriented conforming to IS/IEC - 60947 - 4 - 1
- Wide Range : CR, 9A – 630A (4kW- 375kW) in 13 frame sizes
- System Design : For a compact system building built in aux. contact 1NO / 1NC upto 32A and 1NO + 1NC from 40A to 95A
- Execution : 3P / 4P / 3P capacitor duty
- Control : AC / DC
- Utilization Category : 12 AC Duty Categories  
4 DC Duty Categories
- Flexible : Common add-on, side & Front mounted aux. contact & Accessories
- Options : Diagonal or same side wiring on coils upto 95A
- Indian Conditions : Liberal creepage distance & superior material grade
- Safety : Shrouded terminals to prevent accidental contact
- Facility : Din Rail mounting upto 95A & direct mounting with O/L Relays upto 95A
- Modular design : All accessories snap fitted
- Conservation : Low coil consumption

# CONTACTOR





### CN / CD Series

3 Pole / 4 Pole Power Contactor



Frame Size - 1

Current Rating - 9A, 12A

Power Rating - 4kW, 5.5kW



Frame Size - 2

Current Rating - 18A

Power Rating - 9kW



Frame Size - 3

Current Rating - 25A

Power Rating - 11kW

CN Series : AC contactor with AC coil

CD Series : AC contactor with DC coil

### CH Series

3 Pole / 4 Pole Power Contactor



Frame Size - 1

Current Rating - 115A, 150A

Power Rating - 59kW, 80kW



Frame Size - 2

Current Rating - 185A, 225A

Power Rating - 100kW, 110kW



Frame Size - 3

Current Rating - 265A

Power Rating - 132kW

CH Series : AC contactor with AC / DC coil





Frame Size - 4  
Current Rating - 32A  
Power Rating - 15kW



Frame Size - 5  
Current Rating - 40A, 50A, 65A  
Power Rating - 22kW, 25kW, 37kW



Frame Size - 6  
Current Rating - 80A, 95A  
Power Rating - 45kW



Frame Size - 4  
Current Rating - 330A  
Power Rating - 180kW



Frame Size - 5  
Current Rating - 400A  
Power Rating - 220kW



Frame Size - 6  
Current Rating - 500A  
Power Rating - 280kW



Frame Size - 7  
Current Rating - 630A  
Power Rating - 375kW

Standard conformity : IS/IEC - 60947 - 4 - 1  
 Insulation voltage Ui : 750 V  
 Operation voltage Ue : 690 V  
 Ambient Temperature Range : -5 °C to +55 °C  
 Operating Altitude : 3000 m  
 Mounting Position : ±30° (Vertical Plane)



Contactor		Type CN* / CD*	CRN1 04	CN1 09	CN1 12	
Current Rating at 415V 50Hz AC3 -Ie		A	CR	9	12	
No. of poles			2NO+2NC, 3NO+1NC, 4NO	3P+1NO/1NC, 4P	3P+1NO/1NC, 4P	
Impulse withstand voltage Uimp		kV	6	6	6	
Making Capacity		A	Control Relay (AC-15 / DC-13 Duty)	250	250	
Breaking Capacity at 415V		A		250	250	
AC1 Duty : Rated Operational Current I <sub>th</sub>		A		25	25	
Max. Power Rating at 415V		KW		11	11	
AC2 / AC3 Duty Rated Operational Current I <sub>e</sub>		A		9	12	
Max. Power Rating at 415V For Electrical Life (Refer. electrical life plot)		KW/HP		4 / 5	5.5 / 7.5	
AC4 Duty : Rated Operational Current I <sub>e</sub>		A		9	12	
Max. Power Rating at 415V For Electrical Life (Refer. electrical life plot)		KW/HP		4 / 5	5.5 / 7.5	
Mechanical Life		(Million Ops.)		10	10	10
Switching Frequency (No load)		Ops. / Hr.		3600	3600	3600
Impedence Per Pole		m.ohm.	7	2.5	2.5	
Short Time Current at 40°C (1sec.)		A	NA	245	245	
Short Circuit Back Up Fuse Rating		A	NA	20	20	
Max. Cable Size		Sq. mm	4	4	4	
Tightening torque		Nm	0.8	0.8	0.8	
Weight	3P	Kg.	0.34	0.34	0.34	
	4P	Kg.	0.34	0.34	0.34	
Over all Dimension (W x H x D)	3P	mm	45 x 74 x 82	45 x 74 x 82	45 x 74 x 82	
	4P	mm	45 x 74 x 82	45 x 74 x 82	45 x 74 x 82	
Control Circuit (AC Coil)						
Operating Voltage Range		V	0.7 - 1.1	0.7 - 1.1	0.7 - 1.1	
Power Consumption (inrush / hold ) 50 Hz		VA	70/8	70/8	70/8	
Power Consumption (inrush / hold ) 60 Hz		VA	80/8	80/8	80/8	
Heat Dissipation 50/60Hz		W	1.8-2.7	1.8-2.7	1.8-2.7	
Coil pickup time		ms	12-22	12-22	12-22	
Coil drop out time			5-12	5-12	5-12	

\* CN : AC contactor with AC coil, \*CD : AC contactor with DC coil.

Note: For dimension detail of CD series refer page no. 37

† : Weight of CN5 40 to CN6 95 is provided on request



CN2 18	CN3 25	CN4 32	CN5 40	CN5 50	CN5 65	CN6 80	CN6 95
18	25	32	40	50	65	80	95
3P+1NO/1NC, 4P	3P+1NO/1NC, 4P	3P+1NO/1NC, 4P	3P+1NO+1NC, 4P	3P+1NO+1NC, 4P	3P+1NO+1NC, 4P	3P+1NO+1NC, 4P	3P+1NO+1NC, 4P
6	6	6	8	8	8	8	8
330	450	560	760	900	950	1100	1120
330	450	560	760	900	950	1100	1120
32	40	50	60	80	80	125	125
18	22	25	33	45	45	63	63
18	25	32	40	50	65	80	95
9 / 12.5	11 / 15	15 / 20	22 / 30	25 / 35	37 / 50	45 / 60	45 / 60
18	25	32	40	50	65	80	95
9 / 12.5	11 / 15	15 / 20	22 / 30	25 / 35	37 / 50	45 / 60	45 / 60
10	10	10	8	8	8	6	6
3600	3600	3600	3000	3000	3000	2000	2000
2.5	2	2	1.5	1.5	1	0.8	0.8
320	435	545	735	875	920	1045	1065
32	40	50	63	80	80	100	125
6	10	10	16	25	25	50	50
0.8	1.2	1.2	3.5	3.5	3.5	4	4
0.35	0.5	0.52	1.08	1.08	1.08	1.3	1.3
-	0.5	-	†	†	†	†	†
47 x 76 x 87	57 x 83 x 95	57 x 83 x 100	77 x 120 x 116	77 x 120 x 116	77 x 120 x 116	87 x 120 x 127	87 x 120 x 127
-	57 x 83 x 95	-	85 x 120 x 116	85 x 120 x 116	85 x 120 x 116	96 x 120 x 127	96 x 120 x 127
0.7 - 1.1	0.7 - 1.1	0.7 - 1.1	0.7 - 1.1	0.7 - 1.1	0.7 - 1.1	0.75 - 1.1	0.75 - 1.1
110/11	110/11	110/11	200/20	200/20	200/20	200/20	200/20
115/11	115/11	115/11	200/20	200/20	200/20	200/20	200/20
2.5-3.5	3.0-4.0	6.0-10.0	6.0-10.0	6.0-10.0	6.0-10.0	6.0-10.0	6.0-10.0
12-22 5-12	15-24 5-20	15-24 5-20	20-25 8-15	20-25 8-15	20-25 8-15	20-35 10-20	20-35 10-20

**Add-on Accessories**

CN Series : AC (3 Pole / 4 Pole)

CD Series : DC (3 Pole / 4 Pole)



Contactor (IS/IEC - 60947-4-1) Type *	CRN1 04	CN1 09	CN1 12					
Current Rating at 415V 50Hz AC3 -Ie A	4	9	12					
<b>Common Add-on Accessories</b>								
<b>Add-on</b> <b>Side / Front Mounted Aux. Contact Block</b> Rated operational current at 240V / 415V - 6A / 4A Rated thermal current I <sub>th</sub> - 10A Rated insulation voltage - 750V Duty - AC 15								
<b>Contact Configuration</b>		1NO+1NC	2NO					
Type		CAS11	CAS20					
<b>Add-on</b> <b>Pneumatic Timer Block</b> Type (ON Delay / OFF Delay) Time A - (0.1 -3s) / B - (0.1 - 30s) / C - (10 - 180s)								
Timer type	CPT1A / CPT1B / CPT1C							
<b>Mechanical interlock</b>								
Mechanical interlock Type	← MN1234							
<b>Thermal Overload Relay</b>								
								
Overload Relay Type	RT21	RT11						
For Mounting with 3P / 4P Contactor Type :	CN1 09 to CN4 32							
<b>Current Range in Amp. (Suffix Code No.)</b>								
<b>Features</b>	0.1- 0.16	A	2.5-4	H	0.1- 0.16	A	2.5-4	H
• Protection against overload & single phasing	0.16- 0.25	B	4-6	J	0.16- 0.25	B	4-6	J
• Potential free trip contacts (1NO & 1NC)	0.25- 0.4	C	5.5-8	K	0.25- 0.4	C	5.5-8	K
• Ambient temperature compensated (-5°C to +55 °C)	0.4- 0.63	D	7-10	L	0.4- 0.63	D	7-10	L
• Auto - Manual reset / Manual reset facility	0.63-1.0	E	9-13	M	0.63-1.0	E	10-13	M
• Test mode facility	1-1.6	F	12-18	N	1-1.6	F	13-18	N
• Contactor mounting / Individual mounting with adaptor	1.6-2.5	G	17-25	P	1.6-2.5	G	18-25	P

\* Side mounted aux. contact not applicable for 3P / 4P contactors with DC coil

\* Mechanical interlock not applicable for 3P / 4P contactors with DC coil (9A - 95A)



CN2 18	CN3 25	CN4 32	CN5 40	CN5 50	CN5 65	CN6 80	CN6 95
18	25	32	40	50	65	80	95



1NO+1NC  
CAF11

2NO+2NC  
CAF22

3NO+1NC  
CAF31

4NO  
CAF40



CPT2A / CPT2B / CPT2C



MN56



RT22



RT12



RT23



RT13

CN4 32 to CN5 65

CN5 40 to CN6 95

CN5 40 to CN6 95

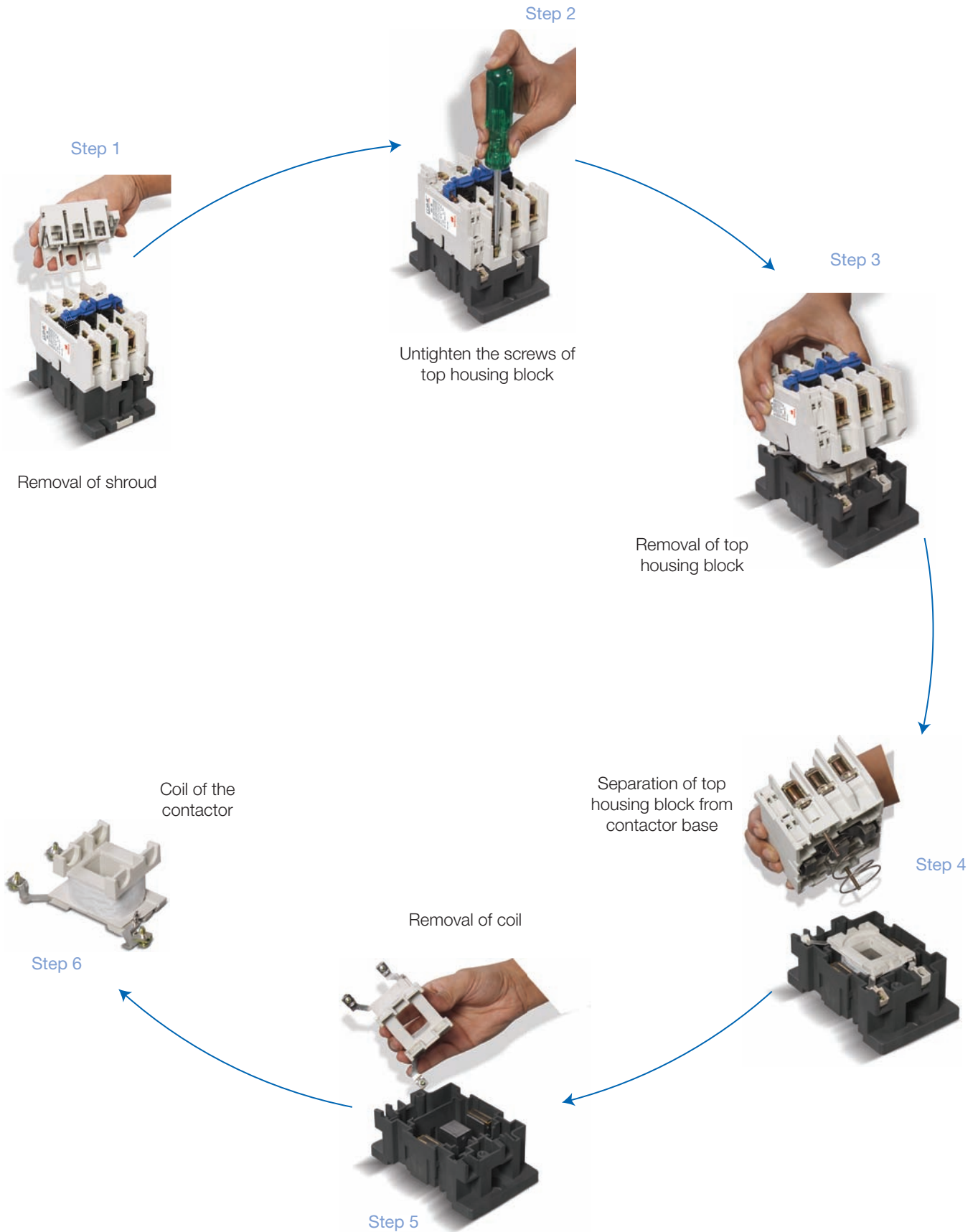
23-32 Q  
28-36 R

23-32 Q  
30-40 R

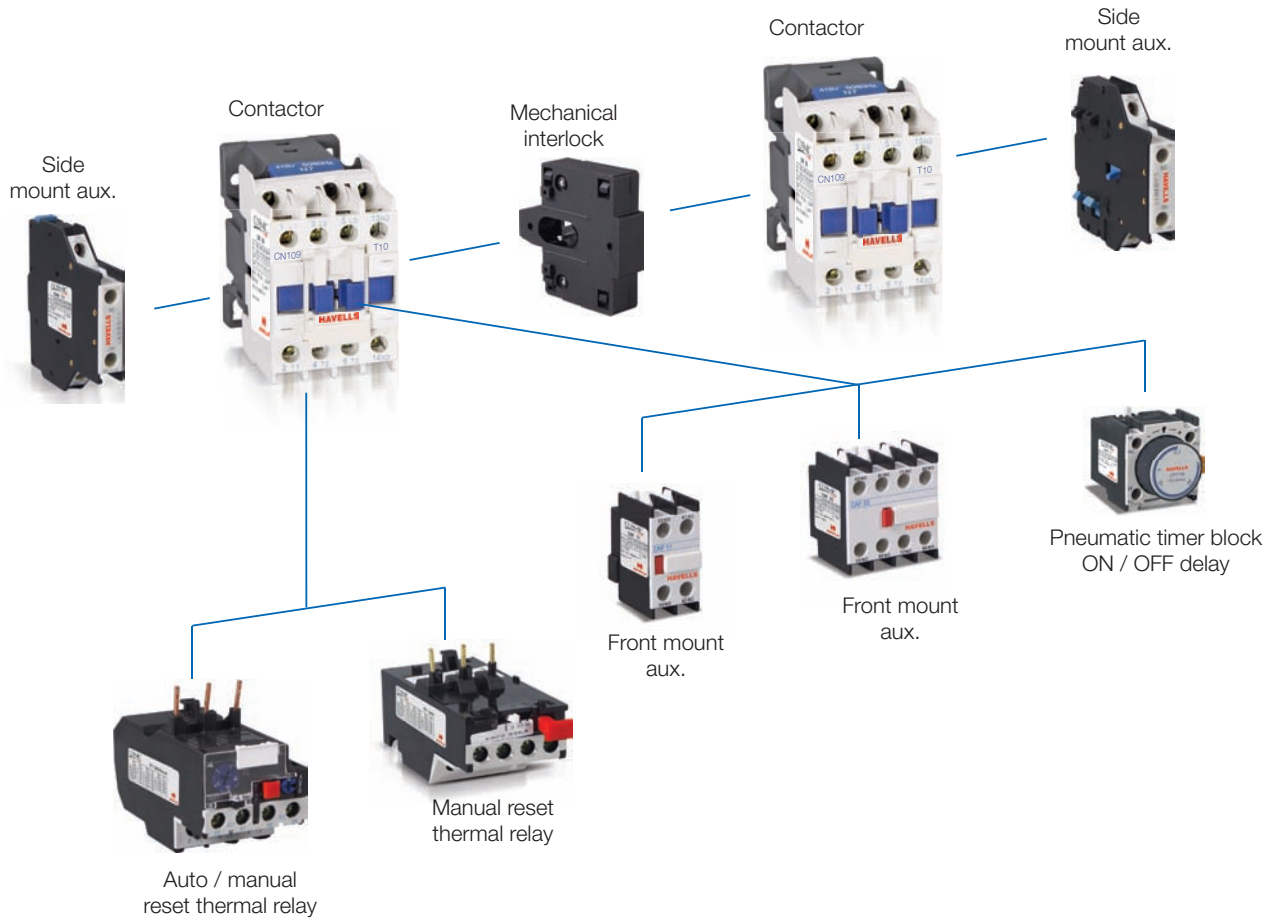
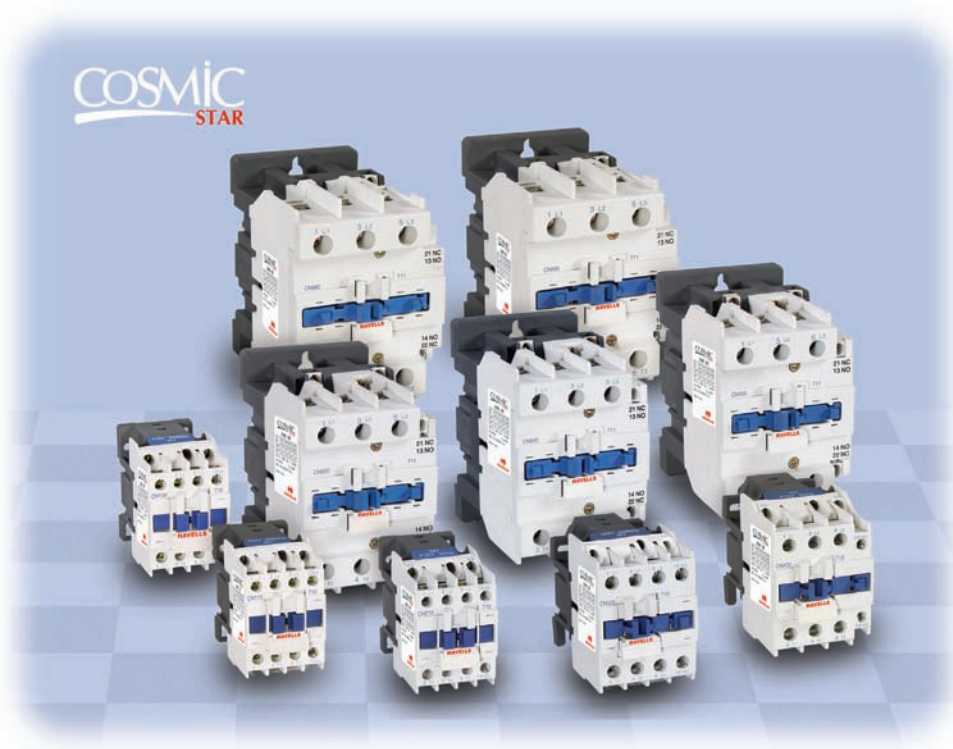
23-32 T  
30-40 U  
37-50 V  
48-65 W  
55-70 X  
63-80 Y  
80-93 Z

38-50 V  
48-57 W  
57-66 X  
63-80 Y

### Ease of accessibility and maintenance



### CN Series Contactors & Accessories



Standard conformity : IS/IEC - 60947-4-1  
 Insulation voltage  $U_i$  : 1000 V  
 Operation voltage  $U_e$  : 1000 V  
 Ambient Temperature Range : -5 °C to +55 °C  
 Operating Altitude : 3000 m  
 Mounting Position :  $\pm 30^\circ$  (Vertical Plane)



Contactor	Type *	CH1 115	CH1 150	CH2 185	
Current Rating at 415V 50Hz AC3 -Ie	A	115	150	185	
No. of poles		3P, 4P	3P, 4P	3P, 4P	
Impulse withstand voltage $U_{imp}$	kV	8	8	8	
Making Capacity	A	1300	1700	2100	
Breaking Capacity at 415V	A	1300	1500	1800	
AC1 Duty : Rated Operational Current $I_{th}$	A	200	250	275	
Max. Power Rating at 415V	KW	110	140	152	
AC2 / AC3 Duty Rated Operational Current $I_e$	A	115	150	185	
Max. Power Rating at 415V For Electrical Life (Refer. electrical life plot)	KW/HP	59 / 75	80 / 100	100 / 125	
AC4 Duty : Rated Operational Current $I_e$	A	115	150	185	
Max. Power Rating at 415V For Electrical Life (Refer. electrical life plot)	KW/HP	59 / 75	80 / 100	100 / 125	
Mechanical Life	(Million Ops.)	3	3	3	
Switching Frequency (No load)	Ops. / Hr.	1800	1800	1800	
Impedance Per Pole	m.ohm.	0.37	0.35	0.33	
Short Time Current at 40°C (1sec.)	A	1235	1615	1995	
Short Circuit Back Up Fuse Rating	A	200	225	315	
Max. Cable Size	Sq. mm	95	120	150	
Tightening Torque	Nm	10	18	18	
Weight	3P	Kg.	3.45	3.45	4.5
	4P	Kg.	3.83	3.83	5.25
Over all Dimension (W x H x D)	3P	mm	164 x 162 x 171	164 x 170 x 171	168 x 174 x 181
	4P	mm	200 x 162 x 171	200 x 170 x 171	208 x 174 x 181
<b>Control Circuit (AC Coil)</b>					
Operating Voltage Range	V	0.75 - 1.1	0.75 - 1.1	0.75 - 1.1	
Power Consumption (inrush / hold) 50 Hz	VA	550 / 45	550 / 45	805 / 55	
Power Consumption (inrush / hold) 60 Hz	VA	660 / 55	660 / 55	970 / 66	
Heat Dissipation 50/60Hz	W	12 - 16	12 - 16	18 - 24	
Coil pickup time	ms	25-40	20-50	20-50	
Coil drop out time	ms	10-15	10-30	10-30	

\* CH Series, AC contactor suitable for both AC & DC coil.







CH2 225	CH3 265	CH4 330	CH5 400	CH6 500	CH7 630
225	265	330	400	500	630
3P, 4P	3P, 4P	3P, 4P	3P, 4P	3P, 4P	3P, 4P
8	8	8	8	8	8
2460	2740	3600	4500	5550	6740
2050	2450	3000	4000	5000	6300
315	350	400	500	700	1000
175	195	222	278	390	555
225	265	330	400	500	630
110 / 150	132 / 180	180 / 220	220 / 270	280 / 340	375 / 450
225	265	330	400	500	630
110 / 150	140 / 190	180 / 240	220 / 270	280 / 340	375 / 450
3	3	3	1	1	1
1800	1800	1500	1500	1500	1500
0.32	0.30	0.28	0.26	0.18	0.12
2340	2600	3420	4275	5270	6400
315	350	500	630	630	630
185	185	240	2X150	2X240	2(60X5) Busbar
35	35	35	35	35	58
4.6	7.28	8.20	9.10	11.35	18.60
5.20	8.25	9.5	10.20	12.95	21.50
168 x 197 x 181	201 x 203 x 213	213 x 206 x 219	213 x 206 x 219	233 x 238 x 232	309 x 304 x 255
208 x 197 x 181	248 x 203 x 213	261 x 206 x 219	261 x 206 x 219	288 x 238 x 232	389 x 304 x 255
0.75 - 1.1	0.75 - 1.1	0.75 - 1.1	0.75 - 1.1	0.75 - 1.1	0.75 - 1.1
805 / 55	1200 / 95	700 / 10	1075 / 15	1100 / 18	1650 / 22
970 / 66	1445 / 110	700 / 10	1075 / 15	1100 / 18	1650 / 22
18 - 24	8	8	14	18	20
20-50 10-30	20-50 10-30	20-50 10-30	20-50 10-30	20-50 10-30	20-50 10-30

### Add-on Accessories

CH Series - AC / DC : (3 Pole / 4 Pole)



Contactor (IS / IEC : 60947-4-1) Type	CH1 115	CH1 150	CH2 185	
Current Rating at 415V 50Hz AC3 -Ie	A	115	150	185
<b>Common Add-on Accessories</b>				
<b>Add-on Front Mounted Aux. Contact Block</b> Rated operational current at 240V / 415V - 6A / 4A Rated thermal current I <sub>th</sub> - 10A Rated insulation voltage - 750V Duty - AC 15				
<b>Contact Configuration</b>			1NO+1NC	
<b>Type</b>			CAF11	
<b>Add-on Pneumatic Timer Block</b> Type (ON Delay / OFF Delay) Time A - (0.1 -3s) / B - (0.1 - 30s) / C - (10 - 180s)				
<b>Timer Type</b>			CPT1A / CPT1B / CPT1C	
<b>Mechanical interlock type No.</b>				
<b>Mechanical interlock type No.</b>	MH 1			
<b>Electronic Overload Relay</b>				
				
<b>Overload Relay Type</b>	ERT1 (Individual mounting)			
<b>For Mounting with 3P / 4P Contactor Type :</b>	CH1 115 to CH2 185			
<b>Current Range in Amp. (Suffix Code No.)</b>	30-50	ERT1 4 A		
<b>Features</b>	48-80	ERT1 4 B		
	60-100	ERT1 4 C		
	90-150	ERT1 4 D		
<ul style="list-style-type: none"> <li>• Electronic Version</li> <li>• Protection against overload &amp; single phasing</li> <li>• Potential free trip contacts (1NO &amp; 1NC)</li> <li>• Ambient temperature compensated ( -5°C to +55 °C)</li> <li>• Manual reset facility</li> <li>• Test mode facility</li> <li>• Individual mounting</li> </ul>				



CH2 225	CH3 265	CH4 330	CH5 400	CH6 500	CH7 630
225	265	330	400	500	630



2NO+2NC  
CAF22

3NO+1NC  
CAF31

4NO  
CAF40



CPT2A / CPT2B / CPT2C



MH 2



MH 3 4 5



MH 6 7

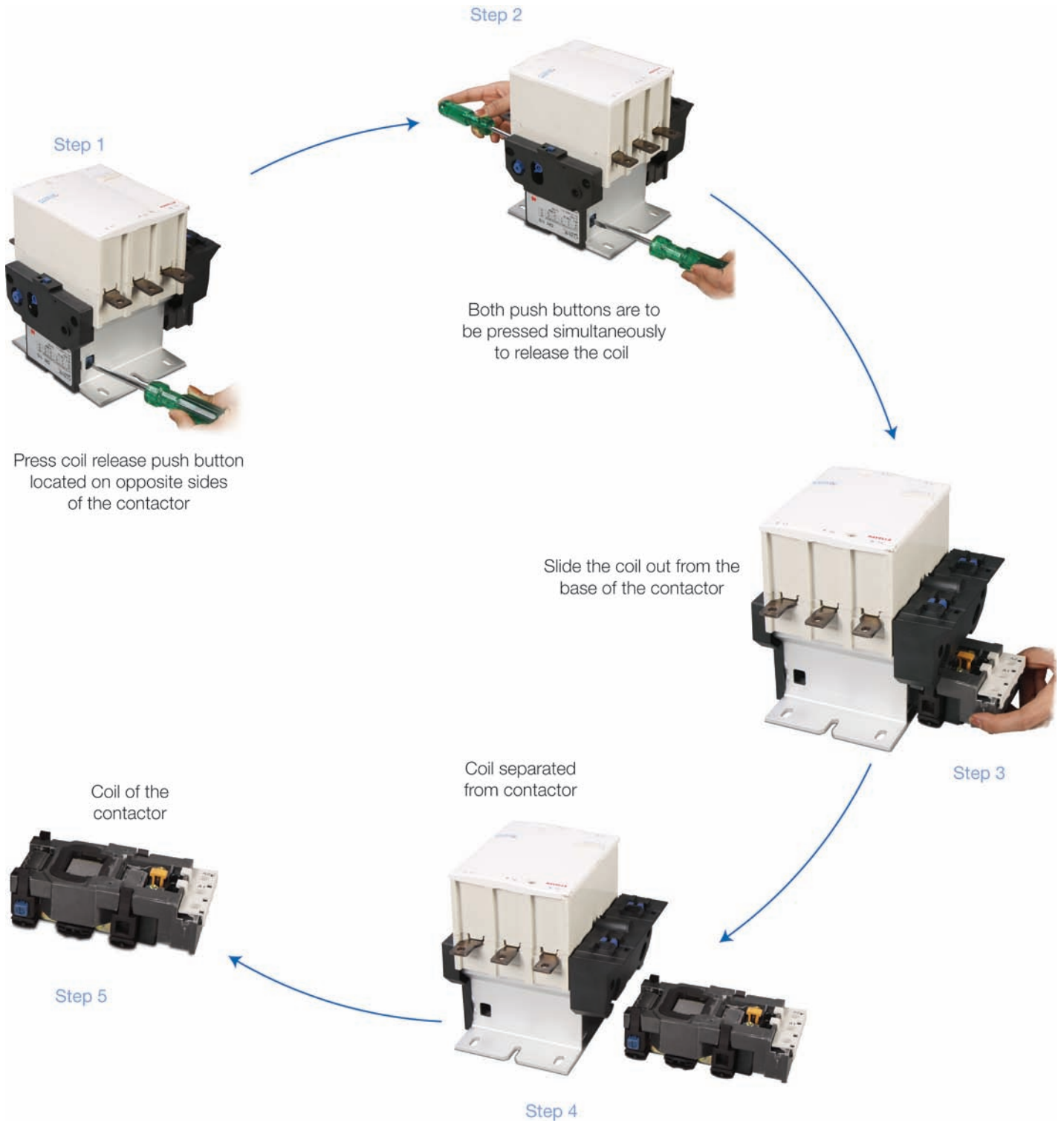


ERT1 (Individual mounting)

CH2 185 to CH7 630

132-220	ERT1 5 E
200-330	ERT1 6 F
300-500	ERT1 6 G
380-630	ERT1 6 H

### Ease of accessibility and maintenance



### CH Series Contactors & Accessories



Contactor

Mechanical interlock

Contactor



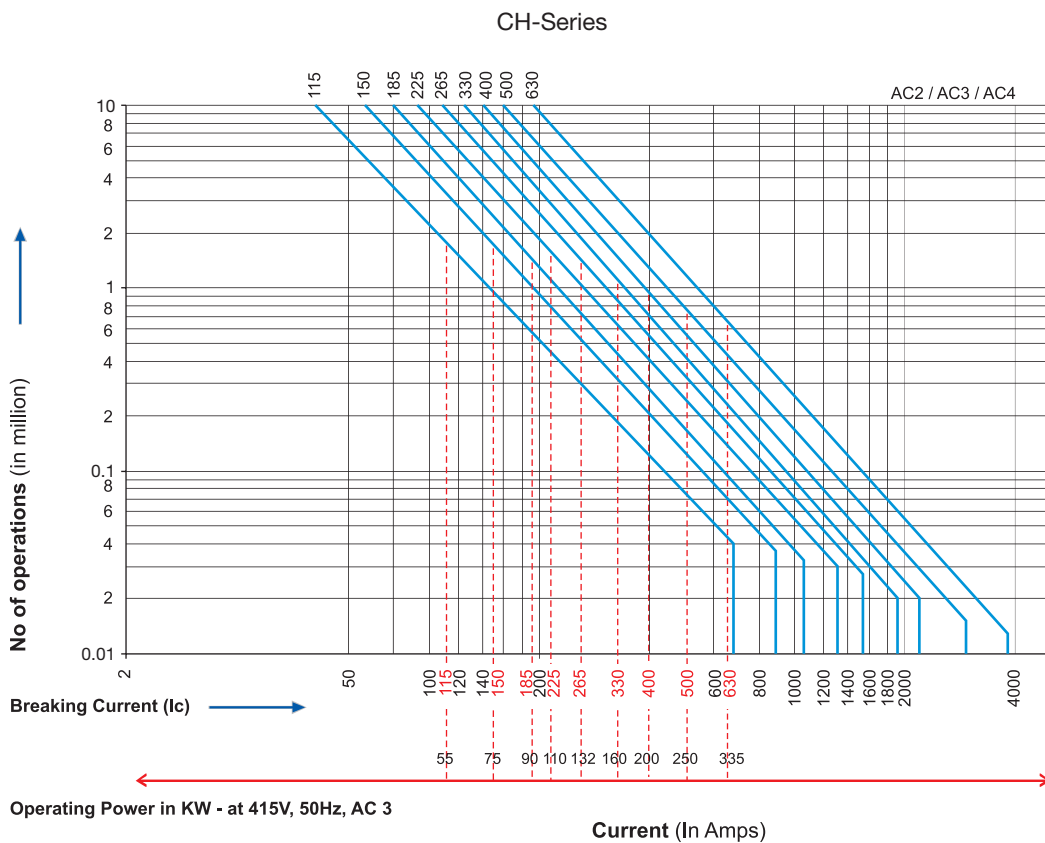
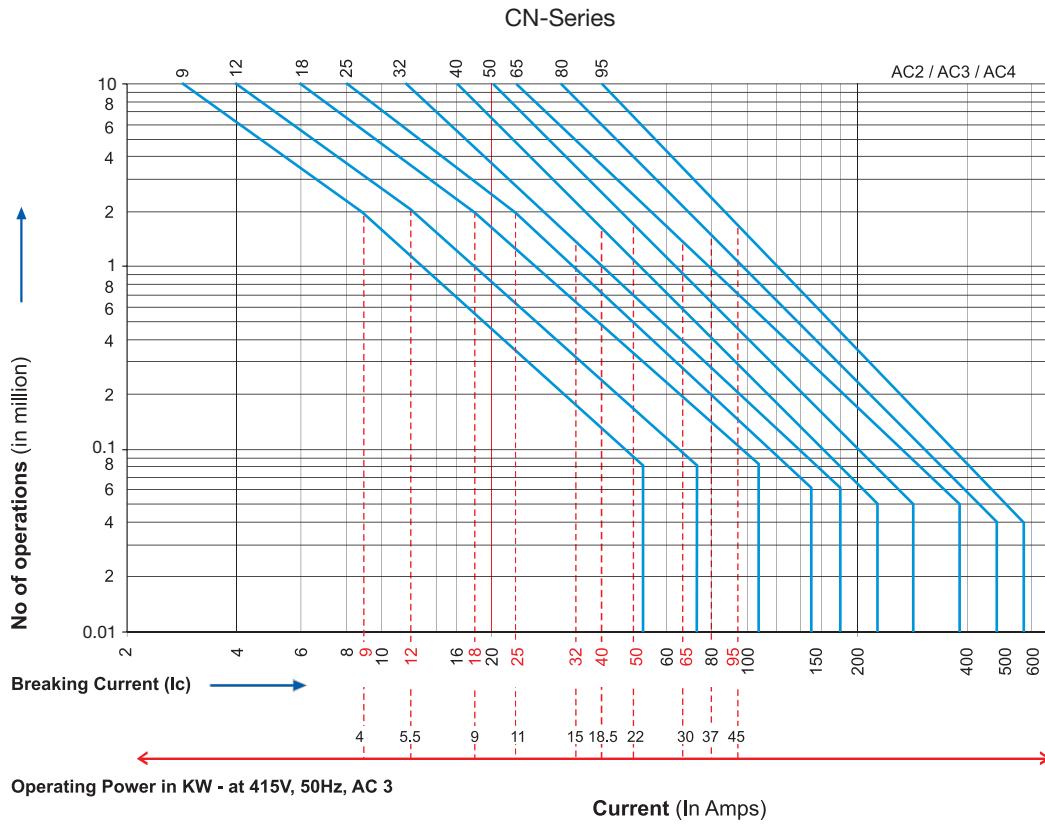
Pneumatic timer block  
ON / OFF delay

Manual reset  
electronic relay

Front mount  
aux.

Front mount  
aux.

### Contactor Electrical Life



### Operational Current & Power Rating

CN Frame												
Contactor Type			CN1 09	CN1 12	CN2 18	CN3 25	CN4 32	CN5 40	CN5 50	CN5 65	CN6 80	CN6 95
Max. Operational Current AC-3			9A	12A	18A	25A	32A	40A	50A	65A	80A	95A
U <sub>e</sub>	220/240V	kW	2.2	3	4	5.5	7.5	11	15	18.5	22	25
		HP	3	4	5	7.5	10	15	20	25	30	35
U <sub>e</sub>	380/400V	kW	4	5.5	7.5	11	15	18.5	22	30	37	45
		HP	5	7.5	10	15	20	25	30	40	50	60
U <sub>e</sub>	415V	kW	4	5.5	9	11	15	22	25	37	40	45
		HP	5	7.5	12.5	15	20	30	35	50	65	60
U <sub>e</sub>	440V	kW	4	5.5	9	11	15	22	30	37	45	45
		HP	5	7.5	12.5	15	20	30	35	50	60	60
U <sub>e</sub>	500V	kW	5.5	7.5	10	15	18.5	22	30	37	55	55
		HP	7.5	10	12.5	20	25	30	40	50	75	75
U <sub>e</sub>	660/690V	kW	5.5	7.5	10	15	18.5	30	33	37	55	55
		HP	7.5	10	12.5	20	25	40	40	50	75	75

CH Frame											
Contactor Type			CH1 115	CH1 150	CH2 185	CH2 225	CH3 265	CH4 330	CH5 400	CH6 500	CH7 630
Max. Operational Current AC-3			115A	150A	185A	225A	265A	330A	400A	500A	630A
U <sub>e</sub>	220/240V	kW	30	40	55	63	75	100	110	147	200
		HP	40	50	75	85	100	125	150	180	250
U <sub>e</sub>	380/400V	kW	55	75	90	110	132	160	220	265	335
		HP	75	100	110	150	180	220	250	340	430
U <sub>e</sub>	415V	kW	59	80	100	110	132	180	220	280	375
		HP	75	100	125	150	180	220	270	340	450
U <sub>e</sub>	440V	kW	59	75	90	110	132	200	250	295	375
		HP	75	100	125	150	180	250	340	400	450
U <sub>e</sub>	500V	kW	75	90	110	129	160	200	250	355	400
		HP	100	110	150	180	220	250	340	430	450
U <sub>e</sub>	660/690V	kW	80	100	110	129	160	220	280	335	450
		HP	100	125	150	180	220	270	340	430	470

Note : For U<sub>e</sub> = 1000 V - operational current and power rating provided on request.





### Motor Currents

Average full-load currents of 3-phase squirrel cage motors, 3-phase 4-pole motors, 50/60 Hz

Motor Currents														
Power		200 / 208 V	220 V	230 V (1)	380 V	400 V	415 V	433 / 440 V	460 V (1)	500 / 525 V	575 V (1)	660 V	690 V	750 V
kW	HP	A	A	A	A	A	A	A	A	A	A	A	A	A
0.37	0.5	2	1.8	2	1.03	0.98	-	0.99	1	1	0.8	0.6	-	-
0.55	0.75	3	2.75	2.8	1.6	1.5	-	1.36	1.4	1.21	1.1	0.9	-	-
0.75	1	3.8	3.5	3.6	2	1.9	2	1.68	1.8	1.5	1.4	1.1	-	-
1.1	1.5	5	4.4	5.2	2.6	2.5	2.5	2.37	2.6	2	2.1	1.5	-	-
1.5	2	6.8	6.1	6.8	3.5	3.4	3.5	3.06	3.4	2.6	2.7	2	-	-
2.2	3	9.6	8.7	9.6	5	4.8	5	4.42	4.8	3.8	3.9	2.8	-	-
3	-	12.6	11.5	-	6.6	6.3	6.5	5.77	-	5	-	3.8	-	-
-	5	-	-	15.2	-	-	-	-	7.6	-	6.1	-	-	-
4	-	16.2	14.5	-	8.5	8.1	8.4	7.9	-	6.5	-	4.9	-	-
5.5	7.5	22	20	22	11.5	11	11	10.4	11	9	9	6.6	-	-
7.5	10	28.8	27	28	15.5	14.8	14	13.7	14	12	11	6.9	-	-
9	-	36	32	-	18.5	18.8	17	16.9	-	13.9	-	10.6	-	-
11	15	42	39	42	22	21	21	20.1	21	18.4	17	14	12.1	11
15	20	57	52	54	30	28.5	28	26.5	27	23	22	17.3	16.5	15
18.5	25	70	64	68	47	35	35	32.8	34	28.5	27	21.9	20.2	18.5
22	30	84	75	80	44	42	40	39	40	33	32	25.4	24.2	22
30	40	114	103	104	60	57	55	51.5	52	45	41	54.6	33	30
37	50	138	126	130	72	69	66	64	65	55	52	42	40	36
45	60	162	150	154	85	81	80	76	77	65	62	49	46.8	42
55	75	200	182	192	105	100	100	90	96	80	77	61	58	52
75	100	270	240	248	138	131	135	125	124	105	99	82	75.7	69
90	125	330	295	312	170	162	165	146	156	129	125	98	94	85
110	150	400	356	360	205	195	200	178	180	156	144	118	113	103
132	-	480	425	-	245	233	240	215	-	187	-	140	135	123
-	200	520	472	480	273	222	260	236	240	207	192	152	128	136
160	-	560	520	-	300	285	280	256	-	220	-	170	165	150
-	250	-	-	600	-	-	-	-	300	-	240	200	-	-
200	-	680	626	-	370	252	340	325	-	281	-	215	203	185
220	300	770	700	720	408	388	385	353	360	310	288	235	224	204
250	350	850	800	840	460	437	425	401	420	360	336	274	253	230
280	-	-	-	-	528	-	-	-	-	-	-	-	-	-
315	-	1070	990	-	584	555	535	505	-	445	-	337	321	292
-	450	-	-	1080	-	-	-	-	540	-	432	-	-	-
355	-	-	1150	-	635	605	580	549	-	500	-	370	350	318
-	500	-	-	1200	-	-	-	-	600	-	480	-	-	-
400	-	-	1250	-	710	675	650	611	-	540	-	410	390	356
450	600	-	-	1440	-	-	-	-	720	-	576	-	-	-
500	-	-	-1570	-	900	855	820	780	-	680	-	515	494	450
560	-	-	1760	-	1000	950	920	870	-	760	-	575	549	500
630	-	-	1980	-	1100	1045	1020	965	-	850	-	645	605	550
710	-	-	-	-	1260	1200	1140	1075	-	960	-	725	694	630

These values are given as a guide. They may vary depending on the type of motor and manufacturer.  
(1) values conforming to the NEC (National Electrical Code).

### Ordering Information



Control Relay with AC Coil					
Frame size	I <sub>th</sub>	Contact arrangement		Type	Cat. No
		NO	NC		
1	10A	2	2	CRN1-22*	IHACR 22*
		3	1	CRN1-31*	IHACR 31*
		4	0	CRN1-40*	IHACR 40*



Control Relay with DC Coil					
Frame size	I <sub>th</sub>	Contact arrangement		Type	Cat. No
		NO	NC		
1	10A	2	2	CRD1-22*	IHDCR 22*
		3	1	CRD1-31*	IHDCR 31*
		4	0	CRD1-40*	IHDCR 40*



Contactor 3-Pole with AC Coil (9A to 95A)									
Frame Size	AC-3 Duty Rating at 415V, 50 Hz			AC-1 Duty Rating at 415V, 50 Hz	Power Poles	Auxilliary Contact Arrangement		Type	Cat. No
	I <sub>e</sub> Amp.	Kw.	HP	I <sub>th</sub> Amp.		NO	NC		
1	9	4	5.0	25	3	1	0	CN1 09 T10*	IHPAA009110*
	9	4	5.0	25		0	1	CN1 09 T01*	IHPAA009101*
	12	5.5	7.5	25		1	0	CN1 12 T10*	IHPAA012110*
	12	5.5	7.5	25		0	1	CN1 12 T01*	IHPAA012101*
2	18	9	12.5	32	3	1	0	CN2 18 T10*	IHPAA018210*
	18	9	12.5	32		0	1	CN2 18 T01*	IHPAA018201*
3	25	11	15	40	3	1	0	CN3 25 T10*	IHPAA025310*
	25	11	15	40		0	1	CN3 25 T01*	IHPAA025301*
4	32	15	20	50	3	1	0	CN4 32 T10*	IHPAA032410*
	32	15	20	50		0	1	CN4 32 T01*	IHPAA032401*
5	40	22	30	60	3	1	1	CN5 40 T11*	IHPAA040511*
	50	25	35	80		1	1	CN5 50 T11*	IHPAA050511*
	65	37	50	80		1	1	CN5 65 T11*	IHPAA065511*
6	80	45	60	125	3	1	1	CN6 80 T11*	IHPAA080611*
	95	45	60	125		1	1	CN6 95 T11*	IHPAA095611*

Contactor 3-Pole with AC coil (115A to 630A)							
Frame Size	AC-3 Duty Rating at 415V, 50 Hz			AC-1 Duty Rating at 415V, 50 Hz	Power Poles	Type	Cat. No
	I <sub>e</sub> Amp.	Kw.	HP	I <sub>th</sub> Amp.			
1	115	59	75	200	3	CH1 115 T*	IHPAA115100*
	150	80	100	250	3	CH1 150 T*	IHPAA150100*
2	185	100	125	275	3	CH2 185 T*	IHPAA185200*
	225	110	150	315	3	CH2 225 T*	IHPAA225200*
3	265	132	180	350	3	CH3 265 T*	IHPAA265300*
4	330	180	220	400	3	CH4 330 T*	IHPAA330400*
5	400	220	270	500	3	CH5 400 T*	IHPAA400500*
6	500	280	340	700	3	CH6 500 T*	IHPAA500600*
7	630	375	450	1000	3	CH7 630 T*	IHPAA630700*



\*To complete the Cat no. suffix the coil voltage from the coil voltage table

- Note: 1. For additional aux. contacts front/side mounted and mechanical interlock refer add-on accessories table.  
 2. Non standard coil voltages are supplied on request.

AC Coils							
Code*	A	C	E	G	H	J	K
AC Voltage	24V	48V	110V	220V	240V	380V	415V



Contactor 4-Pole with AC Coil (9A to 95A)							
Frame Size	AC-1 Duty Rating at 415V , 50 Hz	AC-3 Duty Rating at 415V , 50 Hz			Power Poles	Type	Cat. No
	I <sub>th</sub> Amp.	I <sub>e</sub> Amp.	Kw.	HP			
1	25	9	4	5.0	4	CN1 09 F*	IHPAC009100*
	25	12	5.5	7.5	4	CN1 12 F*	IHPAC012100*
3	40	25	11	15	4	CN3 25 F*	IHPAC025300*
5	60	40	22	30	4	CN5 40 F*	IHPAC040500*
	80	50	25	35	4	CN5 50 F*	IHPAC050500*
	80	65	37	50	4	CN5 65 F*	IHPAC065500*
6	125	80	45	60	4	CN6 80 F*	IHPAC080600*
	125	95	45	60	4	CN6 95 F*	IHPAC095600*



Contactor 4-Pole with AC coil (115A to 630A)							
Frame Size	AC-1 Duty Rating at 415V , 50 Hz	AC-3 Duty Rating at 415V , 50 Hz			Power Poles	Type	Cat. No
	I <sub>th</sub> Amp.	I <sub>e</sub> Amp.	Kw.	HP			
1	200	115	59	75	4	CH1 115 F*	IHPAC115100*
	250	150	80	100	4	CH1 150 F*	IHPAC150100*
2	275	185	100	125	4	CH2 185 F*	IHPAC185200*
	315	225	110	150	4	CH2 225 F*	IHPAC225200*
3	350	265	132	180	4	CH3 265 F*	IHPAC265300*
4	400	330	180	220	4	CH4 330 F*	IHPAC330400*
5	500	400	220	270	4	CH5 400 F*	IHPAC400500*
6	700	500	280	340	4	CH6 500 F*	IHPAC500600*
7	1000	630	375	450	4	CH7 630 F*	IHPAC630700*



\*To complete the Cat no. suffix the coil voltage from the coil voltage table








- Note:
1. For additional aux. contacts front/side mounted and mechanical interlock refer add-on accessories table.
  2. Non standard coil voltages are supplied on request.

AC Coils							
Code*	A	C	E	G	H	J	K
AC Voltage	24V	48V	110V	220V	240V	380V	415V



Contactor 3 Pole with DC Coil (9A to 95A)									
Frame Size	AC-3 Duty Rating at 415V , 50 Hz			AC-1 Duty Rating at 415V , 50 Hz	Power Poles	Auxilliary Contact Arrangement		Type	Cat. No
	I <sub>e</sub> Amp.	Kw.	HP	I <sub>th</sub> Amp.		NO	NC		
1	9	4	5.0	25	3	1	0	CD1 09 T10*	IHPAB009110*
	9	4	5.0	25	3	0	1	CD1 09 T01*	IHPAB009101*
	12	5.5	7.5	25	3	1	0	CD1 12 T10*	IHPAB012110*
	12	5.5	7.5	25	3	0	1	CD1 12 T01*	IHPAB012101*
2	18	9	12.5	32	3	1	0	CD2 18 T10*	IHPAB018210*
	18	9	12.5	32	3	0	1	CD2 18 T01*	IHPAB018201*
3	25	11	15	40	3	1	0	CD3 25 T10*	IHPAB025310*
	25	11	15	40	3	0	1	CD3 25 T01*	IHPAB025301*
4	32	15	20	50	3	1	0	CD4 32 T10*	IHPAB032410*
	32	15	20	50	3	0	1	CD4 32 T01*	IHPAB032401*
5	40	22	30	60	3	1	1	CD5 40 T11*	IHPAB040511*
	50	25	35	80	3	1	1	CD5 50 T11*	IHPAB050511*
	65	37	50	80	3	1	1	CD5 65 T11*	IHPAB065511*
6	80	45	60	125	3	1	1	CD6 80 T11*	IHPAB080611*
	95	45	60	125	3	1	1	CD6 95 T11*	IHPAB095611*



Contactor 3 Pole with DC coil (115A to 630A)							
Frame Size	AC-3 Duty Rating at 415V , 50 Hz			AC-1 Duty Rating at 415V , 50 Hz	Power Poles	Type	Cat. No
	I <sub>e</sub> Amp.	Kw.	HP	I <sub>th</sub> Amp.			
	115	59	75	200	3	CH1 115 T*	IHPAB115100*
	150	80	100	250	3	CH1 150 T*	IHPAB150100*
	185	100	125	275	3	CH2 185 T*	IHPAB185200*
	225	110	150	315	3	CH2 225 T*	IHPAB225200*
	265	132	180	350	3	CH3 265 T*	IHPAB265300*
	330	180	220	400	3	CH4 330 T*	IHPAB330400*
	400	220	270	500	3	CH5 400 T*	IHPAB400500*
	500	280	340	700	3	CH6 500 T*	IHPAB500600*
	630	375	450	1000	3	CH7 630 T*	IHPAB630700*

\*To complete the Cat no. suffix the coil voltage from the coil voltage table  
 Note: 1. For additional aux. contacts, front mounted refer add-on accessories table.  
 2. Non standard coil voltages are supplied on request.



DC Coils				
Code*	A	C	E	G
DC Voltage	24V	48V	110V	220V








Contactor 4-Pole with DC Coil (9A to 95A)							
Frame Size	AC-1 Duty Rating at 415V , 50 Hz	AC-3 Duty Rating at 415V , 50 Hz			Power Poles	Type	Cat. No
	I <sub>th</sub> Amp.	I <sub>e</sub> Amp.	Kw.	HP			
1	25	9	4	5.0	4	CD1 09 F*	IHPAD009100*
	25	12	5.5	7.5	4	CD1 12 F*	IHPAD012100*
3	40	25	11	15	4	CD3 25 F*	IHPAD025300*
5	60	40	22	30	4	CD5 40 F*	IHPAD040500*
	80	50	25	35	4	CD5 50 F*	IHPAD050500*
	80	65	37	50	4	CD5 65 F*	IHPAD065500*
6	125	80	45	60	4	CD6 80 F*	IHPAD080600*
	125	95	45	60	4	CD6 95 F*	IHPAD095600*



\*To complete the Cat no. suffix the coil voltage from the coil voltage table  
 Note: 1. For additional aux. contacts, front mounted refer add-on accessories table.  
 2. Non standard coil voltages are supplied on request.

DC Coils				
Code*	A	C	E	G
DC Voltage	24V	48V	110V	220V



Contactors 4-Pole with DC coil (115A to 630A)							
Frame Size	AC-1 Duty Rating at 415V , 50 Hz	AC-3 Duty Rating at 415V , 50 Hz			Power Poles	Type	Cat. No
	I <sub>th</sub> Amp.	I <sub>e</sub> Amp.	Kw.	HP			
 1	200	115	59	75	4	CH1 115 F*	IHPAD115100*
	250	150	80	100	4	CH1 150 F*	IHPAD150100*
 2	275	185	100	125	4	CH2 185 F*	IHPAD185200*
	315	225	110	150	4	CH2 225 F*	IHPAD225200*
 3	350	265	132	180	4	CH3 265 F*	IHPAD265300*
 4	400	330	180	220	4	CH4 330 F*	IHPAD330400*
 5	500	400	220	270	4	CH5 400 F*	IHPAD400500*
 6	700	500	280	340	4	CH6 500 F*	IHPAD500600*
 7	1000	630	375	450	4	CH7 630 F*	IHPAD630700*

\*To complete the Cat no. suffix the coil voltage from the coil voltage table  
 Note: 1. For additional aux. contacts, front mounted refer add-on accessories table.  
 2. Non standard coil voltages are supplied on request.



DC Coils				
Code*	A	C	E	G
DC Voltage	24V	48V	110V	220V



**Add on Accessories: Auxilliary Contact Block**

Description	Suitable for Mounting on Contactors	Contact Configuration		Type	Cat No.
		NO	NC		
Side Block	CN Frame size 1-6 9A-95A 3P/4P	1	1	CAS11	ISPNASM611
		2	0	CAS20	ISPNASM620
Front Block	CN/CD Frame size 1-6 9A-95A 3P/4P & CH Frame Size 1-7 115A-630A 3P / 4P	1	1	CAF11	ISPNAFM711
		2	2	CAF22	ISPNAFM722
		3	1	CAF31	ISPNAFM731
		4	0	CAF40	ISPNAFM740



**Add on Accessories: Pneumatic Timer Block**

ON Delay	Suitable for Mounting on Contactors	Type	Cat No.
0.1 -3s	CN/CD/CH 9A-630A	CPT1A	IHNN4000
0.1-30s		CPT1B	IHNN5000
10-180s		CPT1C	IHNN6000



**Add on Accessories: Pneumatic Timer Block**

OFF Delay	Suitable for Mounting on Contactors	Type	Cat No.
0.1 -3s	CN/CD/CH 9A-630A	CPT2A	IHNF4000
0.1-30s		CPT2B	IHNF5000
10-180s		CPT2C	IHNF6000



**Mechanical Interlock Site Fitment Type**

Suitable for Mounting on Contactors	Type	Cat No.
CN1 to CN4	MN 1 2 3 4	ISPNM4SV
CN5 to CN6	MN 5 6	ISPNM6SV
CH1	MH 1	ISPHM1SV
CH2	MH 2	ISPHM2SV
CH3, CH4, CH5	MH 3 4 5	ISPHM5SV
CH6, CH7	MH 6 7	ISPHM7SV





Spare Coils (AC)		
For use of Contactor type (3 Pole)	Type	Cat. No.
CRN1, CN1 09, CN1 12, CN2 18	CX1-2*	ISPNCN2*
CN3 25, CN4 32	CX1-4*	ISPNCN4*
CN5 40, CN5 50, CN5 65, CN6 80, CN6 95	CX1-6*	ISPNCN6*
CH1 115, CH1 150	CY1-1*	ISPNCN1*
CH2 185, CH2 225	CY1-2*	ISPNCN2*
CH3 265	CY1-3*	ISPNCN3*
CH4 330	CY1-4*	ISPNCN4*
CH5 400	CY1-5*	ISPNCN5*
CH6 500	CY1-6*	ISPNCN6*
CH7 630	CY1-7*	ISPNCN7*

\*To complete the type/ cat no. suffix the coil voltage from the coil voltage table



Spare Coils (AC)		
For use of Contactor type (4 Pole)	Type	Cat. No.
CRN1, CN1 09, CN1 12	CX1-2*	ISPNCN2*
CN3 25	CX1-4*	ISPNCN4*
CN5 40, CN5 50, CN5 65, CN6 80, CN6 95	CX1-6*	ISPNCN6*
CH1 115, CH1 150	CY1-1*	ISPNCN1*
CH2 185, CH2 225	CY1-2*	ISPNCN2*
CH3 265	CY1-3*	ISPNCN3*
CH4 330	CY1-4*	ISPNCN4*
CH5 400	CY1-5*	ISPNCN5*
CH6 500	CY1-6*	ISPNCN6*
CH7 630	CY1-7*	ISPNCN7*

\*To complete the type/ cat no. suffix the coil voltage from the coil voltage table

AC Coils							
Code*	A	C	E	G	H	J	K
AC Voltage	24V	48V	110V	220V	240V	380V	415V

Spare Coils (DC)		
For use of Contactor type (3 Pole)	Type	Cat. No.
CRD1, CD1 09, CD1 12, CD2 18	CX4-2*	ISPNDN2*
CD3 25, CD4 32	CX4-4*	ISPNDN4*
CD5 40, CD5 50, CD5 65, CD6 80, CD6 95	CX4-6*	ISPNDN6*
CH1 115, CH1 150	CY4-1*	ISPNDH1*
CH2 185, CH2 225	CY4-2*	ISPNDH2*
CH3 265, CH4 330	CY4-34*	ISPNDH34*
CH5 400	CY4-5*	ISPNDH5*
CH6 500	CY4-6*	ISPNDH6*
CH7 630	CY4-7*	ISPNDH7*



\*To complete the type/ cat no. suffix the coil voltage from the coil voltage table

Spare Coils (DC)		
For use of Contactor type (4 Pole)	Type	Cat. No.
CRD1, CD1 09, CD1 12	CX4-2*	ISPNDN2*
CD3 25	CX4-4*	ISPNDN4*
CD5 40, CD5 50, CD5 65, CD6 80, CD6 95	CX4-6*	ISPNDN6*
CH1 115, CH1 150	CY4-1*	ISPNDH1*
CH2 185, CH2 225	CY4-2*	ISPNDH2*
CH3 265	CY4-3*	ISPNDH3*
CH4 330	CY4-4*	ISPNDH4*
CH5 400	CY4-5*	ISPNDH5*
CH6 500	CY4-6*	ISPNDH6*
CH7 630	CY4-7*	ISPNDH7*



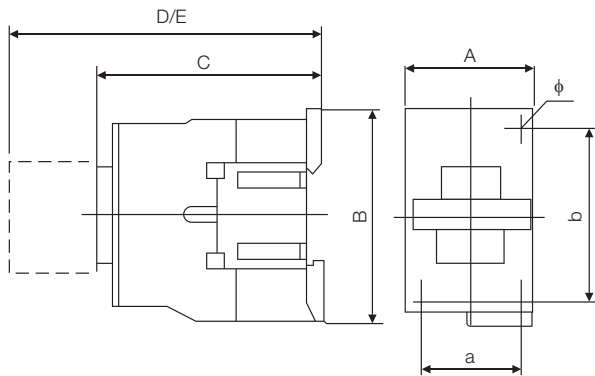
\*To complete the type/ cat no. suffix the coil voltage from the coil voltage table

DC Coils				
Code*	A	C	E	G
DC Voltage	24V	48V	110V	220V

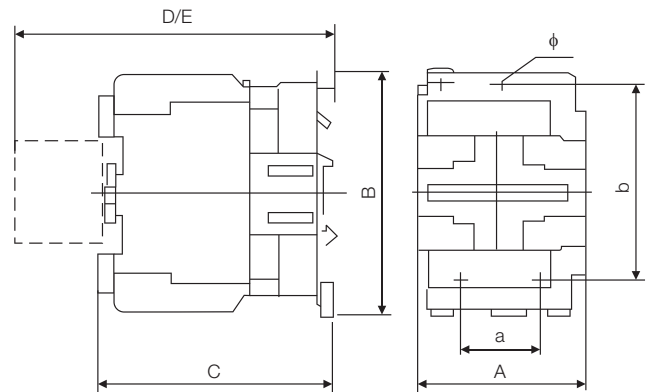
**Dimension (in mm)**

CN series AC contactor with AC coil - 3 Pole / 4 Pole

CN1 09 - CN4 32



CN5 40 - CN6 95



Dimension Detail									
Type No		A	B	C	D	E	a	b	Φ
CN1 9-12	3P	45	74	82	113	133	34/35	50/60	4.5
	4P	45	74	82	113	133	34/35	50/60	4.5
CN2 18	3P	47	76	87	118	138	34/35	50/60	4.5
CN3 25	3P	57	83	95	126	146	40	48	4.5
	4P	57	83	95	126	146	40	48	4.5
CN4 32	3P	57	83	100	131	151	40	48	4.5
CN5 40-65	3P	77	120	116	145	165	40	100/110	6.5
	4P	85	120	116	145	165	40	100/110	6.5
CN6 80-95	3P	87	120	127	175	195	40	100/110	6.5
	4P	96	120	127	175	195	40	100/110	6.5

D: With front add on block

E: With pneumatic timer block

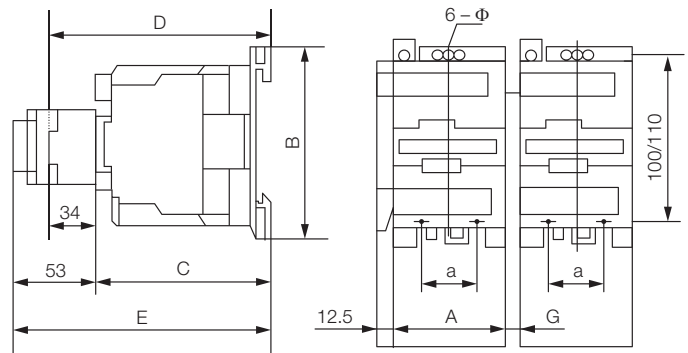
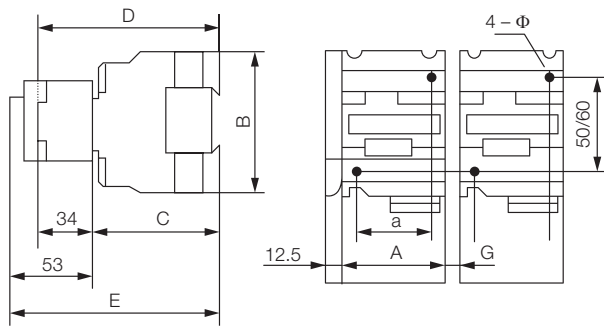
Note: Dimension of CRN1 same as CN1 9-12

Dimension (in mm)

CD series DC contactor with DC coil - 3 Pole / 4 Pole

CD1 9 - CD4 32

CD5 40 - CD6 95



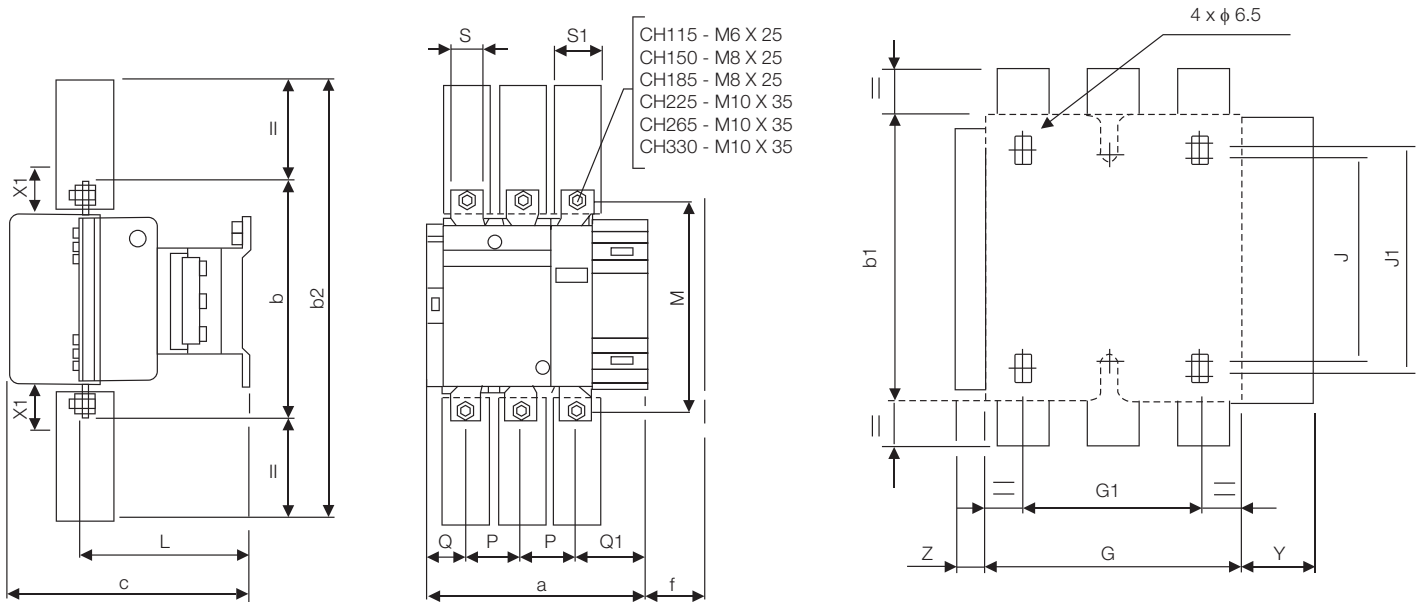
Dimension, in mm									
Type No		A	B	C	D	E	a	Φ	G
CD1 9-12	3P	45	74	119	153	172	35	4.5	15
	4P	45	74	119	153	172	35	4.5	15
CD2 18	3P	47	76	125	159	178	35	4.5	15
CD3 25	3P	57	83	135	169	188	40	4.5	15
	4P	57	83	135	169	188	40	4.5	15
CD4 32	3P	57	83	140	174	193	40	4.5	15
CD5 40-65	3P	77	120	200	234	253	40	6.5	15
	4P	85	120	200	234	253	40	6.5	15
CD6 80-95	3P	87	120	215	249	268	40	6.5	15
	4P	96	120	215	249	268	40	6.5	15

D: With front add on block  
 E: With pneumatic timer block  
 G: Interlocking mechanism  
 Note: Dimension of CRD1 same as CD1 9-12

**Dimension (in mm)**

CH series AC contactor with AC / DC coil - 3 Pole / 4 Pole

CH1 115 - CH4 330

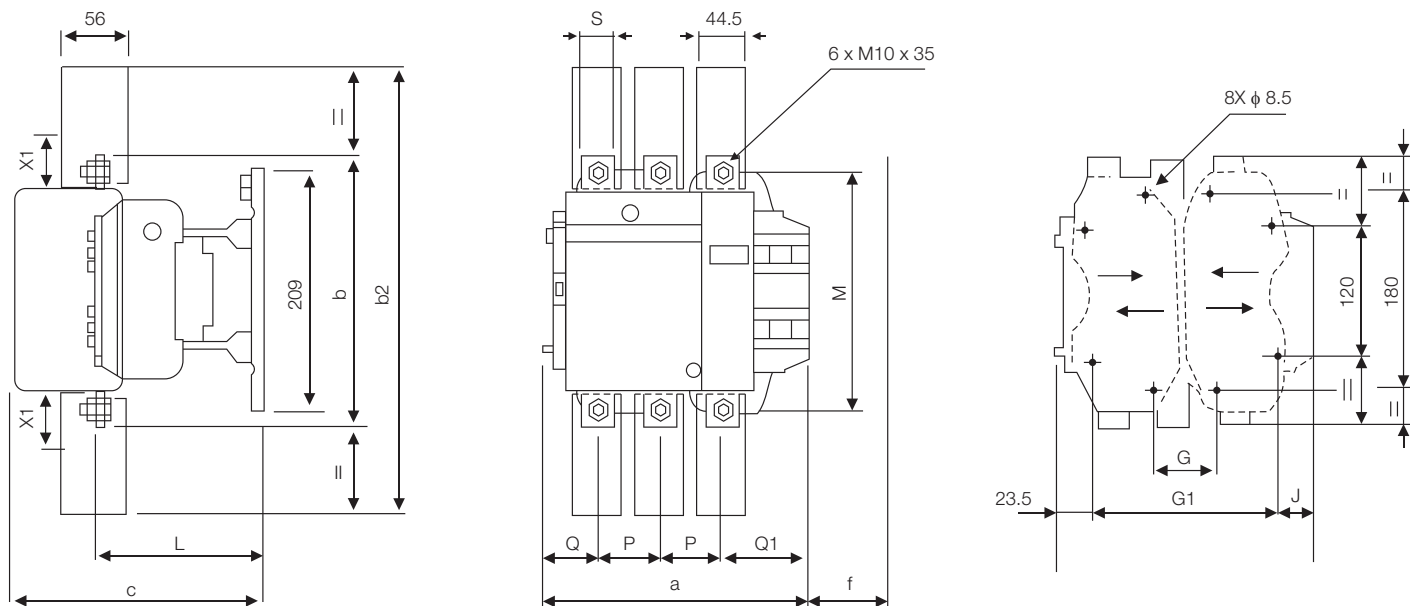


Dimension, in mm

Type No	a	b	b1	b2	c	f	G	G1	J	J1	L	M	P	Q	Q1	S	S1	Y	Z	
CH1 115	3P	164	162	137	265	171	131	106	80	106	120	107	147	37	29.5	60	15	26	44	13.5
	4P	200	162	137	265	171	131	143	80	106	120	107	147	37	29.5	60	15	26	44	13.5
CH1 150	3P	164	170	137	301	171	131	106	80	106	120	107	150	40	26	57.5	20	34	44	13.5
	4P	200	170	137	301	171	131	143	80	106	120	107	150	40	26	55	20	34	44	13.5
CH2 185	3P	168	174	137	305	181	130	111	80	106	120	113.5	154	40	26	59.5	20	34	44	13.5
	4P	208	174	137	305	181	130	151	80	106	120	113.5	154	40	26	59.5	20	34	44	13.5
CH2 225	3P	168	197	137	364	181	130	111	80	106	120	113.5	172	48	21	51.5	25	44.5	44	13.5
	4P	208	197	137	364	181	130	151	80	106	120	113.5	172	48	17	47.5	25	44.5	44	13.5
CH3 265	3P	201	203	145	375	213	147	142	96	106	120	141	178	48	39	66.5	25	44.5	38	21.5
	4P	248	203	145	375	213	147	190	96	106	120	141	178	48	34	66.5	25	44.5	38	21.5
CH4 330	3P	213	206	145	375	219	147	154.5	96	109	120	145	181	48	43	74	25	44.5	45	20.5
	4P	261	206	145	375	219	147	202.5	96	106	120	145	181	48	43	74	25	44.5	38	20.5

f : Minimum distance required for coil removal

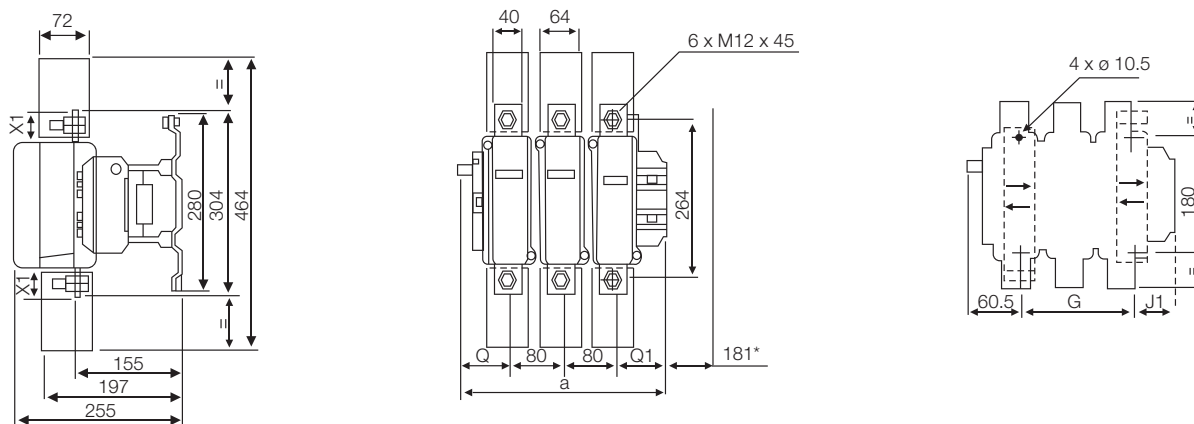
CH5 400 - CH6 500



Dimension, in mm

Type No	a	b	b2	c	f	G*	Gmin	Gmax	G1	G1min	G1max	J	L	M	P	Q	Q1	S	
CH5 400	3P	213	206	375	219	119	80	66	102	170	156	192	19.5	145	181	48	43	74	25
	4P	261	206	375	219	119	80	66	150	170	156	240	67.5	145	181	48	43	74	25
CH6 500	3P	233	238	400	232	141	80	66	120	170	156	210	39.5	146	208	55	46	77	30
	4P	288	238	400	232	141	140	66	175	230	156	265	34.5	150	208	55	46	77	30

CH7 630



Dimension, in mm

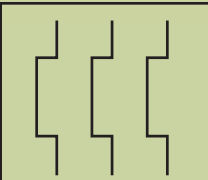
Type No	a	G	Gmin	Gmax	J1	Q	Q1	
CH7 630	3P	309	180	100	195	68.5	60	89
CH7 630	4P	389	240	150	275	68.5	60	89

\* Minimum distance required for coil removal

# THERMAL OVERLOAD RELAY







## Introduction

A wide range of bimetal thermal overload relays are offered for close protection of motors & other inductive loads against overload, single phasing & unbalanced system voltages.

Thermal Overload Relays are ambient temperature compensated and are independent of variation in ambient temperature. Protection against single phasing & unbalanced voltages has been provided by means of differential tripping mechanism which ensures positive protection of motors / loads. They are provided with 1NO + 1NC potentially free contacts which can be used for signalling. The relay can be used in either Auto or Manual reset mode.

## Standards :

IS / IEC : 60947-4-1

## Type :

- Auto / manual reset
- Manual reset



## Range :

- Contactor Mounting - 0.1A - 93A in 24 direct reading version (Auto / manual).
- Contactor Mounting - 0.1A - 80A in 20 direct reading version (Manual).
- Individual Mounting - 0.1A - 93A in 24 direct reading version (Auto / manual & Manual).
- Electronic Individual Mounting - 30A - 630A in 8 direct reading version (Manual).

## Features :

- Protection against overload & single phasing
- Auto manual / manual reset facility
- Ambient temperature compensated
- Potential free trip contacts
- Test mode facility
- Contactor mounting / Individual mounting with adaptor
- Matching to contactor rating upto 95A

## Principle of Operation

The heating elements in the main circuit heat the bimetal tripping elements corresponding to the motor load current. The heating elements are calibrated such that the set trip point is achieved in accordance with the standards. By means of trip bar, the movement / deflection of the bimetal is transmitted to plunger which in turn operates the trip mechanism and thus the contacts are separated. The trip point can be easily set on a scale in accordance with the nominal motor rated current.

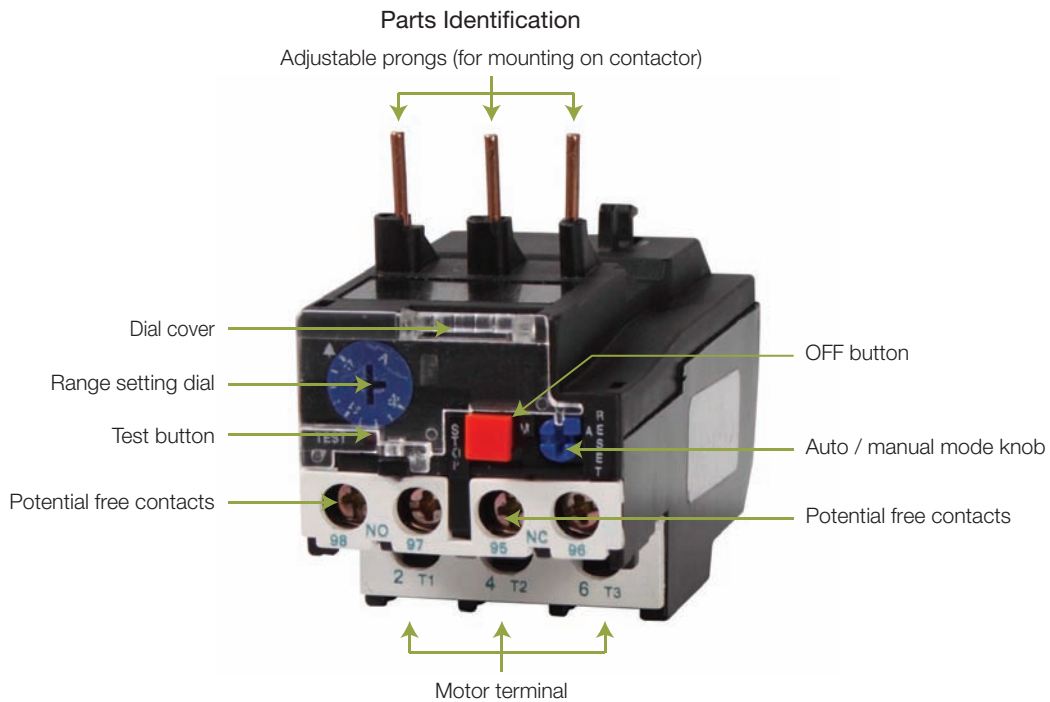
Bimetal elements for compensating the trip point in case of different ambient temperature is fitted on the trip lever. Buttons are used for testing the circuit to be protected, for resetting by hand and for conversion from manual to auto reset mode.

## Differential Mechanism

The relay operates on the differential system of protection provided by the double slide mechanism. Under single phasing and unbalanced voltage conditions, the two slides of the relay undergo differential deflection. One slide senses the movement of the bimetal that deflects the maximum, while the other senses the minimum deflection.

The slides are linked in such a way that the difference in movements of the two slides is amplified for actuation of the trip lever. This leads to accelerated tripping under single phasing.

### Thermal Overload Relay



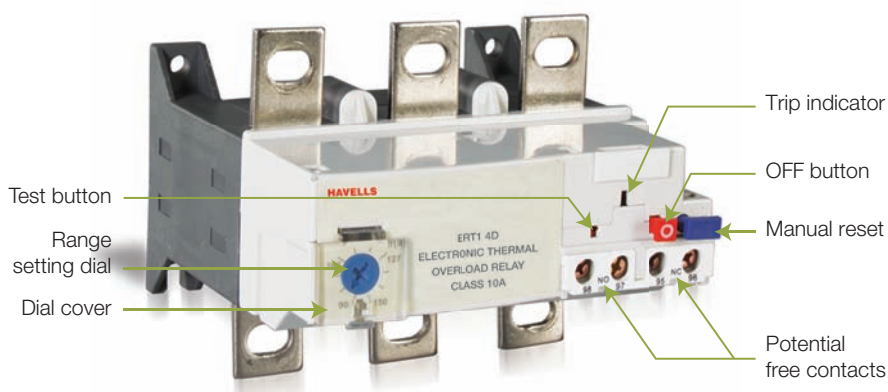
### Electronic Overload Relay

The ERT1 4 overload relays are specifically made suitable for operating conditions of motors. They provide protection against

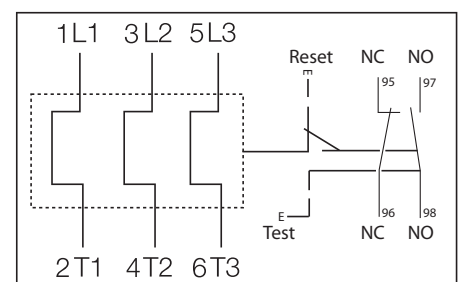
- Thermal overload of three phase or single phase balanced or unbalanced circuits
- Phase failure and large phase unbalance
- Protracted starting times
- Prolonged stalled rotor condition

These electronic overload relays are ambient temperature compensated and based on differential principle & provided with adjustable current setting dial, trip indicator, manual reset & test facility. The current setting can be locked by sealing the transparent protective dial cover.

**Parts Identification**



**Terminal Marking**



## Technical Information

Conformity of Standard	: IS / IEC - 60947 - 4-1
Ambient temperature range	: -5°C - +55°C
Operating Altitude	: 2000 meters
Pollution degree	: 3
Degree of protection	: IP 20
Trip Class	: 10A



### Thermal Overload Relay

Over Load Relay Type of Reset	Type	Thermal	
		Auto / Manual	Manual
<b>Current Range</b>			
Contactor Mounting	A	0.1 - 93	0.1 - 80
Individual Mounting (with adaptor)	A	0.1 - 93	0.1 - 80
Rated Insulation Voltage (Ui)	V	750	750
Rated Operational Voltage (Ue)	V	415	415
Switching Frequency	OPS. / Hr.	15	15
<b>Terminal Capacity</b>			
Contactor Mounting (RT 21) / (RT 11)	Sq. mm	10	10
Contactor Mounting (RT 22) / (RT 12)	Sq. mm	25	50
Contactor Mounting (RT 23) / (RT 13)	Sq. mm	50	50
<b>Auxilliary Circuit</b>			
Insulation Voltage	V	750	750
Rated Thermal Current	A	6	6
Rated Current (AC-15)	at 220V AC	A	1.64
	at 415 V AC	A	0.95
(DC-13)	at 220 V DC	A	0.15
Auxilliay Terminal	Sq. mm	2 x 2.5	2 x 2.5

### Weight / Dimension

O / L relay auto / manual reset			O / L relay manual reset		
Type	kg	W x H x D	Type	kg	W x H x D
RT21	0.156	47 x 66 x 94	RT11	0.127	45 x 56 x 91
RT22	0.217	59 x 78 x 94	RT12	0.358	63.5 x 73 x 118
RT23	0.433	55 x 83 x 114	RT13	0.364	63.5 x 73 x 118

### Technical Information

Conformity of Standard	: IS / IEC - 60947 - 4-1
Ambient temperature range	: -5°C - +55°C
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Pollution degree	: 3
Degree of protection	: IP 20
Trip Class	: 10A

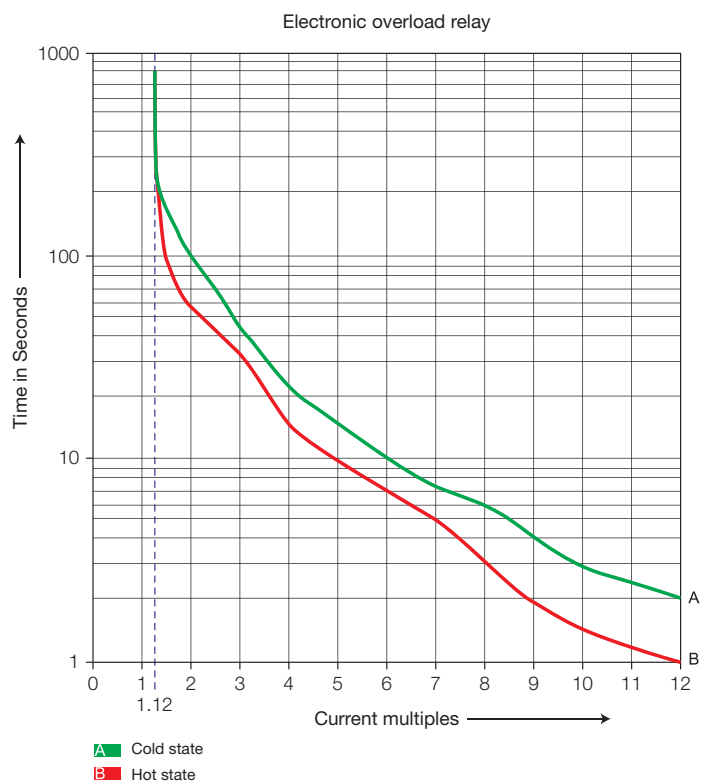
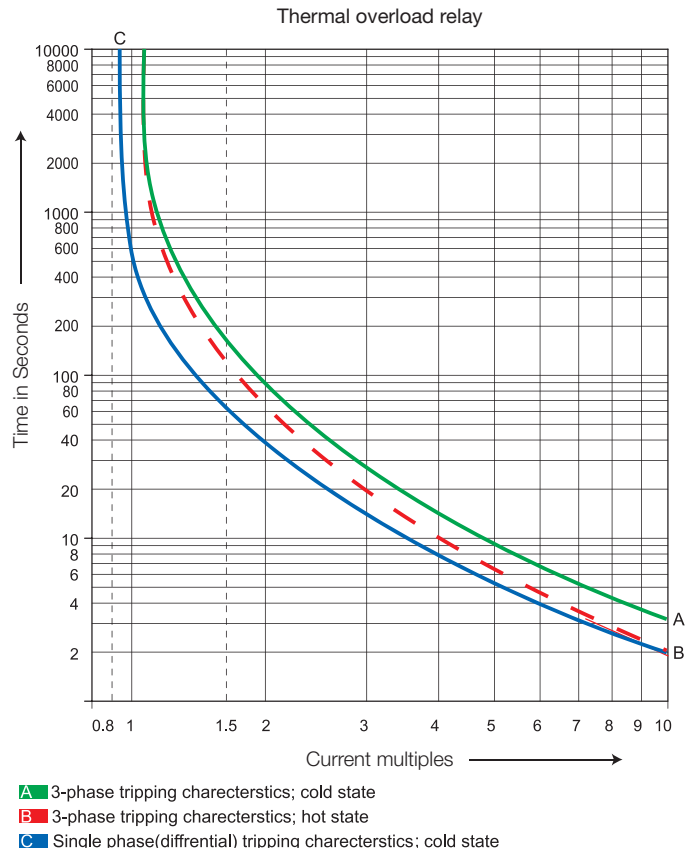


Electronic Overload Relay		
Over Load Relay	Type	Electronic
Type of Reset		Manual
Current Range	A	30 - 630
Rated Insulation Voltage ( Ui )	V	1000
Rated Operational Voltage ( Ue )	V	415
Rated Frequency	Hz	50 / 60
Power Terminal Connection		
Width of Terminal lug	mm	20
Clamping Screw		M8
Tightening torque	Nm	18
Trip Indication		On relay front
Test Function		On relay front
Stop Function		Through stop push button
Tripping limit		
No Trip		1.05 In
Trip		1.2 In
Sensitivity to Single Phasing		Yes
Current Adjustment		Setting dial on relay front
Security Sealing		Yes

Weight / Dimension		
Manual reset		
Type	kg	W x H x D
ERT1 4A	0.885	115 x 96 x 123.5
ERT1 4B	0.900	115 x 96 x 123.5
ERT1 4C	0.900	115 x 96 x 123.5
ERT1 4D	0.885	115 x 96 x 123.5
ERT1 5E	0.950	120 x 101 x 123.5
ERT1 6F	2.320	150 x 136.8 x 127.6
ERT1 6G	2.320	150 x 136.8 x 127.6
ERT1 6H	4.160	150 x 136.8 x 127.6

### Time / Current Characteristics

Average operating time related to multiples of the tripping current



Relay Selection Chart

DOL Starting				
3 $\phi$ Motor Rating at 415V 50Hz.		Approx. Full Load Current	Relay Range	Backup Fuse Rating
KW	HP	Amp.	Amp.	Amp.
0.37	0.5	1.0	1-1.6	4
0.55	0.75	1.6	1.6-2.5	4
0.75	1	2.0	1.6-2.5	6
1.5	2	3.5	2.5-4	10
2.2	3	5.0	4-6	16
3	4	6.5	5.5-8	20
3.7	5	7.5	7-10	20
5.5	7.5	11.2	10-13	25
7.5	10	14	13-18	25
9	12.5	18	13-18/18-25	32
11	15	21	18-25	50
15	20	28.5	23-32	50
18.5	25	35	30-40	63
22	30	42	38-50	80
30	40	57	48-57/57-66	100
37	50	66	63-80	125
45	60	81	60 - 100	125
55	75	100	90 - 150	160
63	85	112	90 - 150	160
75	100	135	90 - 150	200

Star Delta Starting					
3 $\phi$ Motor Rating at 415V 50Hz.		Full Load Line current	Full Load phase Current	Relay Range	Backup Fuse Rating
KW	HP	Amp	Amp	Amp	Amp
5.5	7.5	11	6.35	5.5-8	20
7.5	10	14.8	9	7-10	20
9.3	12.5	18	10.39	10-13	25
11	15	21	12.12	10-13	25
15	20	28	16.1	13-18	32
18.5	25	35	20.2	18-25	50
22.5	30	42	24	18-25	50
26	35	47	26.9	23-32	63
30	40	57	33	30-40	80
37	50	66	38.1	30-40	80
45	60	80	47	38-50	100
55	75	100	58	57-66	100
67	90	120	69.2	63-80	160
75	100	135	77.9	48-80	160
90	125	165	95.3	60-100	160
100	135	182	105	90-150	200
110	150	200	115.5	90-150	200

### Ordering Information

Thermal Over Load Relay (Auto / Manual Reset)					
Relay Frame size	Relay Range	Suitable for Contactor Frame size	Type	Cat. No.	Individual Mounting Block
	0.1-0.16	CN1to CN4	RT21A	IHNR 11AA	 Type RTA2-25 Cat No. ISSTRX024025
	0.16-0.25		RT21B	IHNR 11AB	
	0.25-0.4		RT21C	IHNR 11AC	
	0.4-0.63		RT21D	IHNR 11AD	
	0.63-1		RT21E	IHNR 11AE	
	1-1.6		RT21F	IHNR 11AF	
	1.6-2.5		RT21G	IHNR 11AG	
	2.5-4		RT21H	IHNR 11AH	
	4-6		RT21J	IHNR 11AJ	
	5.5-8		RT21K	IHNR11AK	
	7-10		RT21L	IHNR 11AL	
	9-13		RT21M	IHNR 11AM	
	12-18		RT21N	IHNR 11AN	
	17-25		RT21P	IHNR 11AP	
	23-32	CN4 to CN5	RT22Q	IHNR22AQ	 Type RTA2-36 Cat No. ISSTRX024136
	28-36		RT22R	IHNR22AR	
	23-32	CN5 to CN6	RT23T	IHNR33AT	 Type RTA2-93 Cat No. ISSTRX024293
	30-40		RT23U	IHNR33AU	
	37-50		RT23V	IHNR33AV	
	48-65		RT23W	IHNR33AW	
	55-70		RT23X	IHNR33AX	
	63-80		RT23Y	IHNR33AY	
	80-93		RT23Z	IHNR33AZ	



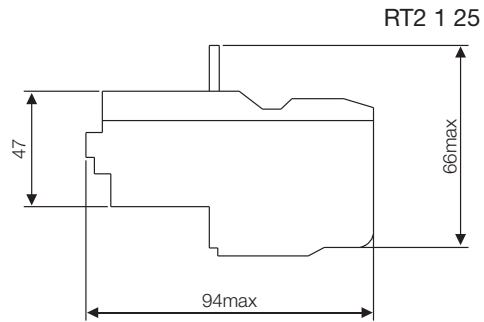
Thermal Over Load Relay (Manual Reset)					
"Relay Frame size"	Relay Range	Suitable for Contactor Frame size	Type	Cat. No	Individual Mounting Block
1	0.1-0.16	CN 1 to CN 4	RT11A	IHNR11MA	 Type RTA1-25 Cat No. ISSTRX024325
	0.16-0.25		RT11B	IHNR11MB	
	0.25-0.4		RT11C	IHNR11MC	
	0.4-0.63		RT11D	IHNR11MD	
	0.63-1		RT11E	IHNR11ME	
	1-1.6		RT11F	IHNR11MF	
	1.6-2.5		RT11G	IHNR11MG	
	2.5-4		RT11H	IHNR11MH	
	4-6		RT11J	IHNR11MJ	
	5.5-8		RT11K	IHNR11MK	
	7-10		RT11L	IHNR11ML	
	10-13		RT11M	IHNR11MM	
	13-18		RT11N	IHNR11MN	
18-25	RT11P	IHNR11MP			
2	23-32	CN 5 to CN 6	RT12Q	IHNR22MQ	 Type RTA1-80 Cat No. ISSTRX024480
	30-40		RT12R	IHNR22MR	
3	38-50	CN 5 to CN 6	RT13V	IHNR33MV	 Type RTA1-80 Cat No. ISSTRX024480
	48-57		RT13W	IHNR33MW	
	57-66		RT13X	IHNR33MX	
	63-80		RT13Y	IHNR33MY	

Electronic Overload Relay (Manual Reset)				
"Relay Frame size"	Relay Range	Suitable for Contactor Frame size	Type	Cat. No
4	30-50	CH 1 to CH 2	ERT1 4A	IHETR050
	48-80		ERT1 4B	IHETR080
	60-100		ERT1 4C	IHETR100
	90-150		ERT1 4D	IHETR150
5	132-220	CH 2 to CH 5	ERT1 5E	IHETR220
6	200-330	CH 2 to CH 7	ERT1 6F	IHETR330
	300-500		ERT1 6G	IHETR500
	380-630		ERT1 6H	IHETR630

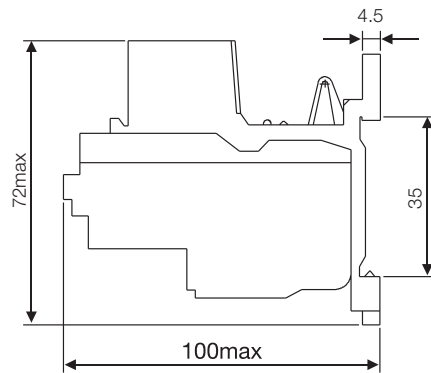
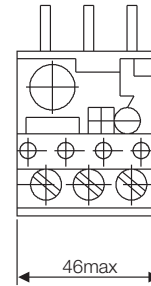


Dimension (in mm)

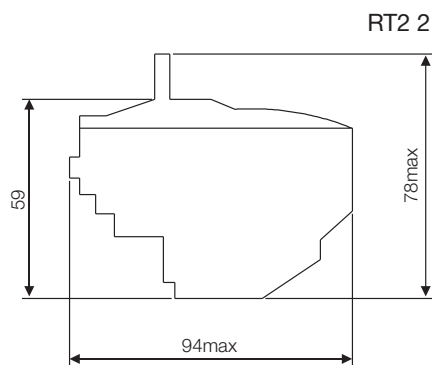
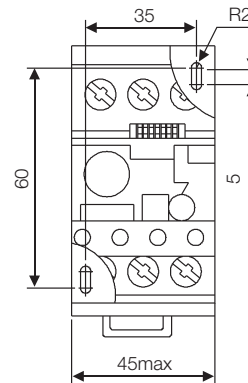
Thermal Overload Relay (Auto / Manual reset)



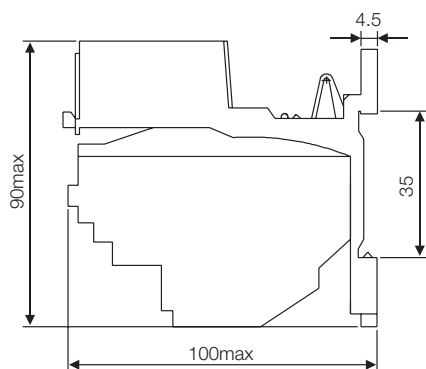
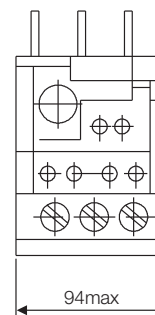
Without adapter block



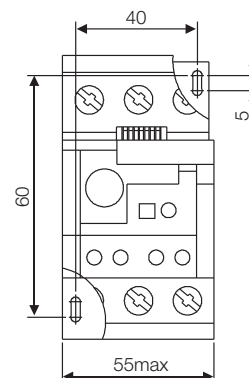
With adapter block



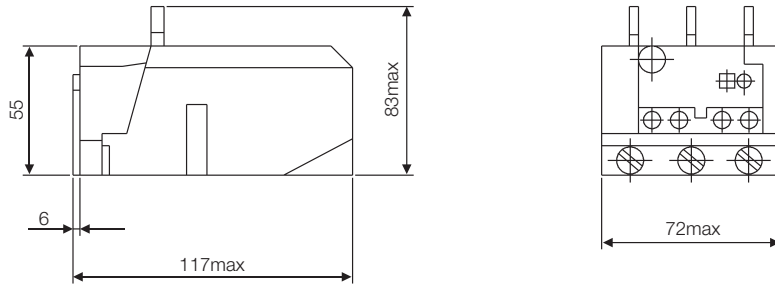
Without adapter block



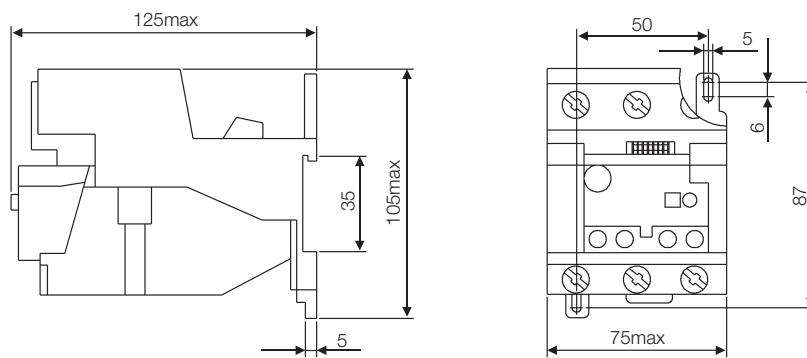
With adapter block



RT2 3 93



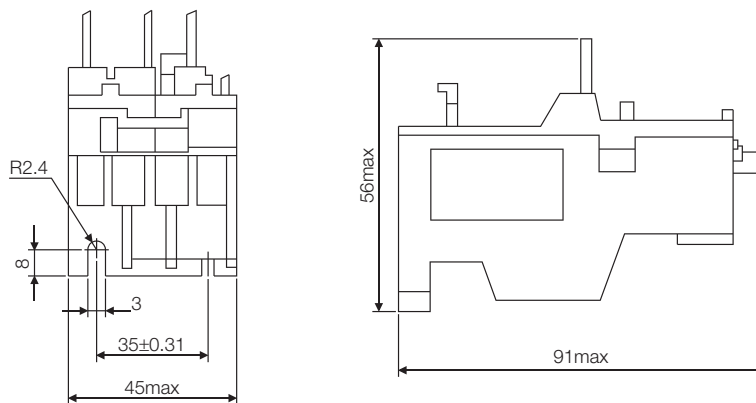
Without adapter block



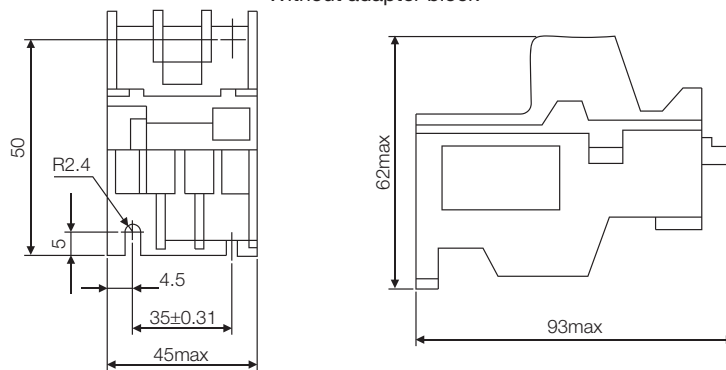
With adapter block

Thermal Overload Relay (Manual Reset)

RT1 1 25

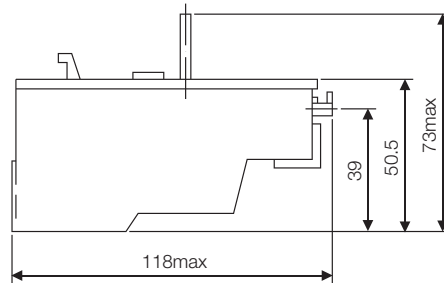
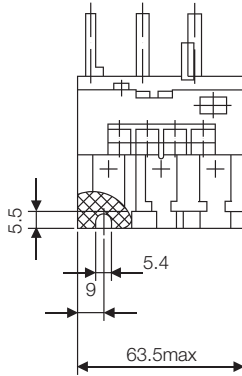


Without adapter block

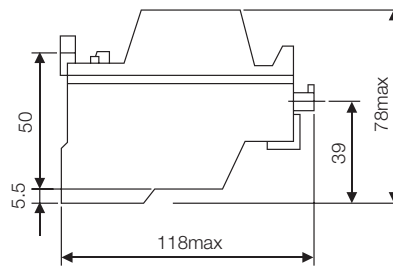
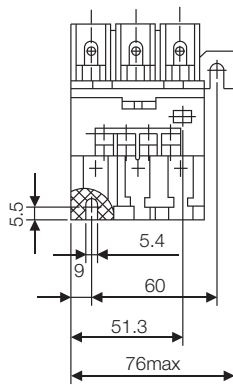


With adapter block

### RT1 2 40

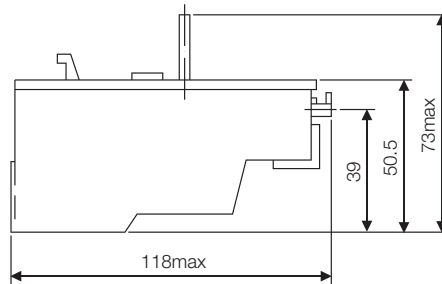
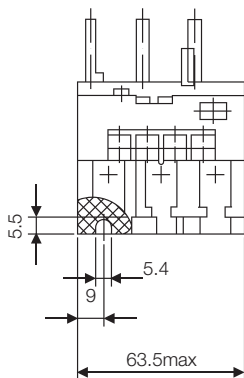


Without adapter block

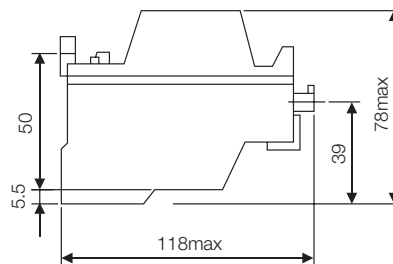
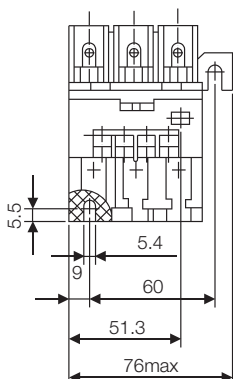


With adapter block

### RT1 3 80



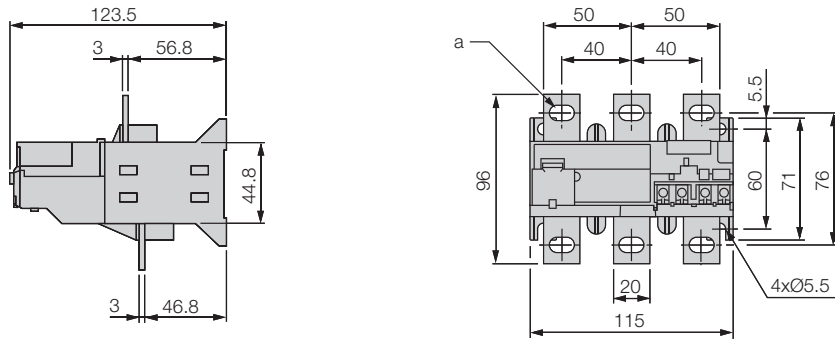
Without adapter block



With adapter block

Electronic Overload Relay (Manual reset)

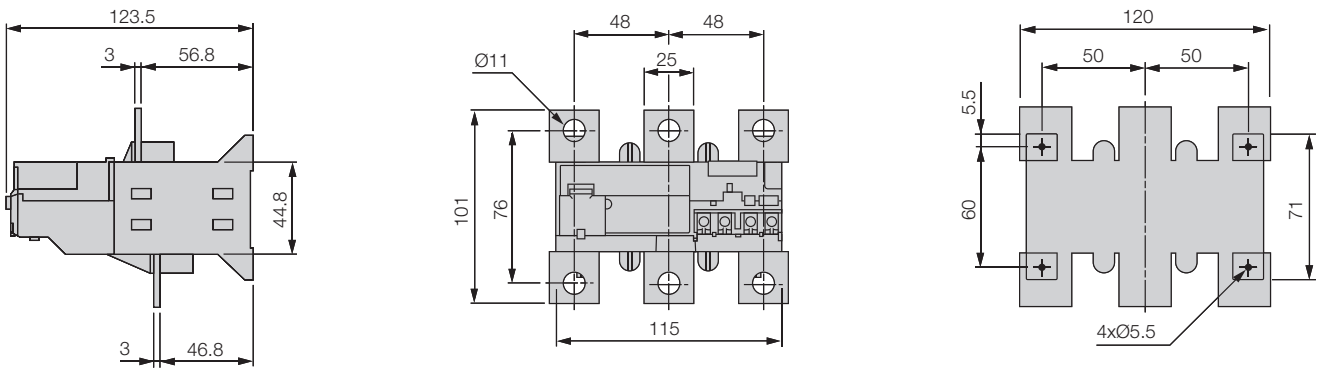
ERT1 4D



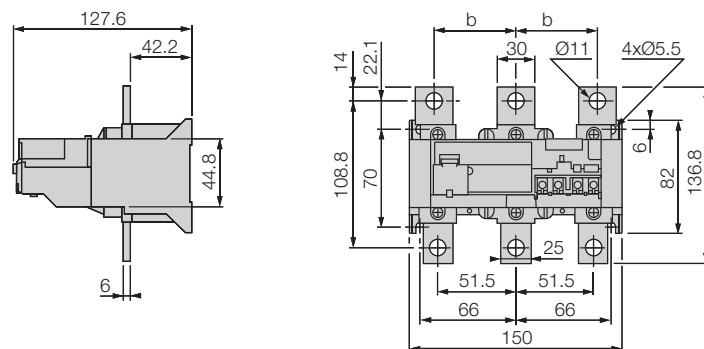
a 6.5 x 13.5 - ERT1 4A

8.5 x 13.5 - ERT1 4B, ERT1 4C, & ERT1 4D

ERT1 5E



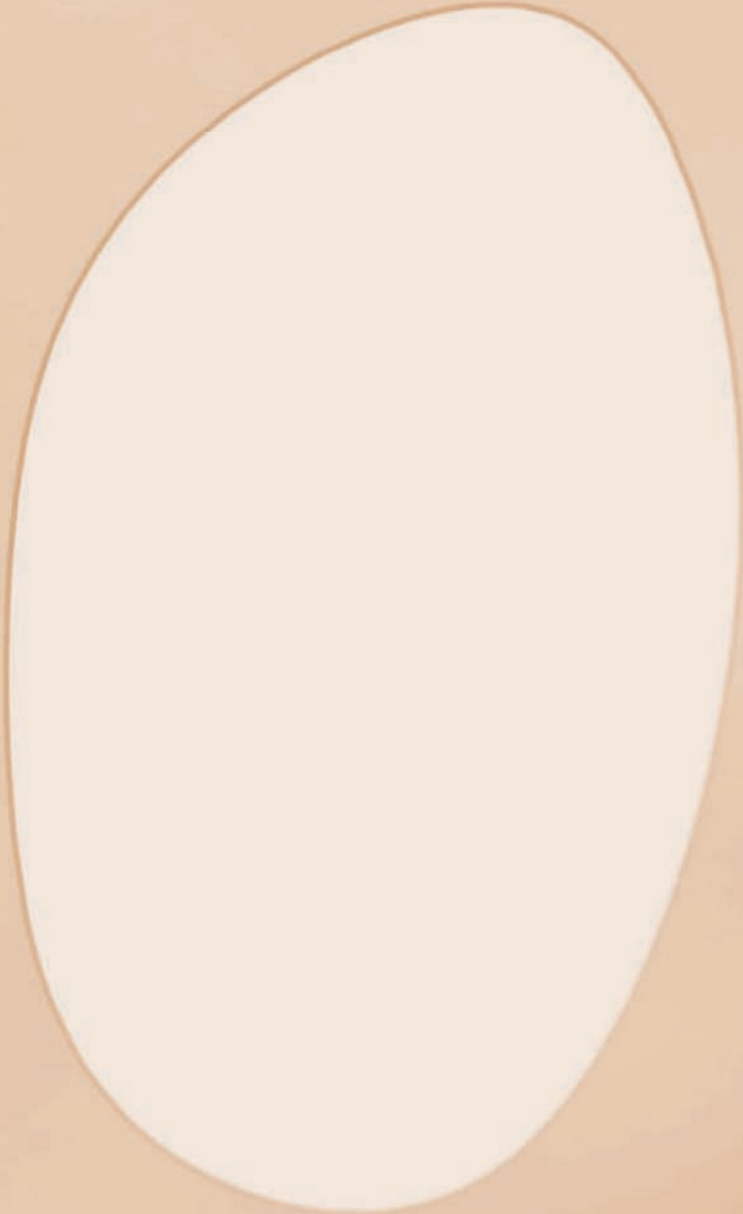
ERT1 6H

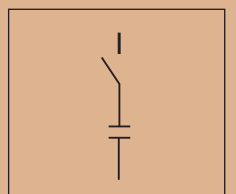


b 48 - ERT1 6F

55 - ERT1 6G, ERT1 6H

# CAPACITOR DUTY CONTACTOR



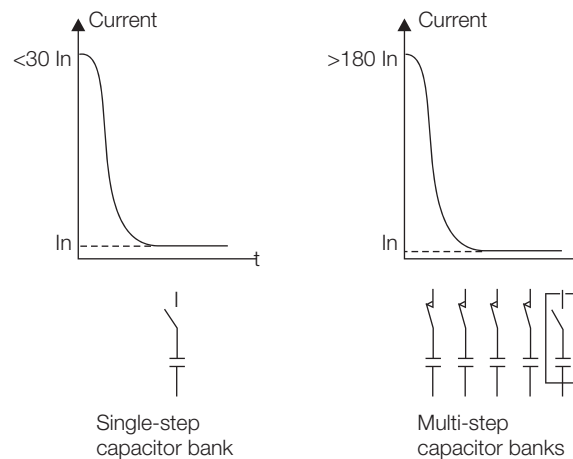


### Introduction

Normal contactor when used for capacitor switching is unable to meet the operational requirements.

In fact, at the time of switching, a capacitor effectively appears as a short circuit. The magnitude of capacitor in-rush or charging current will depend upon value of AC voltage level alongwith impedance of feeder cables and supply transformers.

When switching individual capacitor bank the charging current peaks upto 30 times the rated capacitor current can occur and incase of multi stage capacitors the in-rush current peaks of more than 180 times the rated capacitor current can occur.



These large current can flow through contactor since initial in-rush current is taken from both main supply and capacitor already connected. Such in-rush current of high magnitude is undesirable & can weld the main contacts of normal contactors.

It is therefore, essential to:

- (a) Limit the current peak by inserting quick discharge series damping resistance.
- (b) Use specific Capacitor Duty Contactors.

Hence, special Capacitor Duty Contactors are designed to meet Capacitor switching application.

### Principle of Operation

Contactor is fitted with block of three early make auxilliary contacts in series with quick discharge damping six - resistors - 2 per phase to limit peak current to value within contactor making capacity such that normal rated capacitor current is carried by main contacts which, after closing effectively short out the resistors.

### Standards

IS / IEC : 60947-4-1

### Range

12KVAR - 50KVAR in 5 frames

### Execution

3 Pole



#### Features :

- High electrical life
- Low watt loss & conservation of energy
- Cost saving & less maintenance
- Safety against high voltage



### Technical Information

Standard conformity : IS / IEC : 60947-4-1

Utilisation category : AC-6b

Ambient temperature range : -5 °C - + 55 °C



Contactor for capacitor switching

Contactor	Type	CC2-12	CC3-18	CC4-20	CC5-30	CC6-50	
Rated Current at 415V 50Hz, AC3 - (Ie)	A	18	25	32	65	95	
No. of Poles		3	3	3	3	3	
Rated Insulation Voltage (Ui)	V	750	750	750	750	750	
Rated Operational Voltage (Ue)	V	440	440	440	440	440	
<b>Maximum Switching Capacity (40°C)</b>							
	at 220V/240V	KVA	6	9	10	15	25
	at 415V/440V		12	18	20	30	50
Mechanical Life	No. of Ops. (Million)	10	10	10	10	10	
Electrical Life at Rated Load	No. of Ops. (Million)	0.2	0.2	0.1	0.1	0.1	
Maximum operating rate	Ops./Hr.	240	240	240	240	100	
<b>Terminal Capacity</b>							
	No. of Cables		1	1	1	1	1
	Flexible / Solid Max. Cable Size	Sq. mm	2.5 / 4	4 / 6	4 / 10	6 / 16	16 / 25
Weight		Kg.	0.610	0.645	0.645	1.3	1.5
Overall Dimension (W x H x D)		mm	56x140x130	58x140x136	58x140x137	75x180x150	85x200x160
<b>Control Circuit (AC coil)</b>							
Operating Voltage Range (50/ 60 Hz)	V	0.7 - 1.1	0.7 - 1.1	0.7 - 1.1	0.7 - 1.1	0.7 - 1.1	
Power Consumption	50Hz - Inrush	VA	110	110	110	200	200
	Sealed	VA	11	11	11	20	20
	60Hz - Inrush	VA	115	115	115	200	200
	Sealed	VA	11	11	11	20	20
Heat dissipation (50/ 60 Hz)	W	3 - 4	6 - 10	6 - 10	6 - 10	6 - 10	
Coil pick up time	ms.	15 - 24	15 - 24	15 - 24	20 - 25	20 - 35	
Coil drop out time	ms.	5 - 20	5 - 20	5 - 20	8 - 15	10 - 20	
<b>Auxilliary Contact</b>							
Rated Thermal Current	A	10	10	10	10	10	
Rated Insulation Voltage	V	750	750	750	750	750	
Terminal Capacity	No. of Cables		1	1	1	1	1
	Max. Size	Sq. mm	1.5	1.5	1.5	1.5	1.5

### Ordering Information



Capacitor Duty Contactor 3-Pole with AC Coil					
KVAR Rating at 50/60Hz $\theta \leq 55^\circ \text{C}$		Inst. Aux. Contact		Type	Cat. No.
220/240V	415/440V	NO	NC		
6	12	1	0	CC2 1210*	IHPAE012210*
9	18	1	0	CC3 1810*	IHPAE018310*
10	20	1	0	CC4 2010*	IHPAE020410*
15	30	1	1	CC5 3011*	IHPAE030511*
25	50	1	1	CC6 5011*	IHPAE050611*

\* To Complete Cat . No. Suffix Voltage Code From Coil Voltage Table

Note : 1. For additional aux. contacts block (side mounted type) can be mounted if required. Refer accessories table.

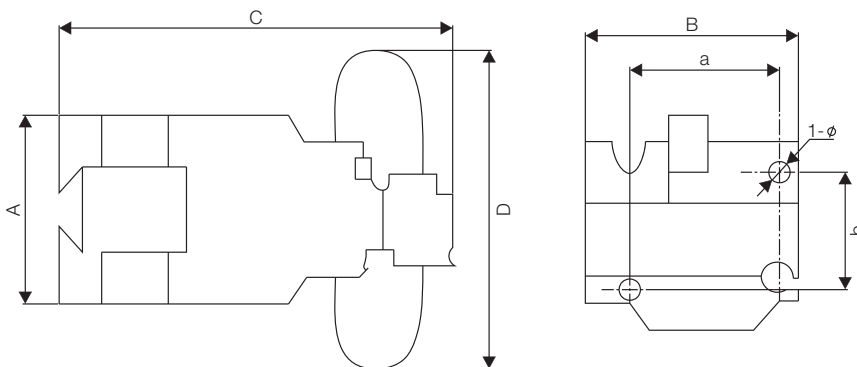


Spare Coils (AC)		
For use of Capacitor Duty Contactor type	Type	Cat. No.
CC2 12	CX1-2*	ISPNCN2*
CC3 18 & CC4 20	CX1-4*	ISPNCN4*
CC5 30 & CC6 40	CX1-6*	ISPNCN6*

\*To complete the type/ cat no. suffix the coil voltage from the coil voltage table

AC Coils							
Code*	A	C	E	G	H	J	K
AC Voltage	24V	48V	110V	220V	240V	380V	415V

### Dimension (in mm)



Dimension, in mm								
Type	External dimension				Mounting dimension			
	A	B	C	D	a	b	Ø	Din Rail
CC2 12	84	56	130	140	40	50 / 60	4.5	35mm
CC3 18	87	58	136	140	40	50 / 60		
CC4 20	87	58	137	140	40	50 / 60		
CC5 30	127	75	150	180	40	100 / 110	6.5	35mm or 75mm
CC6 50	127	85	160	200	40	100 / 110		

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ACB



MCCB



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MCCB Panel Board



Euroload Change Over Switch



Submersible & Motor Starter



Switch Disconnecter Fuse



Load Changeover Switch



Camlock fuse holder



HRC Fuse



Motor



Low Voltage Capacitor



Although every effort has been made to ensure accuracy in the compilation of the technical detail within this publication. Specifications and performance data are constantly changing. Current details should therefore be checked with Havells Group.

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