IEC Contactors & Starters

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IEC Contactors and Starters

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Product Description

Eaton's new line of ***XT*** Relays and Timers includes mini and standard frame control relays and auxiliary contacts, mini electronic on-delay and multi-function timers and an electronic star-delta (wye-delta) timer for use in star-delta (wye-delta) combinations. Because ***XT*** meets UL, CSA, CCC and CE standards, it is the perfect product solution for IEC applications all over the world. The compact, space saving, and easy to install ***XT*** line of IEC contactors and starters is the efficient and effective solution for customer applications.

Features

- For use with Mini and Standard frame size contactors and starters
- Control Relays
  - AC Control from 12V to 550V 50 Hz, 600V 60 Hz
  - DC Control from 12V to 220V
- On-Delay and Multi-Function Timers
  - 24 – 240V AC/DC Control
- Available with screw or spring cage terminals
- 4-Pole Configurations
- IP20 finger and back-of-hand proof
- Large ambient temperature range: -25° to 50°C [-13° to 122°F]
- The XTRE Control Relays have positively driven contacts between the relay and the auxiliary contact modules as well as within the auxiliary contact modules

Standards and Certifications

- IEC EN 60947
- CE Approved
- UL
- CSA
- CCC
- ATEX

Instructional Leaflets

Pub51219	Inside of Packaging XTRM Mini Control Relays
Pub51210	Inside of Packaging 7-15A XTCE Contactors and XTRE Control Relays
Pub51244	XTTR Electronic Star-Delta (Wye-Delta) Timer
Pub51245	XTMT Mini Electronic On-Delay and Multi-Function Timers

Catalogue Number Selection

Table B-1. *XT* — Relay Catalogue Numbering System

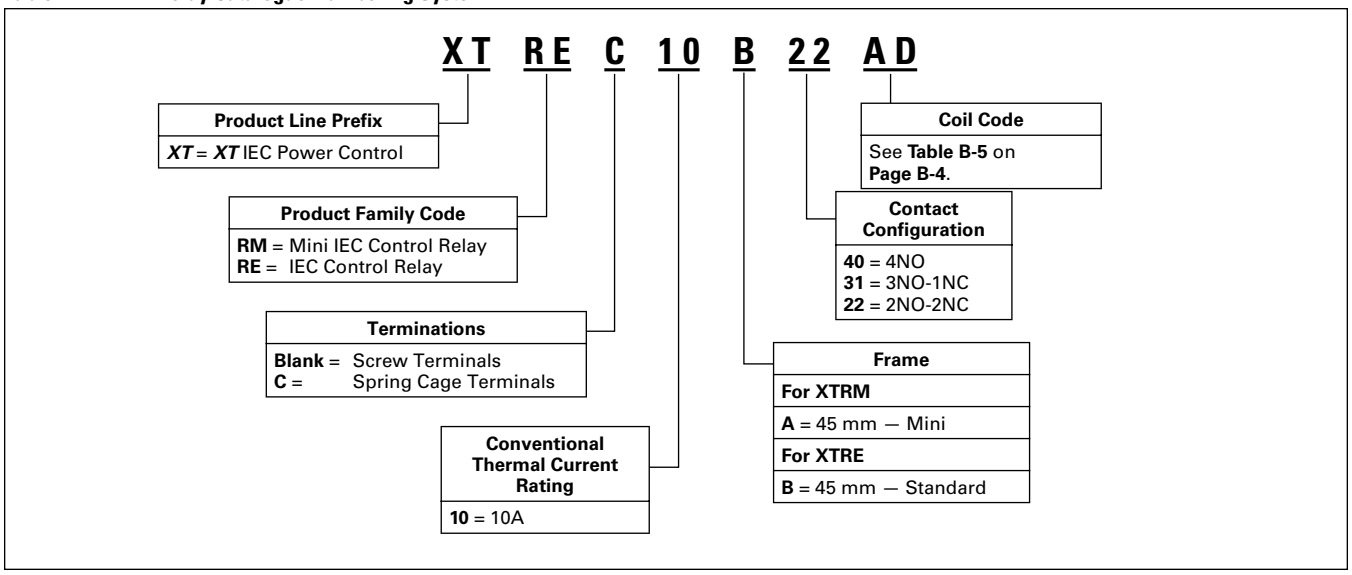
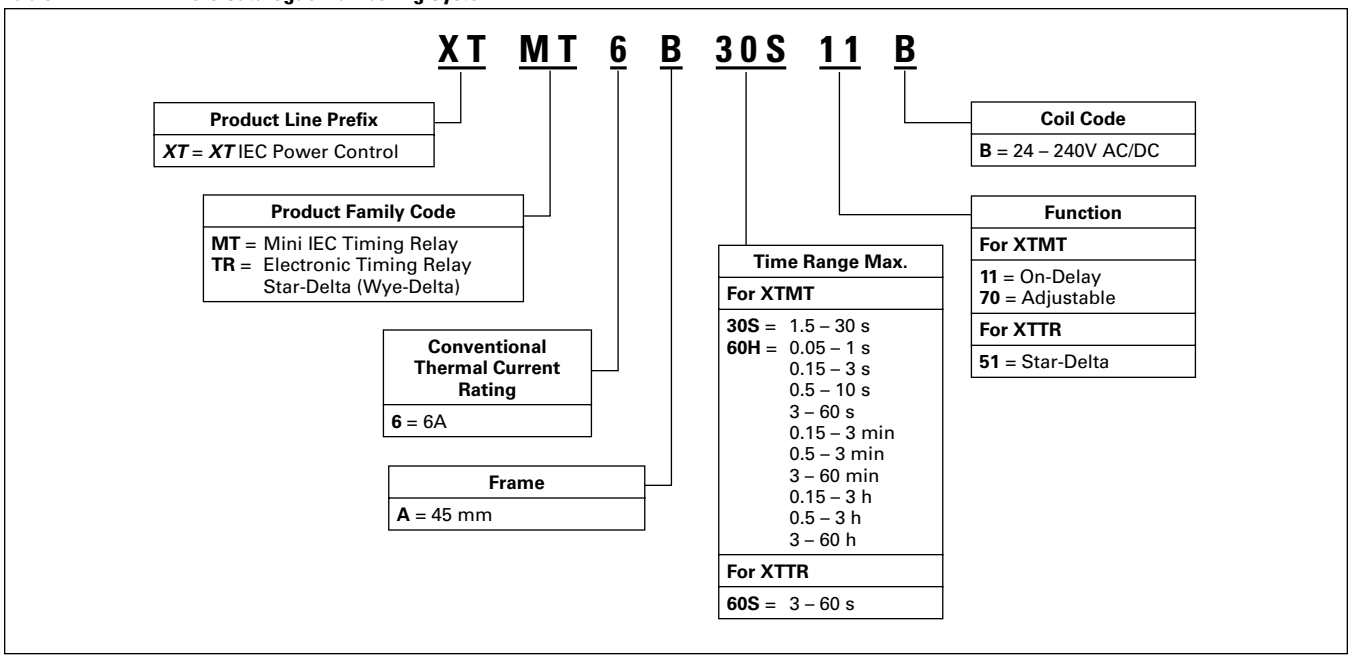


Table B-2. *XT* — Timers Catalogue Numbering System



Product Selection

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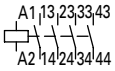
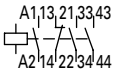
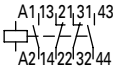
Mini Control Relays

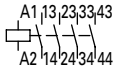
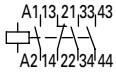
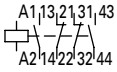
Table B-3. Mini Control Relays

Conventional Thermal Current I_{th} (A)	Contact Configuration	Rated Operational Current AC-15 I_e (A)			Circuit Symbol	Screw Terminals	Spring Cage Terminals	Price	
		220 – 240V	380 – 415V	500V		Catalogue Number ①	Catalogue Number ①	AC Coil	DC Coil
10	4NO	6	3	1.5		**XTRM10A40_**	**XTRMC10A40_**		
10	3NO-1NC	6	3	1.5		**XTRM10A31_**	**XTRMC10A31_**		
10	2NO-2NC	6	3	1.5		**XTRM10A22_**	**XTRMC10A22_**		

① Underscore (_) indicates magnet coil suffix required. See **Table B-5**.

Control Relays

Table B-4. Control Relays

Conventional Thermal Current Open at 60°C I_{th} (A)	Contact Configuration	Rated Operational Current AC-15 I_e (A)			Circuit Symbol	Screw Terminals	Spring Cage Terminals	Price	
		220 – 240V	380 – 415V	500V		Catalogue Number ②	Catalogue Number ②	AC Coil	DC Coil
16	4NO	6	4	1.5		**XTRE10B40_**	**XTREC10B40_**		
16	3NO-1NC	6	4	1.5		**XTRE10B31_**	**XTREC10B31_**		
16	2NO-2NC	6	4	1.5		**XTRE10B22_** ③	**XTREC10B22_** ③		

② Underscore (_) indicates magnet coil suffix required. See **Table B-5**.
③ DC operated control relays XTRE(C)10B22_ can only be combined with 2-pole auxiliary contacts.

Table B-5. Coil Voltage Suffix

Coil Voltage	Suffix Code
110V 50 Hz, 120V 60 Hz	**A**
220V 50 Hz, 240V 60 Hz	**B**
230V 50 Hz	**F**
24V 50/60 Hz	**T**
24V DC	**TD**
415V 50 Hz, 480V 60 Hz	**C**
550V 50 Hz, 600V 60 Hz	**D**

Coil Voltage	Suffix Code
208V 60 Hz	**E**
190V 50 Hz, 220V 60 Hz	**G**
240V 50 Hz, 277V 60 Hz	**H**
380V 50 Hz, 440V 60 Hz	**L**
400V 50 Hz	**N**
380V 60 Hz	**P**
12V 50/60 Hz	**R**

Coil Voltage	Suffix Code
24V 50 Hz	**U**
42V 50 Hz, 48V 60 Hz	**W**
48V 50 Hz	**Y**
120V DC	**AD**
220V DC	**BD**
12V DC	**RD**
48V DC	**WD**

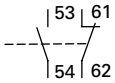
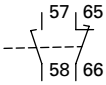
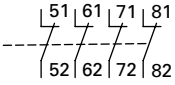
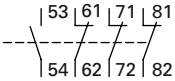
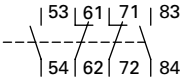
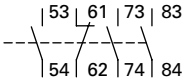
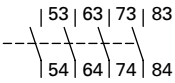
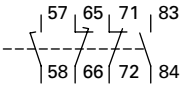
Notes:
- Orders must be placed in multiples of the package quantity listed.
- DC operated control relays have a built-in suppressor circuit.
- Contact terminal numbers to EN50011.
- Coil terminal numbers to EN50005.

Accessories ..... **Page B-5**
Dimensions ..... **Page B-13**
Discount Symbol **MC7/MC8**

Accessories

Auxiliary Contacts

Table B-6. Front Mount Auxiliary Contacts for Use with XTRM Mini Control Relays

Conventional thermal current, I_{th} Open (A)	Rated Operational Current AC-15 I_e (A)			Contact Configuration	Contact Sequence	Package Qty.	Screw Terminals	Spring Cage Terminals	Price ①
	220V 230V 240V	380V 400V 415V	500V				Catalogue Number	Catalogue Number	
10	4	2	1.5	2NC		5	**XTMCXFA02**	—	
10	4	2	1.5	1NO-1NC		5	**XTMCXFA11**	**XTMCXFAC11**	
10	4	2	1.5	2NO		5	**XTMCXFA20**	—	
10	4	2	1.5	$1NO_E$-$1NC_L$		5	**XTMCXFAL11** ②	—	
10	4	2	1.5	4NC		5	**XTMCXFA04**	**XTMCXFAC04**	
10	4	2	1.5	1NO-3NC		5	**XTMCXFA13**	**XTMCXFAC13**	
10	4	2	1.5	2NO-2NC		5	**XTMCXFA22**	**XTMCXFAC22**	
10	4	2	1.5	3NO-1NC		5	**XTMCXFA31**	**XTMCXFAC31**	
10	4	2	1.5	4NO		5	**XTMCXFA40**	**XTMCXFAC40**	
10	4	2	1.5	1NO-1NC $1NO_E$-$1NC_L$		5	**XTMCXFAL22** ②	**XTMCXFCLC22** ②	

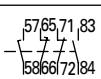
① Orders must be placed in multiples of package quantity listed.

② 1 early-make contact (NO_E), 1 late-break contact (NC_L).

Discount Symbol **MC8**

B

Table B-7. Front Mount Auxiliary Contacts for Use with XTRE Control Relays ③

	Conventional Thermal Current, I_{th} (A), Open at 60°C	Poles	Rated Operational Current AC-15 I_e (A) 220V 230V 240V	380V 400V 415V	500V	Contact Configuration	Circuit Symbol	Pkg. Qty.	Screw Terminals Catalogue Number	Spring Cage Terminals Catalogue Number	Price ①
	16	2	6	3	1.5	2NO		5	**XTCEXFAC20**	**XTCEXFACC20**	
	16	2	6	3	1.5	1NO-1NC		5	**XTCEXFAC11**	**XTCEXFACC11**	
	16	2	6	3	1.5	2NC		5	**XTCEXFAC02**	**XTCEXFACC02**	
	16	2	6	3	1.5	$1NO_E$-$1NC_L$		5	**XTCEXFALC11** ②	**XTCEXFALCC11** ②	
	16	4	6	3	1.5	4NO		5	**XTCEXFAC40**	**XTCEXFACC40**	
	16	4	6	3	1.5	3NO-1NC		5	**XTCEXFAC31**	**XTCEXFACC31**	
	16	4	6	3	1.5	2NO-2NC		5	**XTCEXFAC22**	**XTCEXFACC22**	
	16	4	6	3	1.5	1NO-3NC		5	**XTCEXFAC13**	**XTCEXFACC13**	
	16	4	6	3	1.5	4NC		5	**XTCEXFAC04**	**XTCEXFACC04**	
	16	4	6	3	1.5	1NO-1NC $1NO_E$-$1NC_L$		5	**XTCEXFCLC22** ②	**XTCEXFCLCC22** ②	

① Orders must be placed in multiples of package quantity listed.

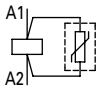
② 1 early-make contact (NO_E), 1 late-break contact (NC_L).

③ Interlocked opposing contacts, to IEC/EN 60947-5-1 Annex L (positively driven), within the auxiliary contact modules (not NO_E and NC_L contacts) and between the auxiliary contacts and built-in contacts of the XTRE control relays.

Suppressors

For AC operated contactors 50 – 60 Hz. On DC operated contactor relays and on XTRE10B the suppressor circuit is built-in. Note drop-out relay.

Varistor Suppressor ④⑤



Contact Sequence

Table B-8. Varistor Suppressor for XTRE

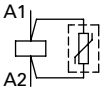
Voltage	For Use with…	Pkg. Qty.	Catalogue Number	Price ⑥
24 – 48	XTCE007B – XTCE015B, XTCF020B, XTRE(C)10B	10	**XTCEXVSBW**	
48 – 130		10	**XTCEXVSBA**	
130 – 240		10	**XTCEXVSBB**	
240 – 500		10	**XTCEXVSBC**	

④ Note drop-out delay.

⑤ For AC operated contactors, 50/60 Hz. DC operated contactors have an integrated suppressor.

⑥ Orders must be placed in multiples of package quantity listed.

Table B-9. Varistor Suppressor for XTRM ⑦

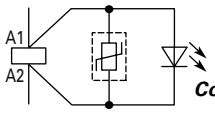
Voltage	For Use with…	Circuit Symbol	Package Qty.	Catalogue Number	Price ⑧
24 – 48	XTRM6A…, XTRM9A…		10	**XTMCXVSW**	
48 – 130	XTRM6A…, XTRM9A…		10	**XTMCXVSA**	
110 – 250	XTRM6A…, XTRM9A…		10	**XTMCXVSB**	
380 – 415	XTRM6A…, XTRM9A…		10	**XTMCXVSN**	
24 – 48	XTRMC6A…, XTRMC9A…		10	**XTMCXVSCW**	
48 – 130	XTRMC6A…, XTRMC9A…		10	**XTMCXVSCA**	
110 – 250	XTRMC6A…, XTRMC9A…		10	**XTMCXVSCB**	

⑦ For AC operated contactors, 50/60 Hz. DC operated contactors have integrated varistor suppressors.

⑧ Orders must be placed in multiples of package quantity listed.

Discount Symbol **MC7/MC8**

Varistor Suppressor with Integrated LED ①②



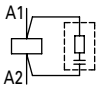
Contact Sequence

Table B-10. Varistor Suppressor for XTRE

Voltage	For Use with…	Pkg. Qty.	Catalogue Number	Price ③
24 – 48 130 – 240	XTRE(C)10B	10 10	**XTCEXVSLBW** **XTCEXVSLBB**	

① Note drop-out delay.
② For AC operated contactors, 50/60 Hz. DC operated contactors have an integrated suppressor.
③ Orders must be placed in multiples of package quantity listed.

RC Suppressor ④⑤



Contact Sequence

Table B-11. RC Suppressor for XTRE

Voltage	For Use with…	Pkg. Qty.	Catalogue Number	Price ⑥
24 – 48 48 – 130 110 – 240 240 – 500	XTRE(C)10B	10 10 10 10	**XTCEXRSBW** **XTCEXRSBA** **XTCEXRSBB** **XTCEXRSBC**	

④ Note drop-out delay.
⑤ For AC operated contactors, 50/60 Hz. DC operated contactors have an integrated suppressor.
⑥ Orders must be placed in multiples of package quantity listed.

Table B-12. RC Suppressor for XTRM ⑦

Voltage	For Use with…	Circuit Symbol	Package Qty.	Catalogue Number	Price ⑧
24 – 48	XTRM6A…, XTRM9A…	A1 A2	10	**XTMCXRSW**	
48 – 130	XTRM6A…, XTRM9A…		10	**XTMCXRSA**	
110 – 250	XTRM6A…, XTRM9A…		10	**XTMCXRSB**	
24 – 48	XTRMC6A…, XTRMC9A…		10	**XTMCXRSCW**	
48 – 130	XTRMC6A…, XTRMC9A…		10	**XTMCXRSCA**	
110 – 250	XTRMC6A…, XTRMC9A…		10	**XTMCXRSCB**	

⑦ For AC operated contactors, 50/60 Hz. Note drop-out delay.
⑧ Orders must be placed in multiples of package quantity listed.

Free-Wheel Diode Suppressor

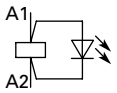
In addition to the built-in suppressor circuit for DC actuated contactors. Prevents negativie breaking voltage when contactors are used in combination with a safety PLC.

Table B-13. Free-Wheel Diode Suppressor for XTRE

Voltage	For Use with…	Pkg. Qty.	Catalogue Number	Price ⑨
12 – 250 DC	XTRE10B	10	**XTCEXD5B**	

⑨ Orders must be placed in multiples of package quantity listed.

Voltage Indicator



Contact Sequence

Table B-14. Voltage Indicator for XTRE

Voltage	For Use with…	Pkg. Qty.	Catalogue Number	Price ⑩
24 – 48 110 – 120 110 – 250	XTRE(C)10B	10 10 10	**XTCEXVIBW** **XTCEXVIBA** **XTCEXVIBB**	

⑩ Orders must be placed in multiples of package quantity listed.

Discount Symbol **MC7/MC8**

B

Connector ①

Table B-15. Connector

	For Use with…	Pkg. Qty.	Catalogue Number	Price ②
	XTRE(C)10B	50	**XTCEXCNC**	
	XTRM10A	50	**XTMCXCN**	

① For mechanically arranging contactors in combinations. Distance between contactors is 0 mm.
② Orders must be placed in multiples of package quantity listed.

Mechanical Interlock ③

Table B-16. Mechanical Interlock

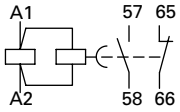
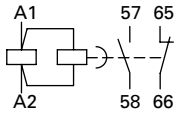
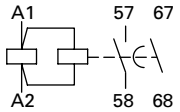
	For Use with…	Pkg. Qty.	Catalogue Number	Price ④
	XTRE10B...	5	**XTCEXMLB**	
	XTRM10A...	5	**XTMCXML**	

③ For two contactors with AC or DC operated magnet system which are horizontally or vertically mounted. For B frame, mechanical lifespan is 2.5 x 10^6 operations and the distance between contactors is 0 mm.
④ Orders must be placed in multiples of package quantity listed.

Electronic Timer Modules

Front (Top) mounted timer modules for use with XTRE10B control relays. Can not be combined with top mount auxiliary contacts, XTCEXF_C_.

Table B-17. Electronic Timer Modules for XTRE

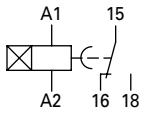
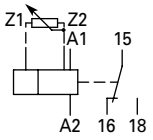
Voltage	Contact Sequence	Timing Range	For Use with…	Pkg. Qty.	Catalogue Number	Price ⑤
On-Delayed						
24V AC/DC		0.05 – 1 s 0.5 – 10 s 15 – 100 s	XTRE10B_	1	**XTCEXTEEC11T**	
100 – 130V AC					**XTCEXTEEC11A**	
200 – 240V AC					**XTCEXTEEC11B**	
Off-Delayed						
24V AC/DC		0.05 – 1 s	XTRE10B_	1	**XTCEXTED1C11T**	
100 – 130V AC					**XTCEXTED1C11A**	
200 – 240V AC					**XTCEXTED1C11B**	
24V AC/DC		0.5 – 10 s	XTRE10B_	1	**XTCEXTED10C11T**	
100 – 130V AC					**XTCEXTED10C11A**	
200 – 240V AC					**XTCEXTED10C11B**	
24V AC/DC		5 – 100 s	XTRE10B_	1	**XTCEXTED100C11T**	
100 – 130V AC					**XTCEXTED100C11A**	
200 – 240V AC					**XTCEXTED100C11B**	
Star-Delta						
24V AC/DC		1 – 30 s	XTRE10B_	1	**XTCEXTEYC20T**	
100 – 130V AC					**XTCEXTEYC20A**	
200 – 240V AC					**XTCEXTEYC20B**	
Sealable Shroud						
	Transparent sealable shroud used to protect electronic timer modules from unwanted access.		XTCEXTEE, XTCEXTED, XTCEXTEY	1	**XTCEXTESHRD**	

⑤ Orders must be placed in multiples of package quantity listed.

Discount Symbol **MC8/MC7**

Mini Electronic Timers


Table B-18. Mini Electronic On-Delay Timers

Conventional Thermal Current I_e (A)	Rated Operational Current I_e AC-11 Amps		Time Range	Function	Terminal Marking According to EN 50042	Catalogue Number	Price
	220/230/240V	380/400/440V					
6	3	3	1.5 – 30 sec 0.05 – 1 sec 0.15 – 3 sec 0.5 – 10 sec 3 – 60 sec	Fixed, On-delay		**XTMT6A30S11B**	
6	3	6	0.15 – 3 min 0.5 – 10 min 3 – 60 min 0.15 – 3 h 0.5 – 10 h 3 – 60 h	Fixed, On-delay		**XTMT6A60H11B**	
6	3	3	0.05 – 1 sec 0.15 – 3 sec 0.5 – 10 sec 3 – 60 sec 0.15 – 3 min 0.5 – 10 min 3 – 60 min 0.15 – 3 h 0.5 – 10 h 3 – 60 h	Adjustable: On-delayed; Fleeting contact on energization; Flashing; Pulse generating; ON-OFF		**XTMT6A60H70B**	

Notes —

Actuating Voltage

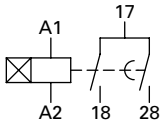
24 – 240 50/60 Hz
24 – 240V DC

Admissible Cable Length

Cable unscreened, with cable cross-section 0.5 – 1.5 mm^2 — **Connection to** Y1/Y2, Z1/Z2
Two-core cable — M250
Two-core cable in the same cable duct with the main cable, 50/60 Hz — M50

Electronic Star-Delta (Wye-Delta) Timers

Table B-19. Electronic Star-Delta (Wye-Delta) Timers

Conventional Thermal Current I_e (A)	Rated Operational Current I_e AC-11 Amps		Time Range	Function	Terminal Marking According to EN 50042	Catalogue Number	Price
	230V	400V					
6	3	3	3 – 60 sec	Fixed, Star-Delta		**XTTR6A60S51B**	

Notes —

Actuating Voltage

24 – 240 50/60 Hz
24 – 240V DC

Admissible Cable Length

Cable unscreened, with cable cross-section 0.5 – 1.5 mm^2 — **Connection to** B1, Z1/Z2
Two-core cable — M250
Two-core cable in the same cable duct with the main cable, 50/60 Hz — M50

Discount Symbol **MC7/MC8**

B

Technical Data and Specifications

Table B-20. Relays and Timers — Technical Data and Specifications

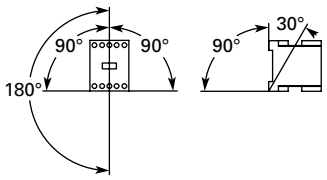
Description	XTRE	XTCEXFAC_	XTCEXTE_	XTRM	XTMCXFA_
General					
Standards	IEC/EN 60947, VDE 0660, UL, CSA		DIN EN 61812, IEC/EN 60947, VDE 060, UL, CSA	IEC/EN 60947, VDE 0660, UL, CSA	
Lifespan, Mechanical AC Operated DC Operated	 20,000,000 20,000,000	 10,000,000 10,000,000	 3,000,000 3,000,000	 10,000,000 20,000,000	 10,000,000 20,000,000
Maximum operating frequency (ops/hr)	9000	9000	—	9000	9000
Climatic Proofing	Damp heat, constant, to IEC 60068-2-78; Damp heat, cyclical, to IEC 60068-2-30				
Ambient Temperature Open (°C, min/max) Enclosed (°C, min/max) Ambient Temperature for Storage (°C, min/max)	 -25/60 -25/40 -40/80	 -25/60 -25/40 -40/80	 -40/80 -25 – 60 -25 – 40	 -25/50 -25/40 —	 -25/50 -25/40 —
Mounting Position			As required, not suspended	As required, except vertically A1/A2 at the bottom	
Mechanical shock resistance (IEC/EN 60068-2-27) Half-sinusoidal shock 10 ms Base unit with auxiliary contact module Make contact Break contact	 7g 5g	 7g 5g	 6g 6g	 10g 8g	 10g 8g
Degree of Protection	IP20	IP20	IP20	IP20	IP20
Protection against direct contact from the front when actuated by a perpendicular test finger (IEC 536)	Finger- and back-of-hand proof				
Weight AC operated (kg) DC operated (kg)	 0.23 0.28	 0.05 0.05	 0.08 0.08	 0.17 0.20	 — —
Terminal capacity Screw terminals Solid (mm^2) Flexible with ferrule (mm^2) Solid or stranded (AWG)	 1 x (0.75 – 4) 2 x (0.75 – 2.5) 1 x (0.75 – 2.5) 2 x (0.75 – 2.5) 18 – 14		 1 x (0.75 – 2.5) 2 x (0.75 – 1.5) 1 x (0.75 – 1.5) 2 x (0.75 – 1.5) 18 – 14	 1 x (0.75 – 2.5) 2 x (0.75 – 2.5) 1 x (0.75 – 1.5) 2 x (0.75 – 1.5) 18 – 14	
Terminal screw	M3.5	M3.5	M3.5	M3.5	M3.5
Pozidriv screwdriver	Size 2	Size 2	Size 2	Size 2	Size 2
Standard screwdriver (mm)	0.8 x 5.5 1 x 6		0.8 x 5.5 1 x 6	0.8 x 5.5 1 x 6	
Max. tightening torque (Nm)	1.2	1.2	1.2	1.2	1.2
Spring cage terminals Solid (mm^2) Flexible with or without ferrule DIN 46228 (mm^2) Solid or stranded (AWG)	 1 x (0.75 – 2.5) 2 x (0.75 – 2.5) 1 x (0.75 – 2.5) 2 x (0.75 – 2.5) 18 – 14		 — — — — —	 1 x (0.75 – 2.5) 2 x (0.75 – 2.5) 1 x (0.75 – 2.5) 2 x (0.75 – 2.5) 18 – 14	
Standard screwdriver (mm)	0.6 x 3.5		—	0.6 x 3.5	
Contacts					
Interlocked opposing contacts to ZH 1/457, including auxiliary contact module	Yes	Yes	No	Yes	Yes
Rated impulse withstand voltage (U_{imp}) V AC	6000	6000	6000	6000	6000
Overvoltage category/pollution degree	III/3	III/3	III/3	III/3	III/3
Rated insulation voltage (U_i) V AC	690	690	600	690	690
Rated operational voltage (U_e) V AC	690	500	400	600	600
Safe isolation to VDE 0106 Part 101 and Part 101/A1 Between coil and auxiliary contacts (V AC) Between the auxiliary contacts (V AC)	 400 400	 400 400	 250 250	 300 300	 300 300
Rated operational current AC-15 220/240V I_e 380/415V I_e 500V I_e	 6 4 1.5	 6 3 —	 Please inquire Please inquire —	 6 3 1.5	 4 2 1.5

Table B-20. Relays and Timers — Technical Data and Specifications (Continued)

Description	XTRE	XTCEXFAC_	XTCEXTE_	XTRM	XTMCXFA_
Contacts (Continued)					
DC-13 ①					
DC13 L/R ≤ 15 mS					
Contacts in series: Voltage:					
1 24V	10	10	—	2.5	2.5
1 60V	6	6	—	—	—
2 60V	10	10	—	2.5	2.5
1 110V	3	3	—	—	—
3 110V	6	6	—	1.5	1.5
1 220V	1	1	—	—	—
3 220V	5	5	—	0.5	0.5
DC-13 L/R ≤ 50 mS					
Contacts in series: Voltage:					
3 24V	4	—	—	—	—
3 60V	4	—	—	—	—
3 110V	2	—	—	—	—
3 220V	1	—	—	—	—
Control circuit reliability (at U_e = 24V DC, U_{min} = 17, I_{min} = 5.4 mA)	Faillure rate = $<10^{-8}$, < one failure in 100 million operations		—	Faillure rate = $<10^{-8}$, < one failure in 100 million operations	
Conventional thermal current (I_{th})	16	16	6	10	10
Short-circuit rating without welding					
Maximum overcurrent protective device					
220/240V – XTPR Frame B	4	—	—	4	4
380/415V – XTPR Frame B	4	—	—	4	4
Short-circuit protection, max. fuse					
500V (A gG/gL)	10	10	6	6	6
500V (A fast)	—	—	—	10	10
Current heat losses at load of I_{th}					
AC operated (W)	0.3	0.3	—	0.2	0.2
DC operated (W)	0.3	0.3	—	0.3	0.3
Magnet Systems					
Pick-up and drop-out values					
AC operated					
Single-voltage coil 50 Hz and dual-voltage coil 50 Hz, 60 Hz (Pick-up x U_c)	0.8 – 1.1	—	0.85 – 11	0.8 – 1.1	—
Dual-frequency coil 50/60 Hz (Pick-up x U_c)	0.8 – 1.1	—	—	0.85 – 1.1	—
DC operated ②					
Pick -up voltage (Pick-up x U_c)	0.8 – 1.1	—	0.7 – 1.2	0.85 – 1.3	—
At 24V: without auxiliary contact module (40°C) (Pick-up x U_c)	0.7 – 1.3	—	—	0.7 – 1.3	—
Power consumption					
Single-voltage coil 50 Hz and dual-voltage coil 50 Hz, 60 Hz					
Pick-up VA	24	—	—	25	—
Pick-up W	19	—	—	22	—
Sealing VA	3.4	—	2	4.6	—
Sealing W	1.2	—	1.8	1.3	—
Dual-frequency coil 50/60 Hz at 50 Hz					
Pick-up VA	27	—	—	30	—
Pick-up W	22	—	—	26	—
Sealing VA	4.2	—	—	5.4	—
Sealing W	1.4	—	—	1.6	—
Dual-frequency coil 50/60 Hz at 60 Hz					
Pick-up VA	25	—	—	29	—
Pick-up W	21	—	—	24	—
Sealing VA	3.3	—	—	3.9	—
Sealing W	1.2	—	—	1.2	—
DC operated					
Pull-in = sealing (W)	3	—	—	2.6	—
Duty factor (% DF)	100	—	100	100	—
Switching times at 100% U_c (approximate values)					
AC operated closing delay (mS)	≤21	—	—	14 – 21	—
AC operated NO contact opening delay (mS)	≤18	—	—	8 – 18	—
AC operated with auxiliary contact module, max. closing delay (mS)	—	—	—	45	45
DC operated closing delay (mS)	≤31	—	—	26 – 35	—
DC operated NO contact opening delay (mS)	≤12	—	—	15 – 25	—
DC operated with auxiliary contact module, max. closing delay (mS)	—	—	—	70	70

① Making and breaking conditions to DC13, time constant as stated.

② Smoothed DC or three-phase bridge rectifier.

B

Control Relays

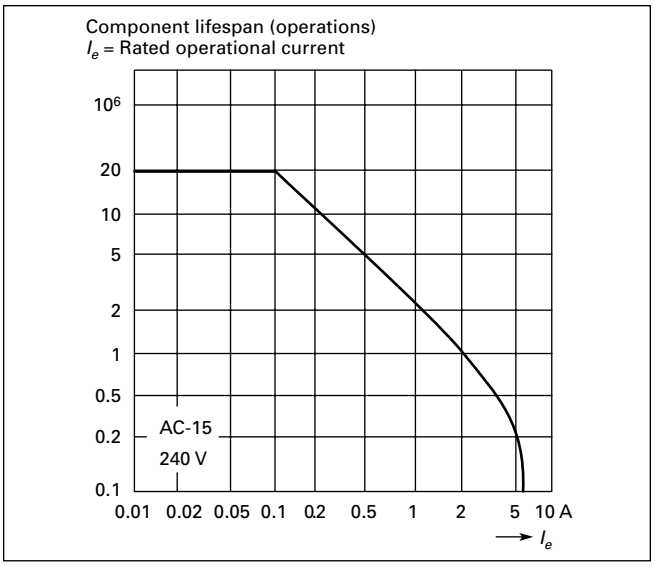


Figure B-1. XTRE (AC-15) Characteristic Curve

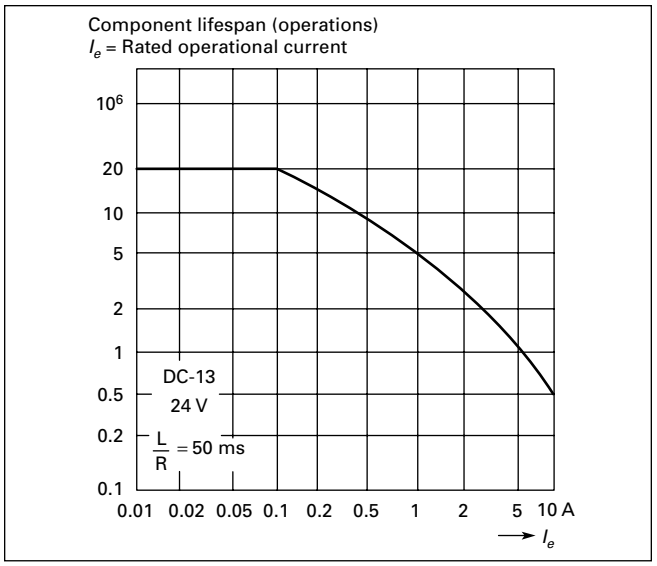


Figure B-2. XTRE (DC-13) Characteristic Curve ①

① Making and breaking conditions to DC-13, time constant as stated.

The diagrams show the closing and opening travel of the contact of the contactor relays and auxiliary contacts at no load. Tolerances are not taken into consideration.

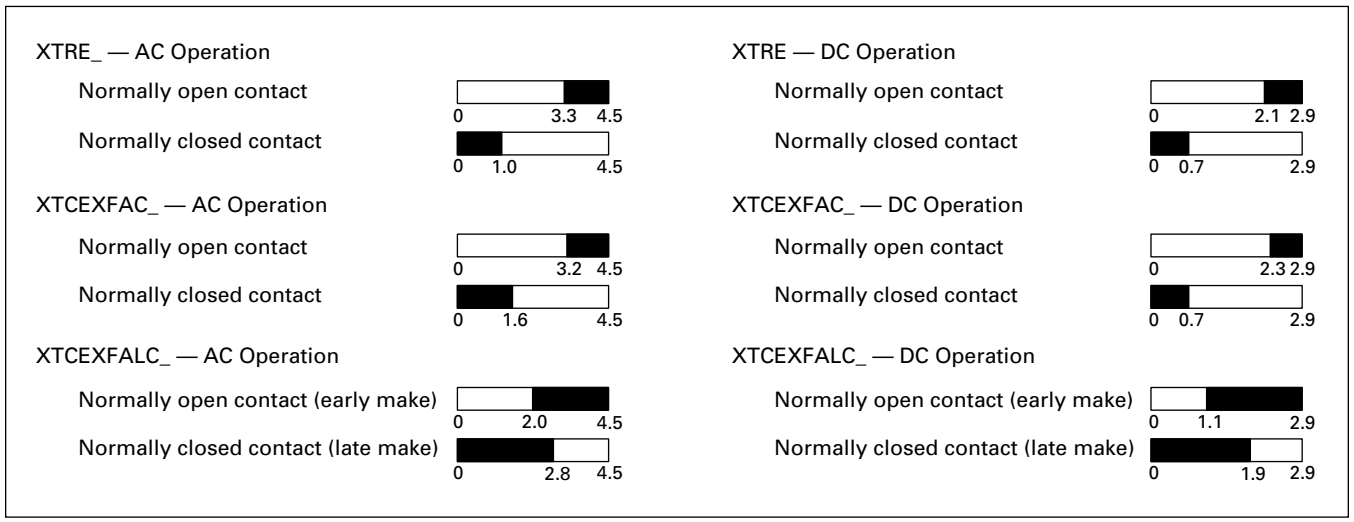


Figure B-3. Contact Travel Diagrams — XTRE

Flow Diagrams — Electronic Timers

XTMT Mini Timers

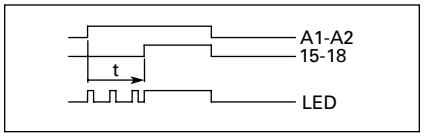


Figure B-4. On-Delayed

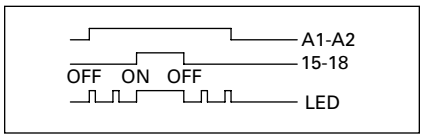


Figure B-5. ON-OFF Function

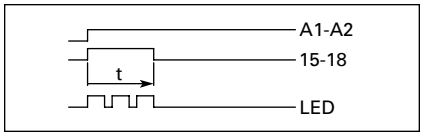


Figure B-6. Fleeting Contact on Energization

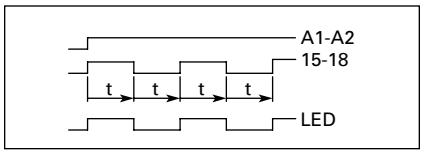


Figure B-7. Flashing, Pulse Initiating

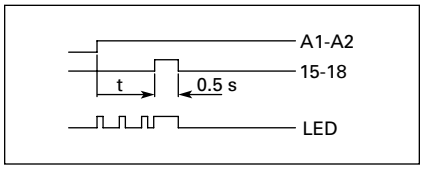


Figure B-8. Pulse Generating

Star-Delta (Wye-Delta) Timer

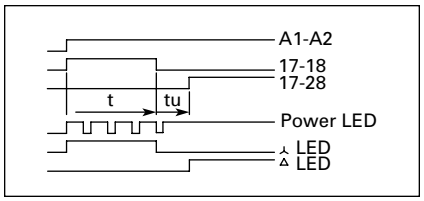


Figure B-9. Star-Delta

Rating Data

Table B-21. Rating Data for Approved Types

Pilot Duty	General Use
Control Relays — XTMR	
A600, P300	10A – 600V AC 0.5A – 250V DC
Timers — XTMT, XTTR	
B300	6A – 250V AC

Dimensions

Mini Control Relays

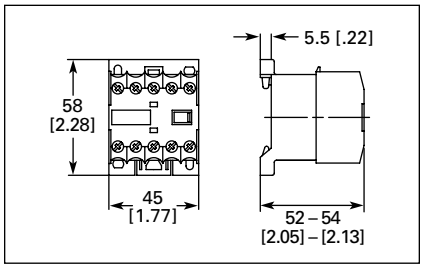


Figure B-10. Mini Control Relay XTRM — Approximate Dimensions in mm [in.]

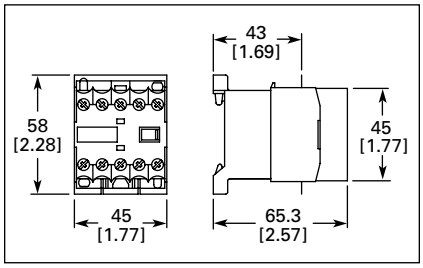


Figure B-11. XTRM Mini Control Relay with IP40 XTMCX Shroud — Approximate Dimensions in mm [in.]

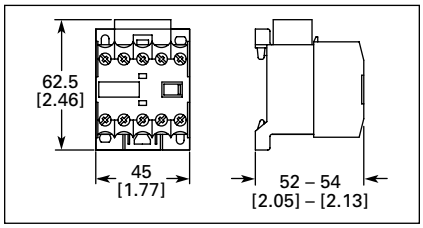


Figure B-12. XTRM Mini Control Relay with RC or Varistor Suppressor — Approximate Dimensions in mm [in.]

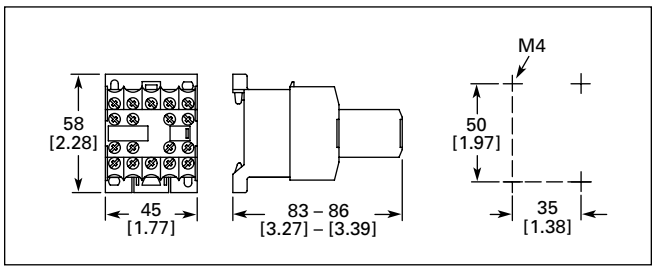


Figure B-13. XTRM Mini Control Relay with XTMCXFA Auxiliary Contact — Approximate Dimensions in mm [in.]

B

Control Relays

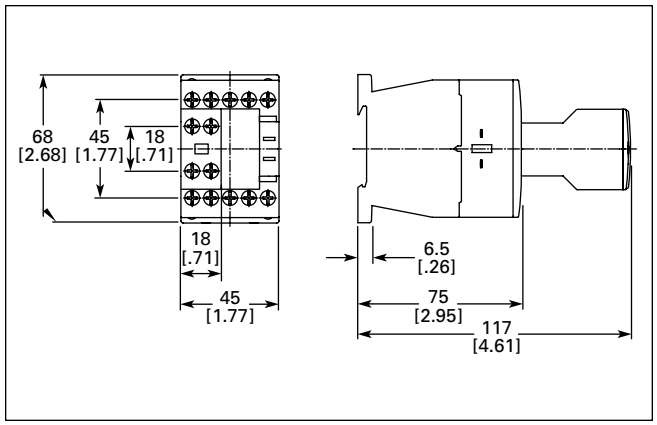


Figure B-14. Control Relay XTRE with XTCEXFA Auxiliary Contact — Approximate Dimensions in Inches (mm)

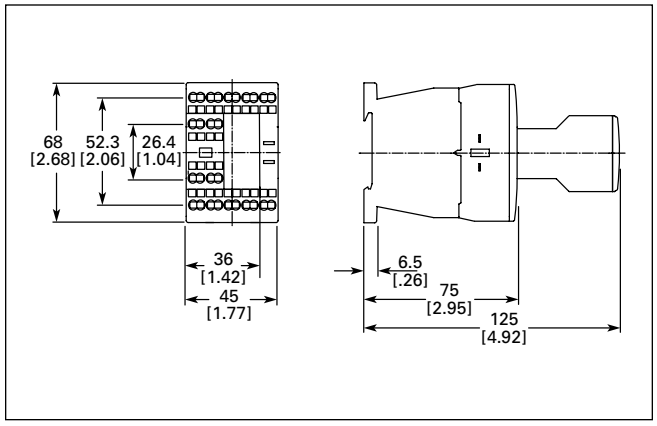


Figure B-15. Control Relay with Spring Cage Terminals XTREC with XTCEXFA Auxiliary Contact — Approximate Dimensions in Inches (mm)

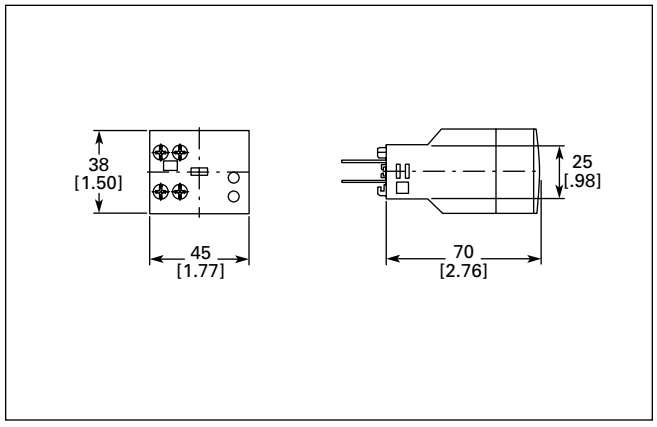


Figure B-16. Electronic Timer Module XTCEXTE — Approximate Dimensions in Inches (mm)

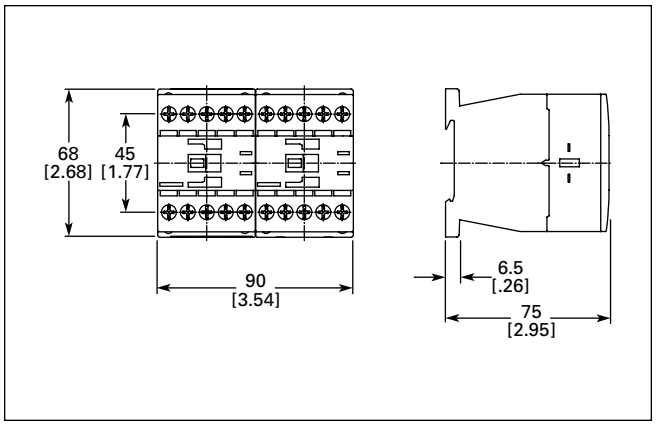


Figure B-17. Control Relays XTRE with XTCEXMLB Mechanical Interlock — Approximate Dimensions in Inches (mm)

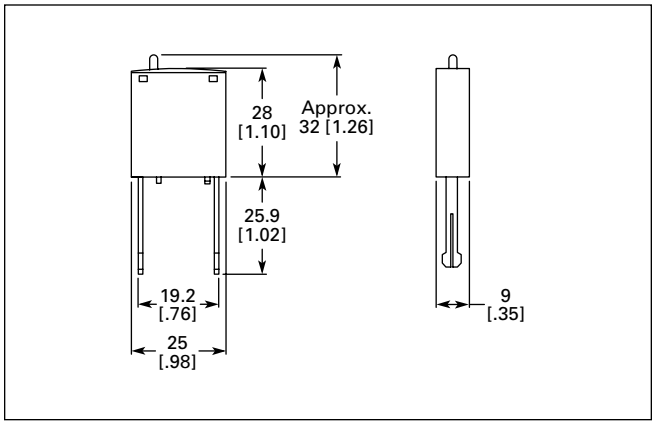


Figure B-18. Coil Suppressors for Use with XTRE Control Relays — Approximate Dimensions in Inches (mm)

Contents

XTMC Mini Contactor

Product Description

Eaton's new line of Cutler-Hammer® ***XT*** Miniature Controls includes non-reversing and reversing mini contactors, mini overload relays and snap-on accessories. A wide range of applications is possible including small electrical motors from fractional to 5 hp (460V AC) or up to 4 kW (400V AC).

Application Description

Due to its compact size, the ***XT*** line of mini controls is best suited to be applied in light duty loads such as hoisting, packaging, material handling, heating, lighting and automation systems. ***XT*** mini contactors are a particularly compact, economic and environmentally friendly solution wherever control of small motors or loads is required.

Features

Mini Contactors — Types XTMC and XTMF, 6 – 9A

- AC Control from 12V to 550V 50 Hz, 600V 60 Hz
- DC Control from 12V to 220V
- Available with screw or spring cage terminals
- Reversing or Non-reversing
- 3 and 4-Pole Configurations
  - 3-Pole XTMC
  - 4-Pole XTMF
- Panel or DIN rail mounting
- IP20 finger and back-of-hand proof
- Low noise operation
- High degree of climatic proofing
- Large ambient temperature range -25° to 50°C [-13° to 122°F]

Mini Overload Relays — Bimetallic Type XTOM

- Phase failure sensitivity
- Direct mount to XTMC and XTMF Mini Contactors
- Trip Class 10
- 11 settings to cover 0.1 to 12A
- Ambient temperature compensated -5° to 50°C [23° to 122°F]
- Manual and automatic reset by selector switch
- 1 Make (NO) or 1 Break (NC) auxiliary contact as standard
- Test/Off Button
- Trip-free release

Standards and Certifications

- IEC EN 60947
- CE Approved
- UL
- CSA
- ATEX
- CCC

Instructional Leaflets

Pub51219	Inside of Packaging XTMC, XTMF Mini Contactors, XTRM Mini Control Relay and Accessories
Pub51243	Inside of Packaging XTOM Mini Overload Relays
Pub51206	Mini Reversing Link Kits
MN03402002E	XTOM Mini Overload Relays Installation and User Manual

B

Catalogue Number Selection

Table B-22. *XT* IEC Miniature Contactors — Catalogue Numbering System

XT MC C 6 A 10 A

Designation
XT = ***XT*** IEC Power Control

Type
MC = 3-Pole FVNR Mini IEC Contactor
MF = 4-Pole FVNR Mini IEC Contactor
MR = 3-Pole FVR Mini IEC Contactor

Terminations
Blank = Screw Terminals
C = Spring Cage Terminals

Current Rating, AC-3
XTMC
6 = 6.6A
9 = 8.8A
XTMF
9 = 8.8A

Frame Size
A = 45 mm Mini

Integral Auxiliary Contact
01 = 1NC
10 = 1NO

Coil Codes	
A = 110V 50 Hz, 120V 60 Hz	**N** = 400V 50 Hz
B = 220V 50 Hz, 240V 60 Hz	**P** = 380V 60 Hz
F = 230V 50 Hz	**R** = 12V 50/60 Hz
T = 24V 50/60 Hz	**U** = 24V 50 Hz
TD = 24V DC	**W** = 42V 50 Hz, 48V 60 Hz
C = 415V 50 Hz, 480V 60 Hz	**Y** = 48V 50 Hz
D = 550V 50 Hz, 600V 60 Hz	**AD** = 120V DC
E = 208V 60 Hz	**BD** = 220V DC
G = 190V 50 Hz, 220V 60 Hz	**RD** = 12V DC
H = 240V 50 Hz, 277V 60 Hz	**WD** = 48V DC
L = 380V 50 Hz, 440V 60 Hz	

Table B-23. *XT* IEC Miniature Overload Relays — Catalogue Numbering System

XT OM P16 A C1

Designation
XT = ***XT*** IEC Power Control

Type
OM = Mini Overload Relay

Overload Release
P16 = 0.1 – 0.16A
P24 = 0.16 – 0.24A
P40 = 0.24 – 0.4A
P60 = 0.4 – 0.6A
001 = 0.6 – 1A
1P6 = 1 – 1.6A
2P4 = 1.6 – 2.4A
004 = 2.4 – 4A
006 = 4 – 6A
009 = 6 – 9A
012 = 9 – 12A

Frame Size
A = 45 mm Mini

Trip Class
C1 = Class 10A

Product Selection

Non-reversing Mini Contactors

Table B-24. Full Voltage Non-reversing Contactors

Operational Current AC-3 Amp Rating 380/400V	Conventional Free Air Thermal Current AC-1 at 50°C	Maximum kW Ratings AC-3				Maximum Three-phase Motor Rating							No. of Power Poles	Aux. Contacts	Catalogue Number ①		Price	
		3-Phase Motors 50 – 60 Hz				1-Phase Horsepower Ratings			3-Phase Horsepower Ratings						Screw Terminals	Spring Cage Terminals		
		220 – 240V	380 – 400V	550V	660/ 690V	115V	200V	230V	200V	230V	460V	575V					AC Coil	DC Coil
6.6	20	1.5	3	3	3	1/4	3/4	1	1-1/2	2	3	3	3	1NO	**XTMC6A10_**	**XTMCC6A10_**		
6.6	20	1.5	3	3	3	1/4	3/4	1	1-1/2	2	3	3	3	1NC	**XTMC6A01_**	**XTMCC6A01_**		
8.8	20	2.2	4	4	4	1/2	1	1-1/2	2	3	5	5	3	1NO	**XTMC9A10_**	**XTMCC9A10_**		
8.8	20	2.2	4	4	4	1/2	1	1-1/2	2	3	5	5	3	1NC	**XTMC9A01_**	**XTMCC9A01_**		
8.8	20	2.2	4	4	4	1/2	1	1-1/2	2	3	5	5	4	—	**XTMF9A00_**	**—**		

① Underscore (_) indicates Magnetic Coil Suffix required. See **Table B-26**.

Reversing Mini Contactors

Table B-25. Full Voltage Reversing Contactors

Operational Current AC-3 Amp Rating 380/400V	Conventional Free Air Thermal Current AC-1 at 50°C	Maximum kW Ratings AC-3				Maximum 3-Phase Current Motor Rating							Spare Auxiliary Contacts		Catalogue Number ②③	Price	
		3-Phase Motors 50 – 60 Hz				1-Phase hp Ratings			3-Phase hp Ratings				K1M	K2M			
		220/ 230/ 240V	380/ 400/ 440V	500V	660/ 690V	115V	200V	230V	200V	230V	460V	575V				AC	DC
6.6	20	1.5	3	3	3	1/4	3/4	1	1-1/2	2	3	3	63 64	63 64	**XTMR6A21_**		
8.8	20	2.2	4	4	4	1/2	1	1-1/2	2	3	5	5	63 64	63 64	**XTMR9A21_**		

② Underscore (_) indicates Magnetic Coil Suffix required. See **Table B-26**.

③ The factory installed reversing mini contactor includes (2) XTMC...01 Contactors, (2) XTMCXFA20 2NO Front Mount Auxiliary Contacts (1) XTMCXRL Reversing Link Kit and (1) XTMCXML Mechanical Interlock.

Overload Relays ..... **Page B-20**
Accessories ..... **Page B-21**
Dimensions ..... **Page B-29**
Discount Symbol **MC8**

B

Table B-26. Magnet Coil Suffix

Coil Voltage	Suffix Code	Coil Voltage	Suffix Code	Coil Voltage	Suffix Code	Coil Voltage	Suffix Code ①
110V 50 Hz, 120V 60 Hz	**A**	415V 50 Hz, 480V 60 Hz	**C**	400V 50 Hz	**N**	120V DC	**AD**
220V 50 Hz, 240V 60 Hz	**B**	550V 50 Hz, 600V 60 Hz	**D**	380V 60 Hz	**P**	220V DC	**BD**
230V 50 Hz	**F**	208V 60 Hz	**E**	12V 50/60 Hz	**R**	12V DC	**RD**
24V 50/60 Hz	**T**	190V 50 Hz, 220V 60 Hz	**G**	24V 50 Hz	**U**	48V DC	**WD**
24V DC	**TD** ①	240V 50 Hz, 277V 60 Hz	**H**	42V 50 Hz, 48V 60 Hz	**W**	—	—
—	—	380V 50 Hz, 440V 60 Hz	**L**	48V 50 Hz	**Y**	—	—

① With DC Operation: Integrated diode resistor combination, coil rating 2.6W.

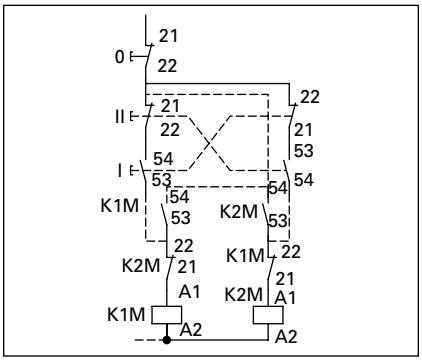


Figure B-19. XTMR Reversing Contactor Control Wiring Diagram

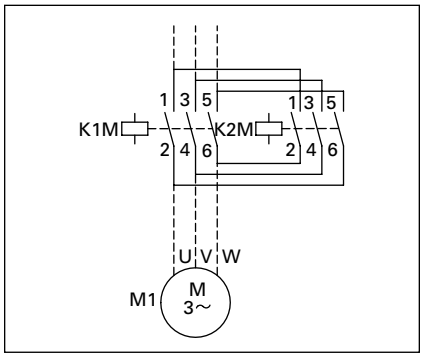


Figure B-20. XTMR Reversing Contactor Power Wiring Diagram

Notes:

IEC Utilization Categories, see **Page B-170**, Reference Data.

AC-1: Non-inductive or slightly inductive loads.

AC-3: Squirrel-cage motors — starting, switching of motors during running.

AC-4: Squirrel-cage motors — starting, plugging, inching.

Star-Delta (Wye-Delta) Miniature Contactors

Table B-27. Star-Delta (Wye-Delta) Miniature Contactor Configuration ①

Maximum kW Ratings AC-3			Maximum 3-Phase Current Motor Rating							Max. Changeover Time (sec.)	Spare Auxiliary Contacts	Components		Price	
3-Phase Motors 50 – 60 Hz			1-Phase hp Ratings			3-Phase hp Ratings						Description	Catalogue Number ①		
220/230/240V	380/400/440V	500V	115V	200V	230V	200V	230V	460V	575V		K1M			AC	DC
4	5.5	5.5	1/2	1	1-1/2	2	3	5	7-1/2	30		K1M Main Contactor	**XTMC9A10_**		
												K1M Auxiliary Contact	**XTMCXFC22**		
												K5M Delta Contactor	**XTMC9A01_**		
												K3M Star Contactor	**XTMC9A10_**		
												K3M Auxiliary Contact	**XTMCXFC02**		
												K1T Timing Relay	**XTTR6A60S51B**		

① Operating Frequency: 30 Starts/hour
② Underscore (_) indicates magnet coil suffix required. **See Table B-29.**

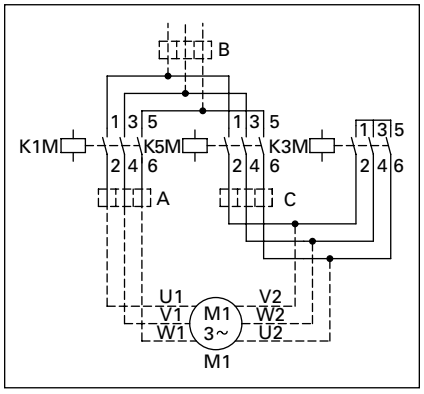


Figure B-21. Star-Delta (Wye-Delta) Power Wiring Diagram

Table B-28. Mini Overload Relay Settings (A)

Setting	Starting
A: I_N x 0.58	≤ 15 sec
Motor Protection in the Y and Delta Configurations.	
B: I_N x 1	15 – 40 sec
Only partial motor protection in star position	
C: I_N x 0.58	> 40 sec
Motor not protected in star position.	
Timing Relay set to approximately 10 sec.	

Note: Depending on the coordination type required (i.e. Type 1 or Type 2) it must be established whether the fuse protection and the input wiring for the main and delta contactors are to be common or separate.

Table B-29. Magnet Coil Suffix

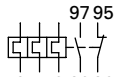
Coil Voltage	Suffix Code	Coil Voltage	Suffix Code	Coil Voltage	Suffix Code	Coil Voltage	Suffix Code ③
110V 50 Hz, 120V 60 Hz	**A**	415V 50 Hz, 480V 60 Hz	**C**	400V 50 Hz	**N**	120V DC	**AD**
220V 50 Hz, 240V 60 Hz	**B**	550V 50 Hz, 600V 60 Hz	**D**	380V 60 Hz	**P**	220V DC	**BD**
230V 50 Hz	**F**	208V 60 Hz	**E**	12V 50/60 Hz	**R**	12V DC	**RD**
24V 50/60 Hz	**T**	190V 50 Hz, 220V 60 Hz	**G**	24V 50 Hz	**U**	48V DC	**WD**
24V DC	**TD** ③	240V 50 Hz, 277V 60 Hz	**H**	42V 50 Hz, 48V 60 Hz	**W**	—	—
—	—	380V 50 Hz, 440V 60 Hz	**L**	48V 50 Hz	**Y**	—	—

③ With DC Operation: Integrated diode resistor combination, coil rating 2.6W.

Overload Relays ..... **Page B-20**
Accessories ..... **Page B-21**
Dimensions ..... **Page B-29**
Discount Symbol **MC8**

Overload Relays

Table B-30. Mini Overload Relays ①②

Overload Release I_t	Trip Class	Contact Sequence	Contact Configuration	Short Circuit Protection (A)				Catalogue Number	Price
				Type 1 Coordination, gG/gL	Type 2 Coordination, gG/gL	Circuit Breaker	CEC/NEC Fuse		
0.1 – 0.16A	10A		1NO-1NC	20	0.5	15	—	**XTOMP16AC1**	
0.16 – 0.24A				20	1	15	—	**XTOMP24AC1**	
0.24 – 0.4A				20	2	15	—	**XTOMP40AC1**	
0.4 – 0.6A				20	2	15	—	**XTOMP60AC1**	
0.6 – 1A	10A		1NO-1NC	20	4	15	3	**XTOM001AC1**	
1 – 1.6A				20	6	15	6	**XTOM1P6AC1**	
1.6 – 2.4A				20	6	15	6	**XTOM2P4AC1**	
2.4 – 4A	10A		1NO-1NC	20	10	15	15	**XTOM004AC1**	
4 – 6A				20	10	15	20	**XTOM006AC1**	
6 – 9A				20	10	15	35	**XTOM009AC1**	
9 – 12A				—	—	—	45	**XTOM012AC1**	

① Short-circuit protection:
Observe the maximum permissible fuse of the contactor with direct device mounting. See **MN03402002E** for more information.

② When fitted directly to the contactor, a clearance of at least 5 mm is required between the overload relays.

Tripping Characteristics Chart

These tripping characteristics are mean values of the spread at 20°C ambient temperature in a cold state. Tripping time depends on response current. With devices at operating temperature, the tripping time of the overload relay reduces to approx. 25% of the read off value. Specific characteristics for each individual setting range can be found on **Page B-28**.

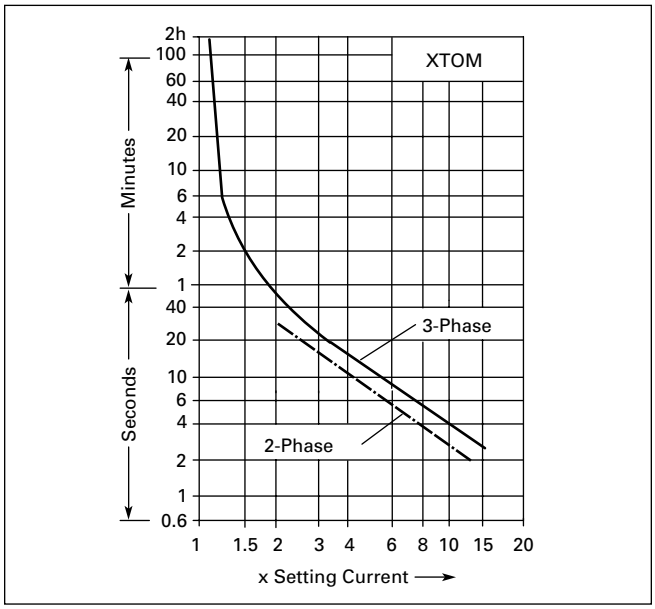


Figure B-22. Tripping Characteristics

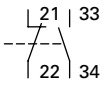
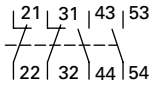
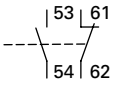
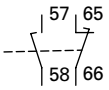
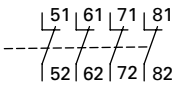
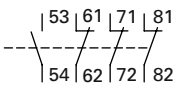
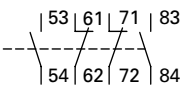
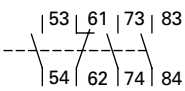
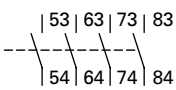
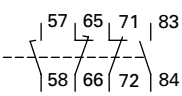
Dimensions ..... **Page B-29**
Discount Symbol **MC8**

Accessories

Auxiliary Contacts

Front mounted snap-on auxiliary contacts for mini contactors are available with screw or spring cage terminals in a variety of contact configurations. Auxiliary contact modules are standard with interlocked opposing contacts, except in the case of early-make or late-break contacts.

Table B-31. Front Mount Auxiliary Contacts for Use with Mini Contactors

Conventional Free Air Thermal Current, $I_{th} = I_e$, AC-1 in Amps	Contact Configuration	Contact Sequence	Package Qty.	Catalogue Number		Price ①
				Screw Terminals	Spring Cage Terminals	
10	2NC		5	**XTMCXFC02**	—	
10	1NO-1NC		5	**XTMCXFD11**	**XTMCXFDC11**	
10	2NO-2NC		5	**XTMCXFC22**	**XTMCXFCC22**	
10	2NC		5	**XTMCXFA02**	—	
10	1NO-1NC		5	**XTMCXFA11**	**XTMCXFAC11**	
10	2NO		5	**XTMCXFA20**	—	
10	$1NO_E$-$1NC_L$		5	**XTMCXFAL11** ②	—	
10	4NC		5	**XTMCXFA04**	**XTMCXFAC04**	
10	1NO-3NC		5	**XTMCXFA13**	**XTMCXFAC13**	
10	2NO-2NC		5	**XTMCXFA22**	**XTMCXFAC22**	
10	3NO-1NC		5	**XTMCXFA31**	**XTMCXFAC31**	
10	4NO		5	**XTMCXFA40**	**XTMCXFAC40**	
10	1NO-1NC 1N O_E-$1NC_L$		5	**XTMCXFAL22** ②	**XTMCXFCLC22** ②	

① Orders must be placed in multiples of package quantity listed.

② 1 early-make contact (NO_E), 1 late-break contact (NC_L).

Discount Symbol **MC8**

B

RC Suppressor

Table B-32. RC Suppressor ①

Voltage	For Use with…	Circuit Symbol	Package Qty.	Catalogue Number	Price ②
24 – 48	XTMC6A…, XTMC9A…	A1 / A2	10	**XTMCXRSW**	
48 – 130	XTMC6A…, XTMC9A…		10	**XTMCXRSA**	
110 – 250	XTMC6A…, XTMC9A…		10	**XTMCXRSB**	
24 – 48	XTMCC6A…, XTMCC9A…		10	**XTMCXRSCW**	
48 – 130	XTMCC6A…, XTMCC9A…		10	**XTMCXRSCA**	
110 – 250	XTMCC6A…, XTMCC9A…		10	**XTMCXRSCB**	

① For AC operated contactors, 50/60 Hz. Note drop-out delay.
② Orders must be placed in multiples of package quantity listed.

Varistor Suppressor

Table B-33. Varistor Suppressor ③

Voltage	For Use with…	Circuit Symbol	Package Qty.	Catalogue Number	Price ④
24 – 48	XTMC6A…, XTMC9A…	A1 / A2	10	**XTMCXVSW**	
48 – 130	XTMC6A…, XTMC9A…		10	**XTMCXVSA**	
110 – 250	XTMC6A…, XTMC9A…		10	**XTMCXVSB**	
380 – 415	XTMC6A…, XTMC9A…		10	**XTMCXVSN**	
24 – 48	XTMCC6A…, XTMCC9A…		10	**XTMCXVSCW**	
48 – 130	XTMCC6A…, XTMCC9A…		10	**XTMCXVSCA**	
110 – 250	XTMCC6A…, XTMCC9A…		10	**XTMCXVSCB**	

③ For AC operated contactors, 50/60 Hz. DC operated contactors have integrated varistor suppressors.
④ Orders must be placed in multiples of package quantity listed.

Mechanical Interlock

Table B-34. Mechanical Interlock

Description	Package Qty.	Catalogue Number	Price ⑤
Mechanical Interlock	5	**XTMCXML**	

⑤ Orders must be placed in multiples of package quantity listed.

Note:
- For two contactors with AC or DC operated magnet system that are horizontally or vertically mounted, the distance between contactors is 0 mm, and the mechanical lifespan is 2.5 x 10^6 operations.

Reversing Link Kit

Table B-35. Reversing Link Kit

Description	Package Qty.	Catalogue Number	Price
Main current wiring for reversing contactors and starters.	1	**XTMCXRL**	

Note:
- The following control cables are integrated as part of the electrical interlock:
  K1M: A1 — K2M: 21; K1M: 21 — K2M: A1
- Reversing Link Kit does not include mechanical interlock. See **Table B-34** for Mechanical Interlock.

Star-Delta (WYE-Delta) Link Kit

Table B-36. Star-Delta (WYE-Delta) Link Kit

Description	Package Qty.	Catalogue Number	Price
Main current wiring for star-delta (wye-delta) combinations. Includes the Star-Delta Bridge.	1	**XTMCXSDL**	

Note:
- The following control cables are integrated in addition to the electrical interlock:
  K3M: A1 — K5M: 21; K3M: 21 — K5M: A1; K3M: A2 — K5M: A2
- When combined with overload relay use separate mounting.

Discount Symbol **MC8**

Star-Delta (WYE-Delta) Bridge

Table B-37. Star-Delta (WYE-Delta) Bridge

Contact Sequence	Package Qty.	Catalogue Number	Price ①
	20	**XTMCXSDB** ②	

① Orders must be placed in multiples of package quantity listed.
② Protected against direct contact in accordance with IEC 536.

Paralleling Link Set for Main Contacts

Table B-38. Paralleling Link Set for Main Contacts

Contact Sequence	Package Qty.	Catalogue Number	Price ③
	5	**XTMCXPLK** ④⑤⑥	

③ Orders must be placed in multiples of package quantity listed.
④ Protected against direct contact in accordance with IEC 536.
⑤ 4th pole can be broken off:
4-pole: I_{th} = 60A; 3-pole: I_{th} = 50A
⑥ AC-1 current carrying capacity of the open contactor increases by a factor of 2.5.

Connector

Table B-39. Connector

Description	Package Qty.	Catalogue Number	Price ⑦
For mechanically arranging contactors and timing relays in combinations.	50	**XTMCXCN** ⑧	

⑦ Orders must be placed in multiples of package quantity listed.
⑧ 0 mm distance between contactors.

IP40 Sealable Transparent Shroud

Table B-40. IP40 Sealable Transparent Shroud

Description	Package Qty.	Catalogue Number	Price
IP40 Sealable Transparent Shroud, snap fitting on mini contactor.	1	**XTMCXSHROUD**	

B

Discount Symbol **MC8**

Technical Data and Specifications

Table B-41. *XT* Miniature Controls — General Specifications

Description	XTMC6A…		XTMC9A…		XTMF9A…	
	AC Coils	DC Coils	AC Coils	DC Coils	AC Coils	DC Coils
Physical and Electrical (Continued)						
Standards	IEC/EN 60947, VDE 0660, CSA, UL, CCC					
Weights in kg [lb]	0.2 [0.44]	0.17 [0.37]	0.2 [0.44]	0.17 [0.34]	0.2 [0.44]	0.17 [0.37]
Mechanical Life — Operations	10,000,000	20,000,000	10,000,000	20,000,000	20,000,000	—
Mechanical Life — Coil @ 50 Hz	7	—	7	—	7	—
Maximum mechanical operating frequency (ops/hr)	9000					
Insulation Voltage (U_i) VAC	690	690	690	690	690	690
Impulse Withstand Voltage (U_{imp}) VAC	6000	6000	6000	6000	6000	6000
Operational Voltage (U_e) VAC	690	690	690	690	690	690
Safe Isolation to VDE 0106 Part 101 and Part 101/A1 between coil and contacts (VAC) between contacts (VAC)	 300 300	 300 300	 300 300	 300 300	 300 300	 300 300
Making Capacity (amps)	110	110	110	110	110	110
Breaking Capacity (amps) 220/230V 380/400V 500V 660/690V	 90 90 64 54	 90 90 64 54	 90 90 64 54	 90 90 64 54	 90 90 64 54	 90 90 64 54
Short-Circuit Protection rating maximum fuse (gL/gG) Type 2 Coordination (A) Type 1 Coordination (A)	 10 20	 10 20	 10 20	 10 20	 10 20	 10 20
Degree of Protection	IP20					
Protection against direct contact when actuated from front (IEC 536)	Finger- and back-of-hand proof					
Terminal Capacity of main and auxiliary contacts Solid (mm^2)	 1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	 1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	 1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	 1 x (0.75 – 2.5) 2 x (0.75 – 2.5	 1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	 1 x (0.75 – 2.5) 2 x (0.75 – 2.5)
Flexible with ferrule (mm^2)	1 x (0.75 – 1.5) 2 x (0.75 – 1.5)	1 x (0.75 – 1.5) 2 x (0.75 – 1.5)	1 x (0.75 – 1.5) 2 x (0.75 – 1.5)	1 x (0.75 – 1.5) 2 x (0.75 – 1.5)	1 x (0.75 – 1.5) 2 x (0.75 – 1.5)	1 x (0.75 – 1.5) 2 x (0.75 – 1.5)
Solid or Stranded (AWG)	18-14	18-14	18-14	18-14	18-14	18-14
Terminal Screw	M3.5	M3.5	M3.5	M3.5	M3.5	M3.5
Posidrive screwdriver	Size 2	Size 2	Size 2	Size 2	Size 2	Size 2
Standard screwdriver (mm)	0.8 x 5.5 1 x 6	0.8 x 5.5 1 x 6	0.8 x 5.5 1 x 6	0.8 x 5.5 1 x 6	0.8 x 5.5 1 x 6	0.8 x 5.5 1 x 6
Max. Tightening Torque Nm Lb-in	 1.2 10.6	 1.2 10.6	 1.2 10.6	 1.2 10.6	 1.2 10.6	 1.2 10.6
Terminal Capacity of spring cage main terminals Solid (mm^2)	 1 x (1 – 2.5) 2 x (1 – 2.5)	 1 x (1 – 2.5) 2 x (1 – 2.5)	 1 x (1 – 2.5) 2 x (1 – 2.5)	 1 x (1 – 2.5) 2 x (1 – 2.5)	 1 x (1 – 2.5) 2 x (1 – 2.5)	 1 x (1 – 2.5) 2 x (1 – 2.5)
Flexible with ferrule (mm^2)	1 x (1 – 2.5) 2 x (1 – 2.5)	1 x (1 – 2.5) 2 x (1 – 2.5)	1 x (1 – 2.5) 2 x (1 – 2.5)	1 x (1 – 2.5) 2 x (1 – 2.5)	1 x (1 – 2.5) 2 x (1 – 2.5)	1 x (1 – 2.5) 2 x (1 – 2.5)
Standard screwdriver (mm)	0.6 x 3.5	0.6 x 3.5	0.6 x 3.5	0.6 x 3.5	0.6 x 3.5	0.6 x 3.5
Mounting Position	As required, except vertical with terminals A1/A2 at the bottom 					
Environmental						
Ambient Temperature	-25° to 50°C [-13° to 122°F]					
Mechanical Shock Resistance (IEC/EN 60068-2-27) Half-sinusoidal shock 10 ms Contactor without auxiliary contact module Main contact — make contact Main contact — break/make contact Contactor with auxiliary contact module Main contact — make contact Main contact — make/break contact	 10g 10/8g 10g 20/20g	 10g 10/8g 10g 20/20g	 10g 10/8g 10g 20/20g	 10g 10/8g 10g 20/20g	 10g — 10g 20/20g	 10g — 10g 20/20g
Climatic Proofing	Damp heat, constant, to IEC 60 068-2-78; Damp heat, cyclic, to IEC 60 068-2-30					
Pollution Degree	III/3	III/3	III/3	III/3	III/3	III/3

Table B-42. *XT* Miniature Controls — Magnet Systems

Description	XTMC6A…		XTMC9A…		XTMF9A…	
	AC Coils	DC Coils	AC Coils	DC Coils	AC Coils	DC Coils
Voltage Tolerance						
Pick-Up (x U_c)						
Single-voltage coil 50 Hz and dual-voltage coil 50 Hz, 60 Hz	0.8 – 1.1	—	0.8 – 1.1	—	0.8 – 1.1	—
Dual frequency coil 50/60 Hz	0.85 – 1.1	—	0.85 – 1.1	—	0.85 – 1.1	—
DC operated ①	—	0.8 – 1.1	—	0.8 – 1.1	—	0.85 – 1.1
Power Consumption						
AC Operation						
Pick-Up VA						
Single-voltage coil 50 Hz and dual-voltage coil 50 Hz, 60 Hz	25	—	25	—	25	—
Dual frequency coil 50/60 Hz at 50 Hz	30	—	30	—	30	—
Dual frequency coil 50/60 Hz at 60 Hz	29	—	29	—	29	—
Pick-Up W						
Single-voltage coil 50 Hz and dual-voltage coil 50 Hz, 60 Hz	22	—	22	—	22	—
Dual frequency coil 50/60 Hz at 50 Hz	26	—	26	—	26	—
Dual frequency coil 50/60 Hz at 60 Hz	24	—	24	—	24	—
Sealing VA						
Single-voltage coil 50 Hz and dual-voltage coil 50 Hz, 60 Hz	4.6	—	4.6	—	4.6	—
Dual frequency coil 50/60 Hz at 50 Hz	5.4	—	5.4	—	5.4	—
Dual frequency coil 50/60 Hz at 60 Hz	3.9	—	3.9	—	3.9	—
Sealing W						
Single-voltage coil 50 Hz and dual-voltage coil 50 Hz, 60 Hz	1.3	—	1.3	—	1.3	—
Dual frequency coil 50/60 Hz at 50 Hz	1.6	—	1.6	—	1.6	—
Dual frequency coil 50/60 Hz at 60 Hz	1.1	—	1.1	—	1.1	—
DC operated ①						
Power consumption pick-up = sealing (VA/W)	—	2.6	—	2.6	—	2.6
Duty Factor (%)	100	100	100	100	100	100
Switching Time at 100% U_c						
Make Contact						
Closing delay min (mS)	14	26	14	26	14	26
Closing delay max (mS)	21	35	21	35	21	35
Opening delay min (mS)	8	15	8	15	8	15
Opening delay max (mS)	18	25	18	25	18	25
Closing delay with top mounting auxiliary contact (mS)	max. 45	max. 70	max. 45	max. 70	max. 45	max. 70
Reversing contactors						
Changeover time at 100% U_c						
Min (mS)	16	40	16	40	16	40
Max (mS)	21	50	21	50	21	50
Arcing time at 690V AC (mS)	max. 12	max. 12	max. 12	max. 12	max. 12	max. 12

① Smoothed DC or three-phase bridge rectifier.

B

Table B-43. XT Miniature Controls

Description	XTMC6A…		XTMC9A…		XTMF9A…	
	AC Coils	DC Coils	AC Coils	DC Coils	AC Coils	DC Coils
AC-1 Operation						
Conventional free air thermal current, 3-pole, 50 – 60 Hz (A)						
at 40°C (I_{th})	22	22	22	22	22	22
at 50°C (I_{th})	20	20	20	20	20	20
at 55°C (I_{th})	19	19	19	19	19	19
Conventional free air thermal current, 1-pole (I_{th})	50	50	50	50	60	60
AC-3 Operation						
Rated Operational Current, 50/60 Hz ① (I_e) in amperes (A)						
220/230V	6.6	6.6	9.0	9.0	9.0	9.0
240V	6.6	6.6	9.0	9.0	9.0	9.0
380/400V	6.6	6.6	9.0	9.0	9.0	9.0
415V	6.6	6.6	9.0	9.0	9.0	9.0
440V	6.6	6.6	9.0	9.0	9.0	9.0
500V	5	5	6.4	6.4	6.4	6.4
660/690V	3.5	3.5	4.8	4.8	4.8	4.8
Rated power (P) in kilowatts (kW)						
220/230V	1.5	1.5	2.2	2.2	2.2	2.2
240V	1.8	1.8	2.5	2.5	2.5	2.5
380/400V	3	3	4	4	4	4
415V	3.1	3.1	4.3	4.3	4.3	4.3
440V	3.3	3.3	4.6	4.6	4.6	4.6
500V	3	3	4	4	4	4
660/690V	3	3	4	4	4	4
AC-4 Operation						
Rated Operational Current, 50/60 Hz ① (I_e) in amperes (A)						
220/230V	5	5	6.6	6.6	6.6	6.6
240V	5	5	6.6	6.6	6.6	6.6
380/400V	5	5	6.6	6.6	6.6	6.6
415V	5	5	6.6	6.6	6.6	6.6
440V	5	5	6.6	6.6	6.6	6.6
500V	3.7	3.7	5	5	5	5
660/690V	2.9	2.9	3.4	3.4	3.4	3.4
Rated power (P) in kilowatts (kW)						
220/230V	1.1	1.1	1.5	1.5	1.5	1.5
240V	1.3	1.3	1.8	1.8	1.8	1.8
380/400V	2.2	2.2	3	3	3	3
415V	2.3	2.3	3.1	3.1	3.1	3.1
440V	2.4	2.4	3.3	3.3	3.3	3.3
500V	2.2	2.2	3	3	3	3
660/690V	2.2	2.2	3	3	3	3

① At maximum permissible ambient temperature.

Table B-44. *XT* Miniature Controls

Description	XTMC6A…		XTMC9A…		XTMF9A…	
	AC Coils	DC Coils	AC Coils	DC Coils	AC Coils	DC Coils
DC-1 Operation ②						
12V	20	20	20	20	—	—
24V	20	20	20	20	—	—
60V	20	20	20	20	—	—
110V	20	20	20	20	—	—
220V	20	20	20	20	—	—
DC-3 Operation ②						
12V	6	6	8	8	—	—
24V	6	6	8	8	—	—
60V	3	3	4	4	—	—
110V	2	2	3	3	—	—
220V	—	—	—	—	1	1
DC-4 Operation ②						
12V	1.8	1.8	2.5	2.5	—	—
24V	1.8	1.8	2.5	2.5	—	—
60V	1.8	1.8	2.5	2.5	—	—
110V	1.1	1.1	1.5	1.5	2.5	2.5
220V	0.2	0.2	0.3	0.3	1	1
Current Heat Loss (3- or 4-pole) in watts						
at I_{th}	2	3.5	2	3.5	2.7	4.7
at I_e to AC-3/400V	0.3	0.4	0.5	0.7	—	—

② Rated operation current (I_e) in amperes, at maximum permissible ambient temperature.

Table B-45. *XT* Miniature Controls — Auxiliary Contacts

Description	Built-in Auxiliary XTMC	Add-on Auxiliary XTMCXF...
Interlocked opposing contacts to ZH1/457, including auxiliary contact module	Yes	Yes
Rated impulse withstand voltage, U_{imp} (VAC)	6000	6000
Overvoltage category / pollution degree	III/3	III/3
Rated insulation voltage, U_i (VAC)	690	690
Rated operational voltage, U_e (VAC)	600	600
Safe isolation to VDE 0106 Part 101 and Part 101(A) in VAC between coil and auxiliary contacts between the auxiliary contacts	 300 300	 300 300
Rated Operational Current AC-15, I_e 220/240V 380/415V 500V DC-13 (Contacts in Series) 1: 24V 2: 60V 3: 100V 3: 220V	 6A 3A 1.5A 2.5A 2.5A 1.5A 0.5A	 4A 2A 1.5A 2.5A 2.5A 1.5A 0.5A
Conventional thermal current, I_{th}	10A	10A
Control circuit reliability (at U_e = 24 VDC, U_{min} = 17 V, I_{min} = 5.4 mA)	<10-8, < one failure at 100 million operations	
Component Lifespan at U_e = 240V AC-15, operations x 10^6 DC-13 L/R = 50 mS: 2 contacts in series at I_e = 0.5A, operations x 10^6	 0.2 0.15	 0.2 0.15
Short Circuit rating without welding Short Circuit protection rating maximum fuse, 500V gG/gL Short Circuit protection rating maximum fuse, 500V fast	 6A 10A	 6A 10A
Current heat loss at conventional free air thermal current I_{th} per contact, W	0.2	0.2

Electrical Switching Operation Charts

Squirrel-cage motors
Operating characteristics
Starting: from rest
Stopping: after attaining a full running speed
Electrical Characteristics —
Make (NO): Up to 6x rated motor current
Breaking (NC): 1x rated motor current

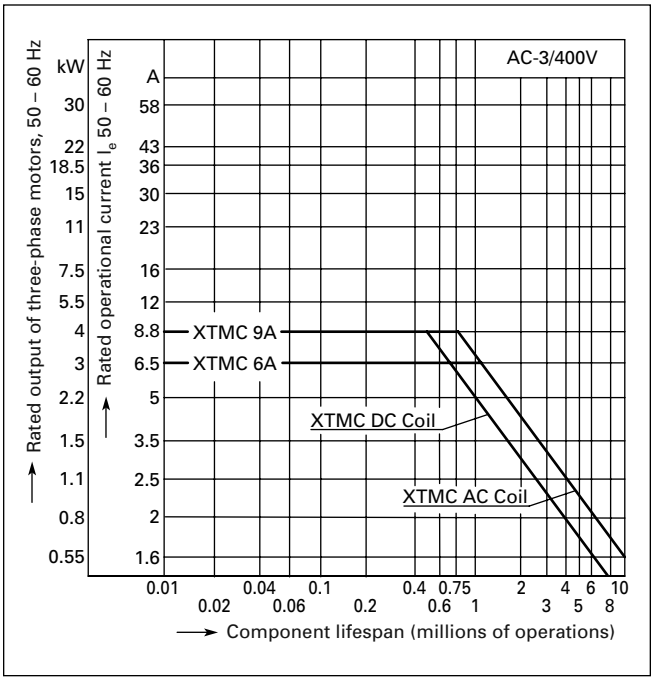


Figure B-23. Normal Switching Duty — AC-3/400V

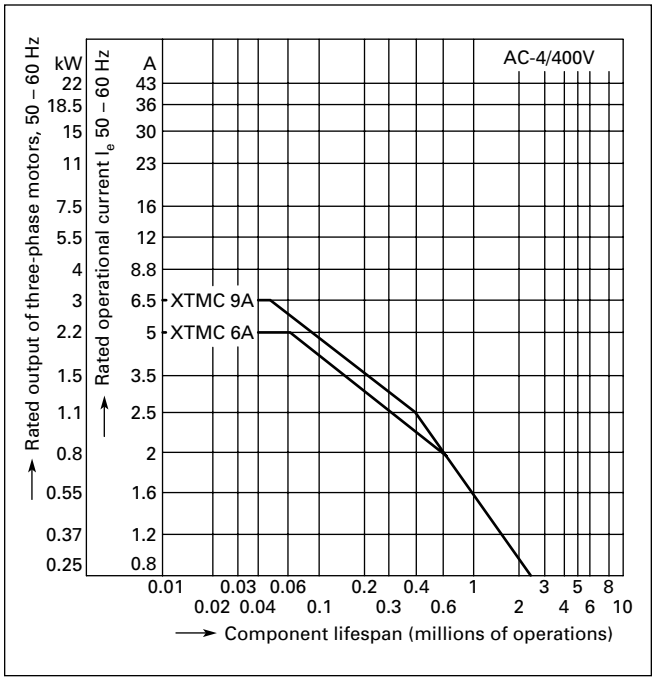


Figure B-25. Extreme Switching Duty — AC-4/400V

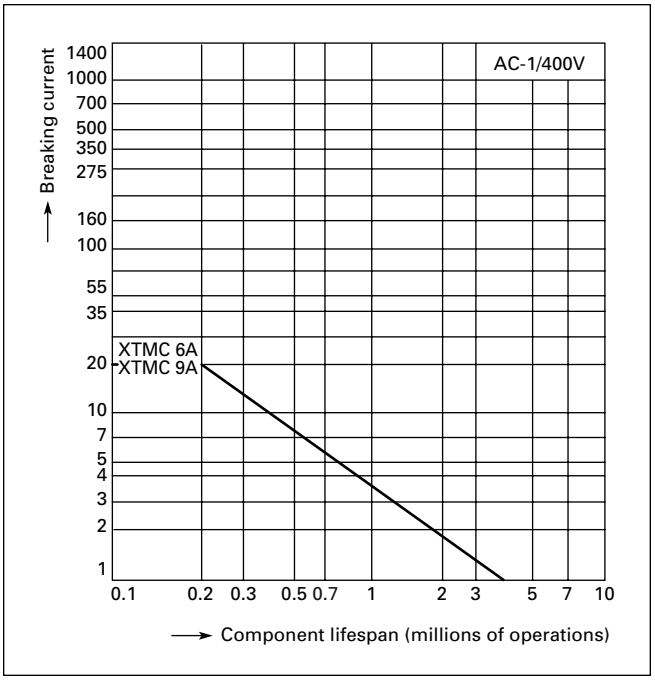


Figure B-24. Switching Duty for Non-motor Loads, 3- & 4-Pole — AC-1/400V

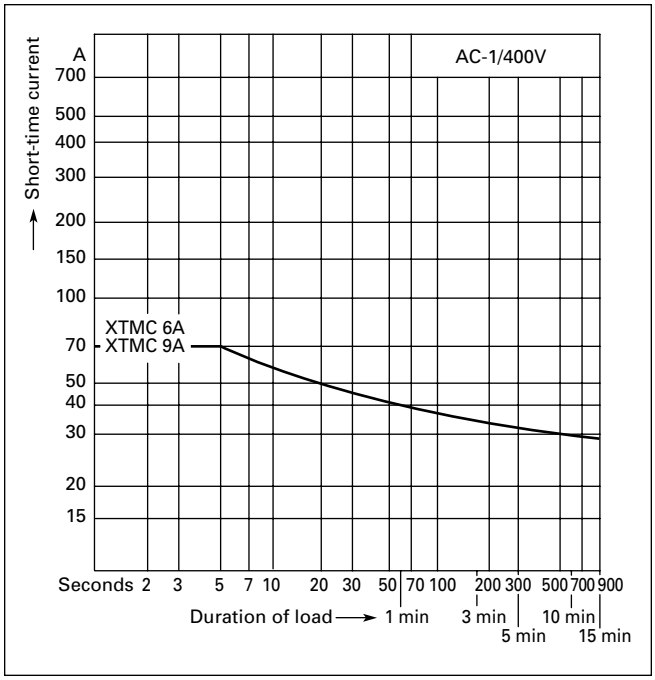
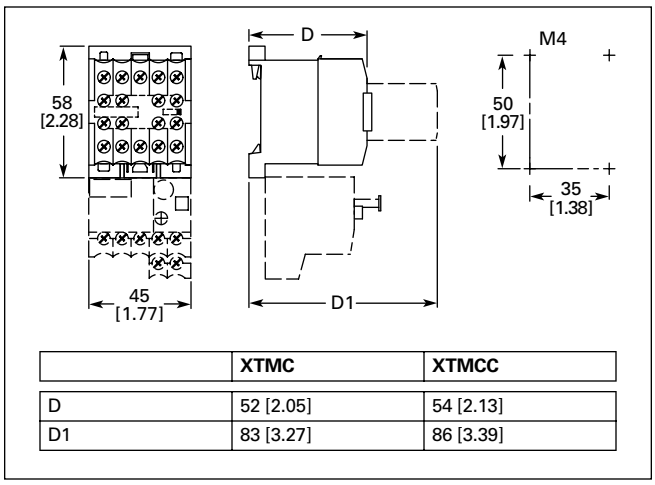


Figure B-26. Short Time Loading, 3-Pole — AC-1/400V (time interval between two loading cycles: 15 minutes)

Dimensions



	XTMC	XTMCC
D	52 [2.05]	54 [2.13]
D1	83 [3.27]	86 [3.39]

Figure B-27. Non-reversing Mini Contactor

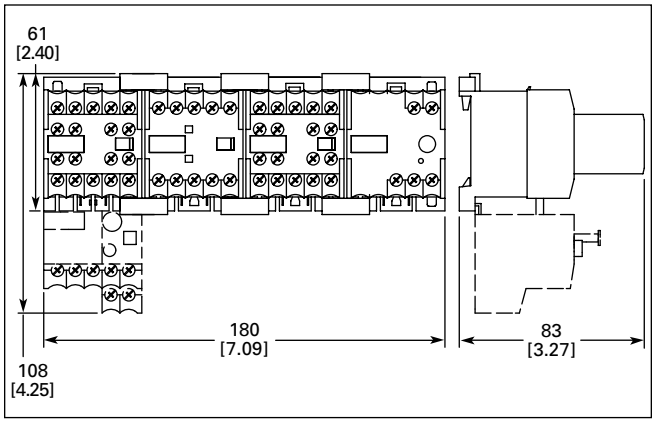


Figure B-28. Star-Delta Starter Combinations

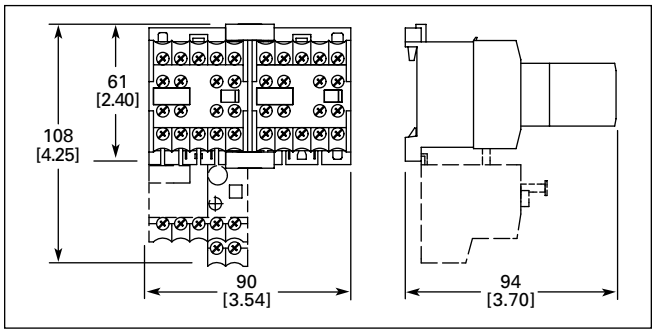


Figure B-29. Reversing Mini Contactor

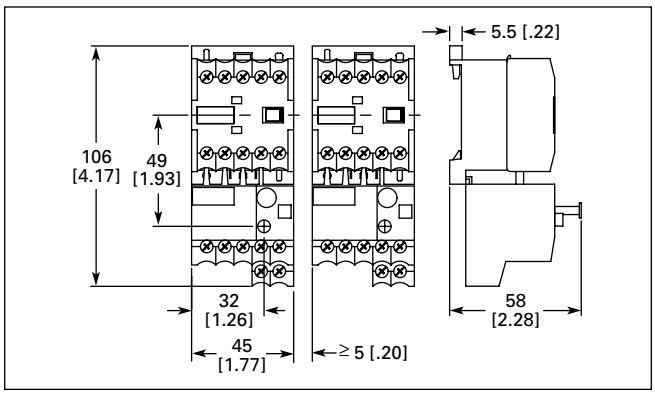


Figure B-30. Non-reversing Mini Contactor with Overload Relay

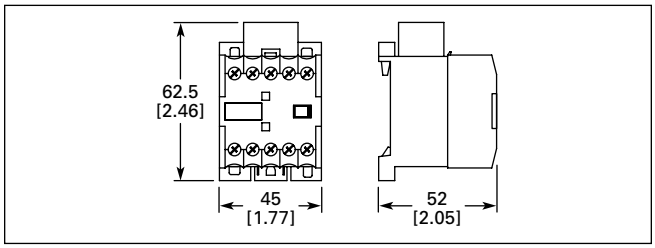


Figure B-31. XTMCXRSA, XTMCXVSA Mini Suppressors — Approximate Dimensions in mm [in]

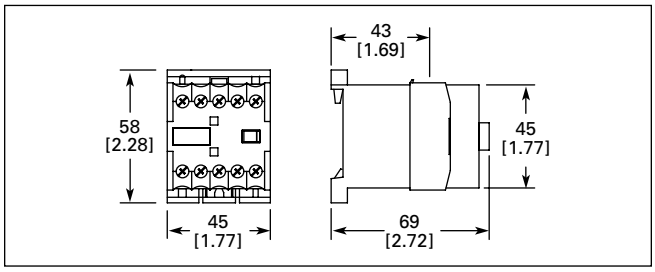


Figure B-32. XTMCXTSA Mini Sealable Shroud — Approximate Dimensions in mm [in]

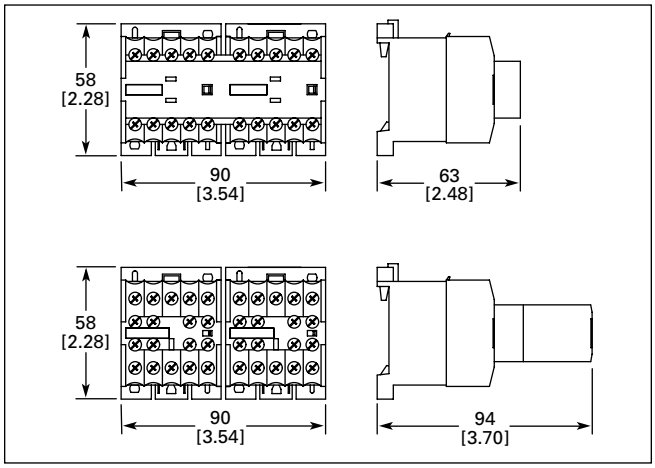


Figure B-33. XTMCXML Mechanical Interlock — Approximate Dimensions in mm [in]

B

Contents

XT Family of Contactors

Contactors and Starters

Product Description

Eaton's new line of ***XT*** Contactors and Starters includes non-reversing and reversing contactors, overload relays and a variety of related accessories. Because ***XT*** meets IEC, UL, CSA, CCC and CE standards, it is the perfect product solution for IEC applications all over the world. The compact, space saving, and easy to install ***XT*** line of IEC contactors and starters is the efficient and effective solution for customer applications from 7A to 2000A.

Features and Benefits

- AC control from 12V to 600V 50/60 Hz
- DC control from 12V to 220V
- Available with screw or spring cage terminals
- Reversing or non-reversing contactors and starters
- AC-3 contactor ratings to 1000A and AC-1 contactor ratings to 2000A
- Non-reversing starters to 650A
- Panel or DIN rail mounting to 65A
- IP20 finger and back-of-hand proof
- Large ambient temperature range, -25 to 50°C [-13 to 122°F]
- AC and DC controlled contactors in the same compact frame
- Low power consumption DC coils
- Built-in NO or NC auxiliary contacts to 32A
- Plug-in accessories for reduced installation time
- Coil replacement on Frames C – N (18 – 820A)
- Contact replacement on Frames D – N (40 – 820A)
- Integrated suppressor 7 – 150A DC operated contactors and 185 – 2000A AC and DC operated contactors

Standards and Certifications

- IEC EN 60947
- CE Approved
- UL
- CSA
- CCC
- ATEX
- RoHS

Note: For Type 2 Coordination, see **Page B-162**.

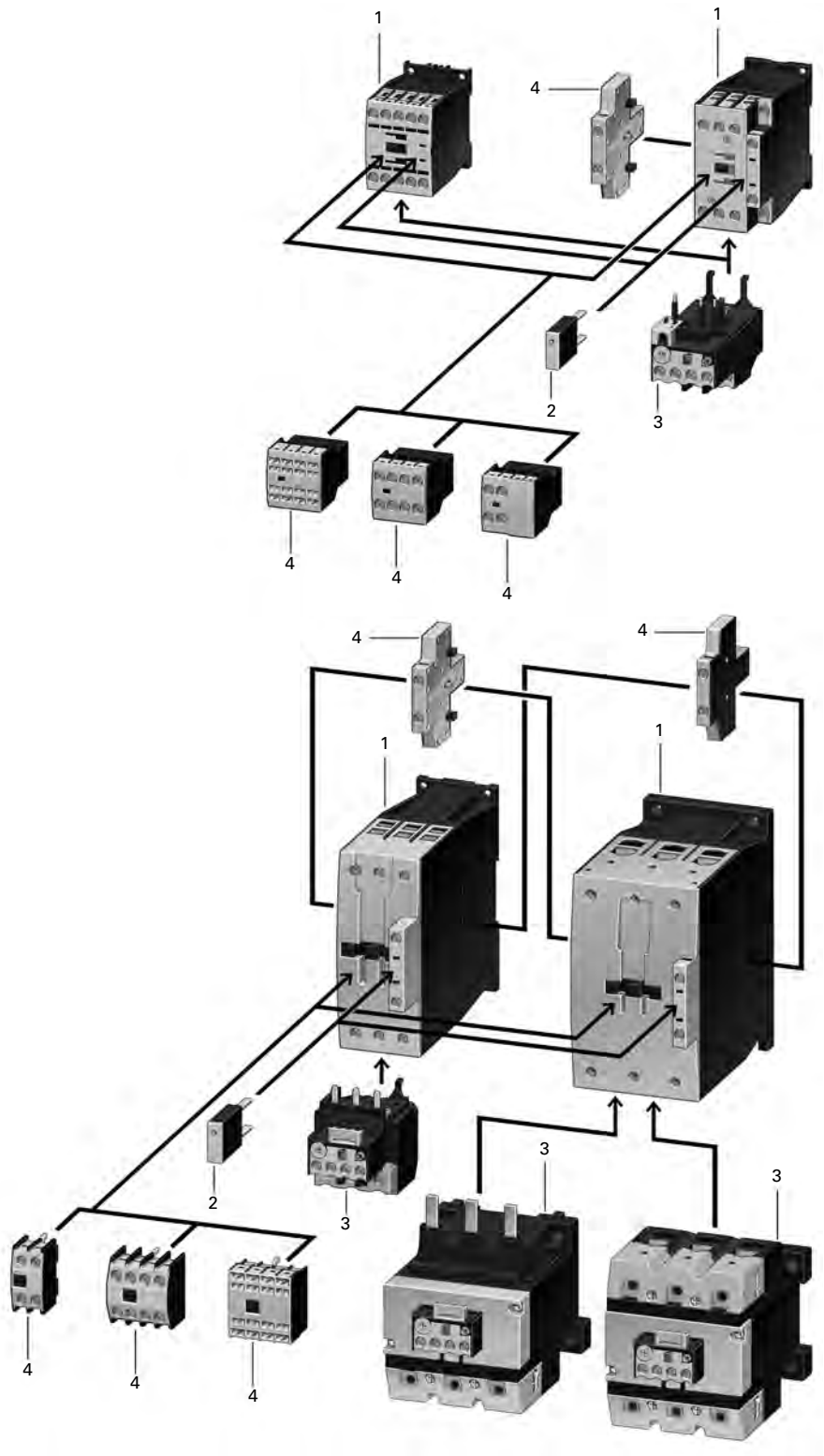


Table B-46. Product Identification

No.	Description	Page
Contactor Up to 150A AC-3		
1	AC: ■ 12 – 600V, 50, 60, 50/60 Hz ■ 0.8 – 1.1 x U_c	**B-34**
	DC: ■ 12 – 250V ■ XTCE…B_ (7 – 15A): 0.8 – 1.1 x U_c ■ XTCE…C_ – XTCE…G_ (18 – 150A): 0.7 – 1.2 x U_c ■ 24V: 0.7 – 1.3 x U_c at 40°C without additional auxiliary contacts	
	Coils for Special Voltages	
	"Safe Isolation" to IEC 536 between coil and contacts	
Suppressors		
2	■ RC suppressor ■ Varistor suppressor ■ Free-wheel diode suppressor	**B-52**
Overload Relays		
3	■ Can be mounted directly ■ Separate mounting, possible ■ Protection of EEx e motors	**B-93**
Auxiliary Contact Modules		
4	■ 2-pole, plug-in type ■ 4-pole, plug-in type ■ Overlapping contacts ■ 2-pole, side mounting	**B-47**

B

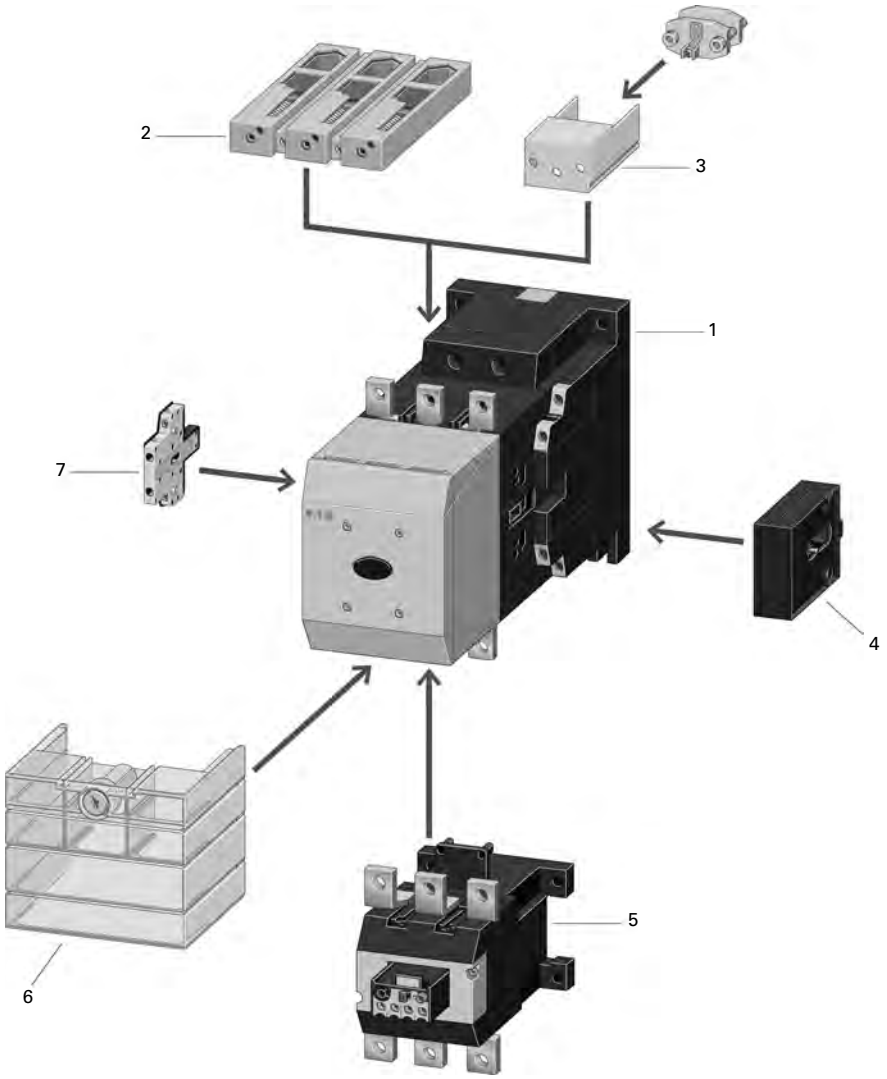


Table B-47. XTCE185 – XTCEC20 Contactors

No.	Description	Page
XTCE Contactors for 185 – 2000A (AC-3)		
1	Multi-Voltage Coils: ■ 24 – 48V DC ■ 48 – 110V AC/DC ■ 110 – 250V AC/DC ■ 250 – 500V AC ■ 0.7 – 1.15 x U_c	**B-34**
	Actuation Options: ■ Directly ■ From the PLC ■ With low-consumption contact Minimized pick-up and sealing power.	
XTCS Contactors for 185 – 500A (AC-3)		
1	Control Voltages: ■ 110 – 120V 50/60 Hz ■ 220 – 240V 50/60 Hz Conventional operation.	**B-35**
Cable Terminal Block		
2	■ 1 or 2 conductors per phase ■ Round and flat conductor connectable ■ Finger-proof	**B-56**
Flat Strip Conductor Terminals		
3	■ 1 or 2 strips per phase ■ Control circuit terminal ■ Cover for fingerproofing	**B-56**
Mechanical Interlock		
4	■ Fits between contactors	**B-54**
Overload Relays		
5	■ Can be mounted directly ■ Separate mounting, possible ■ Protection of EEx e motors ■ PTB certificate	**B-93**
Terminal Shroud		
6	■ Finger-proof	**B-56**
Auxiliary Contact Modules		
7	■ 2-pole, side mounting	**B-47**

Catalogue Number Selection

Table B-48. *XT* IEC Contactors & Starters — Catalogue Numbering System

XT CE C 007 B 01 AD P16

Designation
XT = ***XT*** Line of IEC Control

Type
CE = 3-Pole FVNR IEC Contactor
CS = 3-Pole FVNR S Series IEC Contactor
CF = 4-Pole FVNR IEC Contactor
CR = 3-Pole FVR IEC Contactor
CC = IEC Capacitor Contactor
AE = FVNR IEC Starter
AS = FVNR S-Series IEC Starter
AR = FVR IEC Starter

Terminations	
Blank =	Screw Terminals (6 – 65A); 5 mm (80 – 150A); No Lugs (185 – 2000A)
C =	Spring Cage Terminals (6 – 32A); Spring Cage Coil Terminals Only (185 – 500A)

Current Ratings, AC-3	Frame Size Designation	Built-In Auxiliary Contact
007 = 7A **009** = 9A **012** = 12A **015** = 15A	**B** = 45 mm	**01** = 1NC **10** = 1NO
018 = 18A **025** = 25A **032** = 32A	**C** = 45 mm	
040 = 40A **050** = 50A **065** = 65A	**D** = 55 mm	**00** = 0NO-0NC
080 = 80A **095** = 95A	**F** = 90 mm	
115 = 115A **150** = 150A	**G** = 90 mm	
185 = 185A **225** = 225A **250** = 250A	**L** = 140 mm	**22** = 2NO-2NC
300 = 300A **400** = 400A **500** = 500A	**M** = 160 mm	
580 = 580A **650** = 650A **750** = 750A **820** = 820A **C10** = 1000A	**N** = 250 mm	
C14 = 1400A, AC-1	**P** = 260 mm	
C16 = 1600A, AC-3 **C20** = 2000A, AC-1	**R** = 515 mm	

Coil Codes
See **Table B-57**.

XTAE, XTAS and XTAR Starters Only — Maximum Overload Relay

XTOB Maximum Overload Rating

Frame B	*Frame D*
P16 = 0.1 – 0.16A	**010** = 6 – 10A
P24 = 0.16 – 0.24A	**016** = 10 – 16A
P40 = 0.24 – 0.4A	**024** = 16 – 24A
P60 = 0.4 – 0.6A	**040** = 24 – 40A
001 = 0.6 – 1A	**057** = 40 – 57A
1P6 = 1.0 – 1.6A	**065** = 50 – 65A
2P4 = 1.6 – 2.4A	*Frame F*
004 = 2.4 – 4A	**035** = 25 – 35A
006 = 4 – 6A	**050** = 35 – 50A
010 = 6 – 10A	**070** = 50 – 70A
012 = 9 – 12A	**100** = 70 – 100A
016 = 12 – 16A	*Frame G*
Frame C	**035** = 25 – 35A
P16 = 0.1 – 0.16A	**050** = 35 – 50A
P24 = 0.16 – 0.24A	**070** = 50 – 70A
P40 = 0.24 – 0.4A	**100** = 70 – 100A
P60 = 0.4 – 0.6A	**125** = 95 – 125A
001 = 0.6 – 1A	**150** = 120 – 150A
1P6 = 1.0 – 1.6A	*Frame L*
2P4 = 1.6 – 2.4A	**070** = 50 – 70A
004 = 2.4 – 4A	**100** = 70 – 100A
006 = 4 – 6A	**125** = 95 – 125A
010 = 6 – 10A	**160** = 120 – 160A
016 = 10 – 16A	**220** = 160 – 220A
024 = 16 – 24A	**250** = 200 – 250A
032 = 24 – 32A	

C396 Maximum Overload Rating

	Suffix by Feature Set			
	Econ. Class 10	**Econ. Class 20**	**Std. Class 5/10/ 20/30**	**Adv. Class 10/20**
Frame B				
0.1 – 0.5A =	**1EP05**	**2EP05**	**3EP05**	**4EP05**
0.4 – 2.0A =	**1E002**	**2E002**	**3E002**	**4E002**
1 – 5A =	**1E005**	**2E005**	**3E005**	**4E005**
1.6 – 8A =	**1E008**	**2E008**	**3E008**	**4E008**
6.4 – 32 =	**1E032**	**2E032**	**3E032**	**4E032**
Frame C				
0.1 – 0.5A =	**1EP05**	**2EP05**	**3EP05**	**4EP05**
0.4 – 2.0A =	**1E002**	**2E002**	**3E002**	**4E002**
1 – 5A =	**1E005**	**2E005**	**3E005**	**4E005**
1.6 – 8A =	**1E008**	**2E008**	**3E008**	**4E008**
6.4 – 32A =	**1E032**	**2E032**	**3E032**	**4E032**
Frame D				
1.6 – 8A =	**1E008**	**2E008**	**3E008**	**4E008**
6.4 – 32A =	**1E032**	**2E032**	**3E032**	**4E032**
9 – 45A =	**1E045**	**2E045**	**3E045**	**4E045**
15 – 75A =	**1E075**	**2E075**	**3E075**	**4E075**
Frame F				
22 – 110A =	**1E110**	**2E110**	**3E110**	**4E110**
Frame G				
30 – 150A =	—	—	**3E150**	**4E150**

B

Product Selection

Non-reversing Contactors

Frame B

Frame C

Frame D

Frame F – G

Table B-49. Full Voltage Non-reversing 3-Pole Contactors, Frame B – Frame G

I_e (A)	$I_e = I_{th}$ (A)	Maximum kW Ratings AC-3				Maximum 3-Phase Motor Rating, UL/CSA							Aux. Contacts	Catalogue Number — Screw Terminals ①②	Price	
AC-3	AC-1 (60°C)	3-Phase Motors 50 – 60 Hz				1-Phase hp Ratings			3-Phase hp Ratings						AC Coil	DC Coil
		220/ 230V	380/ 400V	415V	660/ 690V	115V	200V	230V	200V	230V	460V	575V				
Frame B																
7	20	2.2	3	4	3.5	1/4	3/4	1	1-1/2	2	3	5	1NO	**XTCE007B10_**		
7	20	2.2	3	4	3.5	1/4	3/4	1	1-1/2	2	3	5	1NC	**XTCE007B01_**		
9	20	2.5	4	5.5	4.5	1/2	1	1-1/2	3	3	5	7-1/2	1NO	**XTCE009B10_**		
9	20	2.5	4	5.5	4.5	1/2	1	1-1/2	3	3	5	7-1/2	1NC	**XTCE009B01_**		
12	20	3.5	5.5	7	6.5	1	2	2	3	3	10 ③	10	1NO	**XTCE012B10_**		
12	20	3.5	5.5	7	6.5	1	2	2	3	3	10 ③	10	1NC	**XTCE012B01_**		
15.5	20	4	7.5	8	7	1	2	3	5	5	10 ③	10	1NO	**XTCE015B10_**		
15.5	20	4	7.5	8	7	1	2	3	5	5	10 ③	10	1NC	**XTCE015B01_**		
Frame C																
18	35	5	7.5	10	11	2	2	3	5	5	10 ③	15	1NO	**XTCE018C10_**		
18	35	5	7.5	10	11	2	2	3	5	5	10 ③	15	1NC	**XTCE018C01_**		
25	40	7.5	11	14.5	14	2	3	5	7-1/2	7-1/2	15	20	1NO	**XTCE025C10_**		
25	40	7.5	11	14.5	14	2	3	5	7-1/2	7-1/2	15	20	1NC	**XTCE025C01_**		
32	40	10	15	18	17	3	5	5	10	10	20	25	1NO	**XTCE032C10_**		
32	40	10	15	18	17	3	5	5	10	10	20	25	1NC	**XTCE032C01_**		
Frame D																
40	50	12.5	18.5	24	23	3	5	7-1/2	10	15	30	40	—	**XTCE040D00_**		
50	65	15.5	22	30	30	3	7-1/2	10	15	20	40	50	—	**XTCE050D00_**		
65	80	20	30	39	35	5	10	15	20	25	50	60	—	**XTCE065D00_**		
Frame F																
80	90	25	37	48	63	7-1/2	15	15	25	30	60	75	—	**XTCE080F00_**		
95	110	30	45	57	75	7-1/2	15	15	25	40	75	100	—	**XTCE095F00_**		
Frame G																
115	130	37	55	70	90	10	25	25	40	50	100	125	—	**XTCE115G00_**		
150	160	48	75	91	96	15	25	30	40	60	125	125	—	**XTCE150G00_**		

① Underscore (_) indicates magnet coil suffix required. See **Table B-57, Page B-38**.

② For Spring Cage Terminals, insert **C** after the fourth digit of the Catalogue Number. Example: XTCE**C**007B10A. For 7 – 12A XTCEC Contactors, the power, auxiliary and coil terminals are spring cage. For 18 – 32A XTCEC Contactors, the auxiliary and coil terminals are spring cage. For 40 – 150A XTCEC Contactors, the coil terminals only are spring cage.

③ For electrical life contactor application data, see **Table B-51**, **Page B-35**.

Notes:

The 7 – 32A XTCE Contactors have positively driven contacts between the integrated auxiliary contact and the auxiliary contact module as well as within the auxiliary contact modules.

The 40 – 65A XTCE Contactors have positively driven contacts within the auxiliary contact module. 6 auxiliary contacts are possible with a combination of side mounted and front mount auxiliary contacts.

DC operated contactors (Frames B – G, 7 – 150A) have a built-in suppressor circuit.

Frame B – C contactors with 1NC built-in auxiliary are mirror contacts (XTCE...B01_ – XTCE...C01_).

Contact Sequence (Circuit Symbols) ..... **Page B-35**
Coil Voltage Chart ..... **Page B-38**
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Discount Symbol **MC7**

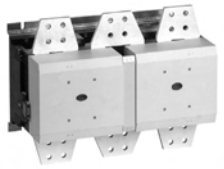
Non-reversing Contactors

Frame L

Frame M

Frame N

Frame P



Frame R

Table B-50. Full Voltage Non-reversing 3-Pole Contactors, Frame L – Frame R

I_e (A)	$I_e = I_{th}$ (A)	Maximum kW Ratings AC-3					Maximum 3-Phase Motor Rating, UL/CSA							Aux. Contacts	Catalogue Number — Screw Terminals ①	Price	
AC-3	AC-1 (60°C)	3-Phase Motors 50 – 60 Hz					1-Phase hp Ratings			3-Phase hp Ratings						AC Coil	DC Coil
		220/ 230V	380/ 400V	415V	660/ 690V ②	1000V ②	115V	200V	230V	200V	230V	460V	575V				
Frame L — Standard Coil (110/120V, 230/240V AC Coil Only)																	
185	275	55	90	110	175	108	—	—	—	50	60	125	150	2NO-2NC	**XTCS185L22_**		
225	315	70	110	132	215	108	—	—	—	60	75	150	200	2NO-2NC	**XTCS225L22_**		
250	330	75	132	148	240	108	—	—	—	75	100	200	250	2NO-2NC	**XTCS250L22_**		
Frame L — Electronic Coil																	
185	275	55	90	110	175	108	—	—	—	50	60	125	150	2NO-2NC	**XTCE185L22_**		
225	315	70	110	132	215	108	—	—	—	60	75	150	200	2NO-2NC	**XTCE225L22_**		
250	350	75	132	148	240	108	—	—	—	75	100	200	250	2NO-2NC	**XTCE250L22_**		
Frame M — Standard Coil (110/120V, 230/240V AC Coil Only)																	
300	400	90	160	180	286	132	—	—	—	100	125	250	300	2NO-2NC	**XTCS300M22_**		
400	500	125	200	240	344	132	—	—	—	125	150	300	400	2NO-2NC	**XTCS400M22_**		
500	700	155	250	300	344	132	—	—	—	150	200	400	500	2NO-2NC	**XTCS500M22_**		
Frame M — Electronic Coil																	
300	400	90	160	180	286	132	—	—	—	100	125	250	300	2NO-2NC	**XTCE300M22_**		
400	500	125	200	240	344	132	—	—	—	125	150	300	400	2NO-2NC	**XTCE400M22_**		
500	700	155	250	300	344	132	—	—	—	150	200	400	500	2NO-2NC	**XTCE500M22_**		
Frame N — Electronic Coil																	
580	800	185	315	348	560	600	—	—	—	200	200	400	600	2NO-2NC	**XTCE580N22_** ③		
650	850	205	355	390	630	600	—	—	—	200	250	500	600	2NO-2NC	**XTCE650N22_** ③		
750	900	240	400	455	720	800	—	—	—	250	300	600	700	2NO-2NC	**XTCE750N22_** ③		
820	1000	260	450	500	750	800	—	—	—	290	350	700	860	2NO-2NC	**XTCE820N22_** ③		
1000	1000	315	560	610	1000	1000	—	—	—	—	—	—	—	2NO-2NC	**XTCEC10N22_** ③		
Frame P — Electronic Coil																	
—	1400	—	—	—	—	—	—	—	—	—	—	—	—	2NO-2NC	**XTCEC14P22_** ③		
Frame R — Electronic Coil																	
1600	1800	500	900	900	1600	1700	—	—	—	560	640	1200	1300	2NO-2NC	**XTCEC16R22_** ③		
—	2000	—	—	—	—	—	—	—	—	—	—	—	—	2NO-2NC	**XTCEC20R22_** ③		

① Underscore (_) indicates magnet coil suffix required. See **Table B-57, Page B-38**.

② For 185 – 500A Contactors at 660/690V or 1000V: Do not reverse directly.

③ When operating the 580 – 2000A XTCE contactors with frequency inverters, the suppressor on the load side must be removed. The load side suppressor must also be removed when performing a high-voltage test — see Pub51204, Pub51209.

Table B-51. Contactor Application Data ④

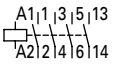
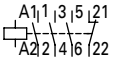
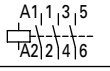
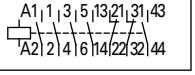
Catalogue Prefix	AC-3	Electrical Life (Operations)
XTCE012B	12A	1 million
XTCE015B	15A	1.2 million
XTCE018C	18A	2 million

④ See **Page B-80** for Electrical Life Curves.

Note:

AC and DC operated contactors have a built-in suppressor circuit (Frames L – R, 185 – 2000A).

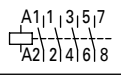
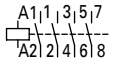
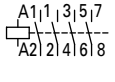
Table B-52. Full Voltage Non-reversing 3-Pole Contactors — Contact Sequence (Circuit Symbols) — Standard Offering

Contactor Frame	Auxiliary Contacts	Contact Sequence
B – C	1NO	
B – C	1NC	
D – G	—	
L – R	2NO-2NC	

Coil Voltage Chart ..... **Page B-38**
Accessories ..... **Page B-47**
Dimensions ..... **Page B-82**
Overload Relays ..... **Page B-93**
Discount Symbol **MC7**

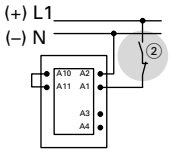
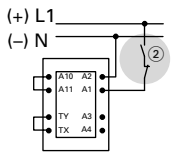
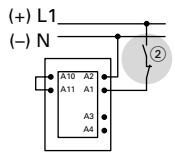
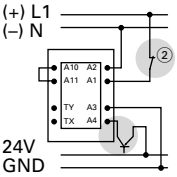
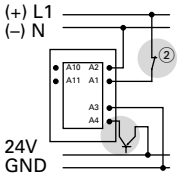
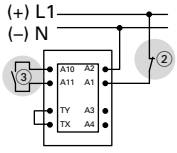
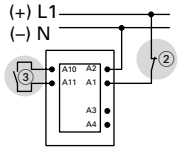
B

Table B-53. Full Voltage 4-Pole Non-reversing Contactors with Screw Terminals

Ie (A)			Maximum kW Ratings AC-3					Maximum hp Motor Rating				Contact Sequence	Catalogue Number ①	Price	
AC-3	Conventional Thermal Current $I_{th} = I_e$ AC-1 Open	AC-1 (40ºC)	3-Phase Motors 50 - 60 Hz					3-Phase hp Ratings						AC Coil	DC Coil
			200/ 230V	380/ 400V	415V	500V	660/ 690V	200V 208V	230V 240V	460V 480V	575V 600V				
Frame B															
12	20	22	3.5	5.5	7	7	6.5	3	3	10	10		**XTCF020B00_**		
Frame C															
18	32	32	5	7.5	10	12	11	7-1/2	7-1/2	10	15		**XTCF032C10_**		
25	45	45	7.5	11	14.5	17.5	14	7-1/2	10	15	20		**XTCF045C10_**		
Frame D															
40	63	63	12.5	18.5	24	28	23	10	15	30	40		**XTCF063D00_**		
50	80	80	15.5	22	30	36	30	15	20	40	50		**XTCF080D00_**		
Frame G															
80	125	125	25	37	48	58	63	25	30	60	75		**XTCF125G00_**		
95	160	160	30	45	57	70	75	25	40	75	100		**XTCF160G00_**		
115	200	200	37	55	70	85	90	40	50	100	125		**XTCF200G00_**		

① Underscore (_) indicates magnet coil suffix required. See **Table B-58**.

Table B-54. Controlling XTCS and XTCE Contactors Frame L – R (185 – 2000A)

Description	XTCS185L – XTCS500M	XTCEC16R, XTCEC20R	XTCE185L – XTCEC14P
Conventional A1/A2 are applied to voltage in the usual manner.			
Direct from the PLC A 24V output from the PLC can be connected directly to connections A3/A4. 	—		
From Low-Consumption Command Devices Command devices which can only be subject to minimal loads such as circuit board relays, control circuit devices or position switches can be connected directly to A10/A11.	—		

② Standstill in an emergency (Emergency-Stop).
③ Command device connection.

Discount Symbol **MC7**

Reversing Contactors

Frame B

Frame C

Frame D

Frame F and G

Table B-55. Full Voltage Reversing Contactors with Screw Terminals

I_e (A)	Maximum kW Ratings AC-3				Maximum 3-Phase Motor Rating						Spare Auxiliary Contacts		Catalogue Number ①	Price	
AC-3	3-Phase Motors 50 – 60 Hz				1-Phase hp Ratings		3-Phase hp Ratings				K1M	K2M		AC Coil	DC Coil
	220/ 230V	380/ 400V	415V	660/ 690V	115V	230V	200V	230V	460V	575V					
Frame B															
7	2.2	3	4	3.5	1/4	1	1-1/2	2	3	5	63 64	63 64	**XTCR007B21_**		
9	2.5	4	5.5	4.5	1/2	1-1/2	2	3	5	7-1/2	63 64	63 64	**XTCR009B21_**		
12	3.5	5.5	7	6.5	1/2	2	3	3	7-1/2	10	63 64	63 64	**XTCR012B21_**		
Frame C															
18	5	7.5	8	11	2	3	5	5	10	15	63 64	63 64	**XTCR018C21_**		
25	7.5	11	14.5	14	2	5	7-1/2	7-1/2	15	20	63 64	63 64	**XTCR025C21_**		
32	10	15	18	17	3	5	10	10	20	25	63 64	63 64	**XTCR032C21_**		
Frame D															
40	12.5	18.5	24	23	3	7-1/2	10	15	30	40	—	—	**XTCR040D11_**		
50	15.5	22	30	30	3	10	15	20	40	50	—	—	**XTCR050D11_**		
65	20	30	39	35	5	15	20	25	50	60	—	—	**XTCR065D11_**		
Frame F															
80	25	37	48	63	7-1/2	15	25	30	60	75	—	—	**XTCR080F11_**		
95	30	45	57	75	7-1/2	15	25	40	75	100	—	—	**XTCR095F11_**		
Frame G															
115	37	55	70	90	10	25	40	50	100	100	—	—	**XTCR115G11_**		
150	48	75	91	96	15	30	40	60	100	100	—	—	**XTCR150G11_**		

① Underscore (_) indicates magnet coil suffix required. See **Table B-57**.

Table B-56. XTCR Reversing Contactor Components

Qty	Frame	B	C	D	F	G
2	Contactor	XTCE...B01_	XTCE...C01_	XTCE...D00_	XTCE...F00_	XTCE...G00_
2	Auxiliary Contact	XTCEXFAC20	XTCEXFAC20	XTCEXFBG11	XTCEXFBG11	XTCEXFBG11
1	Mechanical Interlock	XTCEXMLB	XTCEXMLC	XTCEXMLD	XTCEXMLG	XTCEXMLG
1	Reversing Link Kit	XTCEXRLB	XTCEXRLC	XTCEXRLD	XTCEXRLG	XTCEXRLG

Coil Voltage Chart ..... **Page B-38**
Accessories ..... **Page B-47**
Dimensions ..... **Page B-82**
Overload Relays ..... **Page B-93**
Discount Symbol **MC7**

B

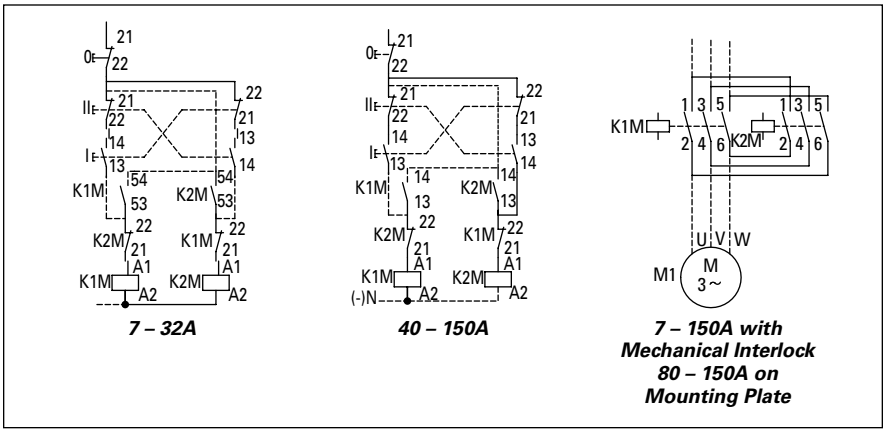
Table B-57. Magnet Coil Suffix

Coil Voltage	Suffix Code
Frame A – B	
110V 50 Hz, 120V 60 Hz	**A**
220V 50 Hz, 240V 60 Hz	**B**
230V 50 Hz	**F**
24V 50/60 Hz	**T**
24V DC	**TD**
415V 50 Hz, 480V 60 Hz	**C**
550V 50 Hz, 600V 60 Hz	**D**
208V 60 Hz	**E**
190V 50 Hz, 220V 60 Hz	**G**
240V 50 Hz, 277V 60 Hz	**H**
380V 50 Hz, 440V 60 Hz	**L**
400V 50 Hz	**N**
380V 60 Hz	**P**
12V 50/60 Hz	**R**
24V 50 Hz	**U**
42V 50 Hz, 48V 60 Hz	**W**
48V 50 Hz	**Y**
120V DC	**AD**
220V DC	**BD**
12V DC	**RD**
48V DC	**WD**

Coil Voltage	Suffix Code
Frame C – F	
110V 50 Hz, 120V 60 Hz	**A**
220V 50 Hz, 240V 60 Hz	**B**
230V 50 Hz	**F**
24V 50/60 Hz	**T**
24 – 27V DC	**TD**
415V 50 Hz, 480V 60 Hz	**C**
550V 50 Hz, 600V 60 Hz	**D**
208V 60 Hz	**E**
190V 50 Hz, 220V 60 Hz	**G**
240V 50 Hz, 277V 60 Hz	**H**
380V 50 Hz, 440V 60 Hz	**L**
400V 50 Hz	**N**
380V 60 Hz	**P**
12V 50/60 Hz	**R**
24V 50 Hz	**U**
42V 50 Hz, 48V 60 Hz	**W**
48V 50 Hz	**Y**
110 – 130V DC	**AD**
200 – 240V DC	**BD**
12 – 14V DC	**RD** ①
48 – 60V DC	**WD**

Coil Voltage	Suffix Code
Frame G	
100 – 120V 50/60 Hz	**A**
190 – 240V 50/60 Hz	**B**
24V 50/60 Hz	**T**
24 – 27V DC	**TD**
480 – 500V 50/60 Hz	**C**
380 – 440V 50/60 Hz	**L**
42 – 48V 50/60 Hz	**W**
110 – 130V DC	**AD**
200 – 240V DC	**BD**
48 – 60V DC	**WD**
Frame L – N	
110 – 250V 40 – 60 Hz/DC	**A**
250 – 500V 40 – 60 Hz	**C**
48 – 110V 40 – 60 Hz/DC	**Y**
24 – 48V DC	**TD** ②
Frame L – M, S-Series	
110 – 120V 50/60 Hz	**A**
220 – 240V 50/60 Hz	**B**
Frame P – R	
220 – 250V 50 – 60 Hz/DC	**B**

① Frame C – D only.
② Frame L – M only.



7 – 32A

40 – 150A

7 – 150A with Mechanical Interlock 80 – 150A on Mounting Plate

Figure B-34. 7 – 150A XTCR Reversing Contactor Wiring Diagram

Accessories ..... **Page B-47**
Dimensions ..... **Page B-82**
Overload Relays ..... **Page B-93**
Discount Symbol **MC7**

Non-reversing Starters

Frame B

Frame C

Frame D

Frame F/G

Frame L

Table B-58. Full Voltage Non-reversing 3-Pole Starters

I_e (A)		Maximum kW Ratings AC-3					Maximum 3-Phase Motor Rating						Auxiliary Contacts	Catalogue Number ①②	Price	
AC-3	AC-1	3-Phase Motors 50 – 60 Hz					1-Phase hp Ratings		3-Phase hp Ratings						AC Coil	DC Coil
		220/ 230V	380/ 400V	415V	660/ 690V	1000V	115V	230V	200V	230V	460V	575V				
Frame B																
7	20	2.2	3	4	3.5	—	1/4	1	1-1/2	2	3	5	1NO	**XTAE007B10_ _**		
7	20	2.2	3	4	3.5	—	1/4	1	1-1/2	2	3	5	1NC	**XTAE007B01_ _**		
9	20	2.5	4	5.5	4.5	—	1/2	1-1/2	3	3	5	7-1/2	1NO	**XTAE009B10_ _**		
9	20	2.5	4	5.5	4.5	—	1/2	1-1/2	3	3	5	7-1/2	1NC	**XTAE009B01_ _**		
12	20	3.5	5.5	7	6.5	—	1	2	3	3	10 ③	10	1NO	**XTAE012B10_ _**		
12	20	3.5	5.5	7	6.5	—	1	2	3	3	10 ③	10	1NC	**XTAE012B01_ _**		
15.5	20	4	7.5	8	7	—	1	3	5	5	10 ③	10	1NO	**XTAE015B10_ _**		
15.5	20	4	7.5	8	7	—	1	3	5	5	10 ③	10	1NC	**XTAE015B01_ _**		
Frame C																
18	35	5	7.5	10	11	—	2	3	5	5	10 ③	15	1NO	**XTAE018C10_ _**		
18	35	5	7.5	10	11	—	2	3	5	5	10 ③	15	1NC	**XTAE018C01_ _**		
25	40	7.5	11	14.5	14	—	2	5	7-1/2	7-1/2	15	20	1NO	**XTAE025C10_ _**		
25	40	7.5	11	14.5	14	—	2	5	7-1/2	7-1/2	15	20	1NC	**XTAE025C01_ _**		
32	40	10	15	18	17	—	3	5	10	10	20	25	1NO	**XTAE032C10_ _**		
32	40	10	15	18	17	—	3	5	10	10	20	25	1NC	**XTAE032C01_ _**		
Frame D																
40	50	12.5	18.5	24	23	—	3	7-1/2	10	15	30	40	—	**XTAE040D00_ _**		
50	60	15.5	22	30	30	—	3	10	15	20	40	50	—	**XTAE050D00_ _**		
65	72	20	30	39	35	—	5	15	20	25	50	60	—	**XTAE065D00_ _**		
Frame F																
80	110	25	37	48	63	—	7-1/2	15	25	30	60	75	—	**XTAE080F00_ _**		
95	110	30	45	57	75	—	7-1/2	15	25	40	75	100	—	**XTAE095F00_ _**		
Frame G																
115	160	37	55	70	105	—	10	25	40	50	100	125	—	**XTAE115G00_ _**		
150	160	48	75	91	125	—	15	30	40	60	125	125	—	**XTAE150G00_ _**		
Frame L																
185	275	55	90	110	175	108	—	—	50	60	125	150	2NO-2NC	**XTAE185L22_ _**		
225	315	70	110	132	215	108	—	—	60	75	150	200	2NO-2NC	**XTAE225L22_ _**		
250	350	75	132	148	240	108	—	—	75	100	200	250	2NO-2NC	**XTAE250L22_ _**		

① Underscore (_) indicates magnet coil suffix required. See **Table B-61**.
② Underscore (_) indicates overload relay suffix required. See **Table B-63**.
③ For electrical life contactor application data see **Table B-62**.

Coil Voltage Chart ..... **Page B-40**
Accessories ..... **Page B-47**
Dimensions ..... **Page B-82**
Overload Relays ..... **Page B-93**
Discount Symbol **MC7**

Table B-59. Full Voltage Non-reversing S-Series 3-Pole Starters

I_e (A)		Maximum kW Ratings AC-3					Maximum 3-Phase Motor Rating						Catalogue Number ①②	Price	
AC-3	AC-1	3-Phase Motors 50 – 60 Hz					1-Phase hp Ratings		3-Phase hp Ratings					AC Coil	DC Coil
		220/ 230V	380/ 400V	415V	660/ 690V	1000V	115V	230V	200V	230V	460V	575V			
Frame L															
185	337	55	90	110	175	108	—	—	50	60	125	150	**XTAS185L22_ _**		
225	386	70	110	132	215	108	—	—	60	75	150	200	**XTAS225L22_ _**		
250	429	75	132	148	240	108	—	—	75	100	200	250	**XTAS250L22_ _**		

① Underscore (_) indicates magnet coil suffix required. See **Table B-61**.
② Underscore (_) indicates overload relay suffix required. See **Table B-63**.

Reversing Starters

Table B-60. Full Voltage Reversing Starters with Screw Terminals

I_e (A)	Maximum kW Ratings AC-3				Maximum 3-Phase Motor Rating						Catalogue Number ③④	Price	
AC-3	3-Phase Motors 50 – 60 Hz				1-Phase hp Ratings		3-Phase hp Ratings					AC Coil	DC Coil
	220/ 230V	380/ 400V	415V	660/ 690V	115V	230V	200V	230V	460V	575V			
Frame B													
7	2.2	3	4	3.5	1/4	1	1-1/2	2	3	5	**XTAR007B21_ _**		
9	2.5	4	5.5	4.5	1/2	1-1/2	3	3	5	7-1/2	**XTAR009B21_ _**		
12	3.5	5.5	7	6.5	1	2	3	3	10	10	**XTAR012B21_ _**		
Frame C													
18	5	7.5	8	11	2	3	5	5	10	15	**XTAR018C21_ _**		
25	7.5	11	14.5	14	2	5	7-1/2	7-1/2	15	20	**XTAR025C21_ _**		
32	10	15	18	17	3	5	10	10	20	25	**XTAR032C21_ _**		
Frame D													
40	12.5	18.5	24	23	3	7-1/2	10	15	30	40	**XTAR040D11_ _**		
50	15.5	22	30	30	3	10	15	20	40	50	**XTAR050D11_ _**		
65	20	30	39	35	5	15	20	25	50	60	**XTAR065D11_ _**		

③ Underscore (_) indicates magnet coil suffix required. See **Table B-61**.
④ Underscore (_) indicates overload relay suffix required. See **Table B-63**.

Table B-61. Magnet Coil Suffix

Coil Voltage	Suffix Code
Frame A – B	
110V 50 Hz, 120V 60 Hz	**A**
220V 50 Hz, 240V 60 Hz	**B**
230V 50 Hz	**F**
24V 50/60 Hz	**T**
24V DC	**TD**
415V 50 Hz, 480V 60 Hz	**C**
550V 50 Hz, 600V 60 Hz	**D**
208V 60 Hz	**E**
190V 50 Hz, 220V 60 Hz	**G**
240V 50 Hz, 277V 60 Hz	**H**
380V 50 Hz, 440V 60 Hz	**L**
400V 50 Hz	**N**
380V 60 Hz	**P**
12V 50/60 Hz	**R**
24V 50 Hz	**U**
42V 50 Hz, 48V 60 Hz	**W**
48V 50 Hz	**Y**
120V DC	**AD**
220V DC	**BD**
12V DC	**RD**
48V DC	**WD**

Coil Voltage	Suffix Code
Frame C – F	
110V 50 Hz, 120V 60 Hz	**A**
220V 50 Hz, 240V 60 Hz	**B**
230V 50 Hz	**F**
24V 50/60 Hz	**T**
24 – 27V DC	**TD**
415V 50 Hz, 480V 60 Hz	**C**
550V 50 Hz, 600V 60 Hz	**D**
208V 60 Hz	**E**
190V 50 Hz, 220V 60 Hz	**G**
240V 50 Hz, 277V 60 Hz	**H**
380V 50 Hz, 440V 60 Hz	**L**
400V 50 Hz	**N**
380V 60 Hz	**P**
12V 50/60 Hz	**R**
24V 50 Hz	**U**
42V 50 Hz, 48V 60 Hz	**W**
48V 50 Hz	**Y**
110 – 130V DC	**AD**
200 – 240V DC	**BD**
12 – 14V DC	**RD** ⑥
48 – 60V DC	**WD**

Coil Voltage	Suffix Code
Frame G	
100 – 120V 50/60 Hz	**A**
190 – 240V 50/60 Hz	**B**
24V 50/60 Hz	**T**
24 – 27V DC	**TD**
480 – 500V 50/60 Hz	**C**
380 – 440V 50/60 Hz	**L**
42 – 48V 50/60 Hz	**W**
110 – 130V DC	**AD**
200 – 240V DC	**BD**
48 – 60V DC	**WD**
Frame L – N	
110 – 250V 40 – 60 Hz/DC	**A**
250 – 500V 40 – 60 Hz	**C**
48 – 110V 40 – 60 Hz/DC	**Y**
24 – 48V DC	**TD** ⑦
Frame L – N, S-Series	
110 – 120V 50/60 Hz	**A**
220 – 240V 50/60 Hz	**B**
Frame P – R	
220 – 250V 50 – 60 Hz/DC	**B**

⑥ Frame C – D only.
⑦ Frame L – M only.

Table B-62. Starter Application Data ⑤

Catalogue Prefix	AC-3	Electrical Life (Operations)
XTAE012B	12A	1 million
XTAE015B	15A	1.2 million
XTAE018C	18A	2 million

⑤ See **Page B-80** for Electrical Life Curves.

Accessories ..... **Page B-47**
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Overload Relays ..... **Page B-93**
Discount Symbol **MC7**

Table B-63. XTOB and XTOT Overload Relay Suffix

Motor Full Load Amperes	Suffix Code	For Use with Contactor Amp Range	Overload Relay Catalogue Number
Frame B			
0.1 – 0.16	**P16**	7 – 15A	**XTOBP16BC1**
0.16 – 0.24	**P24**	7 – 15A	**XTOBP24BC1**
0.24 – 0.4	**P40**	7 – 15A	**XTOBP40BC1**
0.4 – 0.6	**P60**	7 – 15A	**XTOBP60BC1**
0.6 – 1	**001**	7 – 15A	**XTOB001BC1**
1 – 1.6	**1P6**	7 – 15A	**XTOB1P6BC1**
1.6 – 2.4	**2P4**	7 – 15A	**XTOB2P4BC1**
2.4 – 4	**004**	7 – 15A	**XTOB004BC1**
4 – 6	**006**	7 – 15A	**XTOB006BC1**
6 – 10	**010**	7 – 15A	**XTOB010BC1**
9 – 12	**012**	9 – 15A	**XTOB012BC1**
12 – 16	**016**	12 – 15A	**XTOB016BC1**
Frame C			
0.1 – 0.16	**P16**	18 – 32A	**XTOBP16CC1**
0.16 – 0.24	**P24**	18 – 32A	**XTOBP24CC1**
0.24 – 0.4	**P40**	18 – 32A	**XTOBP40CC1**
0.4 – 0.6	**P60**	18 – 32A	**XTOBP60CC1**
0.6 – 1	**001**	18 – 32A	**XTOB001CC1**
1 – 1.6	**1P6**	18 – 32A	**XTOB1P6CC1**
1.6 – 2.4	**2P4**	18 – 32A	**XTOB2P4CC1**
2.4 – 4	**004**	18 – 32A	**XTOB004CC1**
4 – 6	**006**	18 – 32A	**XTOB006CC1**
6 – 10	**010**	18 – 32A	**XTOB010CC1**
10 – 16	**016**	18 – 32A	**XTOB016CC1**
16 – 24	**024**	18 – 32A	**XTOB024CC1**
24 – 32	**032**	25 – 32A	**XTOB032CC1**
Frame D			
6 – 10	**010**	40 – 65A	**XTOB010DC1**
10 – 16	**016**	40 – 65A	**XTOB016DC1**
16 – 24	**024**	40 – 65A	**XTOB024DC1**
24 – 40	**040**	40 – 65A	**XTOB040DC1**
40 – 57	**057**	50 – 65A	**XTOB057DC1**
50 – 65	**065**	65A	**XTOB065DC1**
Frame F			
25 – 35	**035**	80 – 95A	**XTOB055GC1** ①
35 – 50	**050**	80 – 95A	**XTOB050GC1** ①
50 – 70	**070**	80 – 95A	**XTOB070GC1** ①
70 – 100	**100**	80 – 95A	**XTOB100GC1** ①
Frame G			
25 – 35	**035**	115 – 150A	**XTOB055GC1** ①
35 – 50	**050**	115 – 150A	**XTOB050GC1** ①
50 – 70	**070**	115 – 150A	**XTOB070GC1** ①
70 – 100	**100**	115 – 150A	**XTOB100GC1** ①
95 – 125	**125**	115 – 150A	**XTOB125GC1** ①
120 – 150	**150**	150A	**XTOB150GC1** ①
Frame L			
50 – 70	**070**	185 – 250A	**XTOB070LC1**
70 – 100	**100**	185 – 250A	**XTOB100LC1**
95 – 125	**125**	185 – 250A	**XTOB125LC1**
120 – 160	**160**	185 – 250A	**XTOB160LC1**
160 – 220	**220**	185 – 250A	**XTOB220LC1**
200 – 250	**250**	225 – 250A	**XTOB250LC1**

① Catalogue Number refers to direct mount overload relay. Add an **S** to the end of the Catalogue Number for separate mount.

Table B-64. C396 Overload Relay Suffix

FLA Range (Amps)	Suffix	For Use with *XT* IEC Contactor Frame Size / Width	Catalogue Number
	Sandard Class 5/10/20/30		Standard Class 5/10/20/30
45 mm Overload Frame Size			
0.1 – 0.5	**3EP05**	B / 45 mm	**C396A2AP05SELXB**
0.4 – 2.0	**3E002**	B / 45 mm	**C396A2A002SELXB**
1 – 5	**3E005**	B / 45 mm	**C396A2A005SELXB**
1.6 – 8	**3E008**	B / 45 mm	**C396A2A008SELXB**
6.4 – 32	**3E032**	B / 45 mm	**C396A2A032SELXB**
0.1 – 0.5	**3EP05**	C / 45 mm	**C396A2AP05SELXC**
0.4 – 2.0	**3E002**	C / 45 mm	**C396A2A002SELXC**
1 – 5	**3E005**	C / 45 mm	**C396A2A005SELXC**
1.6 – 8	**3E008**	C / 45 mm	**C396A2A008SELXC**
6.4 – 32	**3E032**	C / 45 mm	**C396A2A032SELXC**
6.4 – 32	**3E032**	D / 55 mm	**C396A2A032SELXD**
9 – 45	**3E045**	D / 55 mm	**C396A2A045SELXD**
65 mm Overload Frame Size			
15 – 75	**3E075**	D / 55 mm	**C396B2A075SELXD**
22 – 110	**3E110**	F – G / 90 mm	**C396B2A110SELXF**
110 mm Overload Frame Size			
30 – 150	**3E150**	G / 90 mm	**C396C2A150SELAX** ②

② Catalogue Number listed is for Stand-Alone Overload Relay. For direct connection of 110 mm C396 to Frame G ***XT*** Contactors use 110 mm ***XT*** Bus Bar Kit, C396CBARXT, shown in tables **B-130** and **B-131**. If load side lugs are required, order C396CLUG (set of 3).

Overload Relays ..... **Page B-93**

B

Star-Delta (Wye-Delta) Starters

Table B-65. Star-Delta (Wye-Delta) Starters

I_e (A)	Maximum kW Ratings AC-3						Maximum 3-Phase Current Motor Rating				Maximum Changeover Time (sec)	Components	
AC-3	3-Phase Motors 50 – 60 Hz						3-Phase hp Ratings					Description	Catalogue Number ①
	220/ 230V	380/ 400V	415V	500V	660/ 690V	1000V	200V	230V	460V	575V			
Frame B													
12	3	5.5	7	5.5	5.5	—	3	3	2-1/2	10	< 20	K1M Main Contactor K5M Delta Contactor K3M Star Contactor Mechanical Interlock K1TTiming Relay Overload Relay (3) Auxiliary Contacts Star-Delta Link Kit	**XTCE007B10_** **XTCE007B01_** **XTCE007B01_** **XTCEXMLB** **XTTR6A60S51B** **XTOB…BC1** **XTCEXFAC20** **XTCEXSDLB**
16	4	7.5	8	7.5	7.5	—	3	5	7-1/2	10	< 20	K1M Main Contactor K5M Delta Contactor K3M Star Contactor Mechanical Interlock K1TTiming Relay Overload Relay (3) Auxiliary Contacts Star-Delta Link Kit	**XTCE009B10_** **XTCE009B01_** **XTCE009B01_** **XTCEXMLB** **XTTR6A60S51B** **XTOB…BC1** **XTCEXFAC20** **XTCEXSDLB**
22	5.5	11	14.5	11	11	—	5	5	10	15	< 20	K1M Main Contactor K5M Delta Contactor K3M Star Contactor Mechanical Interlock K1TTiming Relay Overload Relay (3) Auxiliary Contacts Star-Delta Link Kit	**XTCE012B10_** **XTCE012B01_** **XTCE012B01_** **XTCEXMLB** **XTTR6A60S51B** **XTOB…BC1** **XTCEXFAC20** **XTCEXSDLB**
Frame C													
30	7.5	15	19	18.5	18.5	—	7-1/2	7-1/2	15	20	< 20	K1M Main Contactor K5M Delta Contactor K3M Star Contactor Mechanical Interlock K1TTiming Relay Overload Relay (3) Auxiliary Contacts Star-Delta Link Kit	**XTCE018C10_** **XTCE018C01_** **XTCE018C01_** **XTCEXMLC** **XTTR6A60S51B** **XTOB…CC1** **XTCEXFAC20** **XTCEXSDLC**
45	11	22	30	30	22	—	10	15	30	40	< 20	K1M Main Contactor K5M Delta Contactor K3M Star Contactor Mechanical Interlock K1TTiming Relay Overload Relay (3) Auxiliary Contacts Star-Delta Link Kit	**XTCE025C10_** **XTCE025C01_** **XTCE025C01_** **XTCEXMLC** **XTTR6A60S51B** **XTOB…CC1** **XTCEXFAC20** **XTCEXSDLC**
55	15	30	39	37	30	—	15	20	40	50	< 20	K1M Main Contactor K5M Delta Contactor K3M Star Contactor Mechanical Interlock K1TTiming Relay Overload Relay (3) Auxiliary Contacts Star-Delta Link Kit	**XTCE032C10_** **XTCE032C01_** **XTCE032C01_** **XTCEXMLC** **XTTR6A60S51B** **XTOB…CC1** **XTCEXFAC20** **XTCEXSDLC**
Frame D													
70	18.5	37	37	45	37	—	20	25	50	60	< 20	K1M Main Contactor K5M Delta Contactor K3M Star Contactor Mechanical Interlock K1TTiming Relay Overload Relay (2) Auxiliary Contacts (K1M, K3M) (1) Auxiliary Contact (K5M) Star-Delta Link Kit	**XTCE040D00_** **XTCE040D00_** **XTCE040D00_** **XTCEXMLD** **XTTR6A60S51B** **XTOB…DC1** **XTCEXFBG11** **XTCEXFBG31** **XTCEXSDLD0**
90	22	45	45	55	45	—	25	30	60	75	< 20	K1M Main Contactor K5M Delta Contactor K3M Star Contactor Mechanical Interlock K1TTiming Relay Overload Relay (2) Auxiliary Contacts (K1M, K3M) (1) Auxiliary Contact (K5M) Star-Delta Link Kit	**XTCE050D00_** **XTCE050D00_** **XTCE040D00_** **XTCEXMLD** **XTTR6A60S51B** **XTOB…DC1** **XTCEXFBG11** **XTCEXFBG31** **XTCEXSDLD**

① Underscore (_) indicates magnet coil suffix required. See **Table B-67**.

Table B-65. Star-Delta (Wye-Delta) Starters (Continued)

I_e (A)	Maximum kW Ratings AC-3						Maximum 3-Phase Current Motor Rating				Maximum Changeover Time (sec)	Components	
AC-3	3-Phase Motors 50 – 60 Hz						3-Phase hp Ratings					Description	Catalogue Number ①
	220/ 230V	380/ 400V	415V	500V	660/ 690V	1000V	200V	230V	460V	575V			
Frame D (Continued)													
115	30	55	55	75	55	—	40	50	100	125	< 20	K1M Main Contactor K5M Delta Contactor K3M Star Contactor Mechancal Interlock K1TTiming Relay Overload Relay (2) Auxiliary Contacts (K1M, K3M) (1) Auxiliary Contact (K5M) Star-Delta Link Kit	**XTCE065D00_** **XTCE065D00_** **XTCE040D00_** **XTCEXMLD** **XTTR6A60S51B** **XTOB…DC1** **XTCEXFBG11** **XTCEXFBG31** **XTCEXSDLD**
Frame F													
140	37	75	75	90	90	—	40	60	125	150	< 20	K1M Main Contactor K5M Delta Contactor K3M Star Contactor ② Mechancal Interlock ② K1TTiming Relay Overload Relay (2) Auxiliary Contacts (K1M, K3M) (1) Auxiliary Contact (K5M) Star-Delta Link Kit	**XTCE080F00_** **XTCE080F00_** **XTCE050D00_** **XTCEXMLG** **XTTR6A60S51B** **XTOB…FC1** **XTCEXFBG11** **XTCEXFBG31** **XTCEXSDLF**
165	45	90	110	110	132	—	40	60	125	150	< 20	K1M Main Contactor K5M Delta Contactor K3M Star Contactor ② Mechancal Interlock ② K1TTiming Relay Overload Relay (2) Auxiliary Contacts (K1M, K3M) (1) Auxiliary Contact (K5M) Star-Delta Link Kit	**XTCE095F00_** **XTCE095F00_** **XTCE065D00_** **XTCEXMLG** **XTTR6A60S51B** **XTOB…FC1** **XTCEXFBG11** **XTCEXFBG31** **XTCEXSDLF**
Frame G													
200	55	110	132	132	160	—	50	60	125	150	< 20	K1M Main Contactor K5M Delta Contactor K3M Star Contactor Mechancal Interlock K1TTiming Relay Overload Relay (2) Auxiliary Contacts (1) Auxiliary Contact (K5M) Star-Delta Link Kit	**XTCE115G00_** **XTCE115G00_** **XTCE080F00_** **XTCEXMLG** **XTTR6A60S51B** **XTOB…GC1** **XTCEXFBG11** **XTCEXFBG31** **XTCEXSDLG**
260	75	132	148	160	160	—	75	100	200	250	< 20	K1M Main Contactor K5M Delta Contactor K3M Star Contactor Mechancal Interlock K1TTiming Relay Overload Relay (2) Auxiliary Contacts (1) Auxiliary Contact (K5M) Star-Delta Link Kit	**XTCE150G00_** **XTCE150G00_** **XTCE080F00_** **XTCEXMLG** **XTTR6A60S51B** **XTOB…GC1** **XTCEXFBG11** **XTCEXFBG31** **XTCEXSDLG**
Frame L													
315	90	160	180	200	250	132	100	125	250	300	<30	K1M Main Contactor K5M Delta Contactor K3M Star Contactor ② Mechancal Interlock ② K1TTiming Relay Overload Relay K3M Auxiliary Contact Star-Delta Link Kit	**XTCE185L22_** **XTCE185L22_** **XTCE115G00_** **XTCEXMLM** **XTTR6A60S51B** **XTOB…LC1** **XTCEXFBG22** **XTCEXSDLL225**
385	110	200	240	250	315	160	125	150	300	400	<20	K1M Main Contactor K5M Delta Contactor K3M Star Contactor ② Mechancal Interlock ② K1TTiming Relay Overload Relay K3M Auxiliary Contact Star-Delta Link Kit	**XTCE225L22_** **XTCE225L22_** **XTCE150G00_** **XTCEXMLM** **XTTR6A60S51B** **XTOB…LC1** **XTCEXFBG22** **XTCEXSDLL225**
430	132	250	300	315	400	200	125	150	300	400	<30	K1M Main Contactor K5M Delta Contactor K3M Star Contactor Mechancal Interlock K1TTiming Relay Overload Relay Star-Delta Link Kit	**XTCE250L22_** **XTCE250L22_** **XTCE185L22_** **XTCEXMLM** **XTTR6A60S51B** **XTOB…LC1** **XTCEXSDLL250**

① Underscore (_) indicates magnet coil suffix required. See **Table B-67**.

② If mechanical interlock of Star Contactor is required, it must be the same frame size of the Delta Contactor or use the same mechanical interlock, see **Table B-82**, **Page B-54** for mechanical interlocks. (Example: XTCE...L22_ and XTCE...M22_ both use Mechanical Interlock XTCEXMLM.)

Table B-65. Star-Delta (Wye-Delta) Starters (Continued)

I_e (A)	Maximum kW Ratings AC-3						Maximum 3-Phase Current Motor Rating				Maximum Changeover Time (sec)	Components	
AC-3	3-Phase Motors 50 – 60 Hz						3-Phase hp Ratings					Description	Catalogue Number ①
	220/ 230V	380/ 400V	415V	500V	660/ 690V	1000V	200V	230V	460V	575V			
Frame M													
515	160	300	348	355	450	200	150	200	400	500	<30	K1M Main Contactor K5M Delta Contactor K3M Star Contactor Mechancal Interlock K1TTiming Relay Overload Relay Star-Delta Link Kit	**XTCE300M22_** **XTCE300M22_** **XTCE185L22_** **XTCEXMLM** **XTTR6A60S51B** **XTOT…C3S** **XTCEXSDLM400**
685	200	355	390	450	560	220	200	250	500	600	<20	K1M Main Contactor K5M Delta Contactor K3M Star Contactor Mechancal Interlock K1TTiming Relay Overload Relay Star-Delta Link Kit	**XTCE400M22_** **XTCE400M22_** **XTCE250L22_** **XTCEXMLM** **XTTR6A60S51B** **XTOT…C3S** **XTCEXSDLM400**
860	250	450	500	560	600	220	290	350	700	860	<30	K1M Main Contactor K5M Delta Contactor K3M Star Contactor Mechancal Interlock K1TTiming Relay Overload Relay	**XTCE500M22_** **XTCE500M22_** **XTCE300M22_** **XTCEXMLM** **XTTR6A60S51B** **XTOT…C3S**
Frame N													
1000	300	560	610	710	900	355	—	—	—	—	<30	K1M Main Contactor K5M Delta Contactor K3M Star Contactor ② Mechancal Interlock ② K1TTiming Relay Overload Relay	**XTCE580N22_** **XTCE580N22_** **XTCE400M22_** **XTCEXMLN** **XTTR6A60S51B** **XTOT…C3S**
1120	350	630	680	750	950	355	—	—	—	—	<30	K1M Main Contactor K5M Delta Contactor K3M Star Contactor ② Mechancal Interlock ② K1TTiming Relay Overload Relay	**XTCE650N22_** **XTCE650N22_** **XTCE400M22_** **XTCEXMLN** **XTTR6A60S51B** **XTOT…C3S**
1290	400	710	760	900	1200	1400	—	—	—	—	<30	K1M Main Contactor K5M Delta Contactor K3M Star Contactor Mechancal Interlock K1TTiming Relay Overload Relay	**XTCE750N22_** **XTCE750N22_** **XTCE580N22_** **XTCEXMLN** **XTTR6A60S51B** **XTOT…C3S**
1400	450	800	850	950	1300	1400	—	—	—	—	<30	K1M Main Contactor K5M Delta Contactor K3M Star Contactor Mechancal Interlock K1TTiming Relay Overload Relay	**XTCE820N22_** **XTCE820N22_** **XTCE580N22_** **XTCEXMLN** **XTTR6A60S51B** **XTOT…C3S**
1700	560	1000	1050	1200	1700	1700	—	—	—	—	<20	K1M Main Contactor K5M Delta Contactor K3M Star Contactor Mechancal Interlock K1TTiming Relay Overload Relay	**XTCEC10N22_** **XTCEC10N22_** **XTCE650N22_** **XTCEXMLN** **XTTR6A60S51B** **XTOT…C3S**

① Underscore (_) indicates magnet coil suffix required. See **Table B-67**.

② If mechanical interlock of Star contactor is required, it must be the same frame size of the Delta contactor or use the same mechanical interlock, see **Table B-82**, **Page B-54** for mechanical interlocks. (Example: XTCE...L22_ and XTCE...M22_ both use Mechanical Interlock XTCEXMLM.)

Table B-66. Spare Auxiliary Contacts

AC-3	K1M	K3M	K5M
12 – 55			
90 – 260		—	—
315 – 1700			

Notes:

Main Circuit: Depending on the coordination type required (i.e. Type 1 or Type 2) it must be established whether the fuse protection and the input wiring for the main and delta contactors are to be common or separate.

Control Circuit: If the combinations are used in the scope of the IEC/EN 60 204-1, VDE 0113 part 1, point 9.1.1 regarding the supply of control circuits is to be observed.

Coil Voltage Chart ..... **Page B-45**
Accessories ..... **Page B-47**
Dimensions ..... **Page B-82**
Overload Relays ..... **Page B-93**
Discount Symbol **MC7**

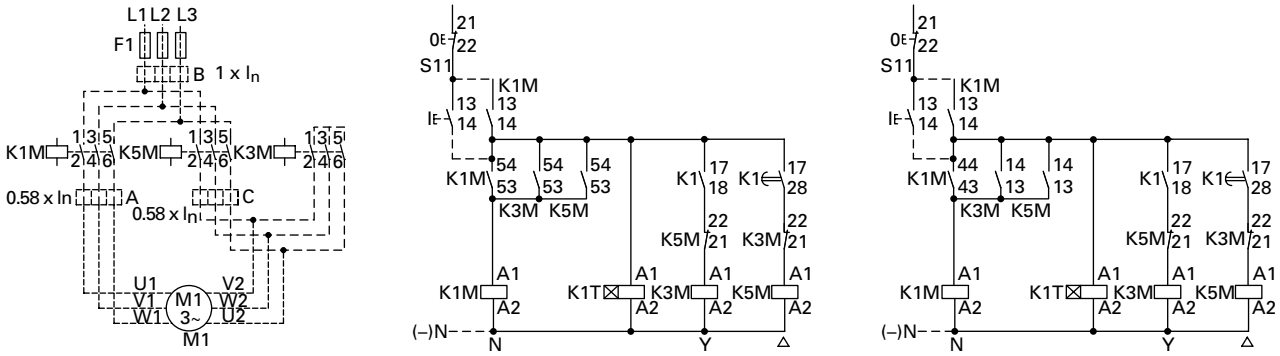
Table B-67. Magnet Coil Suffix

Coil Voltage	Suffix Code
Frame A – B	
110V 50 Hz, 120V 60 Hz	**A**
220V 50 Hz, 240V 60 Hz	**B**
230V 50 Hz	**F**
24V 50/60 Hz	**T**
24V DC	**TD**
415V 50 Hz, 480V 60 Hz	**C**
550V 50 Hz, 600V 60 Hz	**D**
208V 60 Hz	**E**
190V 50 Hz, 220V 60 Hz	**G**
240V 50 Hz, 277V 60 Hz	**H**
380V 50 Hz, 440V 60 Hz	**L**
400V 50 Hz	**N**
380V 60 Hz	**P**
12V 50/60 Hz	**R**
24V 50 Hz	**U**
42V 50 Hz, 48V 60 Hz	**W**
48V 50 Hz	**Y**
120V DC	**AD**
220V DC	**BD**
12V DC	**RD**
48V DC	**WD**

Coil Voltage	Suffix Code
Frame C – F	
110V 50 Hz, 120V 60 Hz	**A**
220V 50 Hz, 240V 60 Hz	**B**
230V 50 Hz	**F**
24V 50/60 Hz	**T**
24 – 27V DC	**TD**
415V 50 Hz, 480V 60 Hz	**C**
550V 50 Hz, 600V 60 Hz	**D**
208V 60 Hz	**E**
190V 50 Hz, 220V 60 Hz	**G**
240V 50 Hz, 277V 60 Hz	**H**
380V 50 Hz, 440V 60 Hz	**L**
400V 50 Hz	**N**
380V 60 Hz	**P**
12V 50/60 Hz	**R**
24V 50 Hz	**U**
42V 50 Hz, 48V 60 Hz	**W**
48V 50 Hz	**Y**
110 – 130V DC	**AD**
200 – 240V DC	**BD**
12 – 14V DC	**RD** ①
48 – 60V DC	**WD**

Coil Voltage	Suffix Code
Frame G	
100 – 120V 50/60 Hz	**A**
190 – 240V 50/60 Hz	**B**
24V 50/60 Hz	**T**
24 – 27V DC	**TD**
480 – 500V 50/60 Hz	**C**
380 – 440V 50/60 Hz	**L**
42 – 48V 50/60 Hz	**W**
110 – 130V DC	**AD**
200 – 240V DC	**BD**
48 – 60V DC	**WD**
Frame L – N	
110 – 250V 40 – 60 Hz/DC	**A**
250 – 500V 40 – 60 Hz	**C**
48 – 110V 40 – 60 Hz/DC	**Y**
24 – 48V DC	**TD**
Frame L – M, S-Series	
110 – 120V 50/60 Hz	**A**
220 – 240V 50/60 Hz	**B**
Frame P – R	
220 – 250V 50 – 60 Hz/DC	**B**

① Frame C – D only.



12 – 385A AC-3 *12 – 55A AC-3* *70 – 1700A AC-3*

Overload Relay Settings (A)

Setting	Starting
A: I_N x 0.58 Motor Protection in the Star (Wye) and Delta Configurations	≤ 15 sec
B: I_N x 1 Only partial motor protection in Star position	15 – 40 sec
C: I_N x 0.58 Motor not protected in Star (Wye) position	> 40 sec
Timing Relay set to approximately 10 sec	

Figure B-35. Wiring Diagrams

Overload Relays ..... **Page B-93**

B

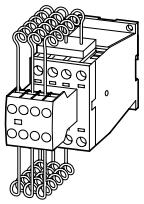
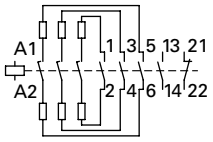
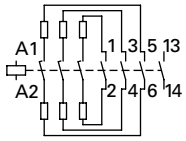


Table B-68. XTCC Contactors for Three-Phase Capacitors

Three-Phase Capacitors, 50 – 60 Hz Open kVAr Ratings ①				Contact Sequence	Catalogue Number ②	Price
230V	400V	525V	690V			
11	20	25	33.3		XTCC020C11_	
15	25	33.3	40		XTCC025C11_	
20	33.3	40	55		XTCC033D10_	
25	50	65	85		XTCC050D10_	

① With series resistors, without quick-discharge resistor.

② Underscore (_) indicates magnet coil suffix required, see **Table B-69**.

Notes:

- Weld-resistant for capacitors with inrush current peaks up to 180 x I_N.

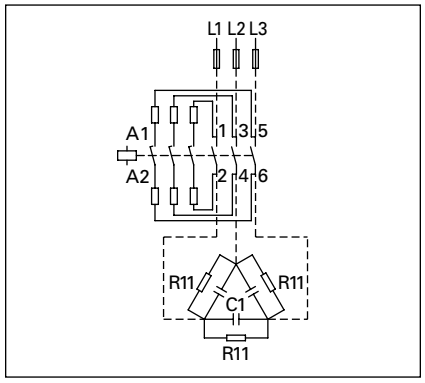


Figure B-36. Wiring Diagram

- In the case of group compensation multi-stage capacitor banks are connected to the mains, as required. In the process, transient currents of up to 180 x I_e can flow between the capacitors. The capacitors are pre-charged via the early-make auxiliary contacts and the fitted wire resistors, thereby reducing the inrush current. The main contacts then close after a time lag and carry the uninterrupted current. The contactors for capacitors are weld-resistant with inrush current peaks up to 180 x 1 I_e due to their special contacts. For switching reactive-power compensation equipment with chokes, observe design notes.
- For switching of power factor connection with reactors please observe engineering notes, **Table B-70**. Use of the contactors XTCE without series resistor for centralized power factor correction — when using contactors for group compensation, a minimum inductance of approximately 6 µH per capacitor must be available to limit the high inrush current peaks. This corresponds to an air-cored coil with 5 windings and a coil diameter of approximately 140 mm diameter. The conductor cross-section must be selected according to the rated current per phase.

Table B-69. Magnet Coil Suffix

Coil Voltage	Suffix Code
110V 50 Hz, 120V 60 Hz	**A**
220V 50 Hz, 240V 60 Hz	**B**
230V 50 Hz, 240V 60 Hz	**F**
400V 50 Hz, 440V 60 Hz	**N**
24V 50/60 Hz	**T**

Table B-70. Engineering Notes for XTCC and XTCE Contactors for Power Factor Correction

Catalogue Number	Switching Duty in kVAr			
	230V	400V 420V 440V	525V	690V
Individual Compensation, Open Version				
XTCE007B	1.5	3	3.5	5
XTCE009B	2	4	4.5	6
XTCE012B	2.5	4.5	5.5	7
XTCE015B	2.5	4.5	5.5	7
XTCE018C	6.5	12	14.5	19
XTCE025C	7	13.5	16	21
XTCE032C	7.5	14.5	17	22.5
XTCE040D	11	20.5	24.5	32
XTCE050D	11.5	22	26	34.5
XTCE065D	12.5	23.5	28	37
XTCE080F	16	30.5	36.5	48
XTCE095F	18	34	41	54
XTCE115G	24	46	54.5	72
XTCE150G	28	53	63.5	83.5
XTCE185L	87	150	190	150
XTCE300M	115	200	265	200
XTCE580N	175	300	400	300
Group Compensation, with Reactor, Open Version				
XTCE007B	4	7	7.5	12
XTCE009B	5	8	10	14
XTCE012B	5.5	10	12	16
XTCE015B	5.5	10	12	16
XTCE018C	7.5	16	20	28
XTCE025C	9	18	23	30
XTCE032C	10	20	24	32
XTCE040D	13	25	30	40
XTCE050D	16	30	36	48
XTCE065D	19	36	43	57
XTCE080F	30	58	68	90
XTCE095F	34	66	79	104
XTCE115G	44	80	100	125
XTCE150G	50	97	115	152
XTCE185L	80	150	200	260
XTCE225L	100	175	230	300
XTCE250L	110	190	260	340
XTCE300M	130	225	290	390
XTCE400M	160	280	370	480
XTCE500M	220	390	500	680
Group Compensation, without Reactor, Open Version				
XTCC020C	11	20	25	33.3
XTCC025C	15	25	33.3	40
XTCC033D	20	33.3	40	55
XTCC050D	25	50	65	85
XTCE185L	66	115	145	115
XTCE300M	85	150	195	150
XTCE580N	145	250	333	250

Discount Symbol **MC7**

Accessories

Auxiliary Contacts

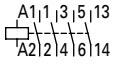
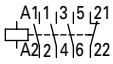
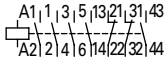
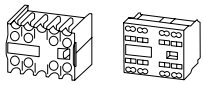
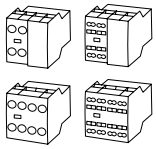
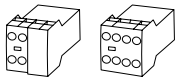
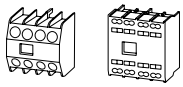
Front mounted snap-on auxiliary contacts for ***XT*** contactors are available with screw or spring cage terminals in a variety of contact configurations.

Notes:
The 7 – 32A XTCE Contactors have positively driven contacts between the integrated auxiliary contact and the auxiliary contact module as well as within the auxiliary contact modules.

The 40 – 65A XTCE Contactors have positively driven contacts within the auxiliary contact module. 6 auxiliary contacts are possible with a combination of side mounted and front mount auxiliary contacts.

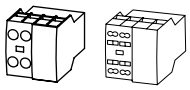
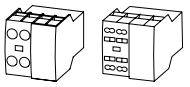
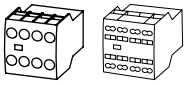
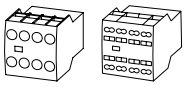
Frame B – C contactors with 1NC built-in auxiliary are mirror contacts (XTCE...B01_ – XTCE...C01_).

Table B-71. XTCE and XTCS Auxiliary Contact Overview

Frame	A	B	C	D	F	G	L – R
Catalogue Numbers	XTMC6A... – XTMC9A...	XTCE007B... – XTCE015B...	XTCE018C... – XTCE032C...	XTCE040D00_ – XTCE065D00_	XTCE080F00_ – XTCE095F00_	XTCE115G00_ – XTCE150G00_	XTCE185L22_ – XTCEC20R22_ ①
Contactor Width	45 mm	45 mm	45 mm	55 mm	90 mm	90 mm	Various
Built-In Auxiliary	1NO or 1NC	1NO or 1NC	1NO or 1NC	—	—	—	2NO-2NC
Contact Sequence							
Front (Top) Mount Auxiliary	**2-Pole & 4-Pole (Screw or Spring Cage):** 	**Standard 2-Pole & 4-Pole Versions (Screw or Spring Cage):**  **Tall Version (Screw Only):** 		**2-Pole (Screw Only):**  **4-Pole (Screw or Spring Cage):** 			N/A
Side Mount Auxiliary	N/A	N/A	**2-Pole (Screw Only):** 	**2-Pole (Screw or Spring Cage):** 			

① Frame L – R auxiliary contacts also apply to XTCS185L... – XTCS500M... contactors.

Table B-72. Auxiliary Contacts

	Conventional Thermal Current, Open at 60°C $I_{th} = I_e$, AC-1 in Amps	Poles	Contact Configuration	Circuit Symbol	Pkg. Qty.	Screw Terminals Catalogue Number	Spring Cage Terminals Catalogue Number	Price ①
Frame B – C — Front (Top) Mount								
	16	2	2NO		5	**XTCEXFAC20**	**XTCEXFACC20**	
	16	2	1NO-1NC		5	**XTCEXFAC11**	**XTCEXFACC11**	
	16	2	2NC		5	**XTCEXFAC02**	**XTCEXFACC02**	
	16	2	$1NO_E$-$1NC_L$		5	**XTCEXFALC11** ②	**XTCEXFALCC11** ②	
	16	2	1NO-1NC		5	**XTCEXFDC11** ③	**XTCEXFDCC11** ③	
	16	2	2NC		5	**XTCEXFCC02** ③	**XTCEXFCCC02** ③	
	16	4	4NO		5	**XTCEXFAC40**	**XTCEXFACC40**	
	16	4	3NO-1NC		5	**XTCEXFAC31**	**XTCEXFACC31**	
	16	4	2NO-2NC		5	**XTCEXFAC22**	**XTCEXFACC22**	
	16	4	1NO-3NC		5	**XTCEXFAC13**	**XTCEXFACC13**	
	16	4	4NC		5	**XTCEXFAC04**	**XTCEXFACC04**	
	16	4	$1NO_E$-$1NC_L$		5	**XTCEXFCLC22** ②	**XTCEXFCLCC22** ②	
	16	4	2NO-2NC		5	**XTCEXFCC22** ③	**XTCEXFCCC22** ③	

① Orders must be placed in multiples of package quantity listed.
② 1 early-make contact ($1NO_E$), 1 late-break contact ($1NC_L$).
③ To avoid dupllicate terminal numbers in contact sequence, these auxiliary contacts should only be used with contactors having a built-in 1NO contact (XTCE...B10_, XTCE...C10_).

Technical Data ..... **Page B-73**
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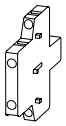
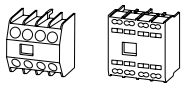
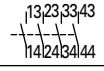
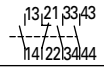
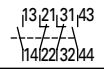
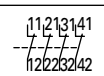
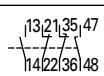
Table B-72. Auxiliary Contacts (Continued)

	Conventional Thermal Current, Open at 60°C $I_{th} = I_e$, AC-1 in Amps	Poles	Contact Configuration	Circuit Symbol	Pkg. Qty.	Screw Terminals Catalogue Number	Spring Cage Terminals Catalogue Number	Price ①
Frame B – C — Front (Top) Mount — Tall Version ③								
	16	2	2NO		5	**XTCEXFATC20**	—	
	16	2	1NO-1NC		5	**XTCEXFATC11**	—	
	16	2	2NC		5	**XTCEXFATC02**	—	
	16	4	2NO-2NC		5	**XTCEXFATC22**	—	
Frame C — Side Mount								
	10	2	1NO-1NC		1	**XTCEXSCC11** ④	—	
Frame D – G — Front (Top) Mount								
	16	2	2NO		5	**XTCEXFBG20**	—	
	16	2	1NO-1NC		5	**XTCEXFAG11**	—	
	16	2	1NO-1NC		5	**XTCEXFBG11**	—	
	16	2	2NC		5	**XTCEXFBG02**	—	
	16	4	4NO-0NC		5	**XTCEXFBG40**	**XTCEXFBGC40**	
	16	4	3NO-1NC		5	**XTCEXFBG31**	**XTCEXFBGC31**	
	16	4	2NO-2NC		5	**XTCEXFBG22**	**XTCEXFBGC32**	
	16	4	2NO-2NC		5	**XTCEXFAG22**	**XTCEXFAGC22**	
	16	4	1NO-3NC		5	**XTCEXFBG13**	**XTCEXFBGC13**	
	16	4	0NO-4NC		5	**XTCEXFBG04**	**XTCEXFBGC04**	
	16	4	$1NO_E$-$1NC_L$		5	**XTCEXFBLG22** ②	**XTCEXFBLGC22** ②	

① Orders must be placed in multiples of package quantity listed.

② 1 early-make contact ($1NO_E$), 1 late-break contact ($1NC_L$).

③ Front (Top) Mount Tall Version is for use with Frame B Electrical Wire Bridges and Link Kits (see **Pages B-54**, **B-55**) and Toolless Plug Combination Connection Kits: XTCEXRLB, XTCEXSDLB, XTPAXTPCB, XTPAXTPCRB, XTPAX.

④ Can be mounted to the left side of contactor only. Can not be used in combination with front (top) mount auxiliary contacts or mechanical interlocks.

Notes:

- Interlocked opposing contacts, to IEC/EN 60947-5-1 Annex L (positively driven), within the auxiliary contact modules (not NO (early make) and NC (late break) contacts) and for the built-in auxiliary contacts of the XTCE007B... – XTCE032C....
- Auxiliary break contact can be used as mirror contact to IEC/EN 60947-4-1 Annex F (not NC (late break) contact).
- No auxiliary contacts can be fitted between two contactors.

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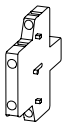
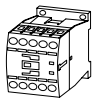
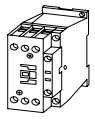
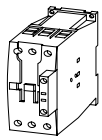
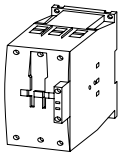
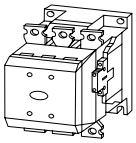
Table B-73. Side Mount Auxiliary Contacts for Frame D – R, 40 – 2000A

	Conventional Free Air Thermal Current, $I_{th} = I_e$, AC-1 in Amps	Poles	Contact Configuration	Circuit Symbol	Pkg. Qty.	Screw Terminals Catalogue Number	Spring Cage Terminals Catalogue Number	Price
Frame D – R								
	10	2	1NO-1NC		1	**XTCEXSBN11**	**XTCEXSBNC11**	
	10	2	$1NO_E$-$1NC_L$		1	**XTCEXSBLN11** ①	—	
	10	2	1NO-1NC		1	**XTCEXSCN11** ②	**XTCEXSCNC11** ②	

① 1 early-make contact ($1NO_E$), 1 late-break contact ($1NC_L$).
② To maintain proper terminal marking, XTCEXSCN_ should not be used with Frame D contactors and only used with Frame F – G contactors in combination with XTCEXSBN_.

Table B-74. Auxiliary Contacts Possible Combinations

Frame Size	Catalogue Number	Contactor	Built-In Auxiliary	Front (Top) Mount		Side Mount	Total Auxiliary Contacts Available
				2-Pole	4-Pole	2-Pole	
A	**XTMC6A… – XTMC9A…**		1NO or 1NC	1	—	—	3
				—	1	—	5
						—	—
B	**XTCE007B… – XTCE015B…**		1NO or 1NC	1	—	—	3
				—	1	—	5
						—	—
C	**XTCE018C… – XTCE032C…**		1NO or 1NC	1	—	—	3
				—	1	—	5
				—	—	1	3
							—
D	**XTCE040D00_ – XTCE065D00_**		—	1	—	2	6
				—	1	1	6
							—
F – G	**XTCE080F00_ – XTCE150G00_**		—	1	—	2	6
				—	1	2	8
				—	—	4	8
							—
L – R	**XTCE185L22_ – XTCEC20R22_**		2NO-2NC	—	—	2	8
				—	—		—

Notes:
- Forced operation contact to IEC/EN 60947-5-1 Appendix L (positively driven), inside the auxiliary contact unit (not early close and late opening).
- Auxiliary normally closed contact can be used as mirror contact to IEC/EN 60947-4-1 Appendix F (not late opening).
- No auxiliary contacts can be fitted between two contactors.

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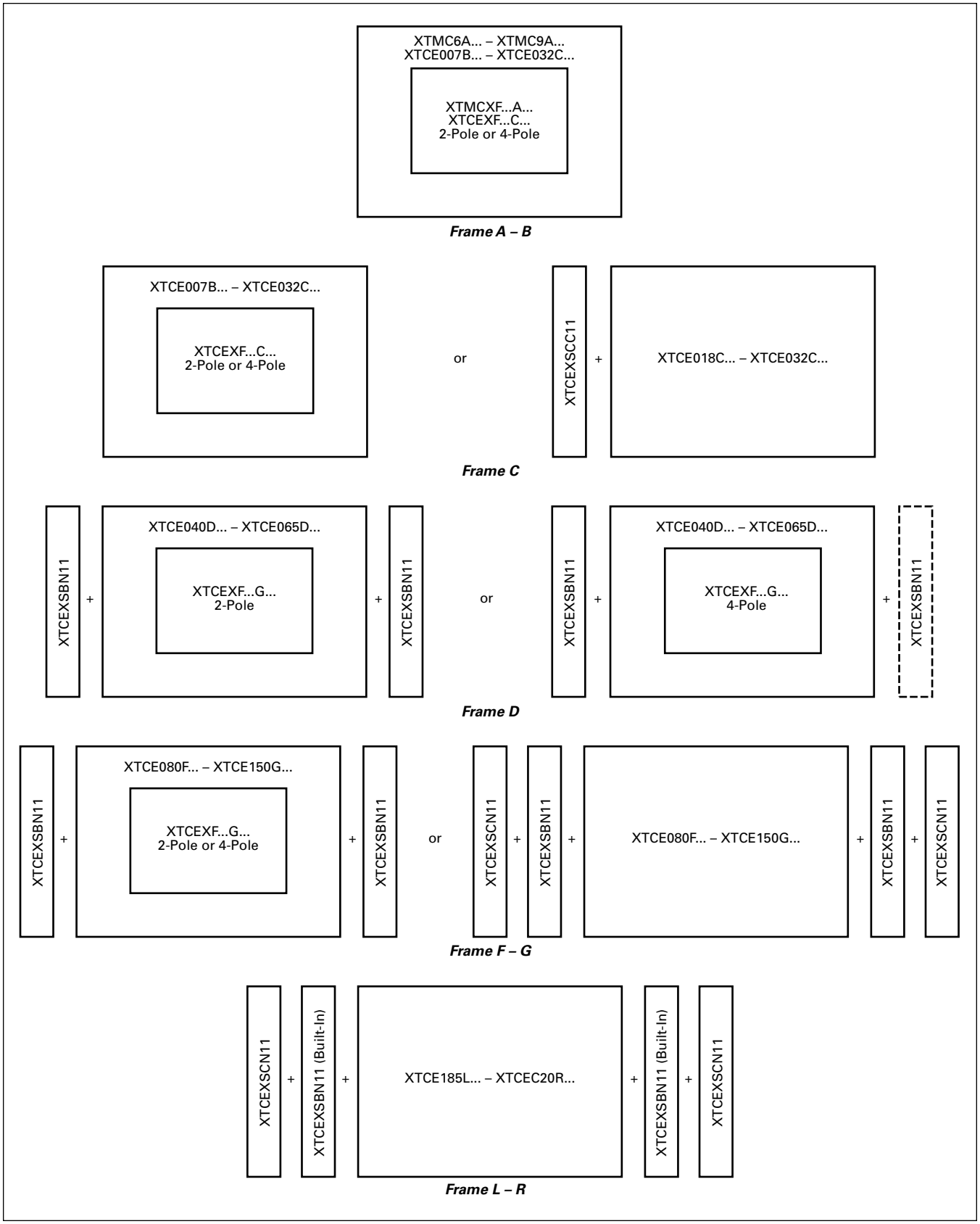


Figure B-37. Auxiliary Contact Combinations

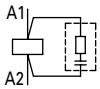
B

Suppressors

The switching of contactor coils can generate voltage transients that July cause arching on switch contacts and/or damage electronics on the control line. Either a RC or Varistor Suppressor is recommended in these types of applications. All ***XT*** DC contactor coils have built-in suppression.

Varistor Suppressors clamp the voltage transient above the maximum coil voltage and are recommended when the level of the transient is known to not exceed the coil voltage. RC Suppressors slow and reduce the level of the voltage transient but do not clamp them at a specific level. The slowing of the transient can reduce electrical interference. These are recommended in applications where operating rates are high.

RC Suppressor ①②



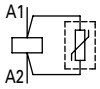
Contact Sequence

Table B-75. RC Suppressor

Voltage	For Use with…	Pkg. Qty.	Catalogue Number	Price ③
24 – 48	XTCE007B – XTCE015B, XTCF020B	10	**XTCEXRSBW**	
48 – 130		10	**XTCEXRSBA**	
110 – 240		10	**XTCEXRSBB**	
240 – 500		10	**XTCEXRSBC**	
24 – 48	XTCE018C – XTCE032C	10	**XTCEXRSCW**	
110 – 130		10	**XTCEXRSCA**	
130 – 240		10	**XTCEXRSCB**	
240 – 500		10	**XTCEXRSCC**	
24 – 48	XTCE040D – XTCE095F	10	**XTCEXRSFW**	
110 – 130		10	**XTCEXRSFA**	
130 – 240		10	**XTCEXRSFB**	
240 – 500		10	**XTCEXRSFC**	

① Note drop-out delay.
② For AC operated contactors, 50 – 60 Hz. DC operated contactors and XTCE165G_ and XTCE150G_ have a built-in suppressor circuit.
③ Orders must be placed in multiples of package quantity listed.

Varistor Suppressor ④⑤



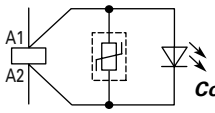
Contact Sequence

Table B-76. Varistor Suppressor

Voltage	For Use with…	Pkg. Qty.	Catalogue Number	Price ⑥
24 – 48	XTCE007B – XTCE015B, XTCF020B	10	**XTCEXVSBW**	
48 – 130		10	**XTCEXVSBA**	
130 – 240		10	**XTCEXVSBB**	
240 – 500		10	**XTCEXVSBC**	
24 – 48	XTCE018C – XTCE032C	10	**XTCEXVSCW**	
48 – 130		10	**XTCEXVSCA**	
130 – 240		10	**XTCEXVSCB**	
240 – 500		10	**XTCEXVSCC**	
24 – 48	XTCE040D – XTCE095F	10	**XTCEXVSFW**	
48 – 130		10	**XTCEXVSFA**	
130 – 240		10	**XTCEXVSFB**	
240 – 500		10	**XTCEXVSFC**	

④ Note drop-out delay.
⑤ For AC operated contactors, 50/60 Hz. DC operated contactors have a built-in suppressor.
⑥ Orders must be placed in multiples of package quantity listed.

Varistor Suppressor with Integrated LED ⑦⑧



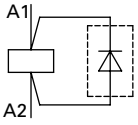
Contact Sequence

Table B-77. Varistor Suppressor

Voltage AC	For Use with…	Pkg. Qty.	Catalogue Number	Price ⑨
24 – 48	XTCE007B – XTCE015B	10	**XTCEXVSLBW**	
130 – 240		10	**XTCEXVSLBB**	
24 – 48	XTCE018C – XTCE032C	10	**XTCEXVSLCW**	
130 – 240		10	**XTCEXVSLCB**	
24 – 48	XTCE040D – XTCE095F	10	**XTCEXVSLFW**	
130 – 240		10	**XTCEXVSLFB**	

⑦ Note drop-out delay.
⑧ For AC operated contactors, 50/60 Hz. DC operated contactors have an integrated suppressor.
⑨ Orders must be placed in multiples of package quantity listed.

Free-Wheel Diode Suppressor ⑩



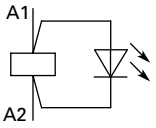
Contact Sequence

Table B-78. Free-Wheel Diode Suppressor

Voltage DC	For Use with…	Pkg. Qty.	Catalogue Number	Price ⑪
12 – 250	XTCE007B – XTCE015B, XTCF020B	10	**XTCEXDSB**	

⑩ In addition to the built-in suppressor circuit for DC actuated contactors. Prevents negative breaking voltage when contactors are used in combination with a safety PLC.
⑪ Orders must be placed in multiples of package quantity listed.

Voltage Indicator



Contact Sequence

Table B-79. Voltage Indicator

Voltage DC	For Use with…	Pkg. Qty.	Catalogue Number	Price ⑫
12 – 48	XTCE007B – XTCE015B, XTCF020B	10	**XTCEXVIBW**	
48 – 130		10	**XTCEXVIBA**	
110 – 250		10	**XTCEXVIBB**	
24 – 48	XTCE018C – XTCE032C	10	**XTCEXVICW**	
48 – 130		10	**XTCEXVICA**	
130 – 250		10	**XTCEXVICB**	
42 – 48	DC operated:	10	**XTCEXVIGW**	
48 – 130	XTCE040D – XTCE095F	10	**XTCEXVIGA**	
130 – 250	AC/DC operated: XTCE115G – XTCE150G	10	**XTCEXVIGB**	

⑫ Orders must be placed in multiples of package quantity listed.

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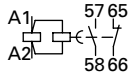
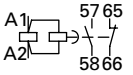
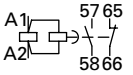
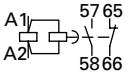
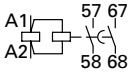
Electronic Timer Modules ①

Table B-80. Electronic Timer Modules for Frame B – C Contactors (7 – 32A)

	Voltage	Contact Sequence	Timing Range	For Use with…	Pkg. Qty.	Catalogue Number	Price
	**On-Delayed**						
	24V AC/DC		0.05 s – 1 s 0.5 – 10 s 5 s – 100 s	XTCE...B... XTCE...C...	1	**XTCEXTEEC11T**	
	100 – 130V AC					**XTCEXTEEC11A**	
	200 – 240V AC					**XTCEXTEEC11B**	
	Off-Delayed						
	24V AC/DC		0.05 s – 1 s	XTCE...B... XTCE...C...	1	**XTCEXTED1C11T**	
	100 – 130V AC					**XTCEXTED1C11A**	
	200 – 230V AC					**XTCEXTED1C11B**	
	24V AC/DC		0.5 – 10 s	XTCE...B... XTCE...C...	1	**XTCEXTED10C11T**	
	100 – 130V AC					**XTCEXTED10C11A**	
	200 – 240V AC					**XTCEXTED10C11B**	
	24V AC/DC		5 s – 100 s	XTCE...B... XTCE...C...	1	**XTCEXTED100C11T**	
	100 – 130V AC					**XTCEXTED100C11A**	
	200 – 240V AC					**XTCEXTED100C11B**	
	Star-Delta						
	24V AC/DC		1 s – 30 s	XTCE...B... XTCE...C...	1	**XTCEXTEYC20T**	
	100 – 130V AC					**XTCEXTEYC20A**	
	200 – 240V AC					**XTCEXTEYC20B**	
Sealable Shroud							
	—	Transparent sealable shroud used to protect electronic timer modules from unwanted access.		XTCEXTEE, XTCEXTED, XTCEXTEY	1	**XTCEXTESHRD**	

① Front (Top) mounted timer modules for use with XTCE...B and XTCE…C contactors. Can not be combined with top mount auxiliary contacts, XTCEXF...C__.

Table B-81. XTCR Reversing Contactor Components

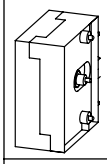
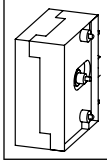
Qty	Frame	B	C	D	F	G
2	Contactor	XTCE...B01_	XTCE...C01_	XTCE...D00_	XTCE...F00_	XTCE...G00_
2	Auxiliary Contact	XTCEXFAC20	XTCEXFAC20	XTCEXFBG11	XTCEXFBG11	XTCEXFBG11
1	Mechanical Interlock	XTCEXMLB	XTCEXMLC	XTCEXMLD	XTCEXMLG	XTCEXMLG
1	Reversing Link Kit	XTCEXRLB	XTCEXRLC	XTCEXRLD	XTCEXRLG	XTCEXRLG

Discount Symbol **MC7**

B

Mechanical Interlock ①

Table B-82. Mechanical Interlock

	For Use with…	Pkg. Qty.	Catalogue Number	Price ②
	XTCE007B – XTCE015B, XTCF020B	5	**XTCEXMLB**	
	XTCE018C – XTCE032C	1	**XTCEXMLC**	
	XTCE040D – XTCE065D	1	**XTCEXMLD**	
	XTCE080F – XTCE150G	1	**XTCEXMLG** ③	
	XTCE185L – XTCE500M	1	**XTCEXMLM**	
	XTCE580N – XTCEC10N	1	**XTCEXMLN** ③	

① For two contactors with AC or DC operated magnet system which are horizontally or vertically mounted. For B – G frames, mechanical lifespan is 2.5 x 10^6 operations and the distance between contactors is 0 mm. For L – N frames, mechanical lifespan is 5 x 10^6 operations and no auxiliary contact can be mounted between the mechanical interlock and the contactor — the distance between contactors is 15 mm.

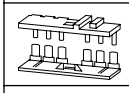
② Orders must be placed in multiples of package quantity listed.

③ XTCEXMLG and XTCEXMLN consist of an interlock element and mounting plate.

Reversing Link Kits

Main current wiring for reversing combinations. Includes Paralleling Bridge and Reversing Bridge. Does not include Mechanical Interlock, see **Table B-82**.

Table B-83. Reversing Link Kits

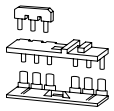
	For Use with…	Pkg. Qty.	Catalogue Number	Price
	XTCE007B – XTCE015B	1	**XTCEXRLB** ④	
	XTCE018C – XTCE032C	1	**XTCEXRLC**	
	XTCE040D – XTCE065D	1	**XTCEXRLD**	
	XTCE080F – XTCE150G	1	**XTCEXRLG**	
	XTCE185L – XTCE250L	1	**XTCEXRLL**	
	XTCE300M – XTCE400M	1	**XTCEXRLM400**	

④ Also includes Interlocking Bridge (XTCEXLBB). The following control cables are integrated for electrical interlock: K1M: A1 – K2M: 21; K1M: 21 – K2M: A1; K1M: A2 – K2M: A2.

Star-Delta (Wye-Delta) Link Kits

Main current wiring for star-delta (wye-delta) combinations. Includes Paralleling Bridge, Reversing Bridge, and Star-Delta Bridge. Does not include Mechanical Interlock, see **Table B-82**.

Table B-84. Star-Delta (Wye-Delta) Link Kits

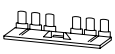
	For Use with…	Pkg. Qty.	Catalogue Number	Price
	XTCE007B – XTCE015B	1	**XTCEXSDLB** ⑤	
	XTCE018C – XTCE032C	1	**XTCEXSDLC**	
	XTCE040D – XTCE065D	1	**XTCEXSDLD**	
	XTCE080F – XTCE095F	1	**XTCEXSDLF**	
	XTCE115G – XTCE150G	1	**XTCEXSDLG**	
	XTCE185L – XTCE225L	1	**XTCEXSDLL225**	
	XTCE250L	1	**XTCEXSDLL250**	
	XTCE300M – XTCE400M	1	**XTCEXSDLM400**	

⑤ Also includes Interlocking Bridge (XTCEXLBB). The following control cables are integrated for electrical interlock: K1M: A1 – K2M: 21; K1M: 21 – K2M: A1; K1M: A2 – K2M: A2.

Paralleling Bridge

Component part of Reversing Link Kit (XTCEXRL_). Parallels the phases on the line-side of two contactors.

Table B-85. Paralleling Bridge

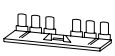
	For Use with…	Pkg. Qty.	Catalogue Number	Price ⑥
	XTCE007B – XTCE015B	20	**XTCEXPBB**	
	XTCE018C – XTCE032C	20	**XTCEXPBC**	
	XTCE040D – XTCE065D	10	**XTCEXPBD**	
	XTCE080F – XTCE150G	10	**XTCEXPBG**	

⑥ Orders must be placed in multiples of package quantity listed.

Reversing Bridge

Component part of Reversing Link Kit (XTCEXRL_). Reverses the phases on the load-side of two contactors.

Table B-86. Reversing Bridge

	For Use with…	Pkg. Qty.	Catalogue Number	Price ⑦
	XTCE007B – XTCE015B	20	**XTCEXRBB**	
	XTCE018C – XTCE032C	20	**XTCEXRBC**	
	XTCE040D – XTCE065D	10	**XTCEXRBD**	
	XTCE080F – XTCE150G	10	**XTCEXRBG**	

⑦ Orders must be placed in multiples of package quantity listed.

Discount Symbol **MC7**

Electrical Interlocking Bridge

Connects NC auxiliary contact with A2 terminal of other contactor in reversing application. Included in XTCEXRLB reversing link kit.

Table B-87. Electrical Interlocking Bridge

For Use with…	Pkg. Qty.	Catalogue Number	Price ①
XTCE007B – XTCE015B	20	**XTCEXLBB**	

① Orders must be placed in multiples of package quantity listed.

Star-Delta (Wye Delta) Bridge

Component part of Star-Delta Link Kit (XTCEXSDL_). Commons the 3-phases on the line side of shorting contactor.

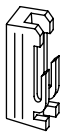
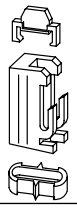
Table B-88. Star-Delta (Wye Delta) Bridge

	For Use with…	Pkg. Qty.	Catalogue Number	Price ②
	XTCE007B – XTCE015B	20	**XTCEXSDBB** ③	
	XTCE018C – XTCE032C	20	**XTCEXSDBC**	
	XTCE040D – XTCE065D	10	**XTCEXSDBD**	
	XTCE080F – XTCE150G	1	**XTCEXSDBG**	
	XTCE185L – XTCE400M	1	**XTCEXSDB400**	
	XTCE500M	1	**XTCEXSDB500**	

② Orders must be placed in multiples of package quantity listed.
③ Frame B is tool-less connection type.

Connector ④

Table B-89. Connector

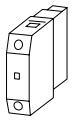
	For Use with…	Pkg. Qty.	Catalogue Number	Price ⑤
	XTCE007B – XTCE032C	50	**XTCEXCNC**	
	XTCE040D – XTCE150G	10	**XTCEXCNG**	

④ For mechanically arranging contactors in combinations. Distance between contactors is 0 mm.
⑤ Orders must be placed in multiples of package quantity listed.

Add-On Fourth Pole

Add-On Fourth Pole for use with Frame D contactors. Only for AC-1 load. Up to two auxiliary contacts can be fitted.

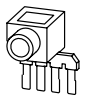
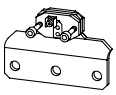
Table B-90. Fourth Pole

	For Use with…	AC-1 (A) Open/ Enclosed	Pkg. Qty.	Catalogue Number	Price
	XTCE040D00_	35/30A	1	**XTCEX4P35D**	
	XTCE050D00_ XTCE065D00_	75/60A	1	**XTCEX4P75D**	

Parallel Link ⑥⑦⑧

For using one contactor per phase. Each package comes with (2) links for line: load.

Table B-91. Parallel Link

	For Use with…	Pkg. Qty.	Catalogue Number	Price ⑨
	XTCE007B – XTCE015B	5	**XTCEXPLKB**	
	XTCE018C – XTCE032C	5	**XTCEXPLKC**	
	XTCE040D – XTCE065D	1	**XTCEXPLKD**	
	XTCE080F – XTCE150G	1	**XTCEXPLKG**	
	XTCE185L	1	**XTCEXPLKL185**	

⑥ Fourth Pole can be broken off: 4-Pole: I_{th} = 60A; 3-Pole: I_{th} = 50A.
⑦ AC-1 current carrying capacity of the contactor increases by a factor of 2.5. For XTCEXPLKL185, one shroud is included for protection against accidental contact
⑧ Protected against accidental contact in accordance with IEC 536.
⑨ Orders must be placed in multiples of package quantity listed.

Discount Symbol **MC7**

B

3-Phase Commoning Link

Main current wiring that parallels and commons the line side of multiple contactors. For use with Frame B contactors only. Protected against accidental contact, short-circuit proof. Max voltage (U_e) = 690V, Max Current (I_e) = 63A.

Table B-92. 3-Phase Commoning Link

	Notes	Pkg. Qty.	Catalogue Number	Price ①
	Suitable for 3 contactors, length = 135 mm	5	**XTCEXCLK3B**	
	Suitable for 4 contactors, length = 180 mm	5	**XTCEXCLK4B**	
	Suitable for 5 contactors, length = 225 mm	5	**XTCEXCLK5B**	

① Orders must be placed in multiples of package quantity listed.

Incoming Terminal

Terminal for use with three-phase commoning link XTCEXCLK_B.

Table B-93. Incoming Terminal

	For Use with…	Pkg. Qty.	Catalogue Number	Price ②
	XTCE007B – XTCE015B	5	**XTCEXITB**	

② Orders must be placed in multiples of package quantity listed.

Terminal Lug Assembly

For connection of: round conductor, flexible and stranded, flat strip conductor. With control circuit terminal. See **Table B-114**, **Page B-73** for terminal capacities.

Table B-94. Terminal Lug Assembly

	For Use with…	Pkg. Qty.	Catalogue Number	Price
	XTCE185L – XTCE225L	1	**XTCEXTLA225**	
	XTCE250L – XTCE400M	1	**XTCEXTLA400**	

Terminal Lug Kit — Set of (3) Lugs

Table B-95. Set of (3) Lugs

For Use with…	Description	Pkg. Qty.	Catalogue Number	Price
XTCE500M	Set of 3 Lugs #4-500MCM 2-Phase Cu/Al 500A	1	**XTCEXTL500**	
XTCE650N	Set of 3 Lugs #2-500MCM 2-Phase Cu/Al 650A	1	**XTCEXTL650**	
XTCE820N	Set of 3 Lugs #2-500MCM 4-Phase Cu/Al 820A	1	**XTCEXTL820**	

Terminal Flat Bar

For connection of a flat strip conductor. Comes with control circuit terminal (Consisting of 3 flat strip conductor terminals).

Table B-96. Terminal Flat Bar

	For Use with…	Pkg. Qty.	Catalogue Number	Price
	XTCE500M – XTCE650N	1	**XTCEXTFB650**	
	XTCE750N – XTCE820N	1	**XTCEXTFB820**	

Note: Not UL Listed.

Control Wire Terminal Extension

Fits to Frame F – G contactors and allows connection of control wire to power terminals.

Table B-97. Control Wire Terminal Extension

For Use with…	Pkg. Qty.	Catalogue Number	Price ③
XTCE080F – XTCE150G	10	**XTCEXTCWG**	

③ Orders must be placed in multiples of package quantity listed.

Terminal Shrouds

Protection against direct contact with connection lugs when touched vertically from the front.

Table B-98. Terminal Shrouds

	For Use with…	Pkg. Qty.	Catalogue Number	Price
	XTCE185L – XTCE400M	1	**XTCEXTS400**	
	XTCE500M	1	**XTCEXTS500**	
	XTCE580N – XTCE650N	1	**XTCEXTS650**	
	XTCE750N – XTCEC10N	1	**XTCEXTS820**	

Discount Symbol **MC7**

Renewal Parts

Table B-99. Replacement Coils

Voltage	Coil Suffix	Catalogue Number	Price
Frame C			
110/50 120/60	**A**	**XTCERENCOILCA**	
110 – 130V DC	**AD**	**XTCERENCOILCAD**	
220/50 240/60	**B**	**XTCERENCOILCB**	
200 – 240V DC	**BD**	**XTCERENCOILCBD**	
415/50 480/60	**C**	**XTCERENCOILCC**	
550/50 600/60	**D**	**XTCERENCOILCD**	
208/60	**E**	**XTCERENCOILCE**	
230/50	**F**	**XTCERENCOILCF**	
190/50 220/60	**G**	**XTCERENCOILCG**	
240/50 277/60	**H**	**XTCERENCOILCH**	
380/50 440/60	**L**	**XTCERENCOILCL**	
400/50	**N**	**XTCERENCOILCN**	
380/60	**P**	**XTCERENCOILCP**	
12/50 12/60	**R**	**XTCERENCOILCR**	
12 – 14V DC	**RD**	**XTCERENCOILCRD**	
24/50 24/60	**T**	**XTCERENCOILCT**	
24 – 27V DC	**TD**	**XTCERENCOILCTD**	
24/50	**U**	**XTCERENCOILCU**	
42/50 48/60	**W**	**XTCERENCOILCW**	
48 – 60V DC	**WD**	**XTCERENCOILCWD**	
48/50	**Y**	**XTCERENCOILCY**	
Frame D			
110/50 120/60	**A**	**XTCERENCOILDA**	
110 – 130V DC	**AD**	**XTCERENCOILDAD**	
220/50 240/60	**B**	**XTCERENCOILDB**	
200 – 240V DC	**BD**	**XTCERENCOILDBD**	
415/50 480/60	**C**	**XTCERENCOILDC**	
550/50 600/60	**D**	**XTCERENCOILDD**	
208/60	**E**	**XTCERENCOILDE**	
230/50	**F**	**XTCERENCOILDF**	
190/50 220/60	**G**	**XTCERENCOILDG**	
240/50 277/60	**H**	**XTCERENCOILDH**	
380/50 440/60	**L**	**XTCERENCOILDL**	
400/50	**N**	**XTCERENCOILDN**	
380/60	**P**	**XTCERENCOILDP**	
12/50 12/60	**R**	**XTCERENCOILDR**	
12 – 14V DC	**RD**	**XTCERENCOILDRD**	
24/50 24/60	**T**	**XTCERENCOILDT**	
24 – 27V DC	**TD**	**XTCERENCOILDTD**	
24/50	**U**	**XTCERENCOILDU**	
42/50 48/60	**W**	**XTCERENCOILDW**	
48 – 60V DC	**WD**	**XTCERENCOILDWD**	
48/50	**Y**	**XTCERENCOILDY**	
Frame F			
110/50 120/60	**A**	**XTCERENCOILFA**	
110 – 130V DC	**AD**	**XTCERENCOILFAD**	
220/50 240/60	**B**	**XTCERENCOILFB**	
200 – 240V DC	**BD**	**XTCERENCOILFBD**	
415/50 480/60	**C**	**XTCERENCOILFC**	
550/50 600/60	**D**	**XTCERENCOILFD**	
208/60	**E**	**XTCERENCOILFE**	
230/50	**F**	**XTCERENCOILFF**	
190/50 220/60	**G**	**XTCERENCOILFG**	
240/50 277/60	**H**	**XTCERENCOILFH**	
380/50 440/60	**L**	**XTCERENCOILFL**	
400/50	**N**	**XTCERENCOILFN**	
380/60	**P**	**XTCERENCOILFP**	
12/50 12/60	**R**	**XTCERENCOILFR**	
24/50 24/60	**T**	**XTCERENCOILFT**	
24 – 27V DC	**TD**	**XTCERENCOILFTD**	
24/50	**U**	**XTCERENCOILFU**	
42/50 48/60	**W**	**XTCERENCOILFW**	
48 – 60V DC	**WD**	**XTCERENCOILFWD**	
48/50	**Y**	**XTCERENCOILFY**	
Frame G			
100 – 120V 50/60	**A**	**XTCERENCOILGA**	
110 – 130V DC	**AD**	**XTCERENCOILGAD**	
190 – 240V 50/60	**B**	**XTCERENCOILGB**	
200 – 240V DC	**BD**	**XTCERENCOILGBD**	
480 – 500V 50/60	**C**	**XTCERENCOILGC**	
380 – 440V 50/60	**L**	**XTCERENCOILGL**	
24/50 24/60	**T**	**XTCERENCOILGT**	
24 – 27V DC	**TD**	**XTCERENCOILGTD**	
42 – 48V 50/60	**W**	**XTCERENCOILGW**	
48 – 60V DC	**WD**	**XTCERENCOILGWD**	
Frame L ①			
110 – 250V AC/DC	**A**	**XTCERENCOILLA**	
250 – 500V 40 – 60	**C**	**XTCERENCOILLC**	
24 – 48V DC	**TD**	**XTCERENCOILLTD**	
48 – 110V AC/DC	**Y**	**XTCERENCOILLY**	
Frame M ①			
110 – 250V AC/DC	**A**	**XTCERENCOILMA**	
250 – 500V 40 – 60	**C**	**XTCERENCOILMC**	
24 – 48V DC	**TD**	**XTCERENCOILMTD**	
48 – 110V AC/DC	**Y**	**XTCERENCOILMY**	
Frame N ①			
110 – 250V AC/DC	**A**	**XTCERENCOILNA**	
250 – 500V 40 – 60	**C**	**XTCERENCOILNC**	
48 – 110V AC/DC	**Y**	**XTCERENCOILNY**	

① Electronic modules including coils.

Table B-100. Replacement Contact Kits

For Use with…	Catalogue Number	Price
XTCE040D – XTCE065D	**XTCERENCONTACTD**	
XTCE185L – XTCE250L	**XTCERENCONTACTL**	
XTCE300M – XTCE500M	**XTCERENCONTACTM**	

Table B-101. Replacement Vacuum Tube Assembly

For Use with…	Catalogue Number	Price
XTCE580N	**XTCERENVACT580**	
XTCE650N	**XTCERENVACT650**	
XTCE750N	**XTCERENVACT750**	
XTCE820N	**XTCERENVACT820**	

Table B-102. Replacement Arc Chambers

For Use with…	Catalogue Number	Price
XTCE185L	**XTCERENARC185**	
XTCE225L	**XTCERENARC225**	
XTCE250L	**XTCERENARC250**	
XTCE300M	**XTCERENARC300**	
XTCE400M	**XTCERENARC400**	
XTCE500M	**XTCERENARC500**	

Discount Symbol **MC17**

Technical Data and Specifications

Contents

Frame B XTCE Contactor

XT Contactors

Frame B

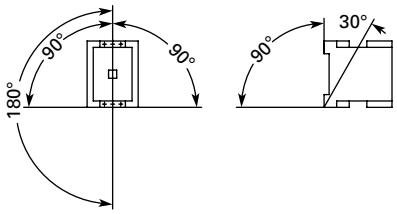
Table B-103. *XT* Contactors Technical Data and Specifications — Frame B

Description	XTCE007B	XTCE009B	XTCE012B, XTCF020B	XTCE015B
General				
Standards	IEC/EN 60947, VDE 0660, UL, CSA, CCC, RoHS			
Weights in kg [Lb]				
AC operated	0.23 [0.51]	0.23 [0.51]	0.23 [0.51]	0.23 [0.51]
DC operated	0.28 [0.62]	0.28 [0.62]	0.28 [0.62]	0.28 [0.62]
Mechanical Life	10,000,000	10,000,000	10,000,000	10,000,000
Mechanical Operating Frequency (ops/hr)				
AC operated	9000	9000	9000	5000
DC operated	9000	9000	9000	5000
Electrical Life	See Curves, **Page B-80**			
Electrical Operating Frequency (ops/hr) — see Curve, **Page B-80**				
AC-1; 400V I_e	800	800	800	800
AC-3; 400V I_e	1000	1000	1000	1000
AC-4; 400V I_e	300	300	300	300
Climatic Proofing	Damp heat, constant, to IEC 60068-2-78; Damp heat, cyclical, to IEC 60068-2-30			
Insulation Voltage (Ui) V AC	690	690	690	690
Impulse Withstand Voltage (Uimp) V AC	8000	8000	8000	8000
Operational Voltage (U_e) V AC	690	690	690	690
Safe Isolation to VDE 0106 Part 101 and Part 101/A1				
Between coil and contacts (V AC)	400	400	400	400
Between contacts (V AC)	400	400	400	400
Making Capacity Up to 690V (Amps) ②	112	112	144	155
Breaking Capacity (Amps)				
220/230V	70	90	120	124
380/400V	70	90	120	124
500V	50	70	100	100
660/690V	40	50	70	70
Short-Circuit Protection Rating Maximum Fuse				
Type 2 Coordination ①				
400V; gG/gL 500V	20	20	20	20
690V; gG/gL 690V	16	16	20	20
Type 1 Coordination ①				
400V; gG/gL 500V	35	35	35	63
690V; gG/gL 690V	20	20	20	50
Degree of Protection	IP20			
Protection against Direct Contact when Actuated from Front (IEC 536)	Finger- and back-of-hand proof			

① IEC 60947 Standard.

② Rated operational current: Making and breaking conditions to DC-13, L/R constant as stated.

Table B-103. *XT* Contactors Technical Data and Specifications — Frame B (Continued)

Description	XTCE007B	XTCE009B	XTCE012B, XTCF020B	XTCE015B
General (Continued)				
Terminal Capacity Main Cable — Screw Terminals				
Solid (mm^2)	1 x (0.75 – 4) 2 x (0.75 – 2.5)	1 x (0.75 – 4) 2 x (0.75 – 2.5)	1 x (0.75 – 4) 2 x (0.75 – 2.5)	1 x (0.75 – 4) 2 x (0.75 – 2.5)
Flexible with ferrule (mm^2)	1 x (0.75 – 2.5) 1 x (0.75 – 2.5)	1 x (0.75 – 2.5) 1 x (0.75 – 2.5)	1 x (0.75 – 2.5) 1 x (0.75 – 2.5)	1 x (0.75 – 2.5) 1 x (0.75 – 2.5)
Solid or Stranded (AWG)	18 – 14	18 – 14	18 – 14	18 – 14
Terminal Capacity Control Circuit Cable — Screw Terminals				
Solid (mm^2)	1 x (0.75 – 4) 2 x (0.75 – 2.5)	1 x (0.75 – 4) 2 x (0.75 – 2.5)	1 x (0.75 – 4) 2 x (0.75 – 2.5)	1 x (0.75 – 4) 2 x (0.75 – 2.5)
Flexible with ferrule (mm^2)	1 x (0.75 – 2.5) 1 x (0.75 – 2.5)	1 x (0.75 – 2.5) 1 x (0.75 – 2.5)	1 x (0.75 – 2.5) 1 x (0.75 – 2.5)	1 x (0.75 – 2.5) 1 x (0.75 – 2.5)
Solid or Stranded (AWG)	18 – 14	18 – 14	18 – 14	18 – 14
Main Cable and Control Circuit Cable Connection Screw/Bolt	M3.5	M3.5	M3.5	M3.5
Tightening torque				
Nm	1.2	1.2	1.2	1.2
Lb-in	10.6	10.6	10.6	10.6
Tools				
Main and Control circuit cable — Screw Terminals	Size 2	Size 2	Size 2	Size 2
Posidrive screwdriver	0.8 x 5.5	0.8 x 5.5	0.8 x 5.5	0.8 x 5.5
Standard screwdriver	1 x 6	1 x 6	1 x 6	1 x 6
Terminal Capacity Main Circuit Cable — Spring Cage Terminals				
Solid (mm^2)	1 x (0.75 – 2.5) 1 x (0.75 – 2.5)	1 x (0.75 – 2.5) 1 x (0.75 – 2.5)	1 x (0.75 – 2.5) 1 x (0.75 – 2.5)	— —
Flexible (mm^2)	1 x (0.75 – 2.5) 1 x (0.75 – 2.5)	1 x (0.75 – 2.5) 1 x (0.75 – 2.5)	1 x (0.75 – 2.5) 1 x (0.75 – 2.5)	— —
Flexible with ferrule (mm^2)	1 x (0.75 – 2.5) 1 x (0.75 – 2.5)	1 x (0.75 – 2.5) 1 x (0.75 – 2.5)	1 x (0.75 – 2.5) 1 x (0.75 – 2.5)	— —
Solid or Stranded (AWG)	18 – 14	18 – 14	18 – 14	—
Terminal Capacity Control Circuit Cable — Spring Cage Terminals				
Solid (mm^2)	1 x (0.75 – 2.5) 1 x (0.75 – 2.5)	1 x (0.75 – 2.5) 1 x (0.75 – 2.5)	1 x (0.75 – 2.5) 1 x (0.75 – 2.5)	— —
Flexible (mm^2)	1 x (0.75 – 2.5) 1 x (0.75 – 2.5)	1 x (0.75 – 2.5) 1 x (0.75 – 2.5)	1 x (0.75 – 2.5) 1 x (0.75 – 2.5)	— —
Flexible with ferrule (mm^2)	1 x (0.75 – 2.5) 1 x (0.75 – 2.5)	1 x (0.75 – 2.5) 1 x (0.75 – 2.5)	1 x (0.75 – 2.5) 1 x (0.75 – 2.5)	— —
Solid or Stranded (AWG)	18 – 14	18 – 14	18 – 14	—
Tools				
Main and Control Circuit Cable — Spring Cage Terminals				
Stripping Length (mm)	10	10	10	10
Screwdriver blade width (mm)	3.5	3.5	3.5	3.5
Mounting Position, AC and DC Operated				
Ambient Temperature				
Open	-25 to 60°C [-13 to 140°F]	-25 to 60°C [-13 to 140°F]	-25 to 60°C [-13 to 140°F]	-25 to 60°C [-13 to 140°F]
Enclosed	-25 to 40°C [-13 to 104°F]	-25 to 40°C [-13 to 104°F]	-25 to 40°C [-13 to 104°F]	-25 to 40°C [-13 to 104°F]
Ambient Storage Temperature	-40 to 80°C [-40 to 176°F]	-40 to 80°C [-40 to 176°F]	-40 to 80°C [-40 to 176°F]	-40 to 80°C [-40 to 176°F]
Environmental				
Mechanical Shock Resistance (IEC/EN 60068-2-27)				
Half-sinusoidal shock 10 mS				
Main contact — NO Contact	10g	10g	10g	10g
Auxiliary contact — NO Contact	7g	7g	7g	7g
Auxiliary contact — NC Contact	5g	5g	5g	5g
Overvoltage Category/Pollution degree	III/3	III/3	III/3	III/3

B

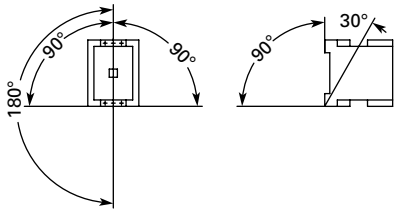
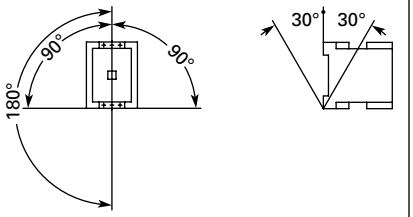
Frame C – D

Table B-104. *XT* Contactors Technical Data and Specifications — Frame C – D

Description	XTCE018C	XTCE025C	XTCE032C	XTCE040D	XTCE050D	XTCE065D
General						
Standards	IEC/EN 60947, VDE 0660, UL, CSA, CCC, RoHS					
Weights in kg [Lb]						
AC operated	0.42 [0.93]	0.42 [0.93]	0.42 [0.93]	0.9 [2.0]	0.9 [2.0]	0.9 [2.0]
DC operated	0.48 [1.06]	0.48 [1.06]	0.48 [1.06]	1.1 [2.4]	1.1 [2.4]	1.1 [2.4]
Mechanical Life	10,000,000	10,000,000	10,000,000	10,000,000	10,000,000	10,000,000
Mechanical Operating Frequency (ops/hr)						
AC operated	5000	5000	5000	5000	5000	5000
DC operated	5000	5000	5000	5000	5000	5000
Electrical Mechanical Operating Frequency (ops/hr) — see Curve, **Page B-80**						
AC-1; 400V I_e	800	800	800	800	800	800
AC-3; 400V I_e	800	800	800	800	800	800
AC-4; 400V I_e	300	300	300	300	300	300
Climatic Proofing	Damp heat, constant, to IEC 60068-2-78; Damp heat, cyclic, to IEC 60 068-2-30					
Insulation Voltage (U_i) V AC	690	690	690	690	690	690
Impulse Withstand Voltage (U_{imp}) V AC	8000	8000	8000	8000	8000	8000
Operating Voltage (U_e) V AC	690	690	690	690	690	690
Safe Isolation to VDE 0106 Part 101 and Part 101/A1						
Between coil and contacts (V AC)	440	440	440	440	440	440
Between contacts (V AC)	238	440	440	440	440	440
Making Capacity (Amps)	238	350	384	560	700	910
Breaking Capacity (Amps)						
220/230V	170	250	320	400	500	650
380/400V	170	250	320	400	500	650
500V	170	250	320	400	500	650
660/690V	120	150	180	250	320	370
Short-Circuit Protection Rating Maximum Fuse (Amps)						
Type 2 Coordination ①						
400V; gG/gL 500V	25	35	63	63	80	125
690V; gG/gL 690V	25	35	35	50	63	80
Type 1 Coordination ①						
400V; gG/gL 500V	63	100	125	125	160	250
690V; gG/gL 690V	50	50	63	80	80	100
Degree of Protection	IP00					
Protection against Direct Contact when Actuated from Front (IEC 536)	Finger- and back-of-hand proof					
Terminal Capacity Main Cable — Screw Terminals						
Solid (mm^2)	1 x (0.75 – 16) 2 x (0.75 – 10)	1 x (0.75 – 16) 2 x (0.75 – 10)	1 x (0.75 – 16) 2 x (0.75 – 10)	1 x (0.75 – 16) 2 x (0.75 – 10)	1 x (0.75 – 16) 2 x (0.75 – 10)	1 x (0.75 – 16) 2 x (0.75 – 10)
Flexible with ferrule (mm^2)	1 x (0.75 – 16) 2 x (0.75 – 10)	1 x (0.75 – 16) 2 x (0.75 – 10)	1 x (0.75 – 16) 2 x (0.75 – 10)	1 x (2.5 – 35) 2 x (2.5 – 25)	1 x (2.5 – 35) 2 x (2.5 – 25)	1 x (2.5 – 35) 2 x (2.5 – 25)
Stranded (mm^2)	1 x 16	1 x 16	1 x 16	1 x (16 – 50) 2 x (16 – 35)	1 x (16 – 50) 2 x (16 – 35)	1 x (16 – 50) 2 x (16 – 35)
Solid or Stranded (AWG)	18 – 6	18 – 6	18 – 6	12 – 2	12 – 2	12 – 2
Flat Conductor (Number of Segments x Width x Thickness) (mm)	—	—	—	2 x (6 x 9 x 0.8)	2 x (6 x 9 x 0.8)	2 x (6 x 9 x 0.8)
Main Cable Connection Screw/Bolt	M5	M5	M5	M6	M6	M6
Tightening torque						
Nm	3	3	3	3	3	3
Lb-in	26.6	26.6	26.6	26.6	26.6	26.6
Terminal Capacity Control Circuit Cable — Screw Terminals						
Solid (mm^2)	1 x (0.75 – 4) 2 x (0.75 – 4)	1 x (0.75 – 4) 2 x (0.75 – 4)	1 x (0.75 – 4) 2 x (0.75 – 4)	1 x (0.75 – 4) 2 x (0.75 – 4)	1 x (0.75 – 4) 2 x (0.75 – 4)	1 x (0.75 – 4) 2 x (0.75 – 4)
Flexible with ferrule (mm^2)	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)
Solid or Stranded (AWG)	18 – 14	18 – 14	18 – 14	18 – 14	18 – 14	18 – 14
Control Circuit Cable Connection Screw/Bolt	M3.5	M3.5	M3.5	M3.5	M3.5	M3.5
Tightening torque						
Nm	1.2	1.2	1.2	1.2	1.2	1.2
Lb-in	10.6	10.6	10.6	10.6	10.6	10.6

① IEC 60947 Standard.

Table B-104. *XT* Contactors Technical Data and Specifications — Frame C – D (Continued)

Description	XTCE018C	XTCE025C	XTCE032C	XTCE040D	XTCE050D	XTCE065D
General (Continued)						
Tools Main and Control Circuit Cable — Screw Terminals Posidrive screwdriver Standard screwdriver	 Size 2 0.8 x 5.5 1 x 6	 Size 2 0.8 x 5.5 1 x 6	 Size 2 0.8 x 5.5 1 x 6	 Size 2 0.8 x 5.5 1 x 6	 Size 2 0.8 x 5.5 1 x 6	 Size 2 0.8 x 5.5 1 x 6
Terminal Capacity Control Circuit Cable — Spring Cage Terminals Solid (mm^2)	 1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	 1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	 1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	 1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	 1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	 1 x (0.75 – 2.5) 2 x (0.75 – 2.5)
Flexible (mm^2)	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)
Flexible with ferrule (mm^2)	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)
Solid or Stranded (AWG)	18 – 14	18 – 14	18 – 14	18 – 14	18 – 14	18 – 14
Tools Main and Control Circuit Cable — Spring Cage Terminals Stripping Length (mm)	 10	 10	 10	 10	 10	 10
Screwdriver blade width (mm)	3.5	3.5	3.5	3.5	3.5	3.5
Mounting Position, AC and DC operated						
Ambient Temperature Open Enclosed	 -25 to 60°C [-13 to 140°F] -25 to 40°C [-13 to 104°F]	 -25 to 60°C [-13 to 140°F] -25 to 40°C [-13 to 104°F]	 -25 to 60°C [-13 to 140°F] -25 to 40°C [-13 to 104°F]	 -25 to 60°C [-13 to 140°F] -25 to 40°C [-13 to 104°F]	 -25 to 60°C [-13 to 140°F] -25 to 40°C [-13 to 104°F]	 -25 to 60°C [-13 to 140°F] -25 to 40°C [-13 to 104°F]
Ambient Storage Temperature	-40 to 80°C [-40 to 176°F]	-40 to 80°C [-40 to 176°F]	-40 to 80°C [-40 to 176°F]	-40 to 80°C [-40 to 176°F]	-40 to 80°C [-40 to 176°F]	-40 to 80°C [-40 to 176°F]
Environmental						
Mechanical Shock Resistance (IEC/EN 60068-2-27) Main contact — NO Contact Auxiliary contact — NO Contact Auxiliary contact — NC Contact	 10 7 5	 10 7 5	 10 7 5	 10 7 5	 10 7 5	 10 7 5
Overvoltage Category / Pollution Degree	III/3	III/3	III/3	III/3	III/3	III/3

B

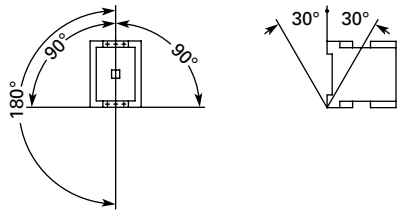
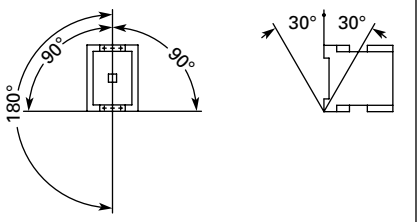
Frame F – G

Table B-105. *XT* Contactors Technical Data and Specifications — Frame F – G

Description	XTCE080F	XTCE095F	XTCE115G	XTCE150G
General				
Standards	IEC/EN 60947, VDE 0660, UL, CSA, CCC, RoHS			
Weights in kg [Lb]				
AC operated	2 [4.41]	2 [4.41]	2 [4.41]	2 [4.41]
DC operated	2.1 [4.63]	2.1 [4.63]	2.1 [4.63]	2.1 [4.63]
Mechanical Life	10,000	10,000	10,000	10,000
Mechanical Operating Frequency (ops/hr)				
AC operated	3600	3600	3600	3600
DC operated	3600	3600	3600	3600
Electrical Mechanical Operating Frequency (ops/hr) — see Curve, **Page B-80**				
AC-1; 400V I_e	800	800	800	800
AC-3; 400V I_e	800	800	800	800
AC-4; 400V I_e	300	300	300	300
Climatic Proofing	Damp heat, constant, to IEC 60068-2-78; Damp heat, cyclic, to IEC 60 068-2-30			
Insulation Voltage (U_i) V AC	1000	1000	1000	1000
Impulse Withstand Voltage (U_{imp}) V AC	8000	8000	8000	8000
Operational Voltage (U_e) V AC	1000	1000	1000	1000
Safe Isolation to VDE 0106 Part 101 and Part 101/A1				
Between coil and contacts (V AC)	690	690	690	690
Between contacts (V AC)	690	690	690	690
Making Capacity (Amps)	1120	1330	1610	2100
Breaking Capacity (Amps)				
220/230V	800	950	1150	1500
380/400V	800	950	1150	1500
500V	800	950	1150	1500
660/690V	650	800	1100	1200
1000V	—	—	—	—
Short-Circuit Protection Rating Maximum Fuse				
Type 2 Coordination ②				
400V; gG/gL 500V	160	160	250	250
690V; gG/gL 690V	160	160	①	①
Type 1 Coordination ②				
400V; gG/gL 500V	250	250	250	250
690V; gG/gL 690V	200	200	①	①
Degree of Protection	IP00			
Protection Against Direct Contact when Actuated from Front (IEC 536)	Finger- and back-of-hand proof			
Terminal Capacity Main Cable — Screw Terminals				
Solid (mm^2)	—	—	—	—
Flexible with ferrule (mm^2)	1 x (10 – 95) 2 x (10 – 70)	1 x (10 – 95) 2 x (10 – 70)	1 x (10 – 95) 2 x (10 – 70)	1 x (10 – 95) 2 x (10 – 70)
Stranded (mm^2)	1 x (16 – 120) 2 x (16 – 95)	1 x (16 – 120) 2 x (16 – 95)	1 x (16 – 120) 2 x (16 – 95)	1 x (16 – 120) 2 x (16 – 95)
Flat Conductor (Number of Segments x Width x Thickness) (mm)	2 x (6 x 16 x 0.8)	2 x (6 x 16 x 0.8)	2 x (6 x 16 x 0.8)	2 x (6 x 16 x 0.8)
Solid or Stranded (AWG)	8 – 250 MCM	8 – 250 MCM	8 – 250 MCM	8 – 250 MCM
Main Cable Connection Screw/Bolt	M10	M10	M10	M10
Tightening torque				
Nm	14	14	14	14
Lb-in	123.9	123.9	123.9	123.9
Terminal Capacity Control Circuit Cable — Screw Terminals				
Solid (mm^2)	1 x (0.75 – 4) 1 x (0.75 – 4)	1 x (0.75 – 4) 1 x (0.75 – 4)	1 x (0.75 – 4) 1 x (0.75 – 4)	1 x (0.75 – 4) 1 x (0.75 – 4)
Flexible with ferrule (mm^2)	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)
Solid or Stranded (AWG)	18 – 14	18 – 14	18 – 14	18 – 14
Control Circuit Cable Connection Screw/Bolt	M3.5	M3.5	M3.5	M3.5
Tightening torque				
Nm	1.2	1.2	1.2	1.2
Lb-in	10.6	10.6	10.6	10.6

① Contact Eaton.
② IEC 60947 Standard.

Table B-105. *XT* Contactors Technical Data and Specifications — Frame F – G (Continued)

Description	XTCE080F	XTCE095F	XTCE115G	XTCE150G
General (Continued)				
Tools Main Circuit Cable — Screw Terminals Hexagon Socket-Head Spanner (mm) Control Circuit Cable — Screw Terminals Posidrive screwdriver Standard screwdriver	 5 Size 2 0.8 x 5.5 1 x 6	 5 Size 2 0.8 x 5.5 1 x 6	 5 Size 2 0.8 x 5.5 1 x 6	 5 Size 2 0.8 x 5.5 1 x 6
Terminal Capacity Control Circuit Cable — Spring Cage Terminals Solid (mm^2)	 1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	 1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	 1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	 1 x (0.75 – 2.5) 2 x (0.75 – 2.5)
Flexible (mm^2)	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)
Flexible with ferrule (mm^2)	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)
Solid or Stranded (AWG)	18 – 14	18 – 14	18 – 14	18 – 14
Tools Control Circuit Cable — Spring Cage Terminals Stripping Length (mm)	 10	 10	 10	 10
Screwdriver blade width (mm)	3.5	3.5	3.5	3.5
Mounting Position, AC and DC operated				
Ambient Temperature Open Enclosed	 -25 to 60°C [-13 to 140°F] -25 to 40°C [-13 to 104°F)	 -25 to 60°C [-13 to 140°F] -25 to 40°C [-13 to 104°F)	 -25 to 60°C [-13 to 140°F] -25 to 40°C [-13 to 104°F)	 -25 to 60°C [-13 to 140°F] -25 to 40°C [-13 to 104°F)
Ambient Storage Temperature	-40 to 80°C [-40 to 176°F]	-40 to 80°C [-40 to 176°F]	-40 to 80°C [-40 to 176°F]	-40 to 80°C [-40 to 176°F]
Environmental				
Mechanical Shock Resistance (IEC/EN 60068-2-27) Half-sinusoidal shock 10 mS Main contact — NO Contact Auxiliary contact — NO Contact Auxiliary contact — NC Contact	 10g 7g 5g	 10g 7g 5g	 10g 7g 5g	 10g 7g 5g
Overvoltage Category/Pollution Degree	III/3	III/3	III/3	III/3

B

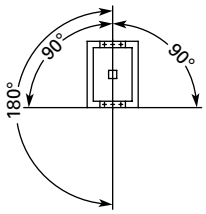
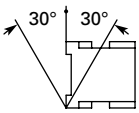
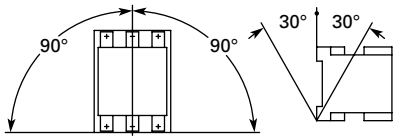
Frame L – M

Table B-106. *XT* Contactors Technical Data and Specifications — Frame L – M

Description	XTCE185L	XTCE225L	XTCE250L	XTCE300M	XTCE400M	XTCE500M
General						
Standards	IEC/EN 60947, VDE 0660, UL, CSA					
Weights in kg [Lb]	6.5 [14.3]	6.5 [14.3]	6.5 [14.3]	8 [18]	8 [18]	8 [18]
Mechanical Life	10,000,000	10,000,000	10,000,000	7000000	7000000	7000000
Mechanical Operating Frequency (ops/hr) AC operated DC operated	 3000 3000	 3000 3000	 3000 3000	 2000 2000	 2000 2000	 2000 2000
Mechanical Operating Frequency (ops/hr)	See **Figure B-43** on **Page B-81**.					
Climatic Proofing	Damp heat, constant, to IEC 60068-2-78; Damp heat, cyclic, to IEC 60 068-2-30					
Insulation Voltage (U_i) V AC	1000	1000	1000	1000	1000	1000
Impulse Withstand Voltage (U_{imp}) V AC	8000	8000	8000	8000	8000	8000
Operating Voltage (U_e) V AC	1000	1000	1000	1000	1000	1000
Safe Isolation to VDE 0106 Part 101 and Part 101/A1 Between coil and contacts (V AC) Between contacts (V AC)	 500 500	 500 500	 500 500	 500 500	 500 500	 500 500
Making Capacity (Amps)	3000	3000	3000	5500	5500	5500
Breaking Capacity (Amps) 220/230V 380/400V 500V 660/690V 1000V	 2500 2500 2500 2500 760	 2500 2500 2500 2500 760	 2500 2500 2500 2500 760	 5000 5000 5000 5000 950	 5000 5000 5000 5000 950	 5000 5000 5000 5000 950
Short-Circuit Protection Rating Maximum Fuse Type 2 Coordination ② 400V; gG/gL 500V 690V; gG/gL 690V 1000V; gG/gL 1000V Type 1 Coordination ② 400V; gG/gL 500V 690V; gG/gL 690V 1000V; gG/gL 1000V	 315 315 160 400 400 200	 315 315 160 400 400 200	 315 315 160 400 400 200	 500 500 200 630 630 250	 500 500 200 630 630 250	 500 500 200 630 630 250
Degree of Protection	IP00					
Protection Against Direct Contact when Actuated from Front (Iec 536)	Finger- and back-of-hand proof with terminal shroud or terminal block.					
Main Cable Cross-Section Flexible with cable lug (mm^2) Stranded with cable lug (mm^2) Solid or Stranded (AWG) Flat Conductor (mm) Busbar — Width in mm	 35 – 95 50 – 120 20	 50 – 240 70 – 240 1/0 – 250 MCM ① 20	 50 – 240 70 – 240 1/0 – 250 MCM ① 25	 50 – 240 70 – 240 1/0 – 250 MCM ① 25	 50 – 240 70 – 240 1/0 – 250 MCM ① 25	 50 – 240 70 – 240 1/0 – 250 MCM ① 30
Main Cable Connection Screw/Bolt Tightening torque Nm Lb-in	M10 24 213	M10 24 213	M10 24 213	M10 24 213	M10 24 213	M10 24 213
Control Circuit Cable Cross-Sections Solid (mm^2)	 1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	 1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	 1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	 1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	 1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	 1 x (0.75 – 2.5) 2 x (0.75 – 2.5)
Flexible with ferrule (mm^2)	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)
Solid or Stranded (AWG)	2 x (18 – 12)	2 x (18 – 12)	2 x (18 – 12)	2 x (18 – 12)	2 x (18 – 12)	2 x (18 – 12)
Control Circuit Cable Connection Screw/Bolt Tightening torque Nm Lb-in	M3.5 1.2 10.6	M3.5 1.2 10.6	M3.5 1.2 10.6	M3.5 1.2 10.6	M3.5 1.2 10.6	M3.5 1.2 10.6
Tools Main cable wrench Control circuit cable pozidrive screwdriver	 16 mm Size 2	 16 mm Size 2	 16 mm Size 2	 16 mm Size 2	 16 mm Size 2	 16 mm Size 2

① Screw tightening with flat cable terminal or cable terminal blocks. See terminal capacity for cable terminal blocks.
② IEC 60947 Standard.

Table B-106. *XT* Contactors Technical Data and Specifications — Frame L – M (Continued)

Description	XTCE185L	XTCE225L	XTCE250L	XTCE300M	XTCE400M	XTCE500M
General (Continued)						
Mounting Position, AC and DC Operated						
Ambient Temperature	-25 to 60°C [-13 to 140°F]	-25 to 60°C [-13 to 140°F]	-25 to 60°C [-13 to 140°F]	-25 to 60°C [-13 to 140°F]	-25 to 60°C [-13 to 140°F]	-25 to 60°C [-13 to 140°F]
Ambient Storage Temperature	-40 to 80°C [-40 to 176°F]	-40 to 80°C [-40 to 176°F]	-40 to 80°C [-40 to 176°F]	-40 to 80°C [-40 to 176°F]	-40 to 80°C [-40 to 176°F]	-40 to 80°C [-40 to 176°F]
Environmental						
Mechanical Shock Resistance (IEC/EN 60068-2-27) Half-sinusoidal shock 10 mS						
Main contact — NO Contact	10g	10g	10g	10g	10g	10g
Auxiliary contact — NO Contact	10g	10g	10g	10g	10g	10g
Auxiliary contact — NC Contact	8g	8g	8g	8g	8g	8g
Overvoltage Category/ Pollution Degree	III/3	III/3	III/3	III/3	III/3	III/3
Switching Capacity, kvar ① Individual Compensation						
230V	87	—	—	115	—	—
400/420/440V	150	—	—	200	—	—
525V	190	—	—	265	—	—
690V	150	—	—	200	—	—
Group Compensation, with Choke						
230V	80	100	110	130	160	160
400/420/440V	150	175	190	225	280	280
525V	200	230	260	290	370	370
690V	260	300	340	390	480	480
Group Compensation, without Choke						
230V	66	—	—	85	—	—
400/420/440V	115	—	—	150	—	—
525V	145	—	—	195	—	—
690V	115	—	—	150	—	—

① When using contactors for group compensation, a minimum inductance of approx. 6 µH per capacitor must be available to limit the high inrush current peaks. This corresponds to an air-cored coil with 5 windings and a coil diameter of approximately 140 mm. The conductor cross-section must be selected according to the rated current per phase.

B

Frame N – R

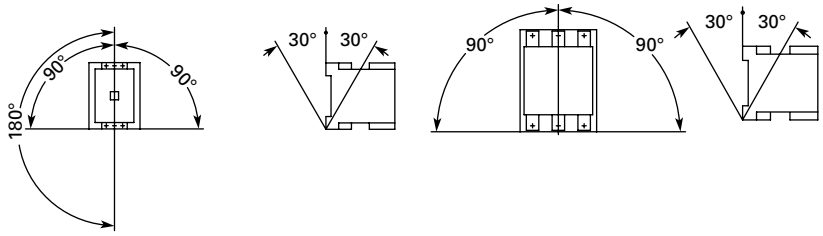
Table B-107. *XT* Contactors Technical Data and Specifications — Frame N – R

Description	XTCE580N	XTCE650N	XTCE750N, XTCE820N,	XTCEC10N	XTCEC14P, XTCEC20R
General					
Standards	IEC/EN 60947, VDE 0660, UL, CSA				
Weights in kg [Lb]	15 [33]	15 [33]	15 [33]	15 [33]	15, 32 [33, 70]
Mechanical Life	5,000,000	5,000,000	5,000,000	5,000,000	5,000,000
Mechanical Operating Frequency (ops/hr)					
AC operated	1000	1000	1000	1000	1000
DC operated	1000	1000	1000	1000	1000
Maximum Operating frequency (ops/hr)	See **Figure B-43** on **Page B-81**.				
Climatic Proofing	Damp heat, constant, to IEC 60068-2-78; Damp heat, cyclic, to IEC 60 068-2-30				
Insulation Voltage (U_i) V AC	1000	1000	1000	1000	1000
Impulse Withstand Voltage (U_{imp}) V AC	8000	8000	8000	8000	8000
Operating Voltage (U_e) V AC	1000	1000	1000	1000	1000
Safe Isolation to VDE 0106 Part 101 and Part 101/A1					
Between coil and contacts (V AC)	500	500	500	500	500
Between contacts (V AC)	500	500	500	500	500
Making Capacity (Amps)	7800	7800	9840	9840	9840
Breaking Capacity (Amps)					
220/230V	6500	6500	8200	8200	8200
380/400V	6500	6500	8200	8200	8200
500V	6500	6500	8200	8200	8200
660/690V	6500	6500	8200	8200	8200
1000V	4350	4350	5800	5800	5800
Short-Circuit Protection Rating Maximum Fuse					
Type 2 Coordination ②					
400V; gG/gL 500V	630	630	630	630	—
690V; gG/gL 690V	630	630	630	630	—
1000V; gG/gL 1000V	500	500	630	630	—
Type 1 Coordination ②					
400V; gG/gL 500V	1000	1000	1200	1200	—
690V; gG/gL 690V	1000	1000	1200	1200	—
1000V; gG/gL 1000V	630	630	800	800	—
Degree of Protection	IP00				
Protection Against Direct Contact when Actuated from Front (Iec 536)	Finger- and back-of-hand proof with terminal shroud or terminal block.				
Main Cable Cross-Section					
Flexible with cable lug (mm^2)	50-240	50-240	50-240	50-240	50-240
Stranded with cable lug (mm^2)	70-240	70-240	70-240	70-240	70-240
Solid or Stranded (AWG)	2/0 – 500 MCM	2/0 – 500 MCM	2/0 – 500 MCM	2/0 – 500 MCM	2/0 – 500 MCM
Flat Conductor (mm)	①	①	①	①	①
Busbar — Width in mm	50	50	50	50	50
Main Cable Connection Screw/Bolt	M10	M10	M12	M12	M12
Tightening torque					
Nm	24	24	35	35	35
Lb-in	213	213	311	311	311
Control Circuit Cable Cross-Sections					
Solid (mm^2)	1 x (0.75 – 2.5)	1 x (0.75 – 2.5)	1 x (0.75 – 2.5)	1 x (0.75 – 2.5)	1 x (0.75 – 2.5)
	2 x (0.75 – 2.5)	2 x (0.75 – 2.5)	2 x (0.75 – 2.5)	2 x (0.75 – 2.5)	2 x (0.75 – 2.5)
Flexible with ferrule (mm^2)	1 x (0.75 – 2.5)	1 x (0.75 – 2.5)	1 x (0.75 – 2.5)	1 x (0.75 – 2.5)	1 x (0.75 – 2.5)
	2 x (0.75 – 2.5)	2 x (0.75 – 2.5)	2 x (0.75 – 2.5)	2 x (0.75 – 2.5)	2 x (0.75 – 2.5)
Solid or Stranded (AWG)	2 x (18 – 12)	2 x (18 – 12)	2 x (18 – 12)	2 x (18 – 12)	2 x (18 – 12)
Control Circuit Cable Connection Screw/Bolt	M3.5	M3.5	M3.5	M3.5	M3.5
Tightening torque					
Nm	1.2	1.2	1.2	1.2	1.2
Lb-in	10.6	10.6	10.6	10.6	10.6

① Screw tightening with flat cable terminal or cable terminal blocks. See terminal capacity for cable terminal blocks.

② IEC 60947 Standard.

Table B-107. *XT* Contactors Technical Data and Specifications — Frame N – R (Continued)

Description	XTCE580N	XTCE650N	XTCE750N, XTCE820N,	XTCEC10N	XTCEC14N, XTCEC20N
General (Continued)					
Tools Main cable wrench Control circuit cable pozidrive screwdriver	 16 mm Size 2	 16 mm Size 2	 18 mm Size 2	 18 mm Size 2	 18 mm Size 2
Mounting Position, AC and DC Operated					
Ambient Temperature	-25 to 60°C [-13 to 140°F]	-25 to 60°C [-13 to 140°F]	-25 to 60°C [-13 to 140°F]	-25 to 60°C [-13 to 140°F]	-25 to 60°C [-13 to 140°F]
Ambient Storage Temperature	-40 to 80°C [-40 to 176°F]	-40 to 80°C [-40 to 176°F]	-40 to 80°C [-40 to 176°F]	-40 to 80°C [-40 to 176°F]	-40 to 80°C [-40 to 176°F]
Environmental					
Mechanical Shock Resistance (IEC/EN 60068-2-27) Half-sinusoidal shock 10 mS (g) Main contact — NO Contact Auxiliary contact — NO Contact Auxiliary contact — NC Contact	 10 10 8	 10 10 8	 10 10 8	 10 10 8	 10 10 8
Overvoltage Category/Pollution Degree	III/3	III/3	III/3	III/3	III/3
Switching Capacity, kvar ① Individual Compensation 230V 400/420/440V 525V 690V	 175 300 400 300	 — — — —	 — — — —	 — — — —	 — — — —

① When using contactors for group compensation, a minimum inductance of approx. 6 µH per capacitor must be available to limit the high inrush current peaks. This corresponds to an air-cored coil with 5 windings and a coil diameter of approximately 140 mm. The conductor cross-section must be selected according to the rated current per phase.

Instructional Leaflets

Table B-108. Instructional Leaflets

Publication Number	Description
Pub51210	7 – 15A, B Frame XTCE, XTCEC and XTCF Contactors and Accessories (Inside of Packaging)
Pub51211	18 – 32A, C Frame XTCE and XTCEC Contactors and Accessories (Inside of Packaging)
Pub51221	XTOB, D Frame Overload Relays (Inside of Packaging)
Pub51222	XTOB, B – C Frame Overload Relays (Inside of Packaging)
Pub51237	7 – 12A, B Frame XTCE Contactors and Auxiliary Contacts
Pub51232	18 – 32A, C Frame XTCE Contactors and Auxiliary Contacts
Pub51216	40 – 65A, D Frame XTCE Contactors and Auxiliary Contacts
Pub51203	185 – 500A, L – M Frame XTCE Contactors and Auxiliary Contacts
Pub51215	S-Series 185 – 500A, L – M Frame XTCE Contactors and Auxiliary Contacts
Pub51204	580 – 1000A, N Frame XTCE Contactors and Auxiliary Contacts
Pub51209	1400 – 2000A, P – R Frame XTCE Contactors and Auxiliary Contacts
Pub51213	7 – 150A, B – G Frame XTAE Non-reversing and XTAR Reversing Starters
Pub51217	XTCEXFA and XTCEXSA Front and Side Mount Auxiliary Contacts from 40 – 150A, D – G Frame XTCE Contactors
Pub51212	XTCEXML Mechanical Interlock for 7 – 150A, B – G Frame XTCE Contactors
Pub51214	XTCEXRL Reversing Link Kits for 18 – 32A, C Frame XTCE Contactors
Pub51218	XTCEXTL Lug Kits for 500 – 820A, M – N Frame XTCE Contactors
Pub51219	XTCEXRLB and XTCEXSDLB Reversing and Star-Delta (Wye-Delta) Link Kits for 7 – 12A, B Frame XTCE Contactors
Pub51205	Accessories for 185 – 500A, L – M Frame XTCE Contactors
Pub51207	Replacement DC Coils
Pub51213	Renewal Parts — Coils for 18 – 32A, C Frame XTCE Contactors
Pub51186	Renewal Parts — Coils for 40 – 65A, D Frame XTCE Contactors

Coil Data

Frame B – D

Table B-109. Coil Data — Frame B – D

	XTCE007B	XTCE009B	XTCE012B XTCF020B	XTCE015B	XTCE018C	XTCE025C	XTCE032C	XTCE040D	XTCE050D	XTCE065D
Voltage Tolerance										
Pick-Up (x U_C)										
AC operated	0.8 – 1.1	0.8 – 1.1	0.8 – 1.1	0.8 – 1.1	0.8 – 1.1	0.8 – 1.1	0.8 – 1.1	0.8 – 1.1	0.8 – 1.1	0.8 – 1.1
DC operated	0.8 – 1.1 ①	0.8 – 1.1 ①	0.8 – 1.1 ①	0.8 – 1.1 ①	0.7 – 1.2 ②	0.7 – 1.2 ②	0.7 – 1.2 ②	0.7 – 1.2 ②	0.7 – 1.2 ②	0.7 – 1.2 ②
Drop-Out (x U_C)										
AC operated	0.3 – 0.6	0.3 – 0.6	0.3 – 0.6	0.3 – 0.6	0.3 – 0.6	0.3 – 0.6	0.3 – 0.6	0.3 – 0.6	0.3 – 0.6	0.3 – 0.6
DC operated	0.15 – 0.6	0.15 – 0.6	0.15 – 0.6	0.15 – 0.6	0.15 – 0.6	0.15 – 0.6	0.15 – 0.6	0.15 – 0.6	0.15 – 0.6	0.15 – 0.6
Power Consumption of the coil at cold state and 1.0 x U_C										
AC operated										
Single-voltage coil 50 Hz										
Pick-Up VA	24	24	24	24	52	52	52	149	149	149
Pick-Up W	19	19	19	19	40	40	40	80	80	80
Sealing VA	3.4	3.4	3.4	3.4	7.1	7.1	7.1	16	16	16
Sealing W	1.2	1.2	1.2	1.2	2.1	2.1	2.1	4.3	4.3	4.3
Single-voltage coil 60 Hz										
Pick-Up VA	30	30	30	30	67	67	67	178	178	178
Pick-Up W	23	23	23	23	50	50	50	117	117	117
Sealing VA	4.4	4.4	4.4	4.4	8.7	8.7	8.7	19	19	19
Sealing W	1.4	1.4	1.4	1.4	2.6	2.6	2.6	5.3	5.3	5.3
50/60 Hz										
Pick-Up VA	27	27	27	27	62	62	62	168	168	168
	25	25	25	25	58	58	58	154	154	154
Pick-Up W	22	22	22	22	48	48	48	120	120	120
	21	21	21	21	43	43	43	43	43	43
Sealing VA	4.2	4.2	4.2	4.2	9.1	9.1	9.1	22	22	22
	3.3	3.3	3.3	3.3	6.5	6.5	6.5	14	14	14
Sealing W	1.4	1.4	1.4	1.4	2.5	2.5	2.5	5.3	5.3	5.3
	1.2	1.2	1.2	1.2	2	2	2	4.3	4.3	4.3
DC operated										
Pick-Up W	3	3	4.5	4.5	12 at 24V	12 at 24V	12 at 24V	24 at 24V	24 at 24V	24 at 24V
Sealing W	3	3	4.5	4.5	0.5 at 24V	0.5 at 24V	0.5 at 24V	0.5 at 24V	0.5 at 24V	0.5 at 24V
Duty Factor (%DF)	100	100	100	100	100	100	100	100	100	100
Switching Time at 100% U_C (approximate values)										
Main Contact										
AC operated										
Closing delay (mS)	<21	<21	<21	<21	<22	<22	<22	<18	<18	<18
Opening delay (mS)	<18	<18	<18	<18	<14	<14	<14	<13	<13	<13
DC operated										
Closing delay (mS)	<31	<31	<31	<31	<47	<47	<47	<54	<54	<54
Opening delay (mS)	<12	<12	<12	<12	<30	<30	<30	<24	<24	<24
Arcing time (mS)	10	10	10	10	10	10	10	10	10	10
Electromagnetic Compatibility (EMC)										
Emitted interference	To EN-60947-1									
Noise Immunity	To EN-60947-1									

① 0.7 – 1.3 without additional auxiliary contact modules and ambient temperature +40°C [104°F].

② Coil Suffix TD: U_{min} 24V DC/U_{max} 27V DC.
Coil Suffix WD: U_{min} 48V DC/U_{max} 60V DC.
Coil Suffix AD: U_{min} 110V DC/U_{max} 130V DC.
Coil Suffix BD: U_{min} 200V DC/U_{max} 240V DC.
Example:
$U_c = 0.7 \times U_{min} - 1.2 \times U_{max}$
$U_c = 0.7 \times 24V - 1.2 \times 27V$ DC

Frame F – G

Table B-110. Coil Data — Frame F – G

	XTCE80F	XTCE95F	XTCE115G	XTCE150G
Voltage Tolerance				
Pick-Up (x U_C)				
AC operated	0.8 – 1.1	0.8 – 1.1	0.8 – 1.1	0.8 – 1.1
DC operated	0.7 – 1.2 ①	0.7 – 1.2 ①	0.7 – 1.2 ①	0.7 – 1.2 ①
Drop-Out (x U_C)				
AC operated	0.3 – 0.6	0.3 – 0.6	0.25 – 0.6	0.25 – 0.6
DC operated	0.15 – 0.6	0.15 – 0.6	0.15 – 0.6	0.15 – 0.6
Power Consumption of the coil at cold state and 1.0 x U_C				
AC operated				
Single-voltage coil 50 Hz				
Pick-Up VA	310	310	180	180
Pick-Up W	165	165	130	130
Sealing VA	26	26	3.1	3.1
Sealing W	5.8	5.8	2.1	2.1
Single-voltage coil 60 Hz				
Pick-Up VA	345	345	170	170
Pick-Up W	190	190	130	130
Sealing VA	30	30	3.1	3.1
Sealing W	7.1	7.1	2.1	2.1
50/60 Hz				
Pick-Up VA	372	328	170	170
Pick-Up W	190	190	130	130
Sealing VA	37.1	22.6	3.1	3.1
Sealing W	7.5	6.1	2.1	2.1
DC operated				
Pick-Up W	90 at 24V	90 at 24V	149 at 24V	149 at 24V
Sealing W	1.3 at 24V	1.3 at 24V	2.1 at 24V	2.1 at 24V
Duty Factor (%DF)	100	100	100	100
Switching Time at 100% U_C (approximate values)				
Main Contact				
AC operated				
Closing delay (mS)	<20	<20	<33	<33
Opening delay (mS)	<14	<14	<41	<41
DC operated				
Closing delay (mS)	<45	<45	<35	<35
Opening delay (mS)	<34	<34	<30	<30
Arcing Time (mS)	15	15	15	15
Permissible Residual Current with Actuation of A1 – A2 By the Electronics (with 0 signal) (mA)	≤ 1	≤ 1	≤ 1	≤ 1
Electromagnetic Compatibility (EMC)				
Emitted interference	To EN60947-1			
Noise Immunity	To EN60947-1			

① At 24V: 0.7 – 1.3 without additional auxiliary contact modules and ambient temperature +40°C [104°F].

B

Frame L – R

Table B-111. Coil Data — Frame L – R

Description	XTCE185L	XTCE225L, XTCE250L	XTCE300M, XTCE400M	XTCE500M
Voltage Tolerance				
Pick-Up (x U_c)				
XTCE185L – XTCEC20R	0.7 x U_{cmin} — 1.15 x U_{cmax}			
XTCS185L – XTCS500M	0.85 x U_{cmin} — 1.1 x U_{cmax}			
Drop-Out (x U_c)				
XTCE185L – XTCEC20R	0.2 x U_{cmin} — 0.6 x U_{cmax}			
XTCS185L – XTCS500M	0.2 x U_{cmin} — 0.4 x U_{cmax}			
Power Consumption of the coil at cold state and 1.0 x U_C				
XTCE185L – XTCEC20R				
Pick-Up VA	250 ①	250 ①	450 ①	450 ①
Pick-Up W	200	200	350	350
Sealing VA	4.3	4.3	4.3	4.3
Sealing W	3.3	3.3	3.3	3.3
XTCS185L – XTCS500M				
Pick-Up VA	360	360	715	715
Pick-Up W	325	325	645	645
Sealing VA	4.3	4.3	4.3	4.3
Sealing W	3.3	3.3	3.3	3.3
Duty Factor (%DF)	100	100	100	100
Switching Time at 100% Main Contact U_C (approximate values)				
XTCE185L – XTCEC20R				
Closing delay (mS)	<100	<100	<80	<80
Opening delay (mS)	<80	<80	<80	<80
XTCS185L – XTCS500M				
Closing delay (mS)	<50	<50	<50	<50
Opening delay (mS)	<40	<40	<40	<40
Reaction in Threshold and Sealing State Transition Range (XTCE185L – XTCEC20R)				
Voltage interruptions				
(0 – 0.2 x U_{cmin}) ≤ 10ms	Time is bridged successfully			
(0 – 0.2 x U_{cmin}) > 10ms	Drop-out of the contactor			
Voltage Dips				
(0.2 – 0.6 x U_{cmin}) ≤ 12ms	Time is bridged successfully			
(0.2 – 0.6 x U_{cmin}) > 12ms	Drop-out of the contactor			
(0.6 – 0.7 x U_{cmin})	Contactor remains switched on			
Excess Voltage				
(1.15 – 1.3 x U_{cmax})	Contactor remains switched on			
(>1.3 x U_{cmax}) ≤ 3s	Contactor remains switched on			
(>1.3 x U_{cmax}) > 3s	Drop-out of the contactor			
Pick – Up phase				
(0 – 0.7 x U_{cmin})	Contactor does not switch on			
(0.7 x U_{cmin} –1.15 x U_{cmax})	Contactor switches on with certainty			
(>1.15 x U_{cmax})	Contactor switches on with certainty			
Permissible contact resistance (of the external command device with actuation of A11), Ω	≤ 500	≤ 500	≤ 500	≤ 500
Permissible residual current (with actuation of A11 by the electronics with 0 signal)	≤ 1	≤ 1	≤ 1	≤ 1
SPS Signal Level (A3 – A4) to IEC/EN 61131-2 (Type 2)				
High	15V	15V	15V	15V
Low	5V	5V	5V	5V
Electromagnetic compatibility (EMC)	This product is designed for operation in industrial environments. Usage in domestic areas can cause radio frequency interference (RFI). Noise suppression measures must be provided for the additional interference.			

① Control transformer with U_k ≤6%.

Table B-111. Coil Data — Frame L – R (Continued)

Description	XTCE580N	XTCE750N, XTCE820N	XTCEC10N	XTCEC14P	XTCEC20R
Voltage Tolerance					
Pick-Up (x U_c) XTCE185L – XTCEC20R XTCS185L – XTCS500M Drop-Out (x U_c) XTCE185L – XTCEC20R XTCS185L – XTCS500M	 0.7 x U_{cmin} — 1.15 x U_{cmax} 0.85 x U_{cmin} — 1.1 x U_{cmax} 0.2 x U_{cmin} — 0.6 x U_{cmax} 0.2 x U_{cmin} — 0.4 x U_{cmax}				
Power Consumption of the coil at cold state and 1.0 x U_C					
XTCE185L – XTCEC20R Pick-Up VA Pick-Up W Sealing VA Sealing W	 800 ① 700 7.5 6.5	 800 ① 700 7.5 6.5	 800 ① 700 7.5 6.5	 800 ① 700 7.5 6.5	 1600 ① 1400 15 13
XTCS185L –– XTCS500M Pick-Up VA Pick-Up W Sealing VA Sealing W	 — — — —	 — — — —	 — — — —	 — — — —	 — — — —
Duty Factor (%DF)	100	100	100	100	100
Switching Time at 100% Main Contact U_C (approximate values)					
XTCE185L – XTCEC20R Closing delay (mS) Opening delay (mS) XTCS185L – XTCS500M Closing delay (mS) Opening delay (mS)	 <70 <70 — —	 <70 <70 — —	 <70 <70 — —	 <70 <40 — —	 <70 <40 — —
Reaction in Threshold and Sealing State Transition Range (XTCE185L – XTCEC20R)					
Voltage interruptions (0 – 0.2 x U_{cmin}) ≤ 10ms (0 – 0.2 x U_{cmin}) > 10ms	 Time is bridged successfully Drop-out of the contactor				
Voltage Dips (0.2 – 0.6 x U_{cmin}) ≤ 12ms (0.2 – 0.6 x U_{cmin}) > 12ms (0.6 – 0.7 x U_{cmin})	 Time is bridged successfully Drop-out of the contactor Contactor remains switched on				
Excess Voltage (1.15 – 1.3 x U_{cmax}) (>1.3 x U_{cmax}) ≤ 3s (>1.3 x U_{cmax}) > 3s	 Contactor remains switched on Contactor remains switched on Drop-out of the contactor				
Pick – Up phase (0 – 0.7 x U_{cmin}) (0.7 x U_{cmin} –1.15 x U_{cmax}) (>1.15 x U_{cmax})	 Contactor does not switch on Contactor switches on with certainty Contactor switches on with certainty				
Permissible contact resistance (of the external command device with actuation of A11), Ω	≤ 500	≤ 500	≤ 500	≤ 500	≤ 500
Permissible residual current (with actuation of A11 by the electronics with 0 signal)	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1
SPS Signal Level (A3 – A4) to IEC/EN 61131-2 (Type 2) High Low	 15V 5V	 15V 5V	 15V 5V	 15V 5V	 15V 5V
Electromagnetic compatibility (EMC)	This product is designed for operation in industrial environments. Usage in domestic areas can cause radio frequency interference (RFI). Noise suppression measures must be provided for the additional interference.				

① Control transformer with U_k ≤7%.

B

Contactor Contact Travel Diagrams

The diagrams indicate the closing and travel of the contacts of the contactors and auxiliary contacts at no-load. Tolerances are not taken into consideration.

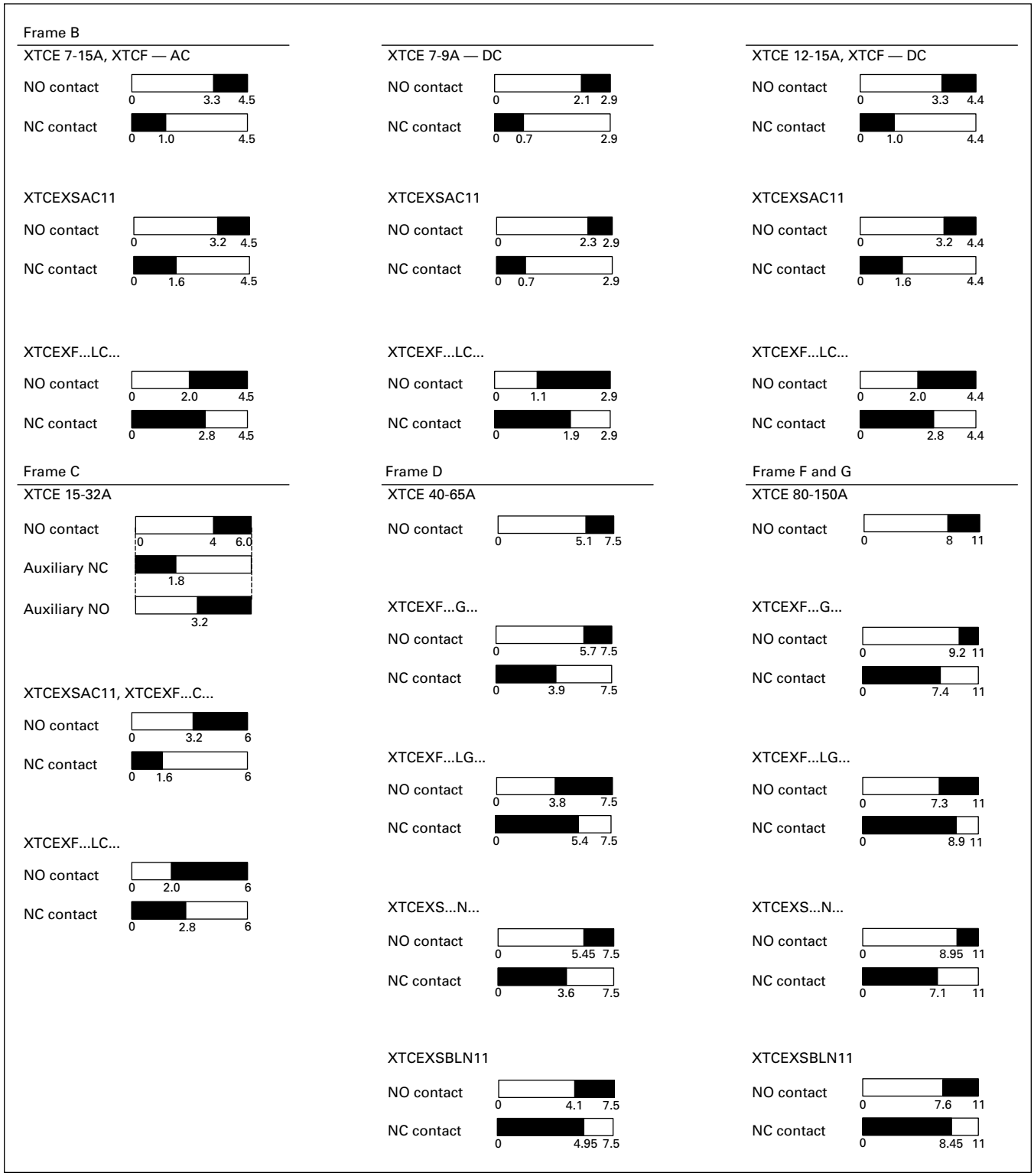


Figure B-38. Contactor Contact Travel Diagrams

Auxiliary Contacts

Table B-112. Auxiliary Contacts Technical Data and Specifications

Description	XTCE007B…– XTCE032C	XTCEXFAC… XTCEXFATC…	XTCEXFCC… XTCEXSCC…	XTCEXFAG…	XTCEXSBLN… XTCEXSBN… XTCEXSBNC… XTCEXSCN… XTCEXSCNC…
Interlocked opposing contacts with an auxiliary contact module (to IEC 60947-5 -1 Annex L)	—	Yes	Yes	Yes	Yes
Break contact (not late-break contact) suitable as a mirror contact (to IEC/EN 60947-4 -1 Annex F)	XTCE007B… – XTCE032C	XTCE007B… – XTCE032C	XTCE007B… – XTCE032C	XTCE040D… – XTCE065D…	XTCE040D… – XTCE065D… XTCE185L… – XTCEC10N…
Rated impulse withstand voltage, (Uimp) V AC	6000	6000	6000	6000	6000
Overvoltage category / pollution degree	III/3	III/3	III/3	III/3	III/3
Rated insulation voltage, (Ui) V AC	690	690	690	690	690
Rated operational voltage, (U_e) V AC	500	500	500	500	500
Safe isolation to VDE 0106 Part 101 and Part 101(A) in V AC Between coil and auxiliary contacts Between the auxiliary contacts	 400 400	 400 400	 400 400	 440 440	 440 440
Rated Operational Current, I_e AC-15 230V 380/415V 500V DC-3 L/R ≤5 mS ① 24V 60V 110V 220V	 6A 4A 1.5A 10A 6A 3A 1A	 6A 3A — 10A 6A 3A 1A	 6A 4A 1.5A 10A 6A 3A 1A	 6A 4A 1.5A 10A 6A 3A 1A	 6A 4A 1.5A 10A 6A 3A 1A
Conventional thermal current, I_{th}	16A	16A	16A ③	10A	10A
Control circuit reliability (at U_e = 24 V DC, U_{min} = 17 V, I_{min} = 5.4 mA)	$<10^{-8}$, < one failure at 100 million operations				
Component Lifespan, Operations x 10^6 at U_e = 230V, AC-15, 3A	1.3	1.3	1.3	1.3	1.3
Short-circuit rating without welding ② Maximum fuse, gG/gL	 10A	 10A	 10A	 16A	 16A

① Making and breaking conditions to DC-13, time L/R contact as stated.
② See fuses overlay for time/current characteristic (on request).
③ Conventional thermal current (I_{th}) of XTCEXSCC_ is 10A.

Table B-113. Parallel Link Technical Data and Specifications

Description	XTCEXPLKB	XTECXPLKC	XTCEXPLKD	XTCEXPLKG	XTCEXPLK185
Terminal Capacity Solid (mm^2)	 1 – 16	 16	 16	 —	 —
Flexible with ferrule (mm^2)	1 x (0.5 – 25) 2 x (0.5 – 16)	1 x (16 – 35)	1 x (16 – 120)	—	—
Stranded (mm^2)	1 x (0.5 – 25) 2 x (0.5 – 16)	1 x (16 – 50)	1 x (16 – 120)	1 x (35 – 300) 2 x (35 – 120)	—
Flat conductor — number of segments x width x thickness (mm)	6 x 9 x 0.8	—	—	2 x (11 x 21 x 1)	1 x (6 x 16 x 0.8) 2 x (20 x 32 x 0.5) 2 x (11 x 21 x 1)
Tightening Torque (Nm)	4	4	14	—	—
Tools Pozidrive screwdriver Hexagon socket head spanner — SW (mm)	 Size 2 —	 Size 2 —	 — 5	 — 6	 — —
Conventional Thermal Current 3-Pole (I_{th}) A 4-Pole (I_{th}) A	 50 60	 100 —	 180 —	 400 —	 — —

Table B-114. Cable Terminal Block, Flat Cable Terminal Technical Data and Specifications

Description	XTCEXTLA225	XTCEXTLA400	XTCEXPLK185	XTCEXTFB650	XTCEXTFB820
Terminal Capacity Stranded (mm^2)	 1 x (16 – 185) 2 x (16 – 150)	 1 x (120 – 300) 2 x (70 – 240)	 —	 —	 —
Stranded (AWG)	1 x (6 – 350 MCM) 2 x (6 – 300 MCM)	1 x (1/0 – 600 MCM) 2 x (1/0 – 500 MCM)	—	—	—
Flat conductor — number of segments x width x thickness (mm)	1 x (3 x 9 x 0.8) 2 x (10 x 16 x 0.8)	1 x (10 x 16 x 0.8) 2 x (20 x 24 x 0.5) 2 x (11 x 21 x 1)	1 x (6 x 16 x 0.8) 2 x (20 x 32 x 0.5) 2 x (11 x 21 x 1)	1 x (6 x 16 x 0.8) 2 x (20 x 32 x 0.5) 2 x (11 x 21 x 1)	1 x (6 x 16 x 0.8) 2 x (10 x 40 x 1) 2 x (20 x 40 x 0.5)

B

AC Ratings

Table B-115. AC Ratings

Description	XTCE007B	XTCE009B	XTCE012B XTCF020B	XTCE015B	XTCE018C	XTCE025C	XTCE032C
AC-1 Operation							
Conventional Free Air Thermal Current, 3-Pole, 50 – 60 Hz							
Open							
at 40°C (I_{th})	22A	22A	22A	22A	40A	45A	45A
at 50°C (I_{th})	21A	21A	21A	21A	38A	43A	43A
at 55°C (I_{th})	21A	21A	21A	21A	37A	42A	42A
at 60°C (I_{th})	20A	20A	20A	20A	35A	40A	40A
Enclosed	18A	18A	18A	18A	32A	36A	36A
Conventional Free Air Thermal Current, 1-Pole (I_{th})							
Open	50A	50A	50A	50A	85A	85A	85A
Enclosed	45A	45A	45A	45A	80A	80A	80A
AC-3 Operation							
Rated Operational Current, 50/60 Hz ① (I_e) in amperes							
220/230V	7	9	12	15.5	18	25	32
240V	7	9	12	15.5	18	25	32
380/400V	7	9	12	15.5	18	25	32
415V	7	9	12	15.5	18	25	32
440V	7	9	12	15.5	18	25	32
500V	5	7	10	12.5	18	25	32
660/690V	4	5	7	9	12	15	18
1000V	—	—	—	—	—	—	—
Rated power (P) in kilowatts							
220/230V	2.2	2.5	3.5	4	5	7.5	10
240V	2.2	3	4	4.6	5.5	8.5	11
380/400V	3	4	5.5	7.5	7.5	11	15
415V	4	5.5	7	8	10	14.5	19
440V	4.5	5.5	7.5	8.4	10.5	15.5	20
500V	3.5	4.5	7	7.5	12	17.5	23
660/690V	3.5	4.5	6.5	7	11	14	17
1000V	—	—	—	—	—	—	—
AC-4 Operation							
Rated Operational Current, 50/60 Hz ① (I_e) in amperes							
220/230V	5	6	7	7	10	13	15
240V	5	6	7	7	10	13	15
380/400V	5	6	7	7	10	13	15
415V	5	6	7	7	10	13	15
440V	5	6	7	7	10	13	15
500V	4.5	5	6	6	10	13	15
660/690V	4	4.5	5	5	8	10	12
1000V	—	—	—	—	—	—	—
Rated power (P) in kilowatts							
220/230V	1	1.5	2	2	2.5	3.5	4
240V	1.5	1.6	2.2	2.2	3	4	4.5
380/400V	2.2	2.5	3	3	4.5	6	7
415V	2.3	2.8	3.4	3.4	5	6.5	7.5
440V	2.4	3	3.6	3.6	5.5	7	8
500V	2.5	2.8	3.5	3.5	6	8	9
660/690V	2.9	3.6	4.4	4.4	6.5	8.5	10
1000V	—	—	—	—	—	—	—
AC-6A Operation							
Transformer Loads	Values are application specific. Calculation is $I_{eAC-3} = X / 6 * I_e$Transformer where X is the inrush current of the transformer and I_eTransformer is the nominal current. ②						
AC-6B Operation							
Capacitor Loads Individual compensation rated operational current I_e of three-phase capacitors in amperes Up to 525V 690V	See **Page B-46** for Capacitor Ratings						
Maximum inrush current peak (x I_e)	30	30	30	30	30	30	30
Component Lifesaving (Operations)	—	—	—	—	—	—	—
Maximum Operating Frequency (ops/hr)	—	—	—	—	—	—	—

① At maximum permissible ambient temperature.

② Example —
The transformer has a nominal current of 10A with an inrush current of 18 times the nominal current. So, the contactor must have an AC-3 current of 18/6 x 10A = 30A. Using an XTCE032C (32A AC-3) contactor is recommended.

Table B-115. AC Ratings (Continued)

Description	XTCE040D	XTCE050D	XTCE065D	XTCE080F	XTCE095F	XTCE115G	XTCE150G
AC-1 Operation							
Conventional Free Air Thermal Current, 3-Pole, 50 – 60 Hz							
Open							
at 40°C (I_{th})	60A	80A	98A	110A	130A	160A	190A
at 50°C (I_{th})	57A	71A	88A	98A	125A	142A	180A
at 55°C (I_{th})	55A	68A	83A	94A	115A	135A	170A
at 60°C (I_{th})	50A	65A	80A	90A	110A	130A	160A
Enclosed	45A	58A	72A	80A	100A	115A	144A
Conventional Free Air Thermal Current, 1-Pole (I_{th})							
Open	125A	162A	200A	225A	275A	325A	400A
Enclosed	112A	145A	180A	200A	250A	285A	360A
AC-3 Operation							
Rated Operational Current, 50/60 Hz ① (I_e) in amperes							
220/230V	40	50	65	80	95	115	150
240V	40	50	65	80	95	115	150
380/400V	40	50	65	80	95	115	150
415V	40	50	65	80	95	115	150
440V	40	50	65	80	95	115	150
500V	40	50	65	80	95	115	150
660/690V	25	32	37	65	80	93	100
1000V	—	—	—	—	—	—	—
Rated power (P) in kilowatts							
220/230V	12.5	15.5	20	25	30	37	48
240V	13.5	17	22	27.5	34	40	52
380/400V	18.5	22	30	37	45	55	75
415V	24	30	39	43	57	70	91
440V	25	32	41	51	60	75	95
500V	28	36	47	58	70	85	110
660/690V	23	30	35	63	75	90	96
1000V	—	—	—	—	—	—	—
AC-4 Operation							
Rated Operational Current, 50/60 Hz ① (I_e) in amperes							
220/230V	18	21	25	40	50	55	65
240V	18	21	25	40	50	55	65
380/400V	18	21	25	40	50	55	65
415V	18	21	25	40	50	55	65
440V	18	21	25	40	50	55	65
500V	18	21	25	40	50	55	65
660/690V	14	17	20	40	50	45	50
1000V	—	—	—	—	—	—	—
Rated power (P) in kilowatts							
220/230V	5	6	7	12	16	17	20
240V	5.5	6.5	7.5	13	17	19	22
380/400V	9	10	12	20	26	28	33
415V	9.5	11	13	24	30	33	39
440V	10	12	14	25	32	35	41
500V	11	13	16	29	36	40	47
660/690V	12	14	17	26	35	43	48
1000V	—	—	—	—	—	—	—
AC-6A Operation							
Transformer Loads	Values are application specific. Calculation is $I_{eAC-3} = X / 6 * I_e$ Transformer where X is the inrush current of the transformer and I_e Transformer is the nominal current. ②						
AC-6B Operation							
Capacitor Loads Individual compensation rated operational current I_e of three-phase capacitors in amperes Up to 525V 690V	See **Page B-46** for Capacitor Ratings						
Maximum inrush current peak (x I_e)	30	30	30	30	30	30	30
Component Lifesaving (Operations)	—	—	—	—	—	—	—
Maximum Operating Frequency (ops/hr)	—	—	—	—	—	—	—

① At maximum permissible ambient temperature.

② Example —
The transformer has a nominal current of 10A with an inrush current of 18 times the nominal current. So, the contactor must have an AC-3 current of 18/6 x 10A = 30A. Using an XTCE032C (32A AC-3) contactor is recommended.

B

Table B-115. AC Ratings (Continued)

Description	XTCE185L	XTCE225L	XTCE250L	XTCE300M	XTCE400M	XTCE500M	XTCE580N
AC-1 Operation							
Conventional Free Air Thermal Current, 3-Pole, 50 – 60 Hz							
at 40°C (I_{th})	337	386	429	490	612	857	980
at 50°C (I_{th})	301	345	383	438	548	767	876
at 55°C (I_{th})	287	329	366	418	522	731	836
at 60°C (I_{th})	275	315	350	400	500	700	800
Conventional Free Air Thermal Current, 1-Pole (I_{th})	685	785	875	1000	1250	1750	2000
AC-3 Operation							
Rated Operational Current, 50/60 Hz ① (I_e) in amperes							
220/230V	185	225	250	300	400	500	580
240V	185	225	250	300	400	500	580
380/400V	185	225	250	300	400	500	580
415V	185	225	250	300	400	500	580
440V	185	225	250	300	400	500	580
500V	185	225	250	300	400	500	580
660/690V	185	225	250	300	400	500	580
1000V	76	76	76	95	95	95	435
Rated power (P) in kilowatts							
220/230V	55	70	75	90	125	155	185
240V	62	75	85	100	132	170	200
380/400V	90	110	132	160	200	250	315
415V	110	132	148	180	240	300	348
440V	115	142	157	190	255	345	370
500V	132	160	180	215	290	360	420
660/690V	175	215	240	286	344	344	560
1000V	108	108	108	132	132	132	600
AC-4 Operation							
Rated Operational Current, 50/60 Hz ① (I_e) in amperes							
220/230V	136	164	200	240	296	360	456
240V	136	164	200	240	296	360	456
380/400V	136	164	200	240	296	360	456
415V	136	164	200	240	296	360	456
440V	136	164	200	240	296	360	456
500V	136	164	200	240	296	360	456
660/690V	136	164	200	240	296	296	456
1000V	76	76	76	95	95	95	348
Rated power (P) in kilowatts							
220/230V	41	51	62	75	92	112	143
240V	45	54	68	82	101	122	156
380/400V	75	90	110	132	160	200	250
415V	80	96	117	142	176	216	274
440V	85	102	125	151	186	229	290
500V	96	116	143	172	214	260	330
660/690V	127	155	189	229	283	344	440
1000V	108	108	108	132	132	132	509
AC-6A Operation							
Transformer Loads	Values are application specific. Calculation is I_{eAC-3} = X / 6 * IeTransformer where X is the inrush current of the transformer and IeTransformer is the nominal current. ②						
AC-6B Operation							
Capacitor Loads Individual compensation rated operational current I_e of three-phase capacitors in amperes							
Up to 525V	220	220	220	307	307	307	463
690V	133	133	133	177	177	177	265
Maximum inrush current peak (x I_e)	30	30	30	30	30	30	30
Component Lifesaving (Operations)	100,000	100,000	100,000	100,000	100,000	100,000	100,000
Maximum Operating Frequency (ops/hr)	200	200	200	200	200	200	200

① At maximum permissible ambient temperature.

② Example —
The transformer has a nominal current of 10A with an inrush current of 18 times the nominal current. So, the contactor must have an AC-3 current of 18/6 x 10A = 30A. Using an XTCE032C (32A AC-3) contactor is recommended.

Table B-115. AC Ratings (Continued)

Description	XTCE650N	XTCE750N	XTCE820N	XTCEC10N	XTCEC14P	XTCEC20R
AC-1 Operation						
Conventional Free Air Thermal Current, 3-Pole, 50 – 60 Hz						
at 40°C (I_{th})	1041	1102	1225	1225	1714	2450
at 50°C (I_{th})	931	986	1095	1095	1533	2190
at 55°C (I_{th})	888	940	1044	1044	1462	2089
at 60°C (I_{th})	850	900	1000	1000	1400	2000
Conventional Free Air Thermal Current, 1-Pole (I_{th})	2125	2250	2500	2500	3500	5000
AC-3 Operation						
Rated Operational Current, 50/60 Hz ① (I_e) in amperes						
220/230V	650	750	820	1000	—	—
240V	650	750	820	1000	—	—
380/400V	650	750	820	1000	—	—
415V	650	750	820	1000	—	—
440V	650	750	820	1000	—	—
500V	650	750	820	1000	—	—
660/690V	650	750	820	1000	—	—
1000V	435	580	580	700	—	—
Rated power (P) in kilowatts						
220/230V	205	240	260	315	—	—
240V	225	260	285	340	—	—
380/400V	355	400	450	560	—	—
415V	390	455	500	610	—	—
440V	420	480	525	650	—	—
500V	470	550	600	730	—	—
660/690V	630	720	750	1000	—	—
1000V	600	800	800	1000	—	—
AC-4 Operation						
Rated Operational Current, 50/60 Hz ① (I_e) in amperes						
220/230V	512	576	656	800	—	—
240V	512	576	656	800	—	—
380/400V	512	576	656	800	—	—
415V	512	576	656	800	—	—
440V	512	576	656	800	—	—
500V	512	576	656	800	—	—
660/690V	512	576	656	800	—	—
1000V	348	464	464	700	—	—
Rated power (P) in kilowatts						
220/230V	161	181	209	260	—	—
240V	176	200	228	280	—	—
380/400V	280	315	355	450	—	—
415V	307	346	394	490	—	—
440V	326	367	418	520	—	—
500V	370	417	474	590	—	—
660/690V	494	556	633	780	—	—
1000V	509	678	678	1000	—	—
AC-6A Operation						
Transformer Loads	Values are application specific. Calculation is $I_{eAC-3} = X / 6 * I_e$Transformer where X is the inrush current of the transformer and I_eTransformer is the nominal current. ②					
AC-6B Operation						
Capacitor Loads Individual compensation rated operational current I_e of three-phase capacitors in amperes						
Up to 525V	463	463	463	463	—	—
690V	265	265	265	265	—	—
Maximum inrush current peak (x I_e)	30	30	30	30	—	—
Component Lifesaving (Operations)	100,000	100,000	100,000	100,000	—	—
Maximum Operating Frequency (ops/hr)	200	200	200	200	—	—

① At maximum permissible ambient temperature.

② Example —
The transformer has a nominal current of 10A with an inrush current of 18 times the nominal current. So, the contactor must have an AC-3 current of 18/6 x 10A = 30A. Using an XTCE032C (32A AC-3) contactor is recommended.

B

DC Ratings

Table B-116. DC Ratings — DC-1

Description	XTCE007B	XTCE009B	XTCE012B XTCF020B	XTCE015B	XTCE018C	XTCE025C	XTCE032C
Rated operation current {1} (I_e) in amperes							
60V	20	20	20	20	35	40	40
110V	20	20	20	20	35	40	40
220V	15	15	15	15	35	40	40
440V	1	1.3	1.3	1.3	2.9	2.9	2.9
	XTCE040D	**XTCE050D**	**XTCE065D**	**XTCE080F**	**XTCE095F**	**XTCE115G**	**XTCE150G**
60V	50	60	72	110	110	160	160
110V	50	50	72	110	110	160	160
220V	45	45	65	70	70	90	90
440V	2.9	2.9	2.9	4.5	4.5	4.5	4.5
	XTCE185L	**XTCE225L**	**XTCE250L**	**XTCE300M**	**XTCE400M**	**XTCE500M**	**XTCE580N**
60V	300	300	300	400	400	400	—
110V	300	300	300	400	400	400	—
220V	300	300	300	400	400	400	—
440V	11	11	11	11	11	11	—
	XTCE650N	**XTCE750N**	**XTCE820N**	**XTCEC10N**	**XTCEC14P**	**XTCEC20R**	**—**
60V	—	—	—	—	—	—	—
110V	—	—	—	—	—	—	—
220V	—	—	—	—	—	—	—
440V	—	—	—	—	—	—	—

Table B-117. DC Ratings — DC-3

Description	XTCE007B	XTCE009B	XTCE012B XTCF020B	XTCE015B	XTCE018C	XTCE025C	XTCE032C
Rated operation current {1} (I_e) in amperes							
60V	20	20	20	20	35	35	40
110V	20	20	20	20	35	35	40
220V	1.5	1.5	1.5	1.5	10	10	25
440V	0.2	0.2	0.2	0.2	0.6	0.6	0.6
	XTCE040D	**XTCE050D**	**XTCE065D**	**XTCE080F**	**XTCE095F**	**XTCE115G**	**XTCE150G**
60V	50	60	72	110	110	160	160
110V	50	50	72	110	110	160	160
220V	25	25	35	35	35	40	40
440V	0.6	0.6	0.6	1	1	1	1
	XTCE185L	**XTCE225L**	**XTCE250L**	**XTCE300M**	**XTCE400M**	**XTCE500M**	**XTCE580N**
60V	300	300	300	400	400	400	—
110V	300	300	300	400	400	400	—
220V	300	300	300	400	400	400	—
440V	—	—	—	—	—	—	—
	XTCE650N	**XTCE750N**	**XTCE820N**	**XTCEC10N**	**XTCEC14P**	**XTCEC20R**	**—**
60V	—	—	—	—	—	—	—
110V	—	—	—	—	—	—	—
220V	—	—	—	—	—	—	—
440V	—	—	—	—	—	—	—

Table B-118. DC Ratings — DC-5

Description	XTCE007B	XTCE009B	XTCE012B XTCF020B	XTCE015B	XTCE018C	XTCE025C	XTCE032C
Rated operation current {1} (I_e) in amperes							
60V	20	20	20	20	35	35	40
110V	20	20	20	20	35	35	40
220V	1.5	1.5	1.5	1.5	10	10	25
440V	0.2	0.2	0.2	0.2	0.6	0.6	0.6
	XTCE040D	**XTCE050D**	**XTCE065D**	**XTCE080F**	**XTCE095F**	**XTCE115G**	**XTCE150G**
60V	50	60	72	110	110	160	160
110V	50	50	72	110	110	160	160
220V	25	25	35	35	35	40	40
440V	0.6	0.6	0.6	1	1	1	1
	XTCE185L	**XTCE225L**	**XTCE250L**	**XTCE300M**	**XTCE400M**	**XTCE500M**	**XTCE580N**
60V	300	300	300	400	400	400	—
110V	300	300	300	400	400	400	—
220V	300	300	300	400	400	400	—
440V	—	—	—	—	—	—	—
	XTCE650N	**XTCE750N**	**XTCE820N**	**XTCEC10N**	**XTCEC14P**	**XTCEC20R**	**—**
60V	—	—	—	—	—	—	—
110V	—	—	—	—	—	—	—
220V	—	—	—	—	—	—	—
440V	—	—	—	—	—	—	—

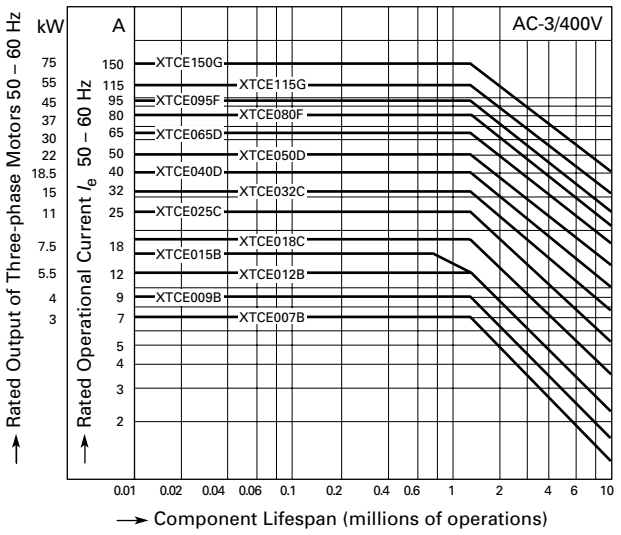
Heat Loss

Table B-119. Current heat loss (3-Pole) in watts

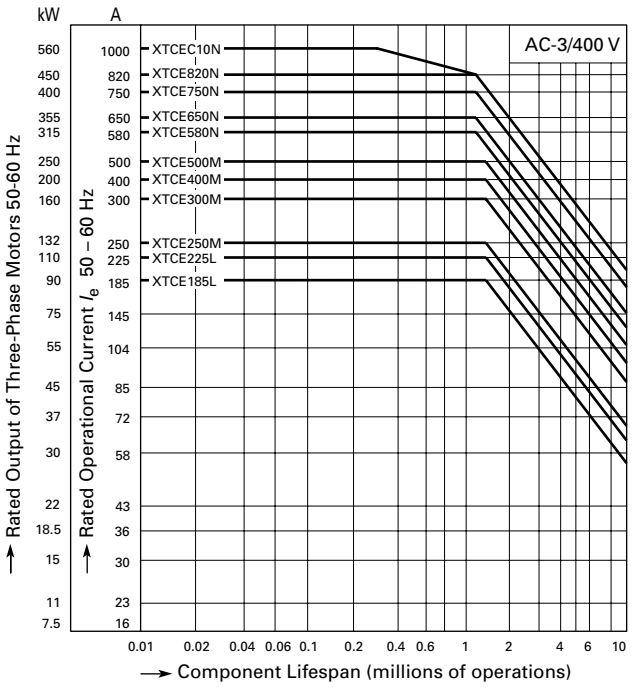
Description	XTCE007B	XTCE009B	XTCE012B XTCF020B	XTCE015B	XTCE018C	XTCE025C	XTCE032C
Current heat loss (3-Pole) in watts							
at I_{th}	3	3	3	3	7.3	9.6	12.1
at I_e to AC-3/400V	0.37	0.6	1.1	1.8	1.9	3.8	6.1
Impedance per pole, mΩ	2.5	2.5	2.5	2.5	2	2	2
	XTCE040D	**XTCE050D**	**XTCE065D**	**XTCE080F**	**XTCE095F**	**XTCE115G**	**XTCE150G**
Current heat loss (3-Pole) in watts							
at I_{th}	11.3	19	28.8	14.6	21.8	30.4	46.1
at I_e to AC-3/400V	7.2	11.3	19	11.5	16.2	23.8	40.5
Impedance per pole, mΩ	1.5	1.5	1.5	0.6	0.6	0.6	0.6
	XTCE185L	**XTCE225L**	**XTCE250L**	**XTCE300M**	**XTCE400M**	**XTCE500M**	**XTCE580N**
Current heat loss (3-Pole) in watts							
at I_{th}	79	108	95	123	188	236	227
at I_e to AC-3/400V	36	55	48	69	120	120	120
Impedance per pole, mΩ	—	—	—	—	—	—	—
	XTCE650N	**XTCE750N**	**XTCE820N**	**XTCEC10N**	**XTCEC14P**	**XTCEC20R**	**—**
Current heat loss (3-Pole) in watts							
at I_{th}	257	288	355	355	697	711	—
at I_e to AC-3/400V	150	200	239	355	—	—	—
Impedance per pole, mΩ	—	—	—	—	—	—	—

B

Life Curves

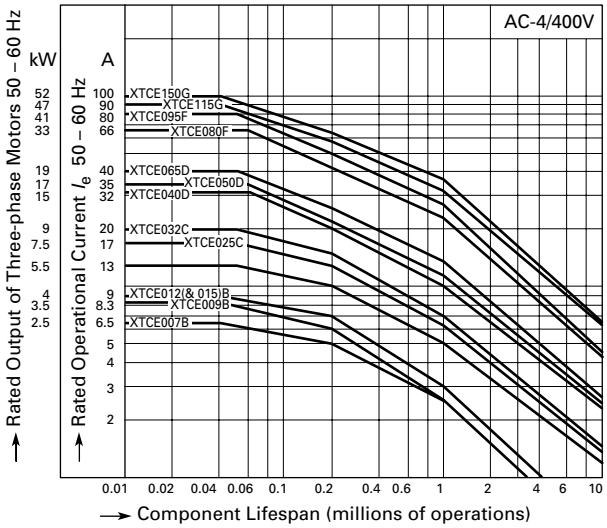


XTCE007B – XTCE150G

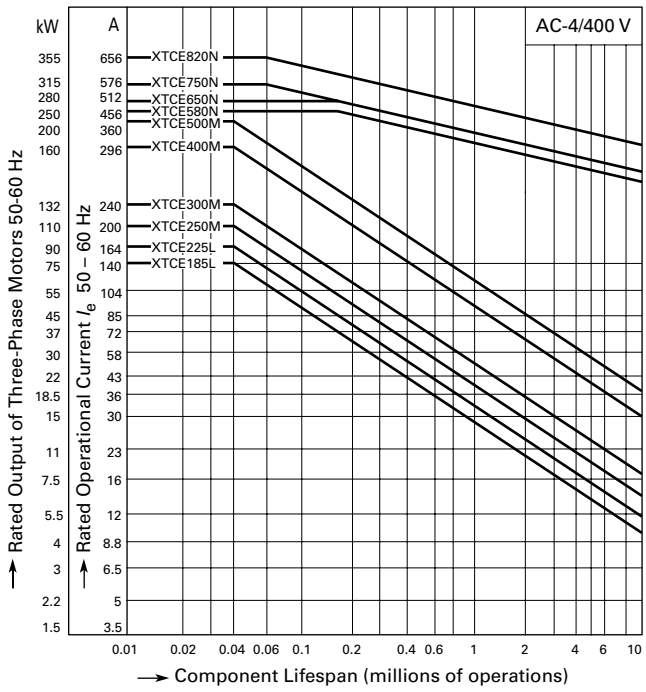


XTCE185L – XTCEC10N

Figure B-39. Normal Switching Duty



XTCE007B – XTCE150G



XTCE185L – XTCE820N

Figure B-40. Extreme Switching Duty

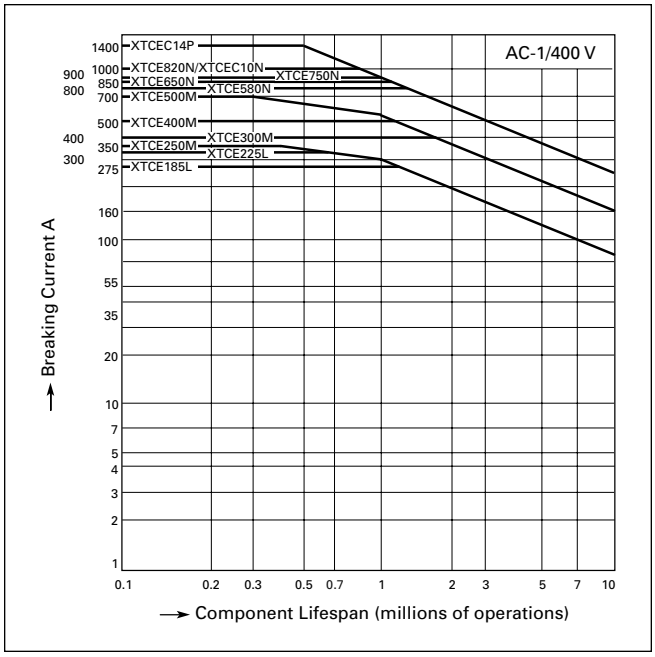


Figure B-41. Switching Duty for Non-motor loads, 3-pole, 4-pole — XTCE185L – XTCEC14P

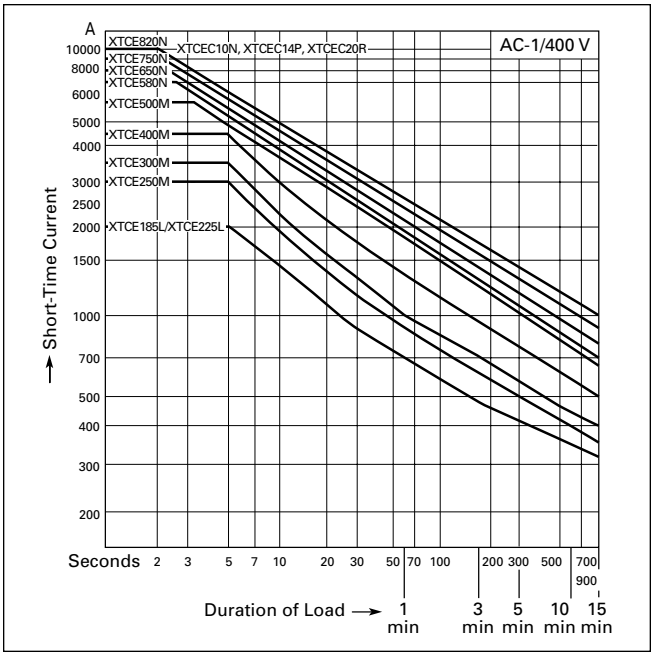
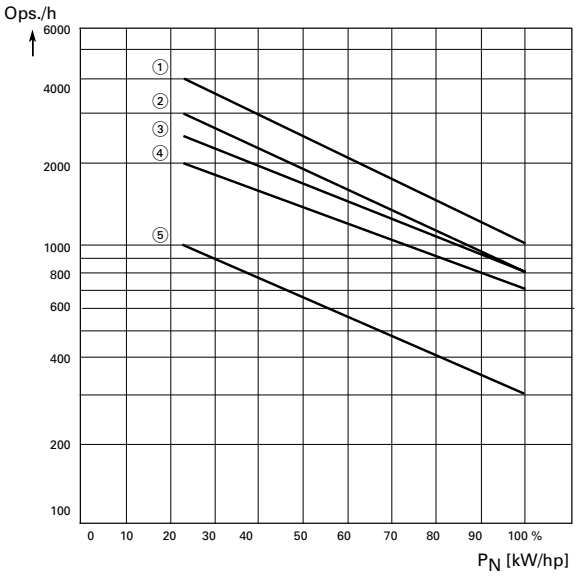


Figure B-42. Short-Time Loading, 3-pole — XTCE185L – XTCEC20R

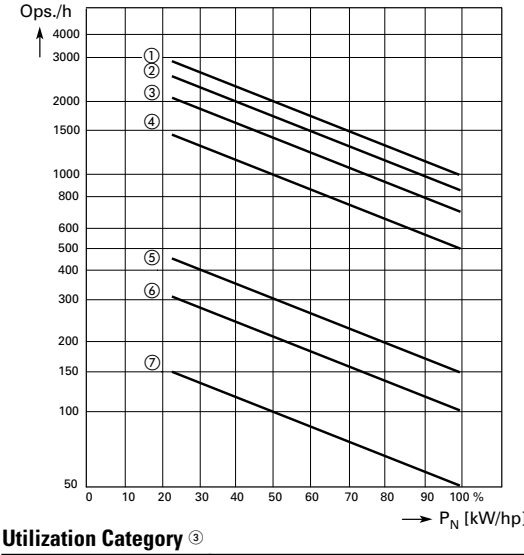


Utilization Category ①

Type	Characteristic Curve Above		
	AC-1	AC-3	AC-2 AC-4
XTCE007B – XTCE015B	3	1	5
XTCE018C – XTCE032C	3	2	5
XTCE040D – XTCE065D	3	2	5
XTCE080F – XTCE150G	3	4	5

① P_N = max. motor rating (kW/hp) of the relevant contactor. ops./h = max. number of operations per hour.

7 to 150 hp



Utilization Category ③

Type	Characteristic Curve Above		
	AC-1	AC-3	AC-4
XTCE185L	2	1	6
XTCE225L	2	1	6
XTCE250L	2	1	6
XTCE300M	3	2	7
XTCE400M	3	2	7
XTCE500M	3	2	7
XTCE580N	3	4	5
XTCE650N	3	4	5
XTCE750N	3	4	5
XTCE820N	3	4	5

③ P_N = max. motor rating (kW/hp) of the relevant contactor. ops./h = max. number of operations per hour.

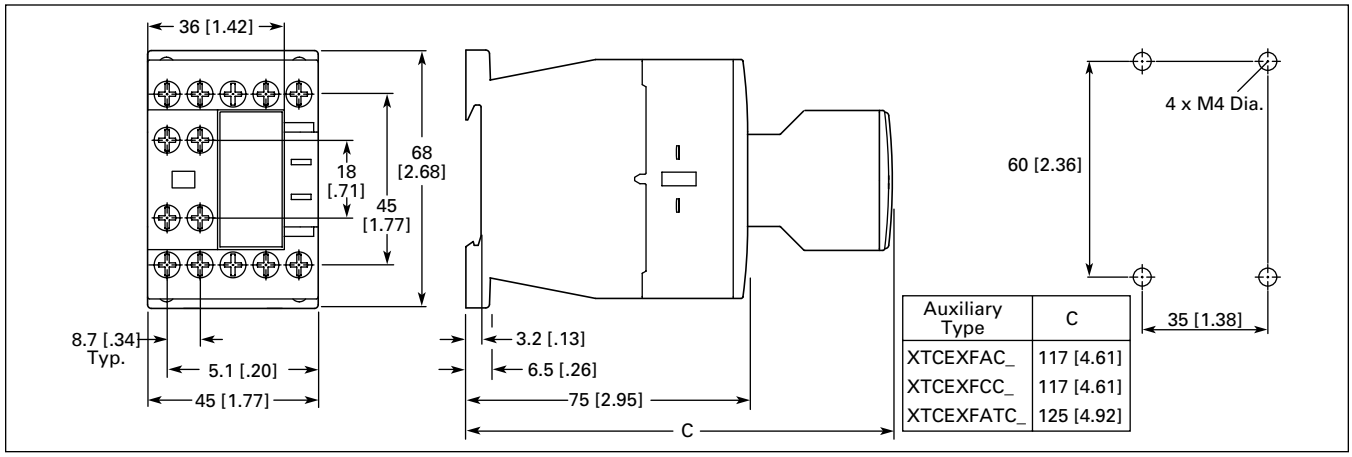
185 to 820 hp

Figure B-43. Maximum Operating Frequency — Related to Rating and Utilization Category (400V)

B

Dimensions

XTCE Contactors



Auxiliary Type	C
XTCEXFAC_	117 [4.61]
XTCEXFCC_	117 [4.61]
XTCEXFATC_	125 [4.92]

Figure B-44. Frame B, XTCE007B – XTCE015B Contactors with Screw Terminals (7 – 15A) — Approximate Dimensions in mm [in]

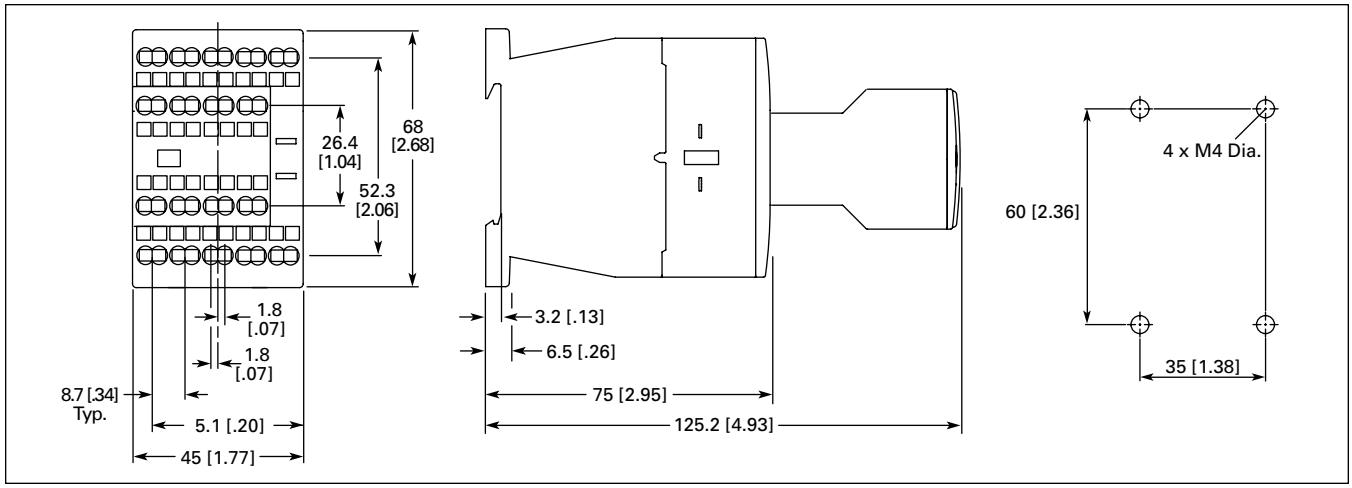


Figure B-45. Frame B, XTCEC007B – XTCEC012B Contactors with Spring Cage Terminals (7 – 12A) — Approximate Dimensions in mm [in]

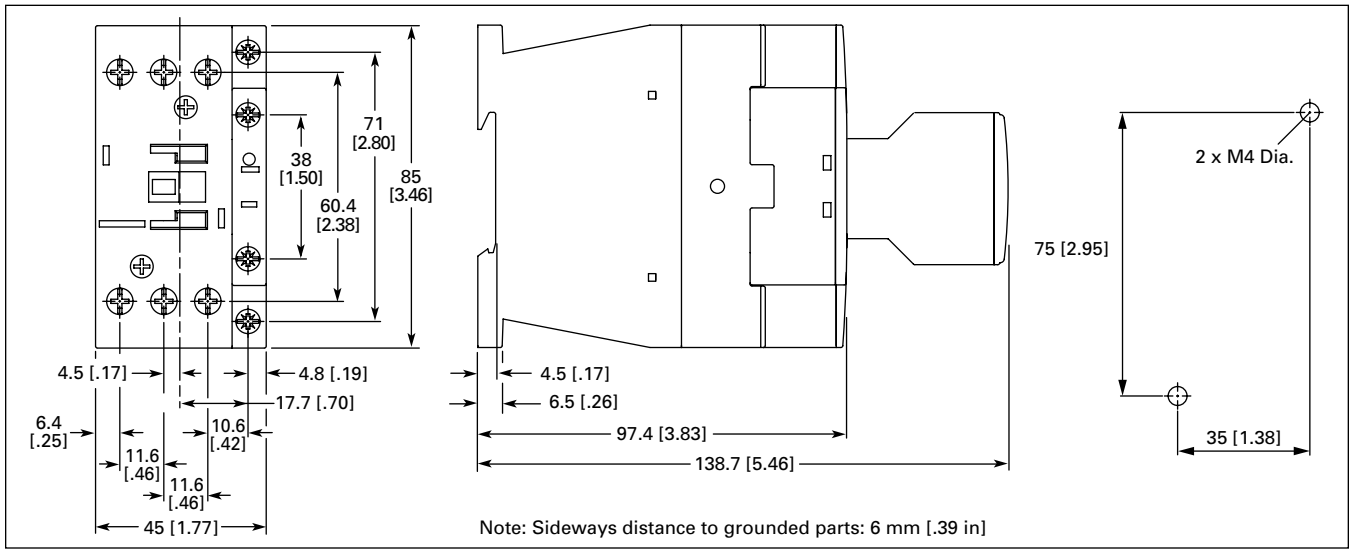


Figure B-46. Frame C, XTCE018C – XTCE032C Contactors (18 – 32A) — Approximate Dimensions in mm [in]

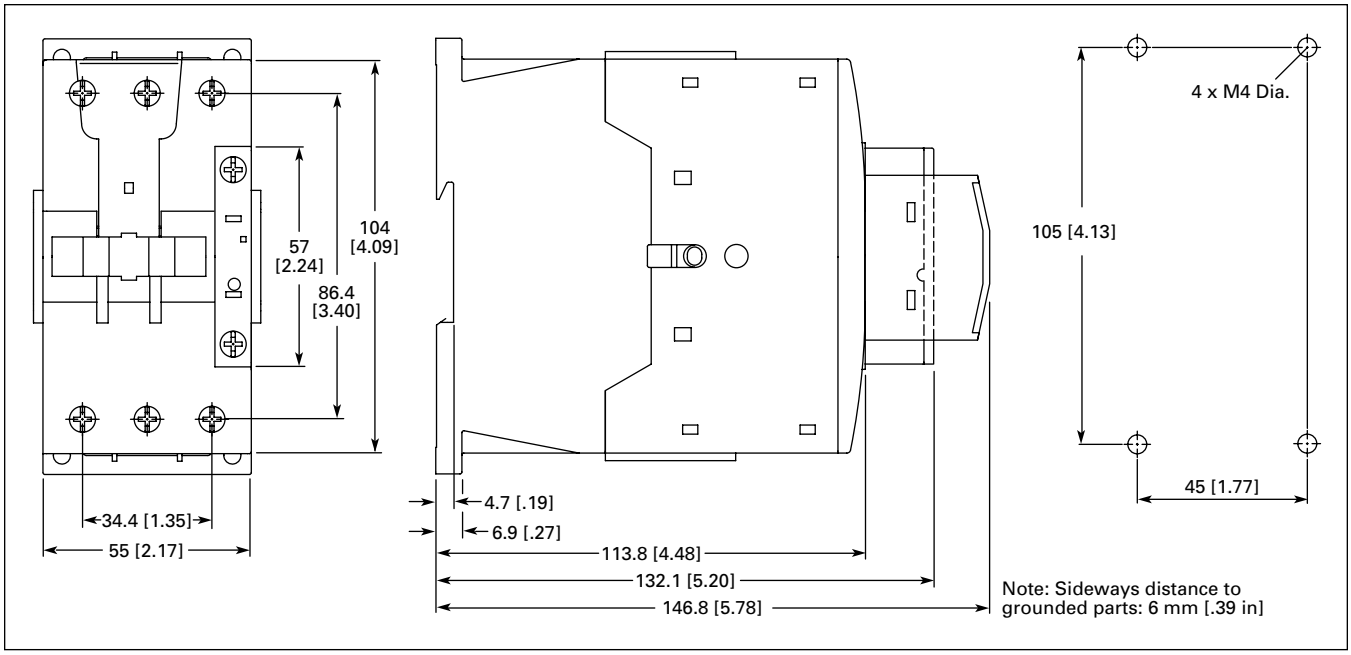


Figure B-47. Frame D, XTCE040D – XTCE065D Contactors (40 – 65A) — Approximate Dimensions in mm [in]

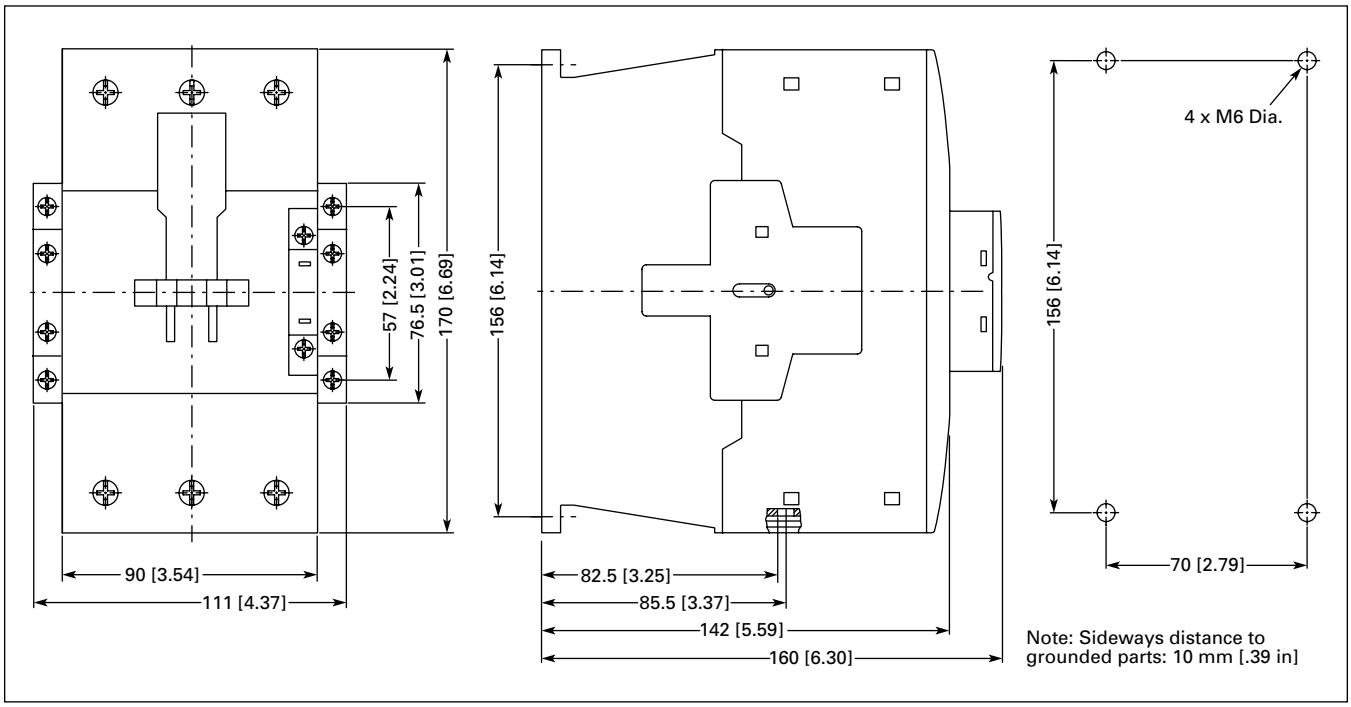
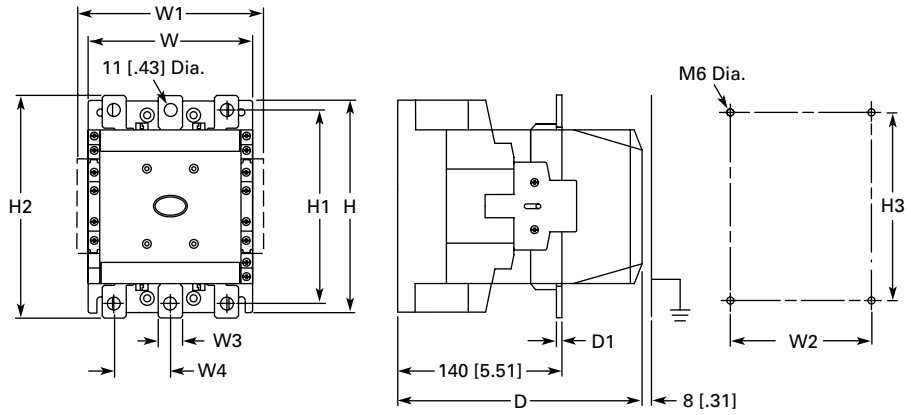


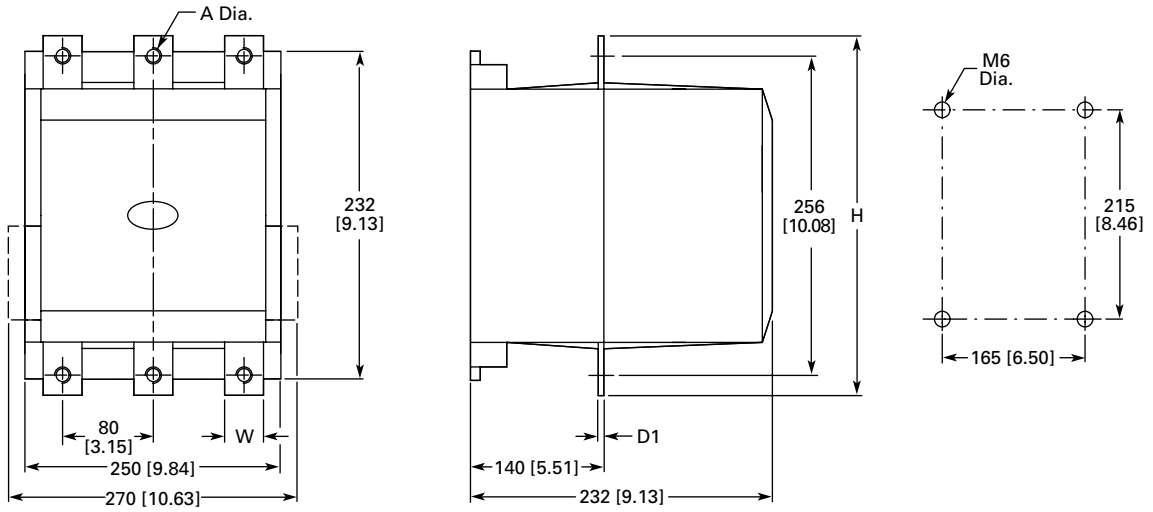
Figure B-48. Frame F – G, XTCE080F – XTCE150G Contactors (80 – 150A) — Approximate Dimensions in mm [in]

B



	W	W1	W2	W3	W4	H	H1	H2	H3	D	D1
Frame L (185 – 250A)	140 [5.51]	160 [6.30]	120 [4.72]	20 [.79]	48 [1.89]	180 [7.09]	164 [6.46]	189 [7.44]	160 [6.30]	208 [8.19]	5 [.20]
Frame M (300 – 500A)	160 [6.30]	180 [7.09]	130 [5.12]	25 [.98]	48 [1.89]	200 [7.87]	184 [7.24]	209 [8.23]	180 [7.09]	216 [8.50]	6 [.24]

Figure B-49. Frame L – M, XTCE185L – XTCE500M Contactors (185 – 500A) — Approximate Dimensions in mm [in]



	W	H	D1	A (Dia.)
XTCE580N	35 [1.38]	286 [11.26]	6 [.24]	11 [.43]
XTCE650N	35 [1.38]	286 [11.26]	6 [.24]	11 [.43]
XTCE750N	45 [1.77]	296 [11.65]	6 [.24]	13.5 [.53]
XTCE820N	45 [1.77]	296 [11.65]	6 [.24]	13.5 [.53]
XTCEC10N	45 [1.77]	296 [11.65]	10 [.40]	13.5 [.53]

Figure B-50. Frame N, XTCE580N – XTCEC10N Contactors (580 – 1000A) — Approximate Dimensions in mm [in]

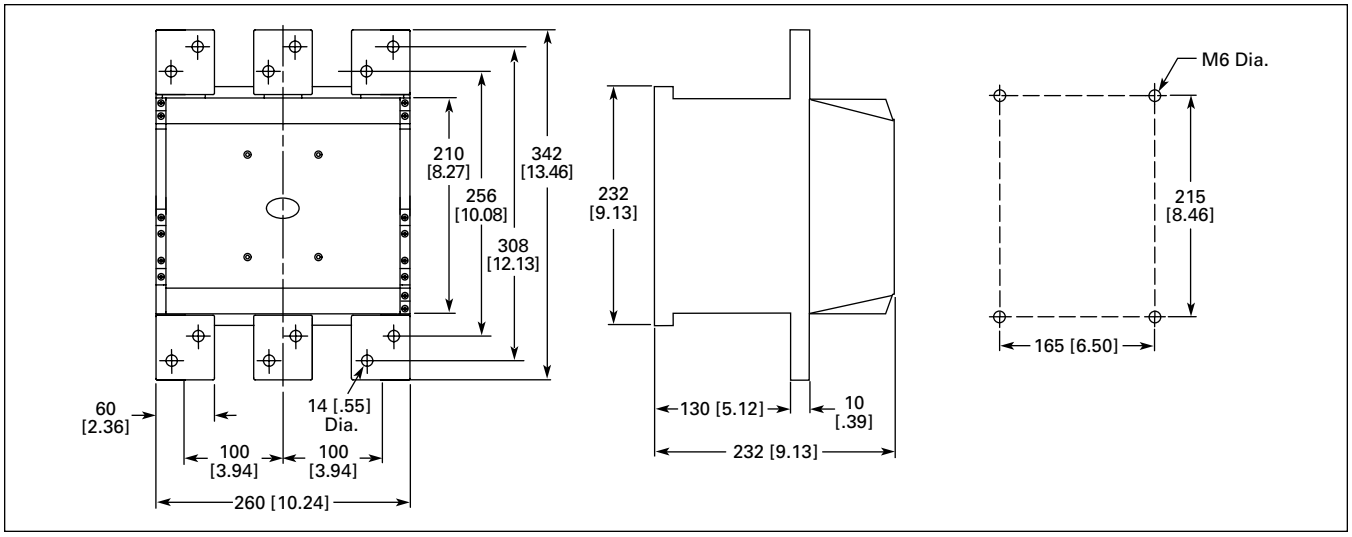


Figure B-51. Frame P, XTCEC14P Contactor (1400A, AC-1) — Approximate Dimensions in mm [in]

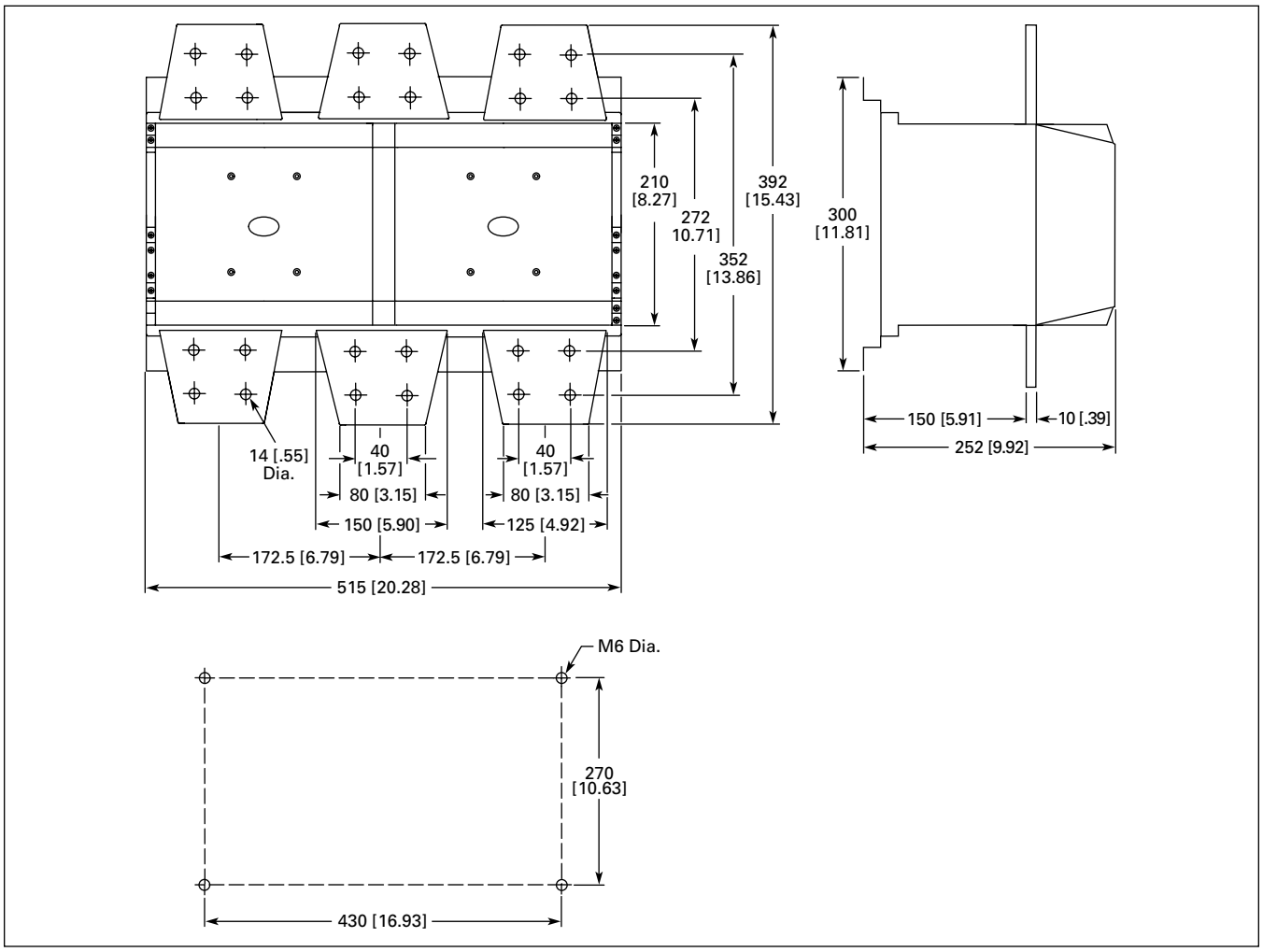


Figure B-52. Frame R, XTCEC16R, XTCEC20R Contactors — Approximate Dimensions in mm [in]

B

XTAE Starters with XTOB Overload Relay

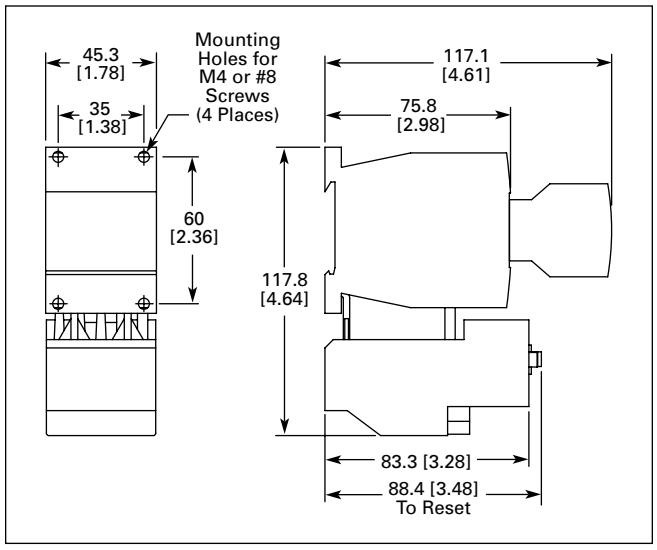


Figure B-53. Frame B, XTAE007B – XTAE012B Starters with XTOB (7 – 12A)

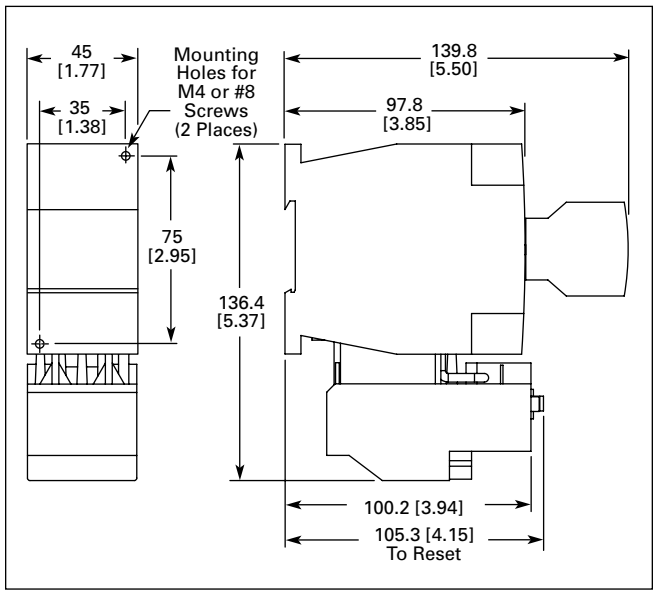


Figure B-54. Frame C, XTAE018C – XTAE032C Starters with XTOB (18 – 32A)

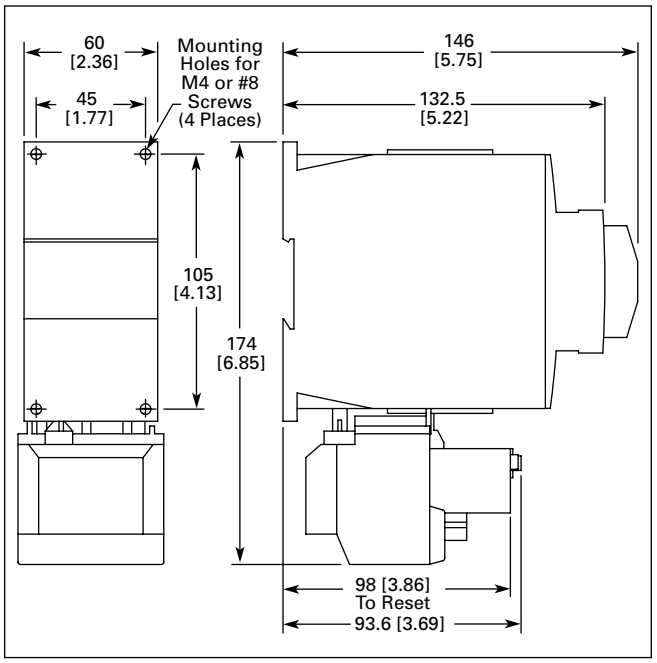


Figure B-55. Frame D, XTAE040D – XTAE065D Starters with XTOB (40 – 65A)

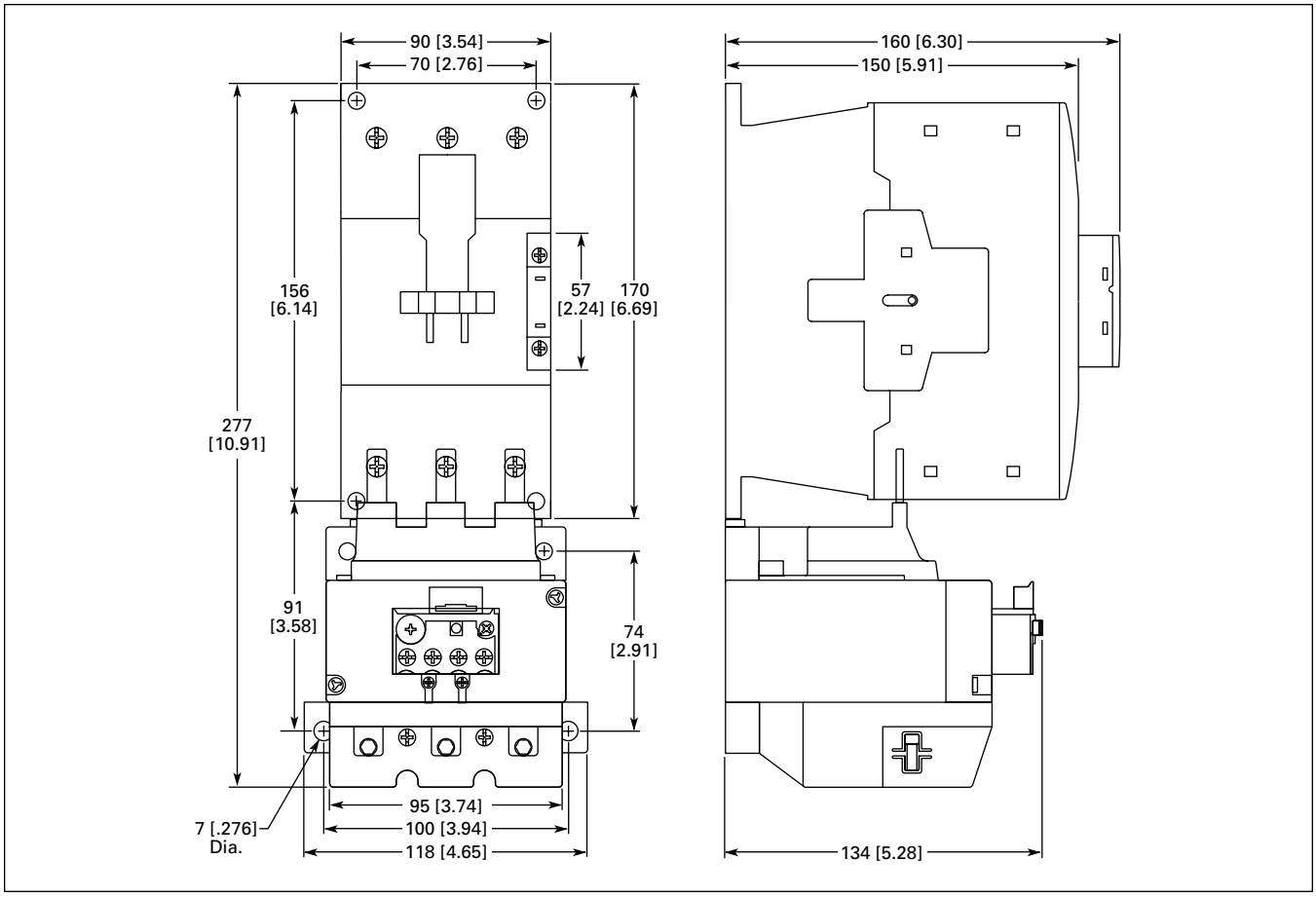


Figure B-56. Frame F – G, XTAE080F – XTAE150G Starters with XTOB (80 – 150A) — Approximate Dimensions in mm [in]

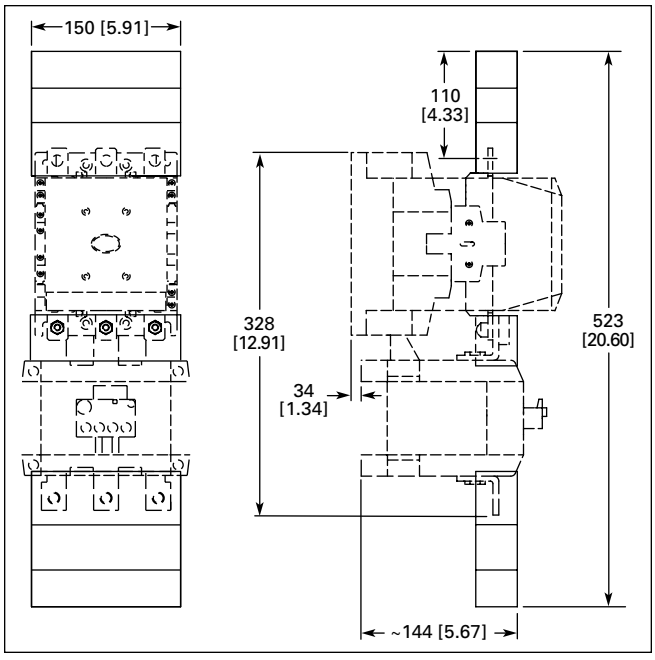


Figure B-57. Frame L, XTAE185L – XTAE250L Starters with XTOB (185 – 250A) — Approximate Dimensions in mm [in]

B

XTAE Starters with C396 Overload Relay

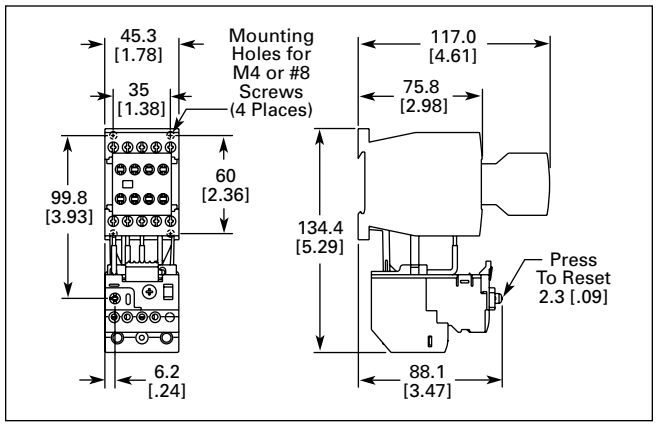


Figure B-58. Frame B, XTAE007B – XTAE012B Starters with C396 (0.1 – 15A)

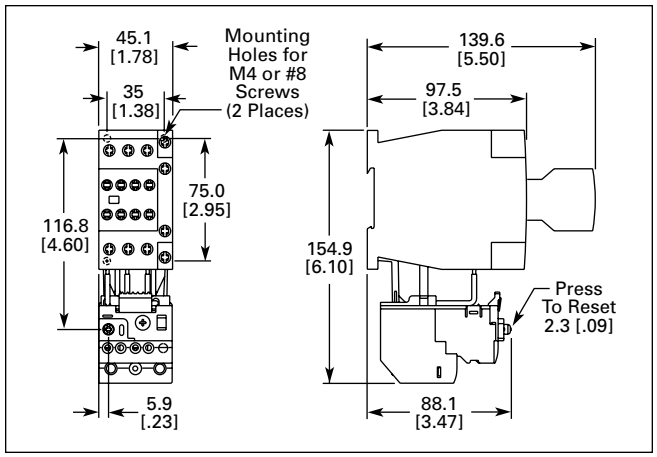


Figure B-59. Frame C, XTAE018C – XTAE032C Starters with C396 (0.1 – 32A)

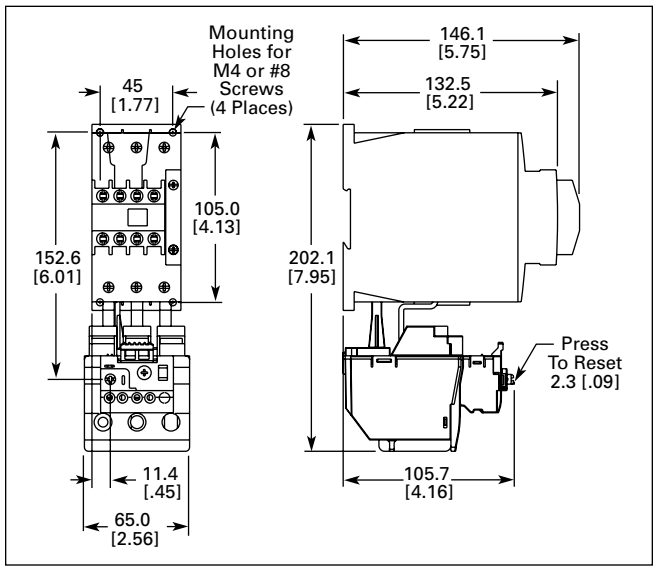


Figure B-60. Frame D, XTAE040D – XTAE065D Starters with C396 (15 – 75A)

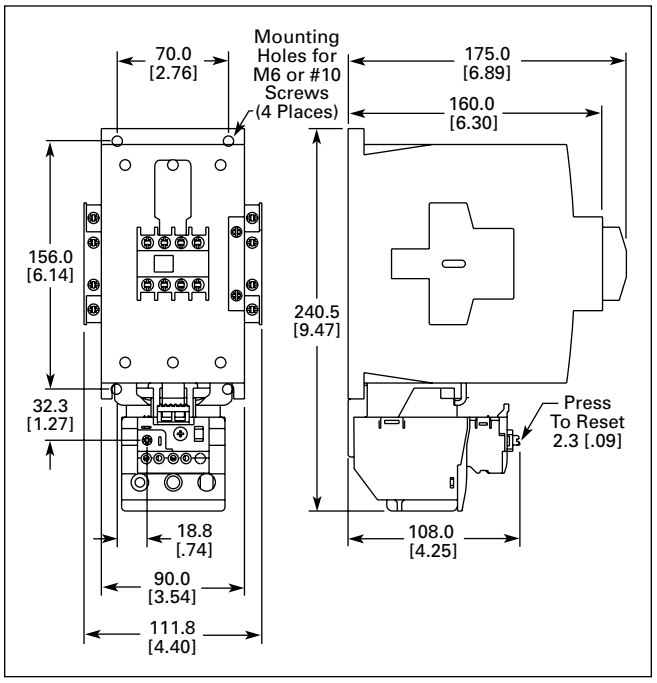


Figure B-61. Frame F and G, XTAE080F – XTAE115G Starters with C396 (22 – 110A)

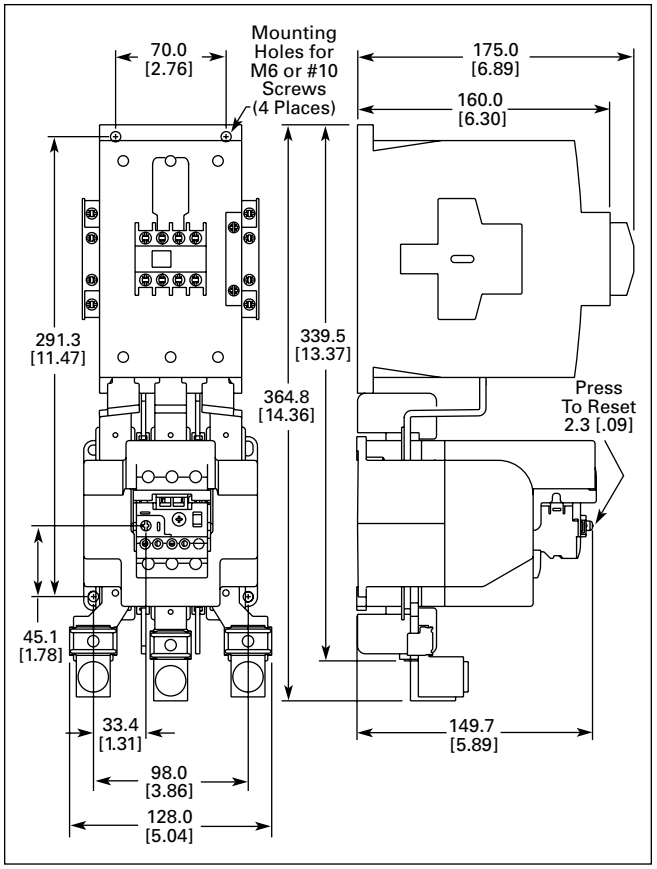
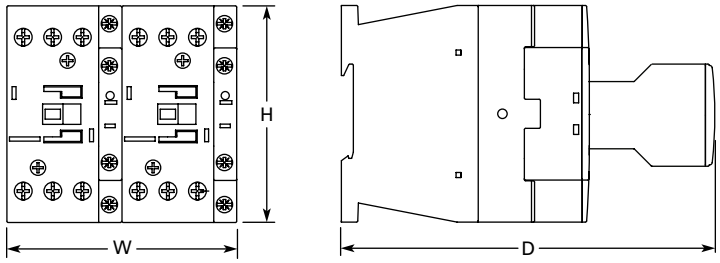


Figure B-62. Frame G, XTAE115G – XTAE150G Starters with C396 (30 – 150A)

Reversing Combination



Frame B (7 – 15A)			Frame C (18 – 32A)			Frame D (40 – 65A)		
W	**H**	**D**	**W**	**H**	**D**	**W**	**H**	**D**
90 [3.54]	68 [2.68]	117 [4.61]	90 [3.54]	85 [3.34]	138 [5.43]	110 [4.33]	115 [4.53]	146.8 [5.78]

Figure B-63. XTCR Reversing Combination Frame B – D — Approximate Dimensions in mm [in]

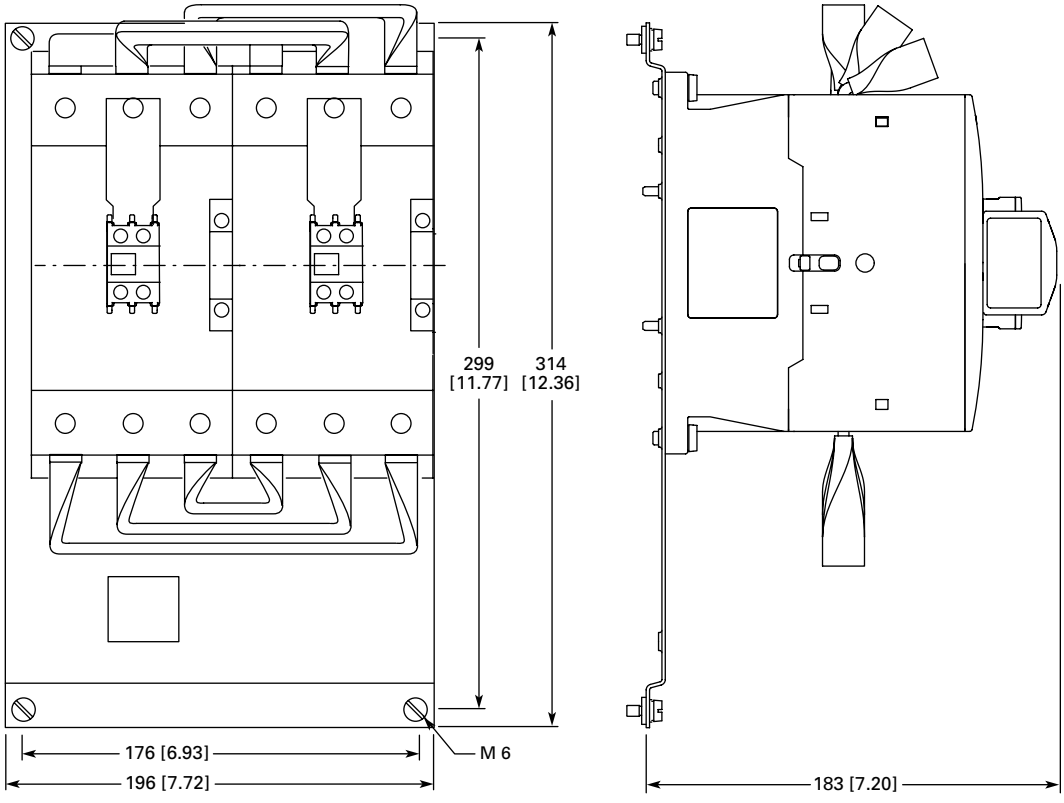
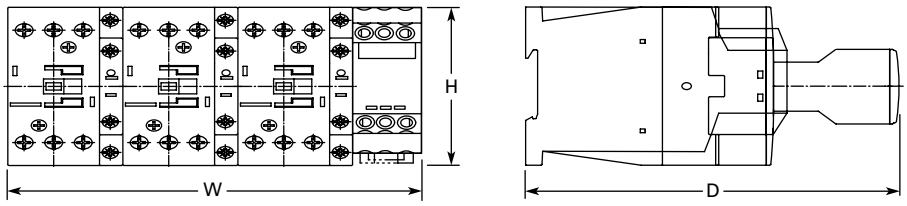


Figure B-64. XTCR Reversing Combination Frame F – G — Approximate Dimensions in mm [in]

B

Star-Delta Combination



Frame B			Frame C			Frame D		
W	H	D	W	H	D	W	H	D
158 [6.22]	68 [2.68]	117 [4.61]	158 [6.22]	85 [3.34]	138 [5.43]	188 [7.40]	115 [4.53]	146.8 [5.78]

Figure B-65. Star-Delta Combination Frame B – D — Approximate Dimensions in mm [in]

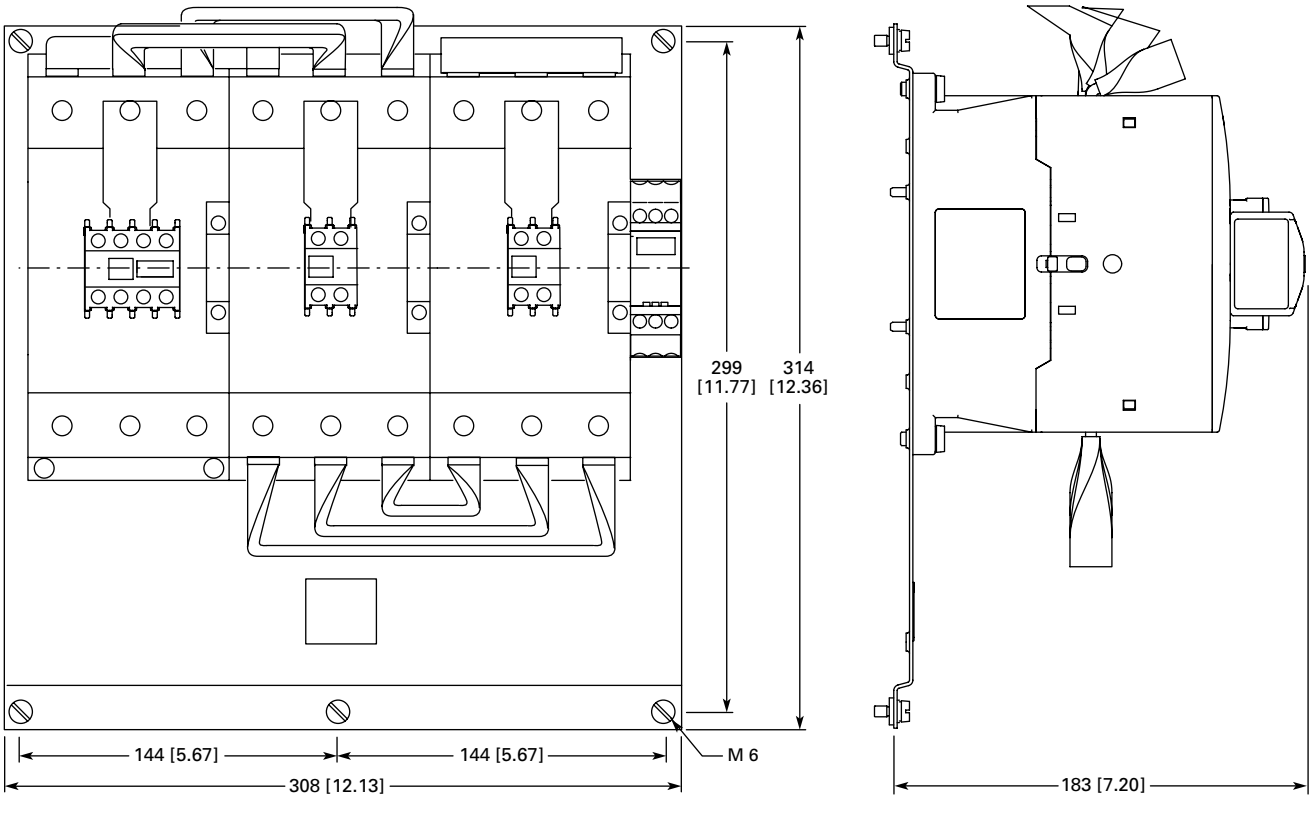


Figure B-66. Star-Delta Combination Frame F – G — Approximate Dimensions in mm [in]

Mechanical Interlock

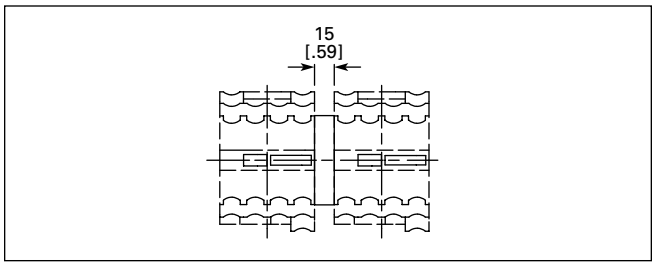


Figure B-67. Frame L – M. XTCEXMLM Mechanical Interlock — Approximate Dimensions in mm [in]

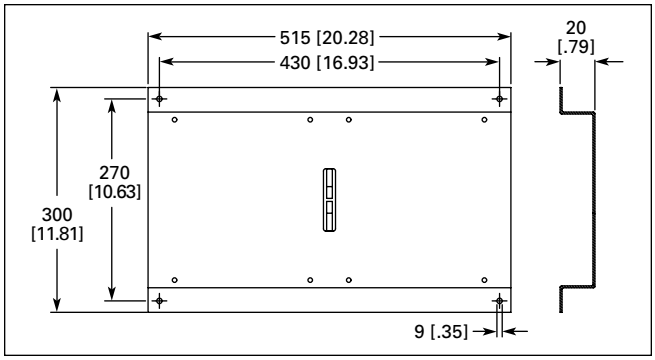
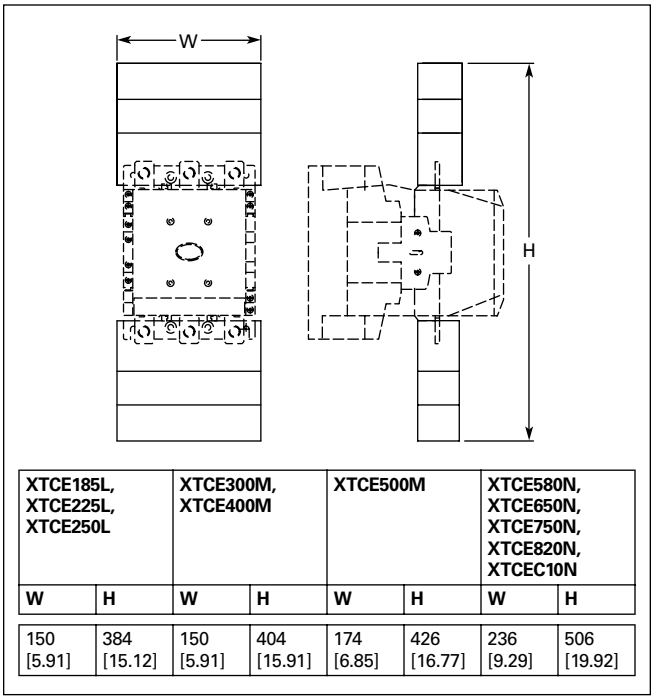


Figure B-68. XTCEXMLN — Approximate Dimensions in mm [in]

Contactor with Terminal Shroud

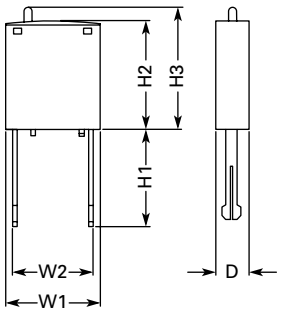


XTCE185L, XTCE225L, XTCE250L		XTCE300M, XTCE400M		XTCE500M		XTCE580N, XTCE650N, XTCE750N, XTCE820N, XTCEC10N	
W	**H**	**W**	**H**	**W**	**H**	**W**	**H**
150 [5.91]	384 [15.12]	150 [5.91]	404 [15.91]	174 [6.85]	426 [16.77]	236 [9.29]	506 [19.92]

Figure B-69. Frame L – N Contactors, XTCE185L – XTCEC10N, with Terminal Shroud XTLEXTS — Approximate Dimensions in mm [in]

B

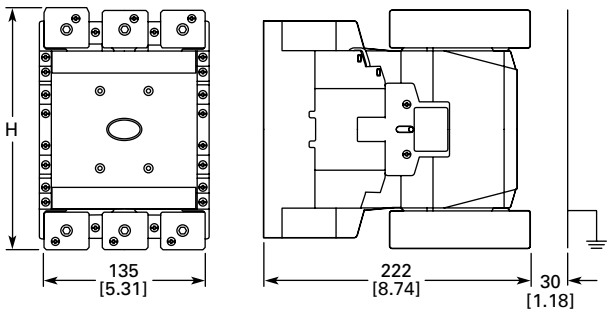
Suppressor



	W1	W2	H1	H2	H3	D
XTCEXRSB... **XTCEXVSB...** **XTCEXVSLB...** **XTCEXDSB...**	25 [.98]	9.2 [.36]	25.9 [1.02]	28 [1.10]	32 [1.26]	9 [.35]
XTCEXRSC... **XTCEXVSC...** **XTCEXVSLC...**	25 [.98]	9.2 [.36]	16 [.63]	28 [1.10]	32 [1.26]	9 [.35]
XTCEXRSF... **XTCEXVSF...** **XTCEXVSLF...**	25 [.98]	20 [.79]	18.5 [.73]	28 [1.10]	32 [1.26]	9 [.35]

Figure B-70. Suppressor — Approximate Dimensions in mm [in]

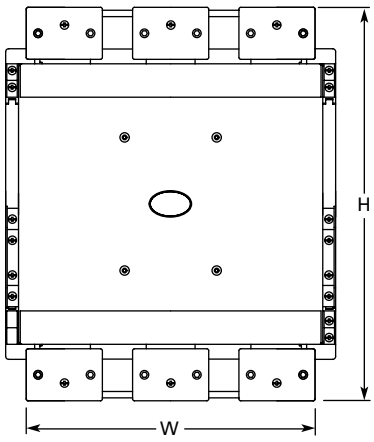
Cable Terminal Block



XTCE185L – XTCE250L	XTCE300M – XTCE400M
198 [7.80]	218 [8.58]

Figure B-71. XTCEXTLA — Approximate Dimensions in mm [in]

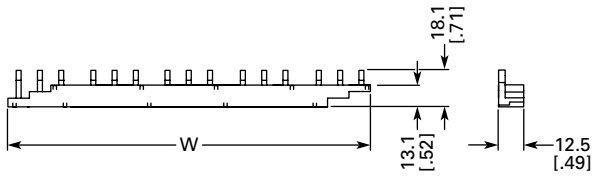
Flat Strip Conductor Terminals



	W	H
XTCE500M	171 [6.73]	232 [9.13]
XTCE580N – XTCE650N	218 [8.58]	295 [11.61]
XTCE750N – XTCE820N	231 [9.09]	310 [12.20]

Figure B-72. XTCEXTFB — Approximate Dimensions in mm [in]

Three-Phase Commoning Link



	W
XTCEXCLK3B	112 [4.41]
XTCEXCLK4B	157 [6.18]
XTCBXCLK5B	202 [7.95]

Figure B-73. Frame B Three-Phase Commoning Link — Approximate Dimensions in mm [in]

Contents

XTOB Overload Relay

XTOT Overload Relay

B

Catalogue Number Selection

Table B-120. *XT* IEC Overload Relays — Catalogue Numbering System

XT **OB** **P16** **B** **C1** **S**

Designation
XT = ***XT*** Line of IEC Control

Type
OB = Bimetallic Overload Relay
OT = Current Transformer Overload Relay

Overload Release	
Frame B	*Frame G*
P16 = 0.1 – 0.16A	**035** = 25 – 35A
P24 = 0.16 – 0.24A	**050** = 35 – 50A
P40 = 0.24 – 0.4A	**070** = 50 – 70A
P60 = 0.4 – 0.6A	**100** = 70 – 100A
001 = 0.6 – 1A	**125** = 95 – 125A
1P6 = 1.0 – 1.6A	**150** = 120 – 150A
2P4 = 1.6 – 2.4A	*Frame L*
004 = 2.4 – 4A	**070** = 50 – 70A
006 = 4 – 6A	**100** = 70 – 100A
010 = 6 – 10A	**125** = 95 – 125A
012 = 9 – 12A	**160** = 120 – 160A
016 = 12 – 16A	**220** = 160 – 220A
Frame C	**250** = 200 – 250A
P16 = 0.1 – 0.16A	*Frame M*
P24 = 0.16 – 0.24A	**063** = 42 – 63A
P40 = 0.24 – 0.4A	**090** = 60 – 90A
P60 = 0.4 – 0.6A	**125** = 85 – 125A
001 = 0.6 – 1A	**160** = 110 – 160A
1P6 = 1.0 – 1.6A	**240** = 160 – 240A
2P4 = 1.6 – 2.4A	**290** = 190 – 290A
004 = 2.4 – 4A	**400** = 270 – 400A
006 = 4 – 6A	**540** = 360 – 540A
010 = 6 – 10A	*Frame N*
016 = 10 – 16A	**063** = 42 – 63A
024 = 16 – 24A	**090** = 60 – 90A
032 = 24 – 32A	**125** = 85 – 125A
Frame D	**160** = 110 – 160A
010 = 6 – 10A	**240** = 160 – 240A
016 = 10 – 16A	**290** = 190 – 290A
024 = 16 – 24A	**400** = 270 – 400A
040 = 24 – 40A	**540** = 360 – 540A
057 = 40 – 57A	**630** = 420 – 630A
065 = 50 – 65A	
Frame F	
035 = 25 – 35A	
050 = 35 – 50A	
070 = 50 – 70A	
100 = 70 – 100A	

Frame Size Designation
B = 45 mm
C = 45 mm
D = 55 mm
G = 90 mm
L = 140 mm
BLANK = XTOT Only

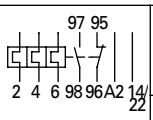
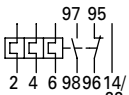
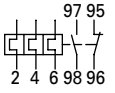
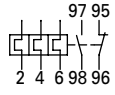
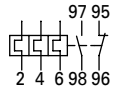
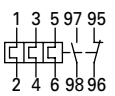
Mounting
BLANK = Direct to Contactor
S = Separate Mount

Trip Class
C1 = Class 10A
C3 = Class 30

B

Product Selection

Table B-121. Overload Relay

	Overload Releases, I_r	Contact Sequence	Contact Configuration	For Use with Contactor Amp Range	Short-Circuit Protection (A) Fuse Type 1 Coordination, gG/gL	Fuse Type 2 Coordination, gG/gL	Maximum Circuit Breaker	CEC/NEC Fuse	Catalogue Number	Price
Frame B — Direct Mount										
	0.1 – 0.16		1NO-1NC	7 – 15A	25	0.5	25	3	**XTOBP16BC1**	
	0.16 – 0.24		1NO-1NC	7 – 15A	25	1	25	3	**XTOBP24BC1**	
	0.24 – 0.4		1NO-1NC	7 – 15A	25	2	25	3	**XTOBP40BC1**	
	0.4 – 0.6		1NO-1NC	7 – 15A	25	4	25	3	**XTOBP60BC1**	
	0.6 – 1		1NO-1NC	7 – 15A	25	4	25	3	**XTOB001BC1**	
	1 – 1.6		1NO-1NC	7 – 15A	25	6	25	6	**XTOB1P6BC1**	
	1.6 – 2.4		1NO-1NC	7 – 15A	25	10	25	6	**XTOB2P4BC1**	
	2.4 – 4		1NO-1NC	7 – 15A	25	16	25	15	**XTOB004BC1**	
	4 – 6		1NO-1NC	7 – 15A	25	20	25	20	**XTOB006BC1**	
	6 – 10		1NO-1NC	7 – 15A	50	25	25	35	**XTOB010BC1**	
	9 – 12		1NO-1NC	9 – 15A	50	25	25	45	**XTOB012BC1**	
	12 – 16		1NO-1NC	12 – 15A	50	25	30	45	**XTOB016BC1**	
Frame C — Direct Mount										
	0.1 – 0.16		1NO-1NC	18 – 32A	25	0.5	25	3	**XTOBP16CC1**	
	0.16 – 0.24		1NO-1NC	18 – 32A	25	1	25	3	**XTOBP24CC1**	
	0.24 – 0.4		1NO-1NC	18 – 32A	25	2	25	3	**XTOBP40CC1**	
	0.4 – 0.6		1NO-1NC	18 – 32A	25	4	25	3	**XTOBP60CC1**	
	0.6 – 1		1NO-1NC	18 – 32A	25	4	25	3	**XTOB001CC1**	
	1 – 1.6		1NO-1NC	18 – 32A	25	6	25	6	**XTOB1P6CC1**	
	1.6 – 2.4		1NO-1NC	18 – 32A	25	10	25	6	**XTOB2P4CC1**	
	2.4 – 4		1NO-1NC	18 – 32A	25	16	25	15	**XTOB004CC1**	
	4 – 6		1NO-1NC	18 – 32A	25	20	25	20	**XTOB006CC1**	
	6 – 10		1NO-1NC	18 – 32A	50	25	25	25	**XTOB010CC1**	
	10 – 16		1NO-1NC	18 – 32A	63	35	30	25	**XTOB016CC1**	
	16 – 24		1NO-1NC	18 – 32A	100	35	30	25	**XTOB024CC1**	
	24 – 32		1NO-1NC	25 – 32A	125	63	30	25	**XTOB032CC1**	
Frame D — Direct Mount										
	6 – 10		1NO-1NC	40 – 65A	50	25	25	25	**XTOB010DC1**	
	10 – 16		1NO-1NC	40 – 65A	63	35	25	25	**XTOB016DC1**	
	16 – 24		1NO-1NC	40 – 65A	63	50	30	25	**XTOB024DC1**	
	24 – 40		1NO-1NC	40 – 65A	125	63	125	125	**XTOB040DC1**	
	40 – 57		1NO-1NC	50 – 65A	160	80	150	150	**XTOB057DC1**	
	50 – 65		1NO-1NC	65A	160	100	150	200	**XTOB065DC1**	
Frame F – G — Direct Mount										
	25 – 35		1NO-1NC	80 – 150A	125	100	125	125	**XTOB035GC1**	
	35 – 50		1NO-1NC	80 – 150A	160	125	150	200	**XTOB050GC1**	
	50 – 70		1NO-1NC	80 – 150A	250	160	150	200	**XTOB070GC1**	
	70 – 100		1NO-1NC	80 – 150A	315	200	400	400	**XTOB100GC1**	
	95 – 125		1NO-1NC	80 – 150A	315	250	500	400	**XTOB125GC1**	
	120 – 150		1NO-1NC	80 – 150A	315	250	600	600	**XTOB150GC1**	
Frame F – G — Separate Mount										
	25 – 35		1NO-1NC	80 – 150A	125	100	125	125	**XTOB035GC1S**	
	35 – 50		1NO-1NC	80 – 150A	160	125	150	200	**XTOB050GC1S**	
	50 – 70		1NO-1NC	80 – 150A	250	160	150	200	**XTOB070GC1S**	
	70 – 100		1NO-1NC	80 – 150A	315	200	400	400	**XTOB100GC1S**	
	95 – 125		1NO-1NC	80 – 150A	315	250	500	400	**XTOB125GC1S**	
	120 – 150		1NO-1NC	80 – 150A	315	250	600	600	**XTOB150GC1S**	
Frame L										
	50 – 70		1NO-1NC	185 – 250A	250	160	150	200	**XTOB070LC1**	
	70 – 100		1NO-1NC	185 – 250A	315	200	400	400	**XTOB100LC1**	
	95 – 125		1NO-1NC	185 – 250A	315	250	500	400	**XTOB125LC1**	
	120 – 160		1NO-1NC	185 – 250A	400	250	600	600	**XTOB160LC1**	
	160 – 220		1NO-1NC	185 – 250A	400 ①	315 ①	800	800	**XTOB220LC1**	
	200 – 250		1NO-1NC	225 – 250A	400 ①	315 ①	600	700	**XTOB250LC1**	

① For separate mounting, short circuit Type 1 rating is 500A and short circuit Type 2 rating is 400A.

Notes:

Short circuit protection: Observe the maximum permissible fuse of the contactor with direct device mounting. See MN03402001E for more information on overload relays for Frame B – G.

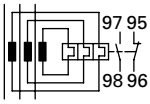
Trip Class: 10A

Suitable for protection of EEx e-motors. EC prototype test certificate available upon request.

Observe manuals MN03402001E and MN03407001E, see **Table B-125**.

Technical Data ..... **Page B-97**
Dimensions ..... **Page B-99**
Discount Symbol **MC7**

Table B-122. Current Transformer Operated Overload Relays ①

	Overload Releases, I_r	Contact Sequence	Contact Configu-ration	For Use with Contactor Amp Range	Short-Circuit Protection (A)				Catalogue Number	Price
					Type 1 Coordi-nation, gG/gL	Type 2 Coordi-nation, gG/gL	Circuit Breaker	CEC/NEC Fuse		
Frame M – N — Separate Mount										
	42 – 63		1NO-1NC	300 – 500A	—	—	150	200	**XTOT063C3S**	
	60 – 90		1NO-1NC	300 – 500A	—	—	250	250	**XTOT090C3S**	
	85 – 125		1NO-1NC	300 – 500A	—	—	500	400	**XTOT125C3S**	
	110 – 160		1NO-1NC	300 – 500A	—	—	600	600	**XTOT160C3S**	
	160 – 240		1NO-1NC	300 – 500A	—	—	600	700	**XTOT240C3S**	
	190 – 290		1NO-1NC	300 – 500A	—	—	600	700	**XTOT290C3S**	
	270 – 400		1NO1-NC	300 – 500A	—	—	1000	1000	**XTOT400C3S**	
	360 – 540		1NO-1NC	500A	—	—	600	1000	**XTOT540C3S**	
	420 – 630		1NO-1NC	630A	—	—	600	1000	**XTOT630C3S**	

① The main current parameters are defined by the main current wiring which is used.

Accessories

Table B-123. DIN Rail or Panel Mount Adapter, Frame C – D ②

	For Use with…	Pkg. Qty.	Catalogue Number	Price
	XTOB…CC1	5	**XTOBXDINC**	
	XTOB…DC1	1	**XTOBXDIND**	

② Can be snap fitted on a top hat rail (DIN rail) to IEC/EN 60715 or can be screw fitted.

Table B-124. Terminal Shroud

	For Use with…	Catalogue Number	Price
	XTOB…LC1	**XTOBXTSL**	

	For direct mounting of …	Catalogue Number	Price
	XTOB…LC1 to XTCE185L, XTCE225L or XTCE250L	**XTOBXTSCL**	

Table B-125. Documentation — Manuals for Overload Monitoring of EEX e-motors

Publication Number	For Use with…
MN03402001E	XTOB…BC1 XTOB…CC1
MN03407001E	XTOB…DC1 XTOB…GC1

Dimensions ..... **Page B-99**
Discount Symbol **MC7**

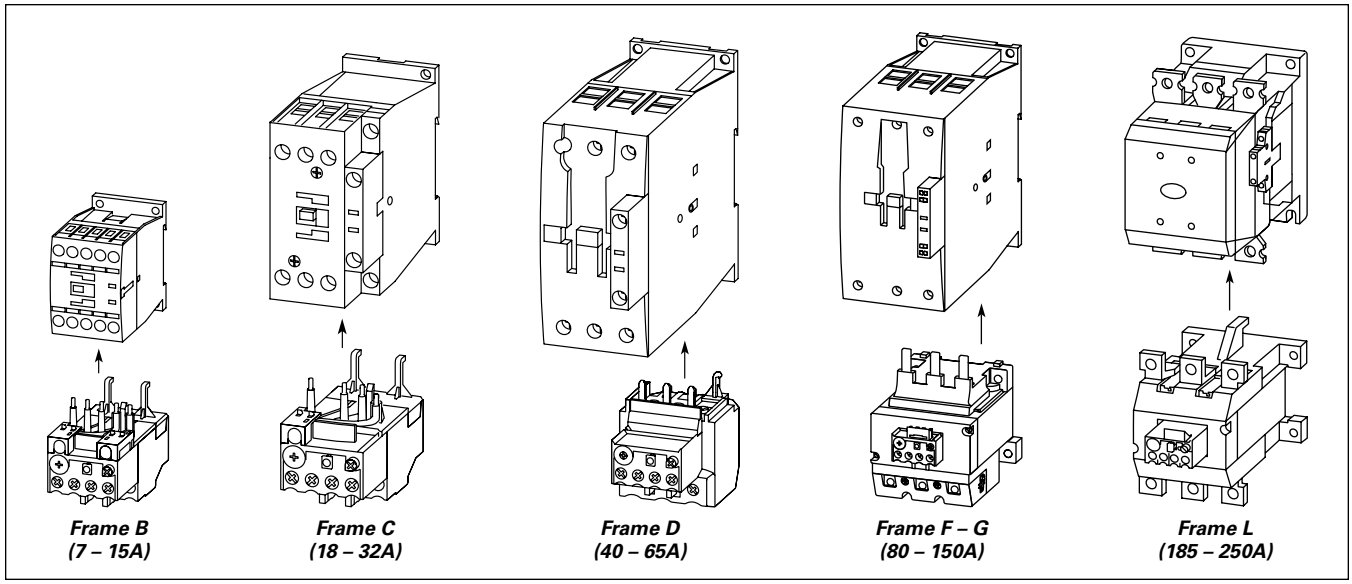


Figure B-74. Overload Fitted Directly to the Contactor

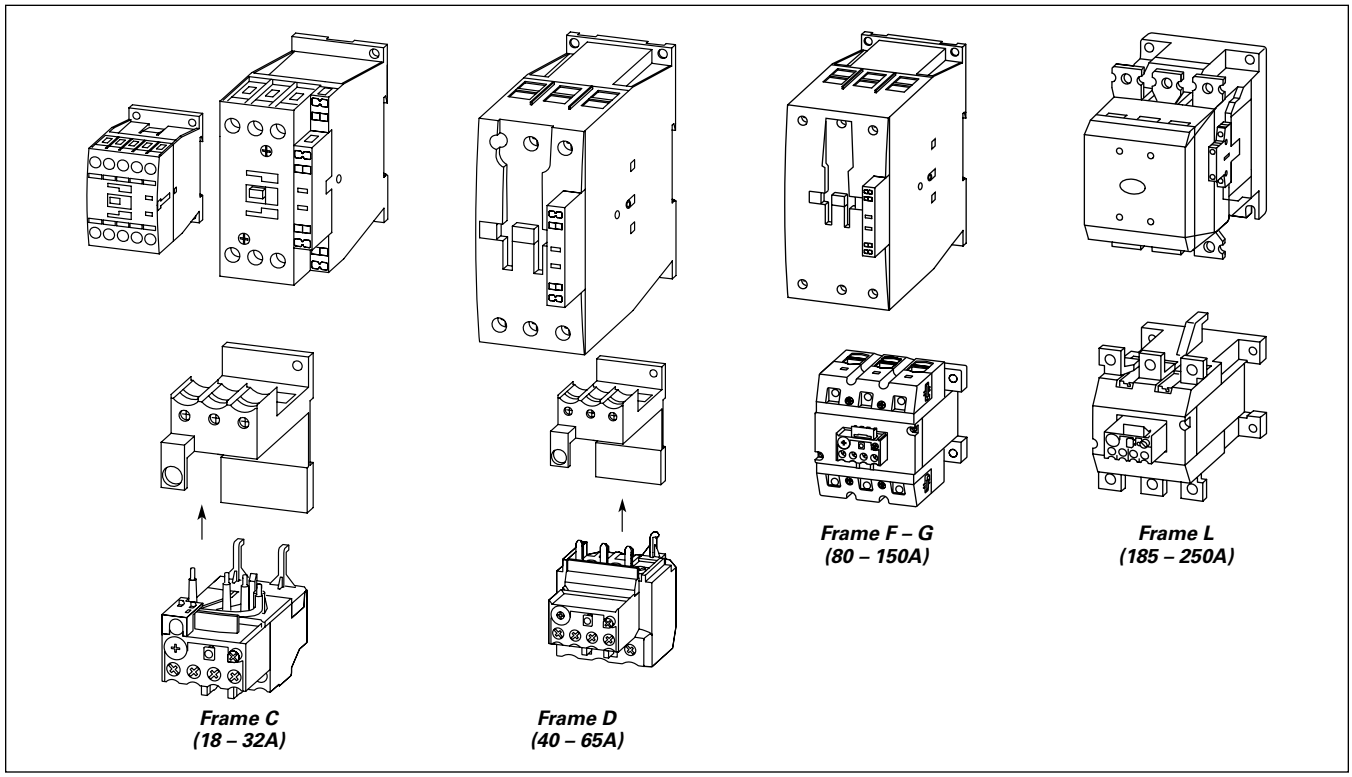


Figure B-75. Overload Mounted Separately from the Contactor

Contactors ..... **Page B-39**
Overload Relays ..... **Page B-94**

Technical Data and Specifications

Table B-126. XTOB Overload Relay — Technical Data and Specifications

Description	XTOB…BC1, XTOB…CC1	XTOB…DC1	XTOB…GC1, XTOB…GC1S	XTOB...LC1
General				
Standards	IEC/EN 60947, VDE 0660, UL, CSA			
Climate Proofing	Damp heat, constant, to IEC 60068-2-78; Damp heat, cyclic, to IEC 60068-2-30			
Ambient Temperature ①	-25°C to +55°C [-13°F to 131°F]	-25°C to +55°C [-13°F to 131°F]	-25°C to +55°C [-13°F to 131°F]	-25°C to +50°C [-13°F to 22°F]
Temperature Compensation	Continuous	Continuous	Continuous	Continuous
Mechanical Shock Resistance (IEC/EN 60068-2-27) Half-Sinusoidal Shock 10 mS	 10g	 10g	 10g	 10g
Degree of Protection	IP20	IP20	IP20	P00
Protection Against Direct Contact when Actuated from Front (IEC 536)	Finger and back of hand proof	Finger and back of hand proof	Finger and back of hand proof	With terminal cover XTOBXTS...L
Insulation Voltage (Ui) V AC	690	690	690	1000
Overvoltage Category / Pollution Degree	III/3	III/3	III/3	III/3
Impulse Withstand Voltage (Uimp) V AC	6000	6000	6000	8000
Operational Voltage (Ue) V AC	690	690	690	1000
Safe Isolation to VDE 0106 Part 101 and part 101/A1 Between auxiliary contacts and main contacts (V AC) Between main contacts (V AC)	 440 440	 440 440	 440 440	 440 440
Overload Release Setting Range	0.1 – 32A	6 – 75A	25 – 150A	50 – 250A
Short Circuit Protection Maximum Fuse	See **Table B-121** on **Page B-94**.			
Temperature Compensation Residual Error > 40°C	<0.25	<0.25	<0.25	<0.25
Current Heat Loss (3 Conductors) Lower value of setting range, W Upper value of setting range	 2.5 6	 3 7.5	 16 28	 16 28
Terminal Capacity Solid, mm^2 Flexible with ferrule, mm^2 Flexible with cable lug, mm^2 Stranded with cable lug, mm^2	 2 x (1 – 6) 2 x (1 – 4) 2 x (1 – 6) ② — —	 2 x (1 – 16) 1 x 25 2 x (1 – 10) ③ — —	 2 x (4 – 16) 1 x (4 – 70) 2 x (4 – 50) — —	 — — — 95 120
Solid or Stranded, AWG	14 - 8	14 - 2	2 / 0	250MCM
Flat Conductor (number of segments x width x thickness, mm^2	—	—	—	6 x 16 x 18
Busbar — Width (mm)	—	—	—	20 x 3
Terminal Screw Tightening Torque Nm Lb-in	M4 1.8 16	M6 3.5 31	M10 10 88.5	M8 x 25 24 221.3
Tools Pozidrive screwdriver Standard screwdriver Hexagon socket head spanner (SW)	 Size 2 1 x 6 —	 Size 2 1 x 6 —	 — — 5 mm	 — — 13 mm
Auxiliary and Control Circuit Connections				
Impulse Withstand Voltage (Uimp) V AC	6000	6000	6000	6000
Overvoltage Category/Pollution Degree	III/3	III/3	III/3	III/3
Terminal Capacity Solid, mm^2 Flexible with ferrule, mm^2 Solid or Stranded (AWG)	 2 x (0.75 – 4) 2 x (0.75 – 2.5) 2 x (18 – 12)	 2 x (0.75 – 4) 2 x (0.75 – 2.5) 2 x (18 – 12)	 2 x (0.75 – 4) 2 x (0.75 – 2.5) 2 x (18 – 12)	 2 x (0.75 – 4) 2 x (0.75 – 2.5) 2 x (18 – 12)
Terminal Screw Tightening Torque Nm Lb-in	M3.5 0.8 – 1.2 7 – 10.6	M3.5 0.8 – 1.2 7 – 10.6	M3.5 0.8 – 1.2 7 – 10.6	M3.5 0.8 – 1.2 7 – 10.6
Tools Pozidrive screwdriver Standard screwdriver	 Size 2 1 x 6	 Size 2 1 x 6	 Size 2 1 x 6	 Size 2 1 x 6
Rated Insulated Voltage (Ui) V AC	500	500	500	500
Rated Operational Voltage	500	500	500	500
Safe Isolation to VDE 0106 Part 101 and part 101/A1 Between auxiliary contacts	 240	 240	 240	 240
Conventional Thermal Current, I_{th}	6	6	6	—

① Ambient Temerpature Operating Range to IEC/EN 60947, PTB: -5°C to +50°C.
② 6 mm^2 flexible with ferrules to DIN 46228.
③ Main contact terminal capacity, solid and stranded conductors with ferrules: When using 2 conductors use identical cross-section.

Table B-126. XTOB Overload Relay — Technical Data and Specifications (Continued)

Description	XTOB…BC1, XTOB…CC1	XTOB…DC1	XTOB…GC1, XTOB…GC1S	XTOB...LC1
Auxiliary and Control Circuit Connections (Continued)				
Rated Operational Current — AC-15				
Make Contact				
120V	1.5	1.5	1.5	1.5
240V	1.5	1.5	1.5	1.5
415V	0.5	0.5	0.5	0.5
500V	0.5	0.5	0.5	0.5
Break Contact				
120V	1.5	1.5	1.5	1.5
240V	1.5	1.5	1.5	1.5
415V	0.9	0.9	0.9	0.9
500V	0.8	0.8	0.8	0.8
Rated Operational Current — DC-13 L/R ≤ 15 mS ①				
24V	0.9	0.9	0.9	0.9
60V	0.75	0.75	0.75	0.75
110V	0.4	0.4	0.4	0.4
220V	0.2	0.2	0.2	0.2
Short Circuit Rating without Welding Maximum Fuse, A gG/gl	6	6	6	6

① Rated operational current: Making and breaking conditions to DC-13, L/R constant as stated.

Tripping Characteristics

These tripping characteristics are the mean values of the spread at 20°C ambient temperature in a cold state.

Tripping time depends on response current. With devices at operating temperature, the tripping time of the overload relay reduces to approximately 25% of the read off value. Specific characteristics for each individual setting range can be found in MN03402001E.

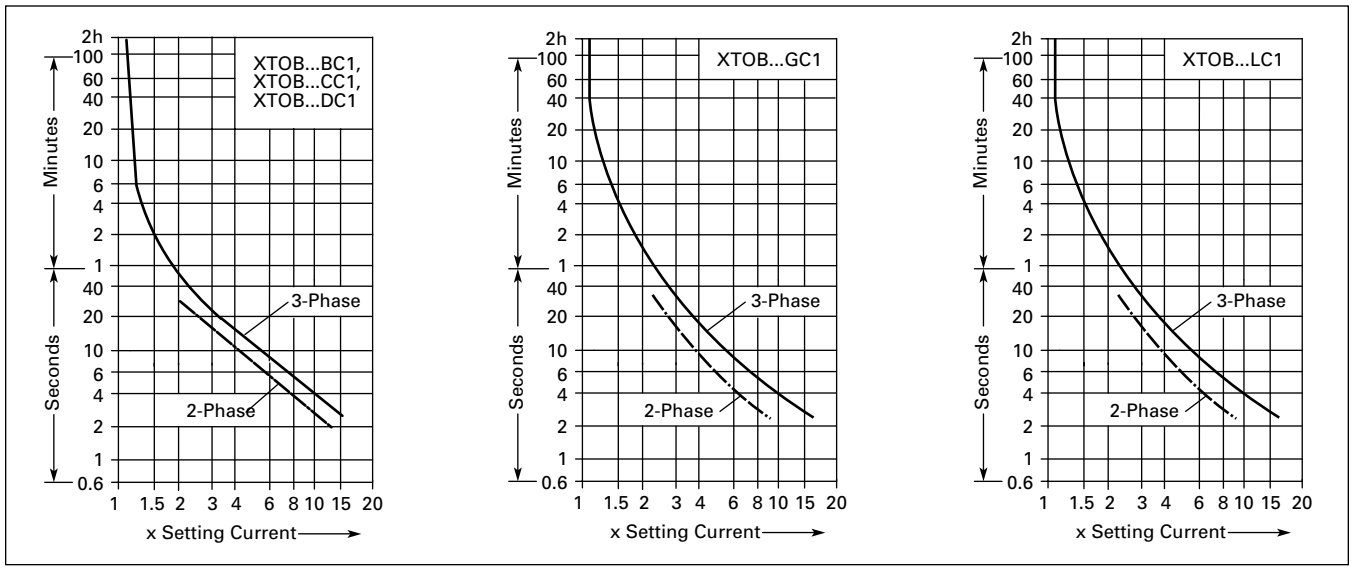


Figure B-76. Tripping Characteristics

Instructional Leaflets

Table B-127. Instructional Leaflets

Publication Number	Description
Pub51221	XTOB, D Frame Overload Relays (Inside of Packaging)
Pub51222	XTOB, B – C Frame Overload Relays (Inside of Packaging)

B

Dimensions

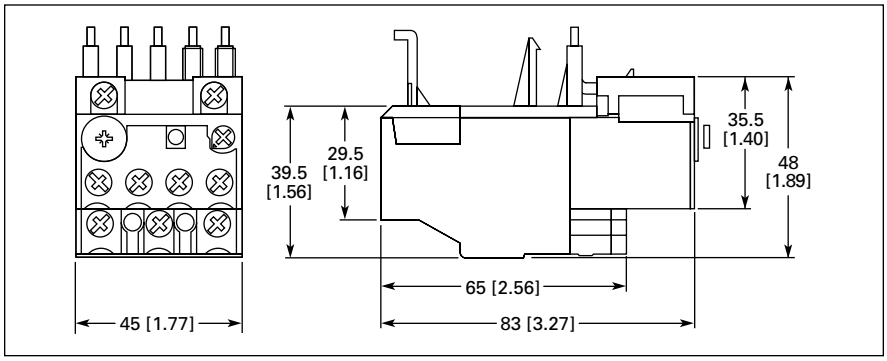


Figure B-77. Frame B – C, XTOB…BC1 and XTOB…CC1 Overload Relays — Approximate Dimensions in mm [in]

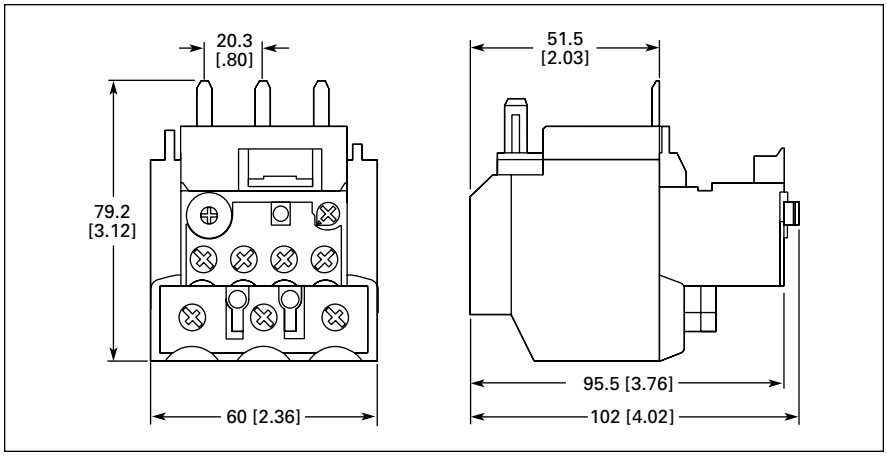
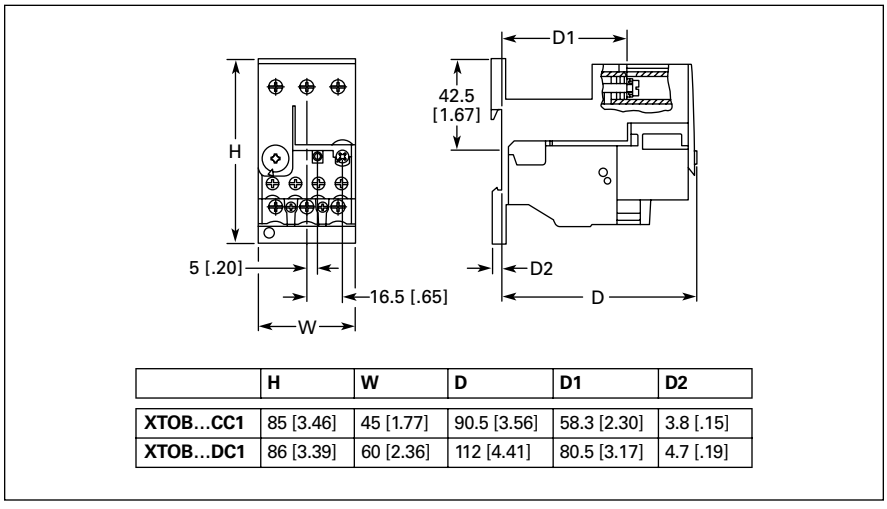


Figure B-78. Frame D, XTOB…DC1 Overload Relay — Approximate Dimensions in mm [in]



	H	W	D	D1	D2
XTOB…CC1	85 [3.46]	45 [1.77]	90.5 [3.56]	58.3 [2.30]	3.8 [.15]
XTOB…DC1	86 [3.39]	60 [2.36]	112 [4.41]	80.5 [3.17]	4.7 [.19]

Figure B-79. Frame B – C, XTOBXDINC DIN Rail or Panel Mount Adapter and Frame D, XTOBXDIND DIN Rail or Panel Mount Adapter — Approximate Dimensions in mm [in]

B

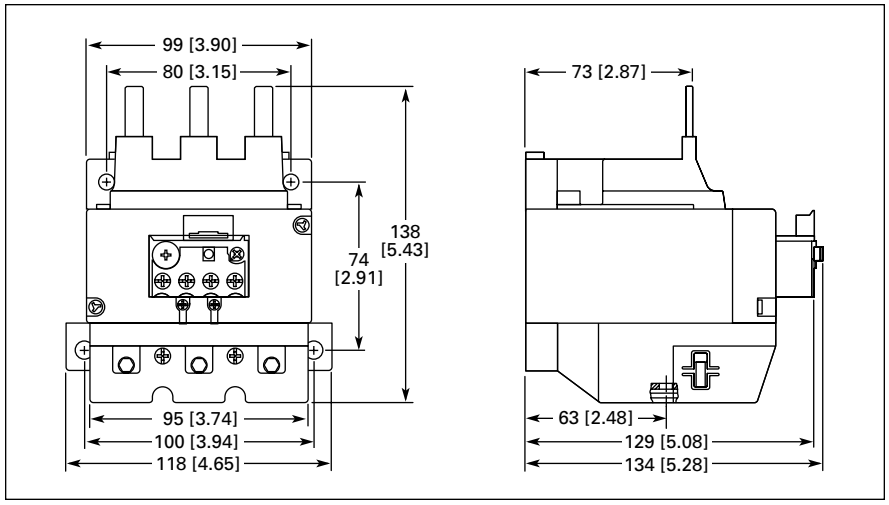


Figure B-80. Frame F – G, XTOB…GC1 Overload Relay — Approximate Dimensions in mm [in]

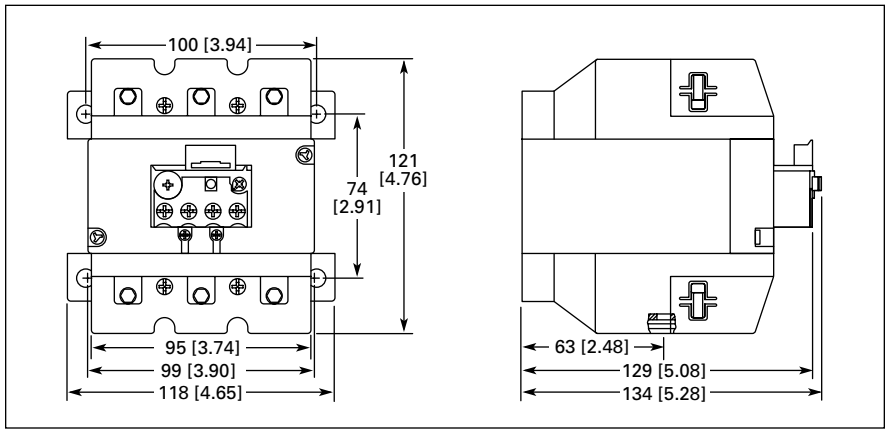


Figure B-81. Frame F – G, XTOB…G1CS Overload Relay — Approximate Dimensions in mm [in]

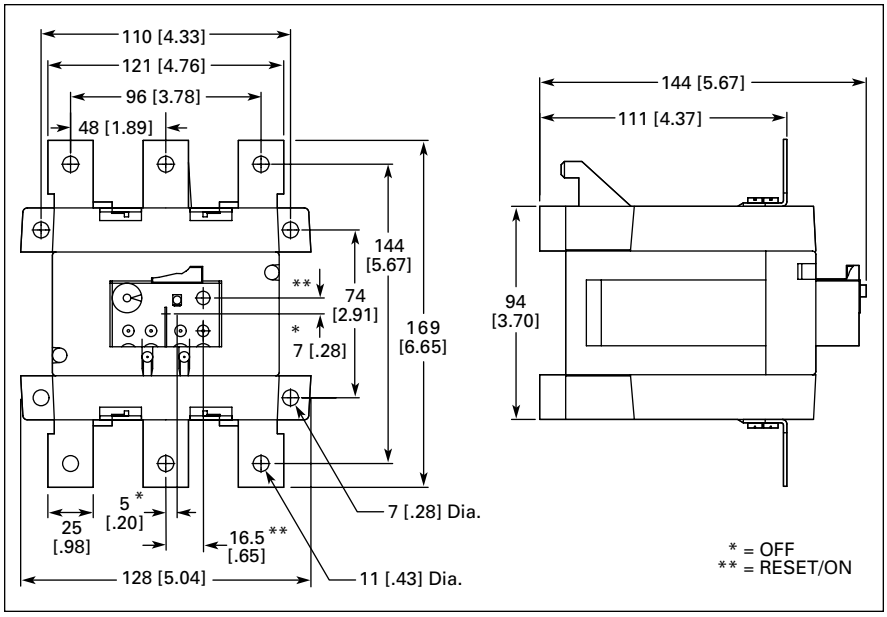


Figure B-82. Frame L, XTOB…LC1 Overload Relay — Approximate Dimensions in mm [in]

Current Transformer Operated Overload Relay

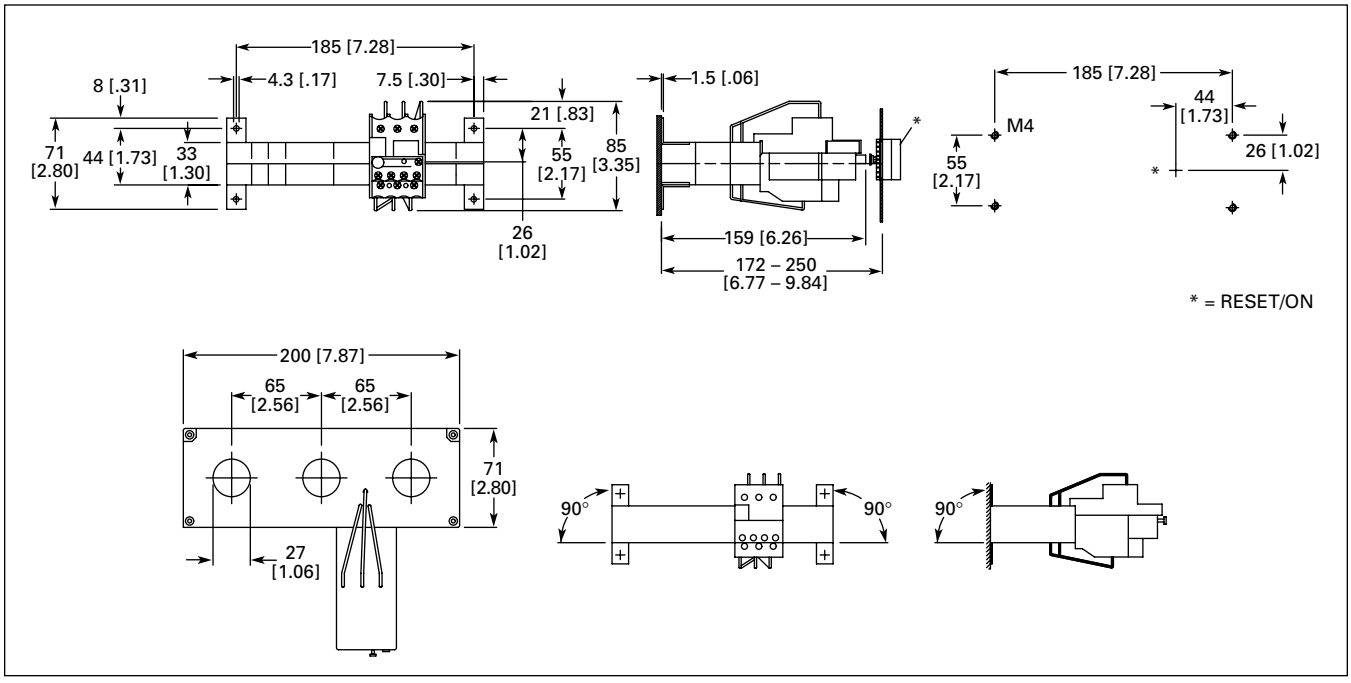


Figure B-83. XTOT…C3S — Approximate Dimensions in mm [in]

Contents

C396 Electronic Overload Relay

Product Description

The C396 is a self-powered, robust electronic overload designed for integrated use with Freedom NEMA, ***XT*** IEC, and DP contactors. The overload can be ordered as a stand-alone version that is designed for Panel-Mounting and for use on 35 mm DIN rail. The C396 has an FLA range of 0.1 – 150 Amps with internal CTs, and up to 1500 Amps using external CTs.

Features

- Standard Version: Selectable trip class (5, 10, 20, 30) with Selectable Manual or Auto Reset
- Broad 5:1 FLA range
- Self-Powered Design, will accept AC voltages from 12 – 690V 50/60 Hz
- Ambient Temperature Compensation
- Low Heat Generation
- Phase Loss Protection
- Phase Unbalance Protection
- Electrically isolated 1NO-1NC Contacts (Push-to-Test)
- Trip Status Indicator
- FLA range of 0.1 – 1500 Amps

Standards and Certifications

- UL Listed Components: Stand-alone, starter-mounted devices and remote reset kit.
- CSA Certified Components: Stand-alone, starter-mounted devices and remote reset kit.
- IEC EN 60947-4-1, EN 60947-5-1
- CE
- RoHS

Catalogue Number Selection

Table B-128. EC396 Electronic Overload Relays — Catalogue Numbering System

C396 A 2 A P05 SEL AX

Device Type
C396 = C396 Electronic Overload Relay

Frame Size
A = 45 mm
B = 65 mm
C = 110 mm

Feature Set

	Reset Type
2 = Standard	**A** = Auto

Max. Amperes Current Rating

Frame A (45 mm)
P05 = 0.1 – 0.5
002 = 0.4 – 2.0
005 = 1 – 5
008 = 1.6 – 8
032 = 6.4 – 32
045 = 9 – 45

Frame B (65 mm)
075 = 15 – 75
110 = 22 – 110

Frame C (110 mm)
150 = 30 – 150

Stand-Alone Overload Relay Suffix
AX = All Frame Sizes

***XT* IEC Adapter Suffix**

Frame B
XB = 0.1 – 0.5A
0.4 – 2.0A
1 – 5A
1.6 – 8A
6.4 – 32A

Frame C
XC = 0.1 – 0.5A
0.4 – 2.0A
1 – 5A
1.6 – 8A
6.4 – 32A

Frame D
XD = 6.4 – 32A
9 – 45A
15 – 75A

Frame F – G
XF = 22 – 110A

Class
SEL = Selectable

① 45 mm overload with external CTs.

Cat. No.
C396B2A110SELFK

Cat. No.
C396C2A150SELAX +
C396CBAR

Table B-129. C396 Stand-Alone Overload Relay

FLA Range (Amps)	Description	Catalogue Number	Price
45 mm Overload Frame Size ①			
0.1 – 0.5	—	**C396A2AP05SELAX**	
0.4 – 2.0		**C396A2A002SELAX**	
1 – 5		**C396A2A005SELAX**	
1.6 – 8		**C396A2A008SELAX**	
6.4 – 32		**C396A2A032SELAX**	
9 – 45		**C396A2A045SELAX**	
65 mm Overload Frame Size ①			
15 – 75	—	**C396B2A075SELAX**	
22 – 110		**C396B2A110SELAX**	
110 mm Overload Frame Size ②			
30 – 150	—	**C396C2A150SELAX**	

① Overload comes with a panel/DIN rail mounting adapter assembled. No separate mounting adapter accessory offered.

② Panel mount only! Overload comes with integrated pass-through holes for power wires. Bus Bar Kit (C396CBAR or C396CBARXT, see **Table B-131**) and Lug Kit (C396CLUG) must be purchased separately if customer prefers not to use pass-through capability.

Table B-130. C396 Overload for Integrated Use with *XT* IEC Contactors

FLA Range (Amps)	*XT* IEC Contactor Frame Size / Width	Catalogue Number	Price
45 mm Overload Frame Size			
0.1 – 0.5	B / 45 mm	**C396A2AP05SELXB**	
0.4 – 2.0	B / 45 mm	**C396A2A002SELXB**	
1 – 5	B / 45 mm	**C396A2A005SELXB**	
1.6 – 8	B / 45 mm	**C396A2A008SELXB**	
6.4 – 32	B / 45 mm	**C396A2A032SELXB**	
0.1 – 0.5	C / 45 mm	**C396A2AP05SELXC**	
0.4 – 2.0	C / 45 mm	**C396A2A002SELXC**	
1 – 5	C / 45 mm	**C396A2A005SELXC**	
1.6 – 8	C / 45 mm	**C396A2A008SELXC**	
6.4 – 32	C / 45 mm	**C396A2A032SELXC**	
6.4 – 32	D / 55 mm	**C396A2A032SELXD**	
9 – 45	D / 55 mm	**C396A2A045SELXD**	
65 mm Overload Frame Size			
15 – 75	D / 55 mm	**C396B2A075SELXD**	
22 – 110	F – G / 90 mm	**C396B2A110SELXF**	
110 mm Overload Frame Size — Stand-Alone or Direct to *XT* Contactor with Indicated Kit			
30 – 150	G / 90 mm	**C396C2A150SELAX** ③	
110 mm ***XT*** Bus Bar Kit		**C396CBARXT**	

③ Catalogue Number shown is for Stand-Alone C396 Overload Relay. For direct connection to ***XT*** Frame G contactor, order additional ***XT*** Bus Bar Kit, C396CBARXT, shown in **Tables B-130** and **B-131**. If load side lugs are required, order C396CLUG (set of 3).

Accessories

Table B-131. C396 Electronic Overload Accessories

	Description	Catalogue Number	Price
	Reset Bar Kit assembles to the top of the overload to increase reset area.	**C396ARST**	
	110 mm Lug Kit ④	**C396CLUG**	
	110 mm Bus Bar Kit ⑤	**C396CBAR**	
	110 mm ***XT*** Bus Bar Kit ⑤	**C396CBARXT**	
 ***C396ARST + C396RR_ _ _ _ Assembled to a C396 Overload Relay***	Remote Reset 24V DC ⑦	**C396RR024DC**	
	Remote Reset 24V AC ⑦	**C396RR024AC**	
	Remote Reset 120V AC ⑦	**C396RR120AC**	
	Remote Reset 240V AC ⑦	**C396RR240AC**	
	Mechanical Reset with E22 Flush Pushbutton and Mechanical Push Rod ⑥ Plastic Black Bezel Chrome Bezel	 **E22PB6N29L** **E22P6N29L**	
	Mechanical Push Rod — for external mechanical reset ⑧	**E22MRL**	
	Mounting Hole Adapter Kit ⑨	**E22ARK**	

④ Set of 3 lugs and hardware, 2 sets are required to wire line and load sides. Bus Bar Kit (C396CBAR or C396CBARXT) is needed to use the Lug Kit.

⑤ Bus bar kits do not include lugs. Order C396CLUG if lugs are needed (3 lugs per kit).

⑥ The operator button is blue with the letters "RESET" printed in white. The push rod is 4.72" long and can be cut to the desired length. This kit can be used alone or in conjunction with the C396 Reset Bar Kit, C396ARST, to increase the size of the reset area on the overload.

⑦ Reset Bar Kit (C396ARST) required to use the Remote Reset modules. Note that all Freedom Starters come with Reset Bars.

⑧ Must be cut to proper length — uncut 4.72 inches (119.9 mm) long.

⑨ Enables a 22.5 mm operator to be mounted in a 30.5 mm holes — 1/16 to 7/32 inch (1.6 to 5.6 mm) panel thickness.

Technical Data ..... **Page B-104**
Dimensions ..... **Pages B-105, B-108**
Discount Symbol..... **MC7**

B

Technical Data and Specifications

Table B-132. Overload Relay Specifications

General Description	C396_2_
	Standard
Protection	
Thermal	1.05 x FLA: Does not trip 1.25 x FLA: Overload trip
Phase Loss	1 Phase = 0, Trip time = 3s (Hot Status)
Phase Imbalance	Max - Min / Max > 40%, Trip time = 3s (Hot Status)
Inrush Current	> 8 x Max FLA, Trip time is 0.3s (Cold Status)
Trip Class	
Class 5, 10, 20, 30	Selectable
Reset	
M / M-O A / A-O	Manual / Manual + Stop Auto / Auto + Stop Auto Reset Time = 165s
Indications	
Test Indicator	Yellow
Trip Indicator	Yellow
PCBA	
Power Sensing	3 phase
Instant Reset by Power ON	CPU reset by Power ON after 2 – 3s
Thermal memory	< 3 min.
Cold and Hot Trip Curves	Power ON > 20 min. is Hot Status
Power Consumption	< 300 mW
Options	
Safety Cover	Covers FLA dial, DIP switches
Remote Reset	24V DC, 24V AC, 120V AC, 240V AC

Table B-132. Overload Relay Specifications (Continued)

General Description	C396_2_
	Standard
Climate Considerations	
Ambient Temperature (Operating)	-25° to 65°C (-13° to 149°F) inside enclosure
Ambient Temperature (Storage / Transportation)	-40° to 80°C (-40° to 176°F)
Humidity	UL991 (H3): 20 – 95% non-condensing
Altitude (Operating)	NEMA ICS1: 2000 meters max above sea level
Pollution (Operating — External)	Pollution degree 3
Mechanical Shock Resistance (IEC/EN 68-2-17)	15g
Vibration (Lloyd's Register of Shipping, Vibration Test 2)	6g
Temperature Compensation	Continuous
Voltages	
Control Voltage	12 – 690V AC, 50/60 Hz
Insulation Voltage (Ui) — Main Circuit	1000V AC
Insulation Voltage (Ui) — Control Circuit	690V AC
Impulse Withstand Voltage (Uimp) VAC	6000
FLA Range	
45 mm Frame: C396A_	0.1 – 45A
65 mm Frame: C396B_	15 – 110A
110 mm Frame: C396C_	30 – 150A
Safety	
Degree of Protection	IP20 (Stand-Alone Version Only)
Capacity	
Control Terminal Capacity	18 – 14 AWG
Control Terminal Tightening Torque in Nm (lb-in)	0.79 (7)
Load Terminal Capacity	
45 mm Frame: C396A_	14 – 6 AWG
65 mm Frame: C396B_	10 – 1 AWG
110 mm Frame: C396C_	6 AWG – 250 mcm
Load Terminal Tightening Torque in Nm (lb-in)	
45 mm Frame: C396A_	3.2 (28)
65 mm Frame: C396B_	9.0 (80)
110 mm Frame: C396C_	22.6 (200)

Dimensions . . . . . **Pages B-105, B-108**

Dimensions

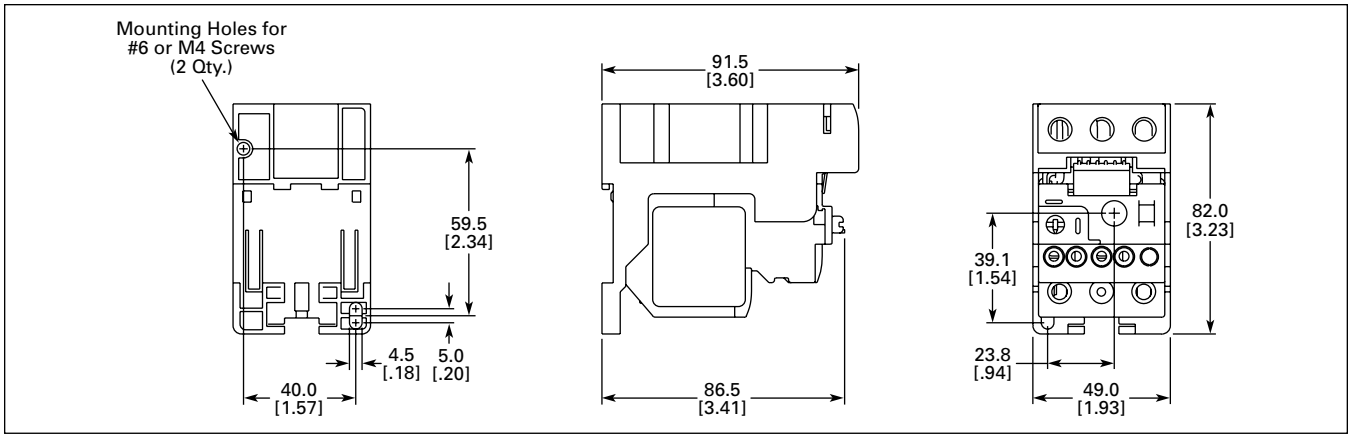


Figure B-84. 45 mm Stand-Alone C396 Electronic Overload Relay — Approximate Dimensions in mm [in]

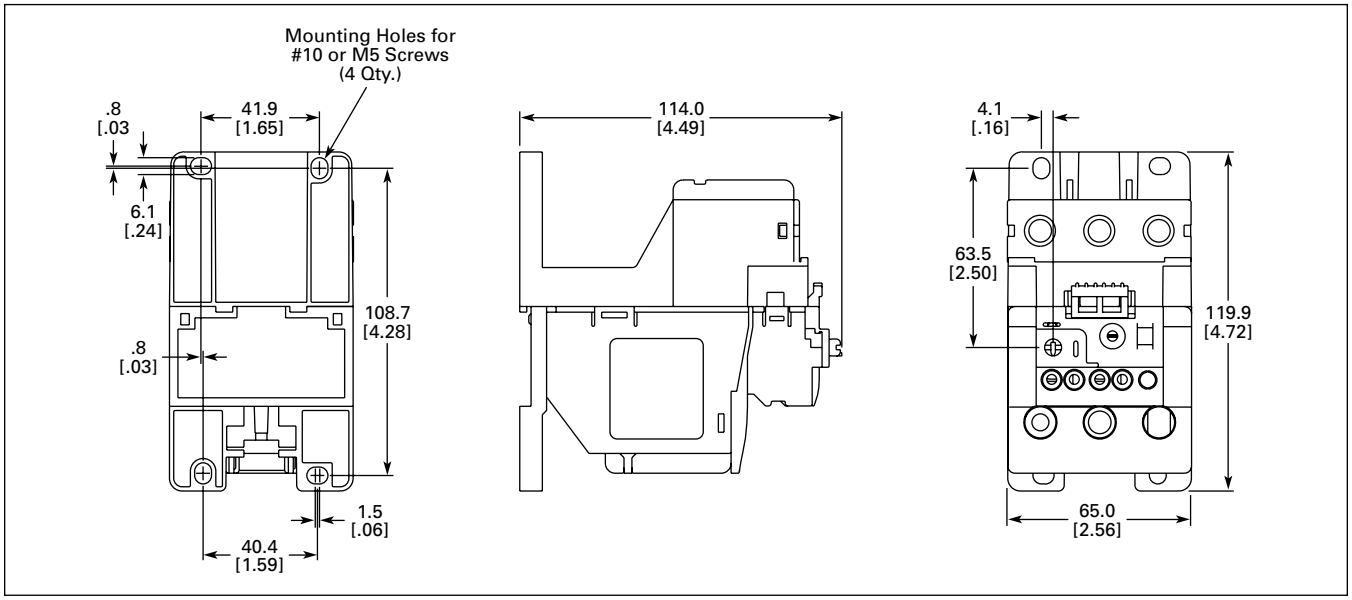


Figure B-85. 65 mm Stand-Alone C396 Electronic Overload Relay — Approximate Dimensions in mm [in]

B

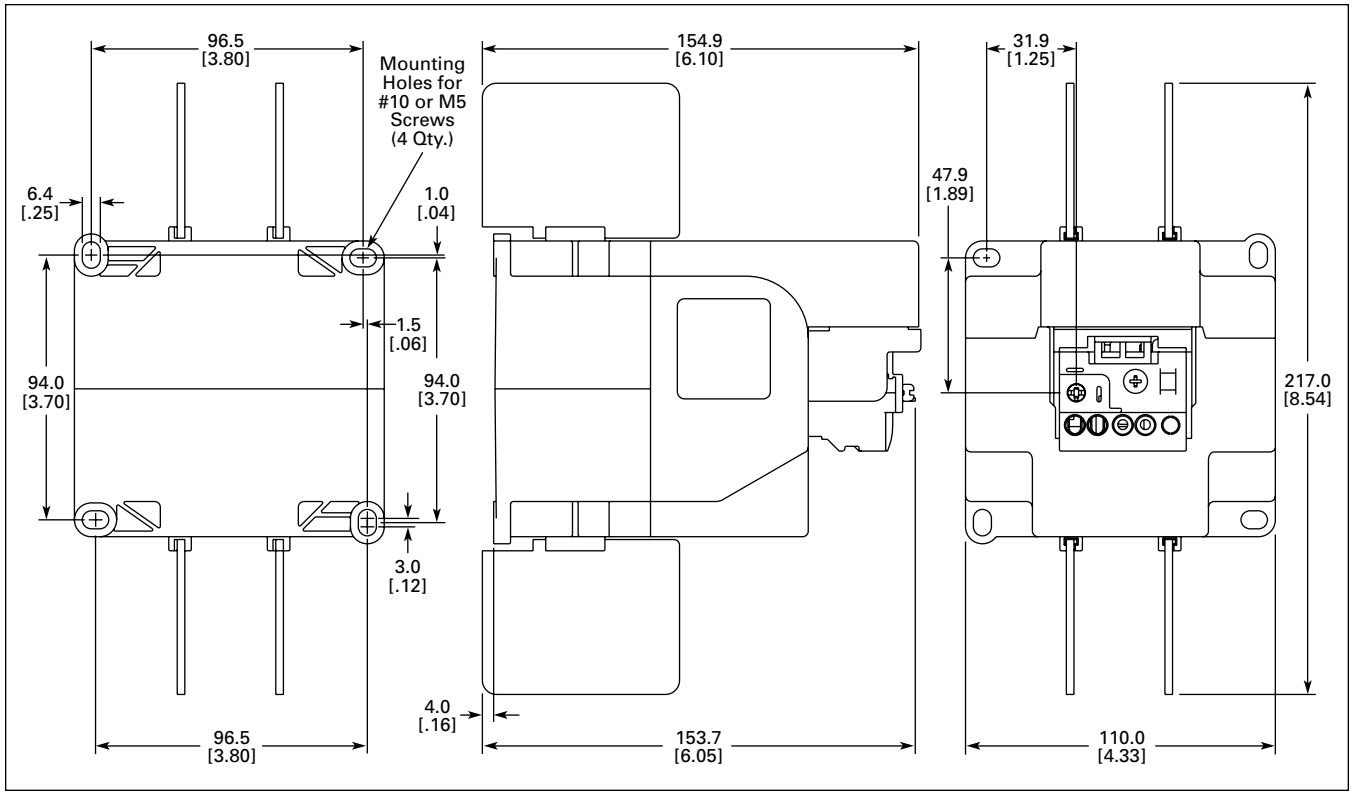


Figure B-86. 110 mm Stand-Alone C396 Electronic Overload Relay — Approximate Dimensions in mm [in]

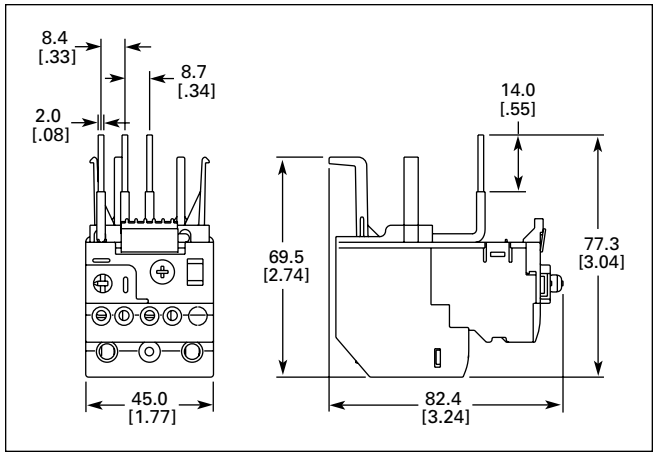


Figure B-87. 45 mm C396 (0.1 – 8A) Direct Connect to *XT* Frame B Contactor — Approximate Dimensions in mm [in]

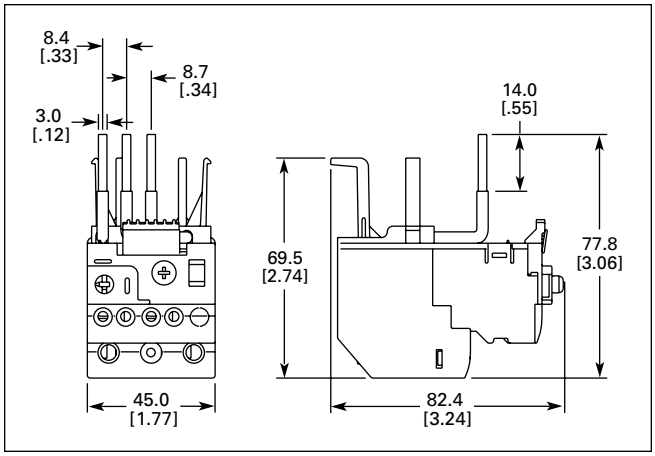


Figure B-88. 45 mm C396 (6.4 – 32A) Direct Connect to *XT* Frame B Contactor — Approximate Dimensions in mm [in]

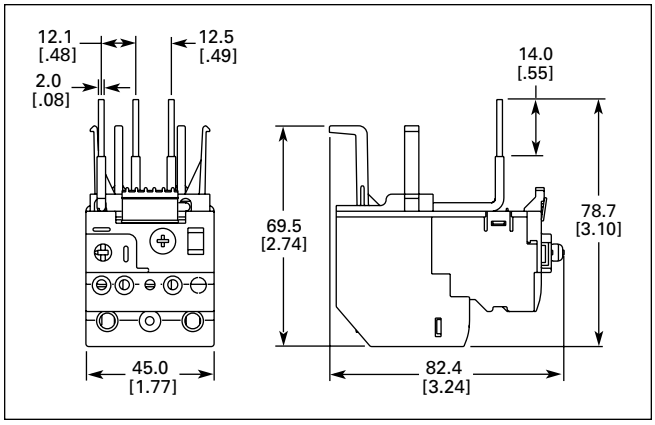


Figure B-89. 45 mm C396 (0.1 – 8A) Direct Connect to *XT* Frame C Contactor — Approximate Dimensions in mm [in]

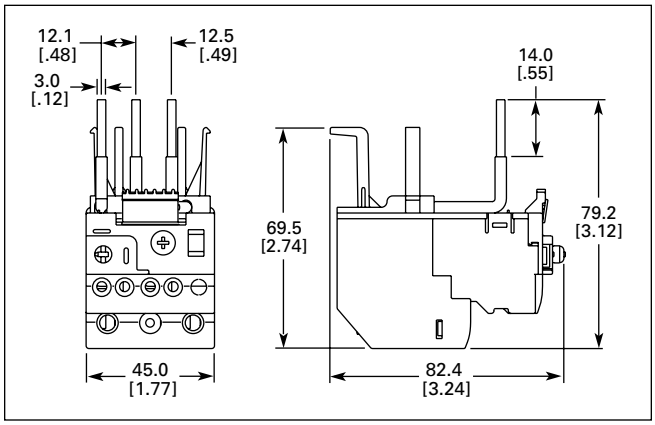


Figure B-90. 45 mm C396 (6.4 – 32A) Direct Connect to *XT* Frame C Contactor — Approximate Dimensions in mm [in]

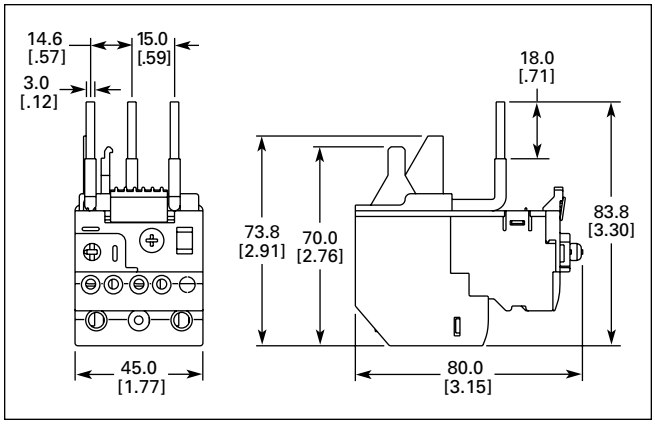


Figure B-91. 45 mm C396 (9 – 45A) Direct Connect to *XT* Frame D Contactor — Approximate Dimensions in mm [in]

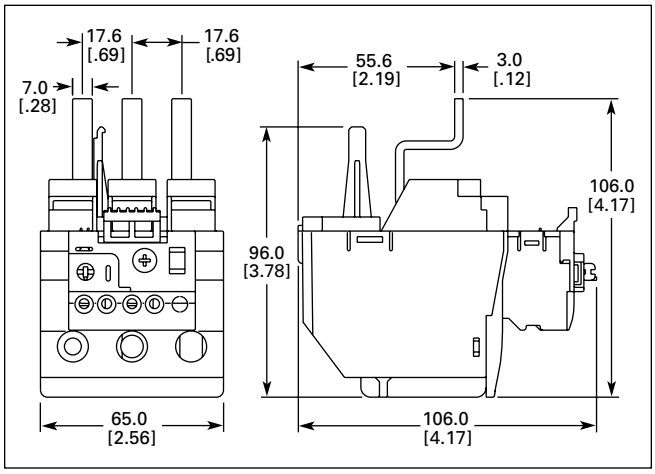


Figure B-92. 65 mm C396 (15 – 75A) Direct Connect to *XT* Frame D Contactor — Approximate Dimensions in mm [in]

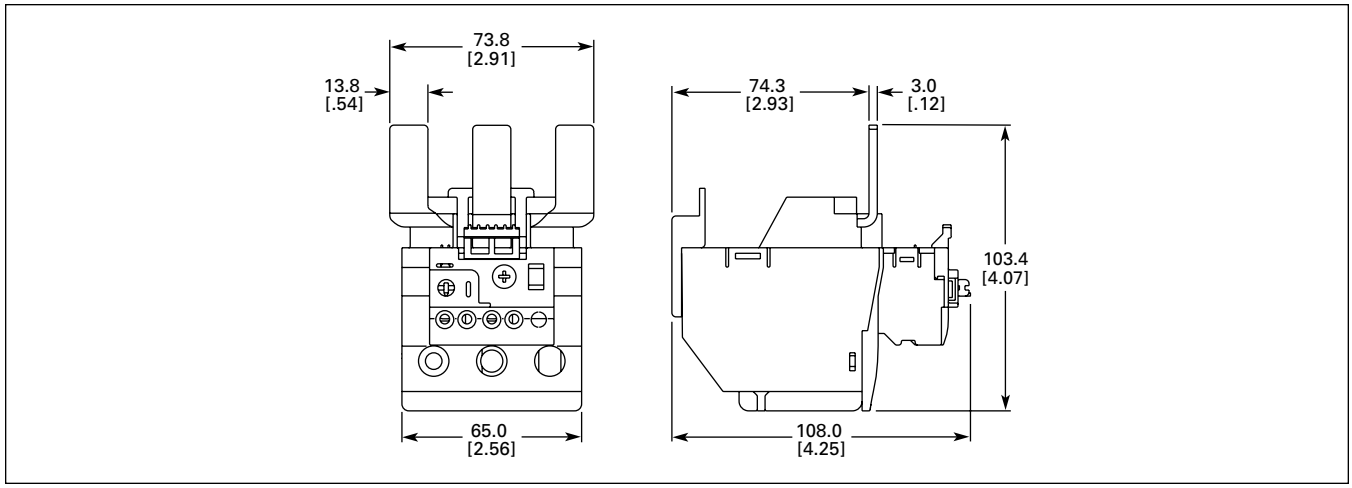


Figure B-93. 65 mm C396 (22 – 110A) Direct Connect to *XT* Frame F – G Contactor — Approximate Dimensions in mm [in]

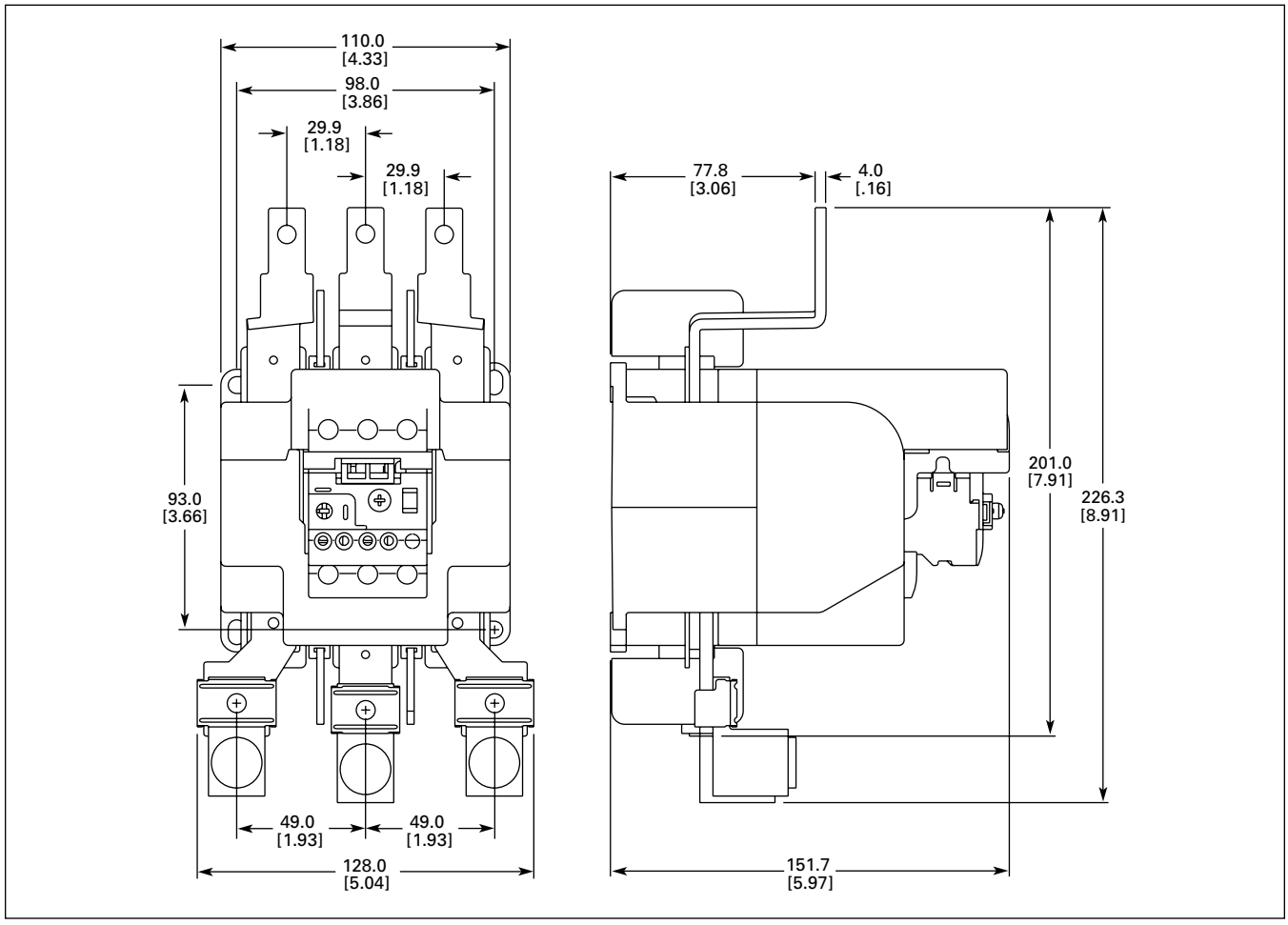


Figure B-94. 110 mm C396 (30 – 150A) + C396CBARXT Direct Connect to *XT* Frame G Contactor — Approximate Dimensions in mm [in]

Contents

Pushbutton

B-Frame

Rotary

B-Frame

D-Frame

Product Description

Eaton's new ***XT*** family of Manual Motor Protectors (MMPs) features a pushbutton or rotary ON/OFF manual disconnect, Class 10 adjustable bimetallic overload relay and fixed magnetic short circuit trip capability in one compact unit. Two frame sizes are available: Frame B (45 mm) for motors with FLA ratings up to 32A and Frame D (55 mm) covers motor FLA ratings up to 63A.

Application Description

The XTPB and XTPR MMPs can be used in the following applications.

Motor Protective Circuit Breaker

In many countries outside of the United States and Canada, especially Europe, the MMPs are tested and classified as thermal magnetic circuit breakers for use in motor branch circuits. This can be an important consideration for all companies who export their equipment and machines internationally. Both the XTPB and XTPR conform to IEC/EN 60947 and have the CE Mark.

Manual Motor Protectors

The XTPB and XTPR MMPs are UL Listed under UL 508 as Manual Motor Protectors. They provide an economical solution for applications requiring simple manual starting and stopping of motors. When used as an MMP, they are typically installed in an enclosure. Many enclosures are offered as accessories for the MMPs. Separate short-circuit protective devices, such as circuit breakers or fuses, are wired ahead of the MMPs. The short-circuit protective device should be sized per the NEC code and should not exceed 400% of the maximum FLA dial setting of the MMP.

Group Motor Installations

A Group Motor Installation can be defined as more than one motor circuit protected by a single set of fuses or circuit breaker on a motor branch circuit. This eliminates the need for individual fuses or circuit breakers for each motor circuit. Substantial component cost savings, panel space savings and reduced wiring installation time can be achieved in Group Motor Installations.

The MMPs are tested and listed for group installation. If remote operation is required, a magnetic contactor can be wired in series with the MMP. See **Figure B-95**.

Article 430.53 of the National Electric Code contains the rules and requirements for Group Motor Installations. Refer to Application Note AP03402001E for NEC requirement for group motor installation.

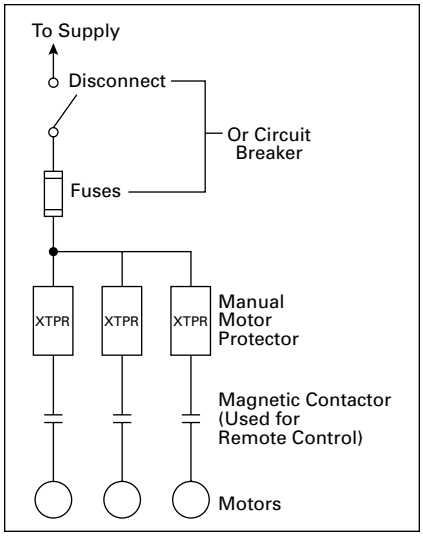


Figure B-95. Group Motor Installation NEC 430-53

See Application Note — AP03402001E.

Protection in Different Controller Types

A UL 508 Type E Self-protected Manual Combination Starter/Motor Controller consists of a single device having integral short circuit protection, a main set of contacts, motor overload protection, and July also include a UL listed Line Side Adapter (See **Figure B-96**). This type of controller is a legitimate short circuit protective device and disconnect means for the downstream motor. It does require an upstream feeder short circuit protective device, but does not require a dedicated branch circuit protection or a disconnect means. A UL 508 Type E rating means that the unit clears a fault and does not experience any welding of the power poles. A UL 508 Type E self-protected manual combination starter will remain fully functional should a short circuit within its ratings occur.

A UL 508 Type F Self-protected Combination Motor Controller consists of a UL 508 Listed Type E Self-protected Manual Combination Starter/Motor Controller, a UL Listed Contactor, and possibly a UL Listed Line Side Adapter. While the Type E self-protected manual motor controller of this combination motor controller device is a legitimate short circuit protective device and disconnect means for the downstream motor, the contactor is *not* "self-protected." *E.g.* XTCE007 – XTCE065.

In addition, as a complete assembly or modular components, the device should have Type 2 Coordination certification. Type 2 Coordination means the Starter or the Controller must exhibit little or no damage following a major short circuit fault and should be able to be returned to proper service without replacing any parts.

Component in a Combination Motor Controller

The XTPB and XTPR MMPs can also be wired in series with a magnetic contactor to complete the assembly of a remotely operated, combination motor controller.

Features

- ON/OFF Rotary Handle with Lockout Provision
- Visible Trip Indication
- Class 10 Overload Protection
- Phase Loss Sensitivity
- Ambient Temperature Compensation to IEC/EN 60947, VDE 0660
- Fixed Short Circuit Trip — 14 times maximum setting of overload FLA dial
- Type 2 Coordination per IEC 947
- Identification Markers Standard on Starter Faceplate
- Motor Applications from 0.1A to 63A
- Built-in heater and magnetic trip elements to protect the motor
- Adjustment dial for setting motor FLA
- DIN Rail Mount
- Terminal Types Available:
  - Screw terminals
  - Screw (line) and Spring Cage (load) terminals
  - Spring Cage terminals
- Accessories include:
  - Front and Side Auxiliary Contacts
  - Trip Indicating Contacts
  - Tamperproof Cover for OLR Dial
  - Undervoltage Release
  - Shunt Trip
  - Thru-the-Door Operators
  - Enclosures
  - 3-Phase Line Side Connecting Links

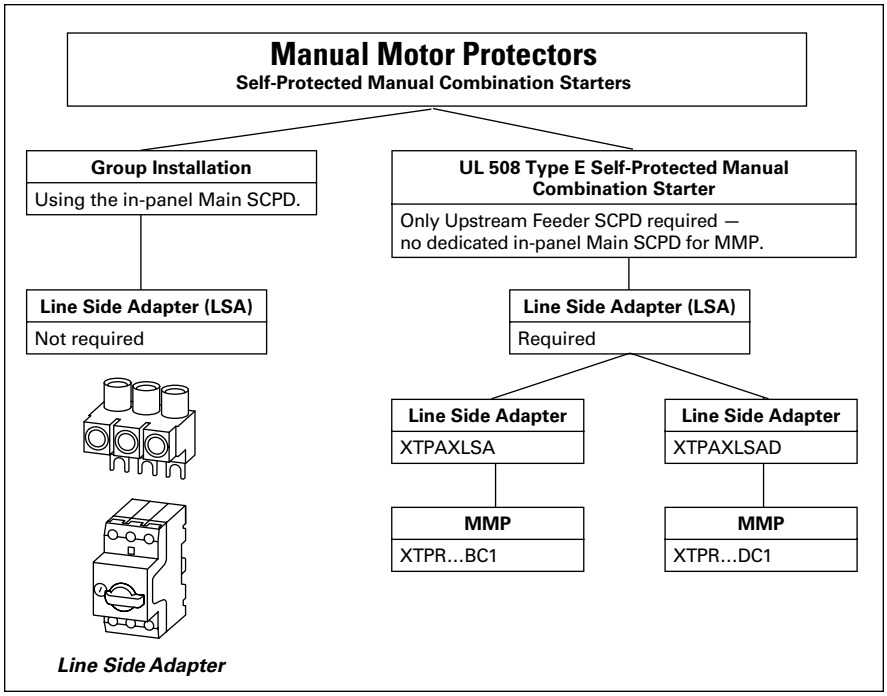


Figure B-96. Line Side Adapters — When to Use Them
Note: Line Side Adapters are not required for non-US applications. Most countries outside of the US classify the MMP as a thermal magnetic circuit breaker.

Standards and Certifications

- UL Listed File No. E245398
- UL 508 Group Motor and Type E Compliant
- IEC/EN 60947
- CSA File 229767, Class 3211-05
- DIN VDE 0660 Part 100, Part 101 and Part 102
- CCC

Note: For Type 2 Coordination of MMCs, see **Tables B-190** through **B-192** on **Pages B-162** and **B-163**.

Types (Configurations)

- Motor Protective Device with Thermal and Magnetic Trip
  - XTPB Pushbutton Actuated Manual Motor Protector up to 25A
  - XTPR Rotary Actuated Manual Motor Protector up to 63A
- For the Protection of Transformers with a high inrush current:
  - XTPT Manual Transformer Protector up to 25A — not UL Approved
- Motor Protective Device without Overload Function:
  - XTPM Motor Protective Circuit Breaker up to 32A — not UL Approved

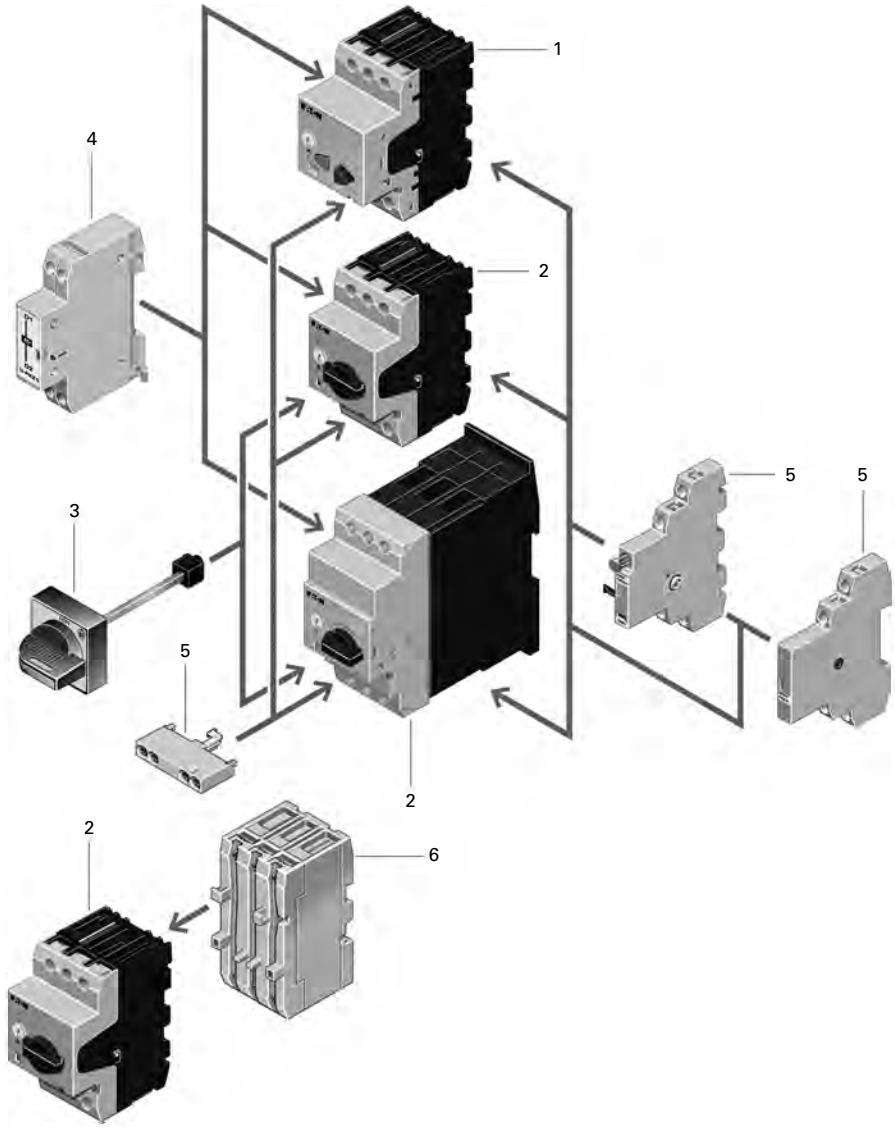


Table B-133. Product Identification

No.	Description	Page
Basic Units		
1	XTPB Pushbutton Manual Motor Protectors: ■ Rated operational current up to 25A ■ Switching capacity 50 kA/415V ■ Short circuit release, fixed setting to 14 x I_u ■ Overload release, adjustable 0.6 — 1 x I_u ■ Single-phasing sensitive	**B-113**
2	XTPR Rotary Manual Motor Protectors: ■ Rated operational current up to 32A, 65A ■ Switching capacity 150/50 kA/ 415V ■ Short circuit release, fixed setting to 14 x I_u ■ Overload release, adjustable 0.6 — 1 x I_u ■ Single-phasing sensitive ■ With screws or spring-loaded terminals	**B-114**
Mounting Accessories		
3	Rotary Handle Mechanism: ■ ON/OFF/Tripped switch position indication ■ Lockable with 3 padlocks ■ Integrated door/cover interlock ■ Extendable by plug fit extension shaft ■ Handle latched in switch positions ■ Optionally also without locking and door interlock function	**B-121**
	Insulated Enclosures: ■ Surface mounting enclosures, IP40, IP55 and IP40 and IP55 front flush mounting enclosure	**B-126**
	Mounting/Wiring: ■ Component adapter for busbar mounting ■ Three-phase commoning link for side-by-side mounting ■ Mounting kits for rapid mounting of direct-on-line, reversing and star-delta starters	**B-122**
Add-On Functions		
4	Voltage Releases: ■ Undervoltage release ■ Shunt release ■ With screws or spring-loaded terminals	**B-120**
5	Standard Auxiliary Contacts: ■ ON/OFF indication ■ Differential fault indication overload/short circuit release ■ ON/OFF for (high capacity) contact module ■ ON/OFF for starter combination ■ With early-make contacts ■ With screws or spring-loaded terminals	**B-118**
6	Current Limiter: ■ Increases the switching capacity of the 10 – 25A Manual Motor Protectors to 100 kA/440V ■ Can be used for individual group protection	**B-120**

B

XTPB
B-Frame

XTPR, XTPM and XTPT
B-Frame

XTPR
D-Frame

Catalogue Number Selection

Table B-134. XT— Catalogue Numbering System

XT PR 012 B C1

Designation
XT = ***XT*** IEC Power Control

Type
PB = Manual Motor Protector — Pushbutton
PR = Manual Motor Protector — Rotary
PM = Manual Motor Protector — Magnetic Only
PT = Manual Transformer Protector (High Mag.)

Trip Class
C1 = Class 10
Blank = Magnetic only (No thermal trip)

Frame Size	
B = 45 mm	**D** = 55 mm

Current Ratings	
B Frame	
P16 = 0.16A	**6P3** = 6.3A
P25 = 0.25A	**010** = 10A
P40 = 0.40A	**012** = 12A
P63 = 0.63A	**016** = 16A
001 = 1A	**020** = 20A
1P6 = 1.6A	**025** = 25A
2P5 = 2.5A	**032** = 32A
004 = 4A	
D Frame	
016 = 16A	**050** = 50A
025 = 25A	**058** = 58A
032 = 32A	**063** = 63A
040 = 40A	

Product Selection

Product Selection for Manual Motor Starter Applications

When ordering, specify Catalogue Numbers according to the following stipulations:

XT Manual Motor Protectors are selected based on the overload current range required for a given motor. This current range is determined from the motor Full Load Ampere rating and Motor Service Factor usually found on the motor nameplate.

For motors with service factors less than 1.15, multiply the motor FLA by .90 to select appropriate MMP.

Example: For motor having FLA of 6.4A and service factor of 1.0 (6.4A x .90 = 5.76A) select Catalogue Number XTPB6P3B01.

See Application Note — AP03402001E.

For motor with service factor of 1.15 or greater, use motor nameplate Full Load Amperes to select the appropriate MMP.

Example: For motor having FLA of 11A and service factor of 1.15, select Catalogue Number XTPR012BC1.

B

B-Frame

Table B-135. XTPB Pushbutton Manual Motor Protectors — Global and North American Ratings
Type 1 and Type 2 Coordination
Motor Protective Device with Thermal and Magnetic Trip

Rated Uninterrupted Current — $I_u = I_e$ (Amps)	FLA Adjustment Range / Overload Release — I_r (Amps)	Short Circuit Release — I_{rm} (Amps)	Maximum Motor Ratings ①									Screw Terminals	
			Maximum kW Rating AC-3 — P (kW)					Maximum hp Rating — P (hp) UL 508/CSA C 22.2 No. 14				Catalogue Number	Price
			3-Phase					3-Phase					
			220 – 240V	380 – 415V	440V	500V	660 – 690V	200V	240V	480V	600V		
Frame B													
0.16	0.1 – 0.16	2.2	—	—	—	—	0.06	②	②	②	②	**XTPBP16BC1**	
0.25	0.16 – 0.25	3.5	—	0.06	0.06	0.06	0.12	②	②	②	②	**XTPBP25BC1**	
0.4	0.25 – 0.4	5.6	0.06	0.09	0.12	0.12	0.18	②	②	②	②	**XTPBP40BC1**	
0.63	0.4 – 0.63	8.8	0.09	0.12	0.18	0.25	0.25	②	②	②	②	**XTPBP63BC1**	
1	0.63 – 1	14	0.12	0.25	0.25	0.37	0.55	②	②	1/2	1/2	**XTPB001BC1**	
1.6	1 – 1.6	22	0.25	0.55	0.55	0.75	1.1	②	②	3/4	1	**XTPB1P6BC1**	
2.5	1.6 – 2.5	35	0.37	0.75	1.1	1.1	1.5	1/2	1/2	1	1-1/2	**XTPB2P5BC1**	
4	2.5 – 4	56	0.75	1.5	1.5	2.2	3	1	1	2	3	**XTPB004BC1**	
6.3	4 – 6.3	88	1.1	2.2	3	3	4	1-1/2	1-1/2	3	5	**XTPB6P3BC1**	
10	6.3 – 10	140	2.2	4	4	4	7.5	3	3	7-1/2	10	**XTPB010BC1**	
12	8 – 12	168	3	5.5	5.5	5.5	11	3	3	7-1/2	10	**XTPB012BC1**	
16	10 – 16	224	4	7.5	9	9	12.5	3	5	10	10	**XTPB016BC1**	
20	16 – 20	280	5.5	9	11	12.5	15	5	5	10	15	**XTPB020BC1**	
25	20 – 25	350	5.5	12.5	12.5	15	22	5	7-1/2	15	20	**XTPB025BC1**	

① Select Manual Motor Protectors by full load amperes. Maximum Motor Ratings (kW, hp) are for reference only.
② In this range, calculate motor rating according to rated current. Specified values to NEC Table 430.250.

Notes:

Single-phasing sensitivity to IEC/EN 60947-4-1, VDE 0660 Part 102.
Can be snap-fit to IEC/EN 60715 top-hat (DIN) with 7.5 or 15 mm height.
Service Factor (SF) — Setting I_r of current scale in dependence of load factor:
SF = 1.15 -> $I_r = 1 \times I_{n\ mot}$
SF = 1 -> $I_r = 0.9 \times I_{n\ mot}$

For manual motor protective circuit breaker switching capacity, see **Page B-135**.

Technical Data ..... **Page B-130**
Discount Symbol **MC7**

B-Frame

D-Frame

Table B-136. XTPR Rotary Manual Motor Protectors with Screw Terminals — Global Ratings and North American Ratings
Type 1 and Type 2 Coordination
Motor Protective Device with Thermal and Magnetic Trip

Rated Uninterrupted Current — $I_u = I_e$ (Amps)	FLA Adjustment Range / Overload Release — I_r (Amps)	Short Circuit Release — I_{rm} (Amps)	Maximum Motor Ratings ①									Screw Terminals ③	
			Maximum kW Rating AC-3 — P (kW)					Maximum hp Rating — P (hp) UL 508/CSA C 22.2 No. 14				Catalogue Number	Price
			3-Phase					3-Phase					
			220 – 240V	380 – 415V	440V	500V	660 – 690V	200V	240V	480V	600V		
Frame B													
0.16	0.1 – 0.16	2.2	—	—	—	—	0.06	②	②	②	②	**XTPRP16BC1**	
0.25	0.16 – 0.25	3.5	—	0.06	0.06	0.06	0.12	②	②	②	②	**XTPRP25BC1**	
0.4	0.25 – 0.4	5.6	0.06	0.09	0.12	0.12	0.18	②	②	②	②	**XTPRP40BC1**	
0.63	0.4 – 0.63	8.8	0.09	0.12	0.18	0.25	0.25	②	②	②	②	**XTPRP63BC1**	
1	0.63 – 1	14	0.12	0.25	0.25	0.37	0.55	②	②	1/2	1/2	**XTPR001BC1**	
1.6	1 – 1.6	22	0.25	0.55	0.55	0.75	1.1	②	②	3/4	1	**XTPR1P6BC1**	
2.5	1.6 – 2.5	35	0.37	0.75	1.1	1.1	1.5	1/2	1/2	1	1-1/2	**XTPR2P5BC1**	
4	2.5 – 4	56	0.75	1.5	1.5	2.2	3	1	1	2	3	**XTPR004BC1**	
6.3	4 – 6.3	88	1.1	2.2	3	3	4	1-1/2	1-1/2	3	5	**XTPR6P3BC1**	
10	6.3 – 10	140	2.2	4	4	4	7.5	3	3	7-1/2	10	**XTPR010BC1**	
12	8 – 12	168	3	5.5	5.5	5.5	11	3	3	7-1/2	10	**XTPR012BC1**	
16	10 – 16	224	4	7.5	9	9	12.5	3	5	10	10	**XTPR016BC1**	
20	16 – 20	280	5.5	9	11	12.5	15	5	5	10	15	**XTPR020BC1**	
25	20 – 25	350	5.5	12.5	12.5	15	22	5	7-1/2	15	20	**XTPR025BC1**	
32	25 – 32	448	7.5	15	15	22	30	7-1/2	10	25	30	**XTPR032BC1**	
Frame D													
16	10 – 16	224	4	7.5	9	9	12.5	3	5	10	15	**XTPR016DC1**	
25	16 – 25	350	5.5	12.5	12.5	15	22	7-1/2	7-1/2	20	25	**XTPR025DC1**	
32	25 – 32	448	7.5	15	17.5	22	22	10	10	25	30	**XTPR032DC1**	
40	32 – 40	560	11	20	22	24	30	10	15	30	40	**XTPR040DC1**	
50	40 – 50	700	14	25	30	30	45	10	15	30	40	**XTPR050DC1**	
58	50 – 58	812	17	30	37	37	55	—	—	40	—	**XTPR058DC1**	
65	55 – 65	882	18.5	34	37	45	55	—	—	—	—	**XTPR063DC1**	

① Select Manual Motor Protectors by full load amperes. Maximum Motor Ratings (kW, hp) are for reference only.

② In this range, calculate motor rating according to rated current. Specified values to NEC Table 430.250.

③ Catalogue number shown comes with screw terminals. For Frame B devices up to 16A, spring cage terminals are available. For spring cage terminals on line and load sides, insert a "C" into the Catalogue number in the 5th position — Example: XTPR**C**_BC1. For spring cage terminals on the load side only, insert an "SC" into the Catalogue number in the 5th and 6th positions — Example: XTPR**SC**_BC1.

Notes:

Single-phasing sensitivity to IEC/EN 60947-4-1, VDE 0660 Part 102.
Can be snap-fit to IEC/EN 60715 top-hat (DIN) with 7.5 or 15 mm height.
Service Factor (SF) — Setting I_r of current scale in dependence of load factor:
SF = 1.15 -> $I_r = 1 \times I_{n\ mot}$
SF = 1 -> $I_r = 0.9 \times I_{n\ mot}$

For manual motor protective circuit breaker switching capacity, see **Page B-135**.

Technical Data ..... **Page B-130**
Discount Symbol **MC7**

B-Frame

D-Frame

Table B-137. XTPR Manual Self-Protected Motor Starters — North American Ratings, UL 508 Type E ③

Motor Protective Device with Thermal and Magnetic Trip

Rated Uninterrupted Current — I_u (Amps)	FLA Adjustment Range / Overload Release — I_r (Amps)	Short Circuit Release — I_{rm} (Amps)	Maximum Motor Ratings ① Maximum hp Rating — P (hp) 3-Phase 200V	240V	480V/ 277V	600V/ 247V	Rated Short-Circuit Breaking Capacity (kA) 240V	480/ 277V	600/ 347V	Line Side Adapter ③ Catalogue Number	Price	Manual Motor Protector — Screw Terminals Catalogue Number	Price
Frame B													
0.16	0.1 – 0.16	2.2	②	②	②	②	50	50	50	**XTPAXLSA**		**XTPRP16BC1**	
0.25	0.16 – 0.25	3.4	②	②	②	②	50	50	50	**XTPAXLSA**		**XTPRP25BC1**	
0.4	0.25 – 0.4	5.6	②	②	②	②	50	50	50	**XTPAXLSA**		**XTPRP40BC1**	
0.63	0.4 – 0.63	8.8	②	②	②	②	50	50	50	**XTPAXLSA**		**XTPRP63BC1**	
1	0.63 – 1	14	②	②	1/2	1/2	50	50	50	**XTPAXLSA**		**XTPR001BC1**	
1.6	1 – 1.6	22	②	②	3/4	1	50	50	50	**XTPAXLSA**		**XTPR1P6BC1**	
2.5	1.6 – 2.5	35	1/2	1/2	1	1-1/2	50	50	50	**XTPAXLSA**		**XTPR2P5BC1**	
4	2.5 – 4	56	1	1	2	3	50	50	50	**XTPAXLSA**		**XTPR004BC1**	
6.3	4 – 6.3	88	1-1/2	1-1/2	3	5	50	50	50	**XTPAXLSA**		**XTPR6P3BC1**	
10	6.3 – 11	140	3	3	7-1/2	10	50	50	50	**XTPAXLSA**		**XTPR010BC1**	
12	8 – 12	168	3	3	7-1/2	10	42	42	—	**XTPAXLSA**		**XTPR012BC1**	
16	10 – 16	224	3	5	10	10	42	42	—	**XTPAXLSA**		**XTPR016BC1**	
20	16 – 20	280	5	5	10	15	42	42	—	**XTPAXLSA**		**XTPR020BC1**	
25	20 – 25	350	5	7-1/2	15	20	18	18	—	**XTPAXLSA**		**XTPR025BC1**	
32	25 – 32	448	7-1/2	10	25	30	18	18	—	**XTPAXLSA**		**XTPR032BC1**	
Frame D													
16	10 – 16	224	3	5	10	15	50	50	10	**XTPAXLSAD**		**XTPR016DC1**	
25	16 – 25	224	5	7-1/2	20	25	50	50	10	**XTPAXLSAD**		**XTPR025DC1**	
32	25 – 32	350	7-1/2	10	25	30	50	50	10	**XTPAXLSAD**		**XTPR032DC1**	
40	32 – 40	448	10	15	30	40	50	50	10	**XTPAXLSAD**		**XTPR040DC1**	

① Select Manual Motor Protectors by full load amperes. Maximum Motor Ratings (kW, hp) are for reference only.

② In this range, calculate motor rating according to rated current. Specified values to NEC Table 430.250.

③ UL 508 Type E starters are assembled from a standard XTPR and a special incoming terminal Line Side Adapter (XTPAXLSA or XTPAXLSAD).

Notes:

A UL 508 Type E Self-Protected Manual Combination Starter (XTPR) consists of a Manual Motor Protector (XTPR) and a UL Listed Line Side Adapter (e.g. XTPAXLSA). The Type E Self-Protected Manual Combination Starter alone is a legitimate short-circuit protective device and disconnect means for the down-stream motor, while a contactor can be added to provide remote operation of the motor circuit.

Accessories ..... **Page B-118**
Technical Data ..... **Page B-130**
Discount Symbol **MC7**

B-Frame

Table B-138. XTPT Transformer Protective Circuit Breakers — Global Ratings ①②

Type 1 and Type 2 Coordination

For the protection of transformers with a high inrush current. Fixed short-circuit trip of 15 – 22 times max. settings of FLA

Rated Uninterrupted Current — I_u (Amps)	FLA Adjustment Range / Overload Release — I_r (Amps)	Short Circuit Release — I_{rm} (Amps)	Maximum Motor Ratings									Screw Terminals	
			Maximum kW Rating AC-3 — P (kW)					Maximum hp Rating — P (hp)				Catalogue Number	Price
			3-Phase					3-Phase					
			220 – 240V	380 – 415V	440V	500V	660 – 690V	200V	240V	480V	600V		
Frame B													
0.16	0.1 – 0.16	2.4	—	—	—	—	—	—	—	—	—	**XTPTP16BC1**	
0.25	0.16 – 0.25	4.25	—	—	—	—	—	—	—	—	—	**XTPTP25BC1**	
0.4	0.25 – 0.4	6.8	—	—	—	—	—	—	—	—	—	**XTPTP40BC1**	
0.63	0.4 – 0.63	12	—	—	—	—	—	—	—	—	—	**XTPTP63BC1**	
1	0.63 – 1	20	—	—	—	—	—	—	—	—	—	**XTPT001BC1**	
1.6	1 – 1.6	32	—	—	—	—	—	—	—	—	—	**XTPT1P6BC1**	
2.5	1.6 – 2.5	50	—	—	—	—	—	—	—	—	—	**XTPT2P5BC1**	
4	2.5 – 4	84	—	—	—	—	—	—	—	—	—	**XTPT004BC1**	
6.3	4 – 6.3	141	—	—	—	—	—	—	—	—	—	**XTPT6P3BC1**	
10	6.3 – 10	224	—	—	—	—	—	—	—	—	—	**XTPT010BC1**	
12	8 – 12	224	—	—	—	—	—	—	—	—	—	**XTPT012BC1**	
16	10 – 16	358	—	—	—	—	—	—	—	—	—	**XTPT016BC1**	
20	16 – 20	380	—	—	—	—	—	—	—	—	—	**XTPT020BC1**	
25	20 – 25	420	—	—	—	—	—	—	—	—	—	**XTPT025BC1**	

① For manual motor protective circuit breaker switching capacity, see **Page B-135**.

② XTPT is not UL/CSA approved.

Notes:

For the protection of transformers with a high inrush current.
Single-phasing sensitivity to IEC/EN 60947-4-1, VDE 0660 Part 102.
Can be snap-fit to IEC/EN 60715 top-hat (DIN) with 7.5 or 15 mm height.
Service Factor (SF) — Setting I_r of current scale in dependence of load factor:

SF = 1.15 -> $I_r = 1 \times I_{n\ mot}$

SF = 1 -> $I_r = 0.9 \times I_{n\ mot}$

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Technical Data ..... **Page B-130**
Discount Symbol **MC7**

B-Frame

Table B-139. XTPM Motor Protective Circuit Breakers for Starter Combinations — Global Ratings
Type 1 and Type 2 Coordination
Motor Protective Device without Overload Function

Rated Uninterrupted Current — I_u (Amps)	FLA Adjustment Range / Overload Release — I_r (Amps)	Short Circuit Release — I_{rm} (Amps)	Maximum Motor Ratings ①									Screw Terminals	
			Maximum kW Rating AC-3 — P (kW)					Maximum hp Rating — P (hp) ②				Catalogue Number	Price
			3-Phase					3-Phase					
			220 – 240V	380 – 415V	440V	500V	660 – 690V	200V	240V	480V	600V		
Frame B													
0.16	—	2.2	—	—	—	—	0.06	—	—	—	—	**XTPMP16B**	
0.25	—	3.5	—	0.06	0.06	0.06	0.12	—	—	—	—	**XTPMP25B**	
0.4	—	5.6	0.06	0.09	0.12	0.12	0.18	—	—	—	—	**XTPMP40B**	
0.63	—	8.8	0.09	0.12	0.18	0.25	0.25	—	—	—	—	**XTPMP63B**	
1	—	14	0.12	0.25	0.25	0.37	0.55	—	—	—	—	**XTPM001B**	
1.6	—	22	0.25	0.37	0.55	0.75	1.1	—	—	—	—	**XTPM1P6B**	
2.5	—	35	0.37	0.75	1.1	1.1	1.5	—	—	—	—	**XTPM2P5B**	
4	—	56	0.75	1.5	1.5	2.2	3	—	—	—	—	**XTPM004B**	
6.3	—	88	1.1	2.2	3	3	4	—	—	—	—	**XTPM6P3B**	
10	—	140	2.2	4	4	4	7.5	—	—	—	—	**XTPM010B**	
12	—	168	3	5.5	5.5	5.5	11	—	—	—	—	**XTPM012B**	
16	—	224	4	7.5	9	9	12.5	—	—	—	—	**XTPM016B**	
20	—	280	5.5	9	11	12.5	15	—	—	—	—	**XTPM020B**	
25	—	350	5.5	12.5	12.5	15	22	—	—	—	—	**XTPM025B**	
32	—	448	7.5	15	15	22	30	—	—	—	—	**XTPM032B**	

① Select Manual Motor Protectors by full load amperes. Maximum Motor Ratings (kW, hp) are for reference only.
② XTPM is not UL/CSA Approved.

Notes:
Can be snap-fit to IEC/EN 60715 top-hat rail with 7.5 or 15 mm height
An appropriate overload relay must be fitted to protect motors against overload.
Combinations of the XTPM Manual Motor Protectors and XTCE/XTCR Contactors + XTOB Overload Relays can be found in the ***XT*** Manual and Combination Motor Controllers section.
When using the XTPM as short-circuit protection for motors with heavy starting duty, the rated operational current I_e must be derated during engineering with the following factors:

Class 5 = 1.0
Class 10 = 1.0
Class 15 = 0.82
Class 20 = 0.71
Class 25 = 0.63
Class 30 = 0.58
Class 35 = 0.53
Class 40 = 0.50

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Discount Symbol **MC7**

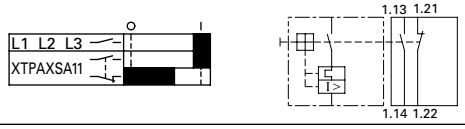
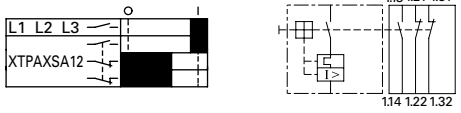
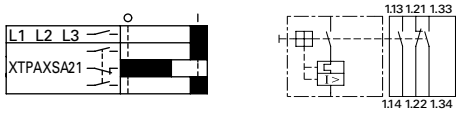
Accessories

Auxiliary Contacts

Side-Mount Auxiliary Contacts

Can be fitted on the right side of manual motor protectors (XTPB, XTPR, XTPM) and manual transformer protectors (XTPT) and can be combined with XTPAXSATR... and XTPAXFA... trip indicating auxiliary contact.

Table B-140. Side-Mount Auxiliary Contacts

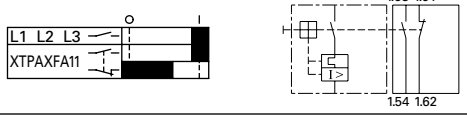
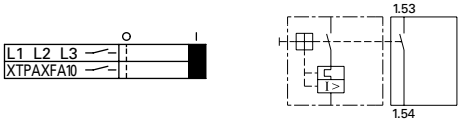
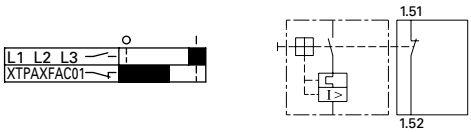
Contact Configuration	Contact Sequence	Screw Terminals		Spring Cage Terminals		Price ①
		Pkg. Qty.	Catalogue Number	Pkg. Qty.	Catalogue Number	
1NO-1NC		1	**XTPAXSA11**	5	**XTPAXSAC11**	
1NO-2NC		1	**XTPAXSA12**	—	—	
2NO-1NC		1	**XTPAXSA21**	—	—	

① Orders must be placed in multiples of package quantity listed.

Front-Mount Auxiliary Contacts

Can be fitted to manual motor protectors (XTPB, XTPR, XTPM) and manual transformer protectors (XTPT). 45 mm (XTPR...B and XTPB) or 55 mm (XTPR...D) widths of manual motor protectors remain unchanged.

Table B-141. Front-Mount Auxiliary Contacts

Contact Configuration	Contact Sequence	Screw Terminals		Spring Cage Terminals		Price ②
		Pkg. Qty.	Catalogue Number	Pkg. Qty.	Catalogue Number	
1NO-1NC		1	**XTPAXFA11**	—	—	
1NO-0NC		1	**XTPAXFA10**	5	**XTPAXFAC10**	
0NO-1NC		—	—	5	**XTPAXFAC01**	

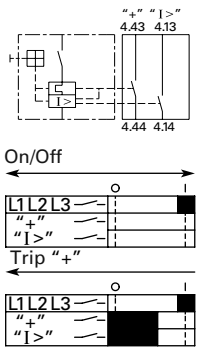
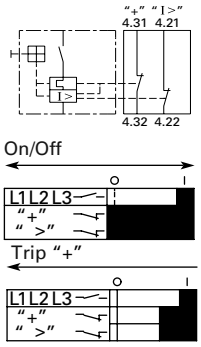
② Orders must be placed in multiples of package quantity listed.

Discount Symbol **MC7**

Side-Mount Trip Indicating Auxiliary Contacts

Can be fitted on the right side of manual motor protectors. Can be combined with standard auxiliary contacts. Trip indication: A. General Trip indication (overload) B. Short-circuit trip. Local short-circuit indication by red indicator, manually resettable.

Table B-142. Side-Mount Trip Indicating Auxiliary Contacts

Contact Configuration	Contact Sequence	Pkg. Qty.	For Use with…	Catalogue Number	Price ①
2 x 1NO		2	XTPB, XTPR, XTPM, XTPT	**XTPAXSATR20**	
2 x 1NC		2	XTPB, XTPR, XTPM, XTPT	**XTPAXSATR02**	

① Orders must be placed in multiples of package quantity listed.

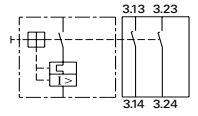
Early-Make Front-Mount Auxiliary Contacts

XTPBXFAEM20

XTPAXFAEM20

For use with XTPB..., B-Frame XTPR and XTPT. Can be fitted to the front of a manual motor protector. 45 mm width of manual motor protector remains unchanged. For early energization of undervoltage release, e.g. in Emergency-Stop circuits to EN 60204.

Table B-143. Early-Make Front-Mount Auxiliary Contacts

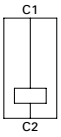
Contact Configuration	Contact Sequence	Pkg. Qty.	For Use with…	Catalogue Number	Price ②
2NO		5	XTPB	**XTPBXFAEM20**	
2NO		2	XTPR, XTPM, XTPT	**XTPAXFAEM20**	

② Orders must be placed in multiples of package quantity listed.

Discount Symbol **MC7**

B

Shunt Release



Contact Sequence

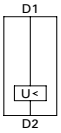
Can be used to trip the manual motor protector from a remote location. Can be fitted on the left side of manual motor protectors. Cannot be combined with the XTPAXUVR. DC: Intermittent operation 5 sec.

Table B-144. Shunt Release

Catalogue Number — Screw Terminals	Catalogue Number — Spring Cage Terminals	Pkg. Qty.	Price ①
XTPAXSR24V50H	—	2	
XTPAXSR48V50H	—	2	
XTPAXSR110V50H	—	2	
XTPAXSR120V60H	—	2	
XTPAXSR208V60H	—	2	
XTPAXSR220V50H	—	2	
XTPAXSR230V50H	**XTPAXSRC230V50H**	2	
XTPAXSR240V50H	—	2	
XTPAXSR240V60H	—	2	
XTPAXSR380V50H	—	2	
XTPAXSR400V50H	—	2	
XTPAXSR415V50H	—	2	
XTPAXSR440V60H	—	2	
XTPAXSR480V60H	—	2	
XTPAXSR24VDC	**XTPAXSRC24VDC**	2	
XTPAXSR48VDC	—	2	
XTPAXSR60VDC	—	2	
XTPAXSR110VDC	—	2	
XTPAXSR125VDC	—	2	
XTPAXSR220VDC	—	2	
XTPAXSR250VDC	—	2	

① Orders must be placed in multiples of package quantity listed.

Undervoltage Release



Contact Sequence

Can be used to trip the manual motor protector from a remote location. Can be fitted on left side manual motor protectors. Cannot be combined with XTPAXSR. When combined with a circuit breaker, it can be used as Emergency-Stop device to IEC/EN 60204.

Table B-145. Undervoltage Release

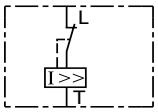
Catalogue Number — Screw Terminals	Catalogue Number — Spring Cage Terminals	Pkg. Qty.	Price ②
XTPAXUVR24V50H	—	2	
XTPAXUVR24V60H	—	2	
XTPAXUVR48V50H	—	2	
XTPAXUVR60V50H	—	2	
XTPAXUVR110V50H	—	2	
XTPAXUVR120V60H	—	2	
XTPAXUVR208V60H	—	2	
XTPAXUVR220V50H	—	2	
XTPAXUVR230V50H	**XTPAXUVRC230V50H**	2	
XTPAXUVR240V50H	—	2	
XTPAXUVR240V60H	—	2	
XTPAXUVR380V50H	—	2	
XTPAXUVR400V50H	—	2	
XTPAXUVR415V50H	—	2	
XTPAXUVR440V60H	—	2	
XTPAXUVR480V60H	—	2	
XTPAXUVR600V60H	—	2	

② Orders must be placed in multiples of package quantity listed.

Current Limiter ③

The XTPAXCL enhances the switching capacity of the XT manual motor protectors. It can be used with the XTPB, XTPR...BC1, XTPR...DC1 for individual or group protections. The rated uninterrupted current is 63A for IEC and 25A for UL/CSA. It can be mounted next to or behind the manual motor protector. See **Tables B-175** and **B-176** for ratings when using the current limiter.

Table B-146. Current Limiter

Description	Contact Sequence	Pkg. Qty.	Catalogue Number	Price
To enhance the switching capacity of non-inherently safe 10 – 25A Manual Motor Protectors to 150 kA/ 440V		1	**XTPAXCL**	

③ Max. rated operation voltage U_e = 690V, rated uninterrupted current I_u = 63A. Can be used for individual and group protection. For group protection and in combination with the XTPR…D, order additional XTPAXIT incoming terminal if required. Mounting next to or behind the manual motor protector. 16 – 63A XTPR...D: 100 kA/400V, 10 kA/690V.

Lockable Rotary Handle

Table B-147. Replacement Lockable Rotary Handle

Description	Pkg. Qty.	Catalogue Number	Price ④
Lockable Rotary Handle that mounts directly to the XTPR manual motor protectors. Comes standard with XTPR.	5	**XTPAXLRH**	

④ Orders must be placed in multiples of package quantity listed.

Discount Symbol **MC7**

IP65 Rotary Handle Mechanism

Table B-148. IP65 Rotary Handle Mechanism ①②③

	Description	Pkg. Qty.	Catalogue Number	Price ④
Complete Kits — Includes Handle, Shaft, and Required Hardware				
	Rotary Handle Mech IP65 Black — For use on main switches to IEC/EN 60204.	1	**XTPAXRHMB**	
	Rotary Handle Mech IP65 Red/Yellow — For use on main switch with Emergency-Stop function to IEC/EN 60204.	1	**XTPAXRHMRY**	
	Rotary Handle Mech IP65 Black — For use on main switches to IEC/EN 60204 where XTPR is mounted 90° from vertical.	1	**XTPAXRHM90B**	
	Rotary Handle Mech IP65 Red/Yellow — For use on main switch with Emergency-Stop function to IEC/EN 60204 where XTPR is mounted 90° from vertical.	1	**XTPAXRHM90RY**	
Separate Parts				
	Rotary Handle Only IP65 Black — For use on main switches to IEC/EN 60204.	10	**XTPAXRHB10**	
	Rotary Handle Only IP65 Red/Yellow — For use on main switch with Emergency-Stop function to IEC/EN 60204.	10	**XTPAXRHRY10**	
	Rotary Handle Only IP65 Black — For use on main switches to IEC/EN 60204 where XTPR is mounted 90° from vertical.	10	**XTPAXRH90B10**	
	Rotary Handle Only IP65 Red/Yellow — For use on main switch with Emergency-Stop function to IEC/EN 60204 where XTPR is mounted 90° from vertical.	10	**XTPAXRH90RY10**	
	Shaft Only, 175 mm length.	10	**XTPAXRHMSFT**	
	Shaft Only , 72 mm length, Bulk Pack of 50 pcs.	50	**XTPAXRHMSFTB72**	
	Shaft Only , 98 mm length, Bulk Pack of 50 pcs.	50	**XTPAXRHMSFTB98**	
	Shaft Only , 175 mm length, Bulk Pack of 50 pcs.	50	**XTPAXRHMSFTB175**	

① Plug-in connection shafts, XTPAXRHMSFT_ can be cut to desired length for mounting depths of 100 – 240 mm. Carrier with extension shaft included.
② With ON/OFF switch position and "+" (tripped), lockable with 3 padlocks, 4 – 8 mm hasp. Can be locked in the ON position, if required.
③ Rotary Handle Mechanisms ship with door interlock disables. See instruction publication with product for how to enable door interlock.
④ Orders must be placed in multiples of package quantity listed.

Telescopic Adapter ⑤

Table B-149. Telescopic Adapter

Description	Pkg. Qty.	Catalogue Number	Price
Telescoping Adapter, 75 – 115 mm Depth, for use with XTPB and B-Frame XTPR MMPs	1	**XTPAXTEA**	

⑤ With 45 mm top-hat rail to IEC/EN 60715 for compensation of the mounting depth of rear mounted devices in surface mounted enclosures. Stepless adjustment via scale from 75 – 115 mm.

Sealing Facility

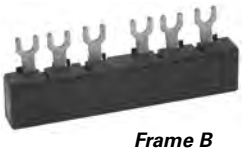
Table B-150. Sealing Facility

Description	Pkg. Qty.	Catalogue Number	Price ⑥
To prevent tampering with the overload release and the test function. It can be sealed using industry standard sealing wire. For use with XTPR manual motor protectors.	5	**XTPAXSW**	

⑥ Orders must be placed in multiples of package quantity listed.

Discount Symbol **MC7**

Three-Phase Commoning Links



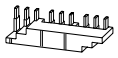
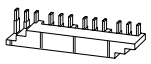
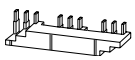
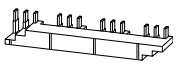
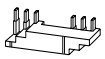
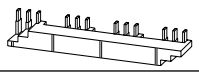
Frame B

Frame D

B

For parallel power feed to several manual motor protectors on terminals 1, 3 and 5.

Table B-151. Three-Phase Commoning Links ①

	For Use with...	Qty. MMP	Length of Link (mm)	Unit Width (mm)	Pkg. Qty.	Catalogue Number	Price ②
Frame B							
	MMP with no side mounted auxiliaries or voltage releases	2	90	45	10	**XTPAXCLKA2**	
		3	135	45	10	**XTPAXCLKA3**	
		4	180	45	10	**XTPAXCLKA4**	
		5	225	45	10	**XTPAXCLKA5**	
	Each MMP with one auxiliary contact or trip-indicating auxiliary contact fitted on the right	2	99	45 + 9	10	**XTPAXCLKB2**	
		3	153	45 + 9	10	**XTPAXCLKB3**	
		4	207	45 + 9	10	**XTPAXCLKB4**	
		5	261	45 + 9	10	**XTPAXCLKB5**	
	Each MMP with an auxiliary contact and trip-indicating auxiliary contact mounted on the right or a voltage release mounted on the left.	2	108	45 + 18	10	**XTPAXCLKC2**	
		4	234	45 + 18	10	**XTPAXCLKC4**	
Frame D							
	MMP with no side mounted auxiliaries or voltage releases	2	110	55	1	**XTPAXCLKA2D**	
		3	165	55	1	**XTPAXCLKA3D**	
		4	220	55	1	**XTPAXCLKA4D**	
	Each MMP with one auxiliary contact or trip-indicating auxiliary contact fitted on the right	2	119	55 + 9	1	**XTPAXCLKB2D**	
		3	183	55 + 9	1	**XTPAXCLKB3D**	
		4	247	55 + 9	1	**XTPAXCLKB4D**	
	Each MMP with an auxiliary contact or trip-indicating auxiliary contact mounted on the right or a voltage release mounted on the left.	2	128	55 + 18	1	**XTPAXCLKC2D**	
		4	274	55 + 18	1	**XTPAXCLKC4D**	

① Protected against accidental contact. B-Frame short circuit proof U_e = 690V, I_u = 63A; D-Frame short circuit proof U_e = 690V, I_u = 128A. Frame B links can be combined by rotating mounting. Frame D links cannot be combined.

② Orders must be placed in multiples of package quantity listed.

Discount Symbol **MC7**

Shroud for Unused Commoning Link Terminals

Table B-152. Shroud for Unused Terminals of Three-Phase Commoning Links

	For Use with…	Description	Pkg. Qty.	Catalogue Number	Price ①
	B-Frame XTPR	To cover unused terminals on three-phase commoning link. Protected against direct contact.	20	**XTPAXUTS**	
	D-Frame XTPR		10	**XTPAXUTSD**	

① Orders must be placed in multiples of package quantity listed.

Incoming Terminal for Three-Phase Commoning Link ②

Table B-153. Incoming Terminal

	For Use with…	Pkg. Qty.	Catalogue Number	Price ③
	B-Frame XTPR, XTPB	5	**XTPAXIT**	

② For three-phase commoning link, protected against accidental contact, U_e = 690V, I_u = 63A; For conductor cross-sections: 2.5 – 25 mm² stranded; 2.5 – 16 mm² flexible with ferrules, AWG 14-6.

③ Orders must be placed in multiples of package quantity listed.

Line-Side Adapter ④

Table B-154. Line-Side Adapter

	For Use with…	Pkg. Qty.	Catalogue Number	Price ⑤
	B-Frame XTPR to create a UL 508Type E/F Manual Combination Starter	5	**XTPAXLSA**	
	D-Frame XTPR to create a UL 508Type E/F Manual Combination Starter	1	**XTPAXLSAD** ⑥	

④ XTPAXLSA is for three-phase commoning link, finger- and back-of-hand proof, U_e = 690V, I_u = 60A for conductor cross sections: 2.5 – 25 mm² stranded, 2.5 – 16 mm² flexible with ferrule, AWG 14-6.

⑤ Orders must be placed in multiples of package quantity listed.

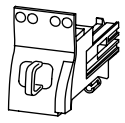
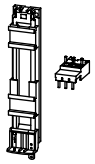
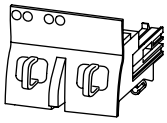
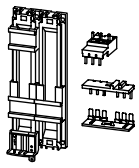
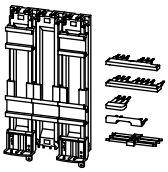
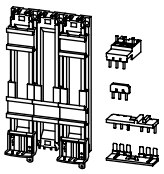
⑥ XTPAXLSAD cannot be combined with three-phase commoning links.

Discount Symbol **MC7**

B

Combination Connection Kits

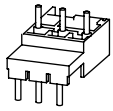
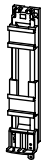
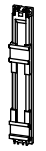
Table B-155. Combination Connection Kits

	For Use with…	Description	Std. Pack	Catalogue Number	Price
Non-reversing Starters					
	XTPR...B + XTCE...B	Comprised of: ■ Mechanical connection element for XTPR...B and contactor ■ Main current wiring between XTPR...B and contactor in tool-less plug connection ■ Cable guidance Use contactor auxiliary switch XTCEXFAT_. Control cable guidance: max. 6 cables up to 2.5 mm^2 external diameter or 4 cables up to 3.5 mm^2 external diameter.	1	**XTPAXTPCB**	
	XTPR...B + XTCE...C	Comprised of: ■ DIN rail adapter plate ■ Main current wiring between XTPR and contactor	1	**XTPAXTPCC**	
	XTPR...D + XTCE...D		1	**XTPAXTPCD**	
Reversing Starters					
	XTPR...B + XTCE...B01_	Comprised of: ■ Mechanical connection element for XTPR...B and contactor ■ Reversing starter main current wiring in tool-less plug connection ■ Control cables for electrical interlocking in tool-less plug connection: – K1M: A1 – K2M: 21 – K1M: 21 – K2M: A1 – K1M: A2 – K2M: A2 ■ Cable guidance Use contactor auxiliary switch XTCEXFAT_. Control cable guidance: max. 6 cables up to 2.5 mm^2 external diameter or 4 cables up to 3.5 mm^2 external diameter.	1	**XTPAXTPCRB**	
	XTPR...B + XTCE...C	Comprised of: ■ DIN rail adapter plate ■ Reversing starter main current wiring	1	**XTPAXTPCRC**	
Star-Delta Starter Sets					
	XTPR...B + XTCE...B	Comprised of: ■ DIN rail adapter plate ■ Main current wiring between XTPR...B and contactor ■ Electrical interlock between delta and star contactor ■ Use as contactor auxiliary switch XTCEXFAT_	1	**XTPAXSDSB**	
	XTPR...B + XTCE...C	Comprised of: ■ DIN rail adapter plate ■ Main current wiring between XTPR...B and contactor	1	**XTPAXSDSC**	

Discount Symbol **MC7**

Combination Connection Kits

Table B-155. Combination Connection Kits (Continued)

	For Use with…	Description	Std. Pack	Catalogue Number	Price ①
Electrical Connection Module					
	XTPR...B + XTCE...C	Comprised of: ■ Main current wiring between XTPR...B and contactor ■ Use only in combination with busbar adapter	5	**XTPAXECMC**	
	XTPR...D + XTCE...D	Comprised of: ■ Main current wiring between XTPR...D and contactor ■ Use only in combination with busbar adapter	5	**XTPAXECMD**	
DIN Rail Adapter Plates					
	XTPAXTPCB XTPAXTPCRB	Comprised of: ■ 45 mm wide adapter plate with one DIN rail ■ Connection element for side-by-side positioning of further plates	4	**XTPAXTPCPB**	
	XTPR...B + XTCE...C XTPAXECMC	Comprised of: ■ 45 mm wide adapter plate with two DIN rails ■ Connection element for side-by-side positioning of further plates	4	**XTPAXTPCRPB**	
	XTPAXECMD XTPR...D + XTCE...C XTPR...D + XTCE...D	Comprised of: ■ 55 mm wide adapter plate with two DIN rails ■ Connection cams for further plates ■ For use with reversing and star-delta starters	4	**XTPAXTPCPD**	
Lateral Module					
	—	■ Can be grouped on the DIN rail adapter ■ Expansion of the mounting width by 9 mm	10	**XTPAXLM**	
Connection Element					
	—	■ For connection of several DIN rail adapters	50	**XTPAXCNE**	

① Orders must be placed in multiples of package quantity listed.

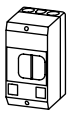
Discount Symbol **MC7**

Pushbutton MMP Enclosures

B-Frame

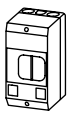
B

Table B-156. Insulated Enclosures for Surface Mounting of XTPB Pushbutton Motor-Protective Circuit Breakers — Global Usage ①

	Degree of Protection	For Use with…	Description	Catalogue Number	Price	Approx. Dimensions mm [in] H x W x D
	IP40 NEMA 1	XTPB MMP Only or with: XTPAXFA…, XTPBXFAEM20, XTPAXSA..., XTPAXUVR..., XTPAXSR...	—	**XTPBXENCS40**		158 x 80 x 116.5 [6.22 x 3.15 x 4.59]
	IP65 NEMA 3R, 4X, 12, 13		With actuation membrane.	**XTPBXENCS65**		158 x 80 x 116.5 [6.22 x 3.15 x 4.59]
	IP65 NEMA 3R, 4X, 12, 13	XTPB MMP Only or with: XTPAXFA…, XTPAXUVR…, XTPAXSR…, XTPAXCL	Lockable in OFF position.	**XTPBXENCSLO65**		158 x 80 x 129.5 [6.22 x 3.15 x 5.10]
	IP65 NEMA 3R, 4X, 12, 13	XTPB MMP Only or with: XTPAXFA…, XTPBXFAEM20, XTPAXUVR..., XTPAXSR…, XTPAXCL	Lockable in OFF position in combination with XTPBXFAEM20 Early Make front mount auxiliary contact	**XTPBXENCSLE65**		158 x 80 x 129.5 [6.22 x 3.15 x 5.10]
	IP65 NEMA 3R, 4X, 12, 13		With Emergency-Stop (E-Stop) pushbutton actuator, Red-Yellow	**XTPBXENCSES65**		158 x 80 x 177.2 [6.22 x 3.15 x 6.98]
	IP65 NEMA 3R, 4X, 12, 13		With Emergency-Stop (E-Stop) pushbutton actuator, Red-Yellow key release	**XTPBXENCSEK65**		158 x 80 x 177.2 [6.22 x 3.15 x 6.98]

① Integrated terminal for PE(N) connection, two M25 cable entry knockouts at top and at bottom.

Table B-157. Insulated Enclosures for Surface Mounting of XTPB Pushbutton Manual Motor Protectors — North American Usage ②③

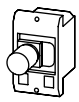
	Degree of Protection	For Use with…	Description	Catalogue Number	Price	Approx. Dimensions mm [in] H x W x D
	IP41 NEMA 1	XTPB MMP Only or with: XTPAXFA…, XTPBXFAEM20, XTPAXSA..., XTPAXUVR..., XTPAXSR…, XTPAXCL	—	**XTPBXENAS41**		158 x 80 x 116.5 [6.22 x 3.15 x 4.59]
	IP65 NEMA 3R, 4X, 12, 13		With actuating diaphragm	**XTPBXENAS65**		158 x 80 x 116.5 [6.22 x 3.15 x 4.59]
	IP65 NEMA 3R, 4X, 12, 13	XTPB MMP Only or with: XTPAXFA…, XTPAXUVR…, XTPAXSR…, XTPAXCL	Lockable in OFF position	**XTPBXENASLO65**		158 x 80 x 129.5 [6.22 x 3.15 x 5.10]
	IP65 NEMA 3R, 4X, 12, 13	XTPB MMP Only or with: XTPAXFA…, XTPBXFAEM20, XTPAXUVR..., XTPAXSR…, XTPAXCL	Lockable in OFF position in combination with XTPBXFAEM20 Early Make front mount auxiliary contact.	**XTPBXENASLE65**		158 x 80 x 129.5 [6.22 x 3.15 x 5.10]
	IP65 NEMA 3R, 4X, 12, 13		With Emergency-Stop (E-Stop) pushbutton actuator, Red-Yellow	**XTPBXENASES65**		158 x 80 x 177.2 [6.22 x 3.15 x 6.98]
	IP65 NEMA 3R, 4X, 12, 13		With Emergency-Stop (E-Stop) pushbutton actuator, Red-Yellow key release	**XTPBXENASEK65**		158 x 80 x 177.2 [6.22 x 3.15 x 6.98]

② Built-in terminal for PE(N).

③ North American enclosures come with conduit adapters for use with 1/2" NPT.

Dimensions ..... **Page B-138**
Discount Symbol **MC7**

Table B-158. Insulated Enclosures for Flush Mounting of XTPB Pushbutton Manual Motor Protectors — Global and North American Usage ①

	Degree of Protection	For Use with…	Description	Catalogue Number	Price	Approx. Dimensions mm [in] H x W x D
	Front IP40 NEMA 1	XTPB Only or with: XTPAXFA…, XTPBXFAEM20, XTPAXSA…, XTPAXUVR…, XTPAXSR…, XTPAXCL	—	**XTPBXENCF40**		129 x 90.2 x 115.2 [5.08 x 3.55 x 4.54]
	Front IP65 NEMA 3R, 4X, 12, 13		With actuation membrane	**XTPBXENCF55**		129 x 90.2 x 115.2 [5.08 x 3.55 x 4.54]
	Front IP65 NEMA 3R, 4X, 12, 13	XTPB Only or with: XTPAXFA…, XTPAXUVR…, XTPAXSR…, XTPAXCL	Lockable in OFF position	**XTPBXENCFLO55**		129 x 90.2 x 115.2 [5.08 x 3.55 x 4.54]
	Front IP65 NEMA 3R, 4X, 12, 13	XTPB Only or with: XTPAXFA…, XTPBXFAEM20, XTPAXUVR…, XTPAXSR…, XTPAXCL	Lockable in OFF position in combination with XTPBXFAEM20 Early Make front mount auxiliary contact	**XTPBXENCFLE55**		129 x 90.2 x 115.2 [5.08 x 3.55 x 4.54]
	Front IP65 NEMA 3R, 4X, 12, 13		With Emergency-Stop (E-Stop) pushbutton actuator	**XTPBXENCFES55**		129 x 90.2 x 175.9 [5.08 x 3.55 x 6.93]
	Front IP65 NEMA 3R, 4X, 12, 13		With Emergency-Stop (E-Stop) pushbutton actuator, key release	**XTPBXENCFEK55**		129 x 90.2 x 175.9 [5.08 x 3.55 x 6.93]

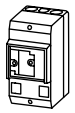
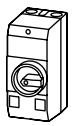
① Integrated terminal for PE(N) connection.

Rotary MMP Enclosures

B-Frame

D-Frame

Table B-159. Insulated Enclosures for Surface Mounting of B-Frame (0.1 – 32A) XTPR Rotary Motor-Protective Circuit Breakers — Global Usage

	Degree of Protection	For Use with…	Description	Catalogue Number	Price	Approx. Dimensions mm [in] H x W x D
	IP41 with vertical mounting	B-Frame XTPR Only or with: XTPAXFA…, XTPAXSA…, XTPAXSATR…, XTPAXUVR…, XTPAXSR…, XTPAXCL	Cover with aperture dimensioned to accommodate front of MMP. IP40, when mounted turned through 90° to left/right	**XTPAXENCS41** ②		160 x 100 x 104 [6.30 x 3.94 x 4.09]
	IP65		With black/grey rotary handle	**XTPAXENCS65B** ②		160 x 100 x 130 [6.30 x 3.94 x 5.12]
	IP65		With red/yellow rotary handle for use as Emergency-Stop switches to IEC/EN 60204	**XTPAXENCS65RY** ②		160 x 100 x 130 [6.30 x 3.94 x 5.12]
	IP40	B-Frame XTPR Only or with: XTPAXSA…, XTPAXUVR…, XTPAXSR…, XTPAXCL	Cover with aperture dimensioned to accommodate front of MMP.	**XTPAXENCS40** ③		158 x 80 x 100 [6.22 x 3.15 x 3.94]
	IP55	B-Frame XTPR Only or with: XTPAXFA…, XTPAXSA…, XTPAXUVR…, XTPAXSR…, XTPAXCL	With black/gray rotary handle	**XTPAXENCS55B** ③		158 x 80 x 125.5 [6.22 x 3.15 x 4.94]
	IP55		With red/yellow rotary handle for use as Emergency-Stop switches to IEC/EN 60204	**XTPAXENCS55RY** ③		158 x 80 x 125.5 [6.22 x 3.15 x 4.94]

② M25 metric cable entry knock-out, top and bottom. Cable push-through membrane, top and bottom, in the back plate and as a control line entry. Includes N and PE terminals.

③ Integrated terminal for PE(N) connection, two M25 cable entry knockouts at the top and bottom.

Discount Symbol **MC7**

B

Table B-160. Insulated Enclosures for Surface Mounting of B-Frame (0.1 – 32A) XTPR Rotary Manual Motor Protectors — North American Usage ①

	Degree of Protection	For Use with…	Description	Catalogue Number	Price	Approx. Dimensions mm [in] H x W x D
	IP55 NEMA 1, 12, 3R	B-Frame XTPR Only or with: XTPAXSA…and XTPAXFA…, XTPAXUVR…and XTPAXFA…, XTPAXSR…and XTPAXFA…, XTPAXCL	With black/gray rotary handle	**XTPAXENAS55B**		160 x 100 x 130 [6.30 x 3.94 x 5.12]
			With red/yellow rotary handle for use as Emergency-Stop switch to VDE 0113	**XTPAXENAS55RY**		160 x 100 x 130 [6.30 x 3.94 x 5.12]

① Built-in N and PE terminal, lower part without knockouts.

Table B-161. Insulated Enclosures for Surface Mounting of B-Frame XTPR (0.1 – 32A) Rotary Motor-Protective Circuit Breakers with XTPAXFAEM20 Early-Make Front Mount Auxiliary Contact — Global Usage

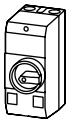
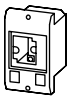
	Degree of Protection	For Use with…	Description	Catalogue Number	Price	Approx. Dimensions mm [in] H x W x D
	IP65	B-Frame XTPR and XTPAXFAEM20 only or with: XTPAXFA…, XTPAXSA…, XTPAXSATR…, XTPAXUVR…, XTPAXSR…, XTPAXCL	With black/gray rotary handle	**XTPAXENCSEM65B**		160 x 100 x 130 [6.30 x 3.94 x 5.12]
	IP65		With red/yellow rotary handle for use as Emergency-Stop switches to IEC/EN 60204	**XTPAXENCSEM65RY**		160 x 100 x 130 [6.30 x 3.94 x 5.12]
	IP55	B-Frame XTPR and XTPAXFAEM20 only or with: XTPAXFA…, XTPAXUVR…, XTPAXSR…, XTPAXCL	With black/gray rotary handle	**XTPAXENCSEM55B**		158 x 80 x 100 [6.22 x 3.15 x 3.94]
	IP55		With red/yellow rotary handle for use as Emergency-Stop switches to IEC/EN 60204	**XTPAXENCSEM55RY**		158 x 80 x 100 [6.22 x 3.15 x 3.94]

Table B-162. Insulated Enclosures for Surface Mounting of B-Frame XTPR (0.1 – 32A) Rotary Manual Motor Protectors with XTPAXFAEM20 Early-Make Front Mount Auxiliary Contact — North American Usage ②

	Degree of Protection	For Use with…	Description	Catalogue Number	Price	Approx. Dimensions mm [in] H x W x D
	IP55 NEMA 1, 12, 3R	B-Frame XTPR Only or with: XTPAXSA…, XTPAXUVR…, XTPAXCL	With black/grey rotary handle	**XTPAXENASEM55B**		160 x 100 x 130 [6.30 x 3.94 x 5.12]
			With red/yellow rotary handle for use as Emergency-Stop switch to VDE 0113	**XTPAXENASEM55RY**		160 x 100 x 130 [6.30 x 3.94 x 5.12]

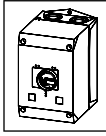
② Built-in N and PE terminal, lower part without knockouts.

Table B-163. Insulated Enclosures for Flush Mounting of B-Frame (0.1-32A) XTPR Rotary Manual Motor Protectors — Global Usage ③

	Degree of Protection	For Use with…	Description	Catalogue Number	Price	Approx. Dimensions mm [in] H x W x D
	Front IP40	B-Frame XTPR Only or with: XTPAXSA…, XTPAXUVR…, XTPAXSR…, XTPAXCL	Cover with aperture dimensioned to accommodate front of MMP.	**XTPAXENCF40**		129 x 85 x 96 [5.08 x 3.35 x 3.78]
	Front IP55	B-Frame XTPR Only or with: XTPAXSA…, XTPAXUVR…, XTPAXSR…, XTPAXFA…, XTPAXCL	With black/gray rotary handle	**XTPAXENCF55B**		129 x 85 x 124 [5.08 x 3.35 x 4.88]
			With red/yellow rotary handle for use as Emergency-Stop switches to IEC/EN 60204	**XTPAXENCF55RY**		129 x 85 x 124 [5.08 x 3.35 x 4.88]

③ Integrated terminal for PE(N) connection.

Table B-164. Insulated Enclosures for Surface Mounting of D-Frame (10 – 63A) Rotary Motor-Protective Circuit Breakers ④⑤

	Degree of Protection	For Use with…	Description	Catalogue Number	Price	Approx. Dimensions mm [in] H x W x D
	IP65 NEMA 1, 12, 3R	D-Frame XTPR Only or with: XTPAXFA…, XTPAXFAEM20, XTPAXSA…, XTPAXSATR…, XTPAXUVR…, XTPAXSR…, XTPAXCL	With black/gray rotary handle	**XTPAXENCSD65B**		240 x 160 x 197 [9.45 x 6.30 x 7.76]
	IP65 NEMA 1, 12, 3R		With red/yellow rotary handle for use as Emergency-Stop switches to IEC/EN 60204	**XTPAXENCSD65RY**		240 x 160 x 197 [9.45 x 6.30 x 7.76]

④ Integrated terminal for PE(N) connection.

⑤ Metric knockouts:
Top ÷ bottom: M25/M32
In backplate: M25/M32
Control cable entry: M20

Discount Symbol **MC7**

MMP Enclosure Accessories

Table B-165. XTPR Manual Motor Protector Enclosure Padlock Attachment

	For Use with…	Description	Pkg. Qty.	Catalogue Number	Price ①
	XTPAXENCS65B, XTPAXENCS65RY, XTPAXENCSEM65B, XTPAXENCSEM65RY, XTPAXENCS55B, XTPAXENCS55RY, XTPAXENCSEM55B, XTPAXENCSEM55RY	Padlocking feature. Up to 3 padlocks with 3 – 6 mm hasp thickness. For use as main switch to IEC/EN 60204.	3	**XTPAXPL1** ②	
	XTPAXENCSD65B, XTPAXENCSD65RY		1	**XTPAXPL2** ②	
	XTPAXENCF55B, XTPAXENCF55RY		3	**XTPAXPL3** ③	

① Orders must be placed in multiples of package quantity listed.
② Lockable in the 0-position of the XTPR manual motor protector.
③ Lockable in the OFF position of the B-Frame XTPR manual motor protector.

Table B-166. Neutral Terminal for use with XTPB and B-Frame XTPR Flush-Mount Enclosures

	For Use with…	Description	Pkg. Qty.	Catalogue Number	Price ④
	**XTPBXENCF40, XTPBXENCF55, XTPAXENCF40, XTPAXENCF55B, XTPAXENCF55RY**	**For connection of a fifth conductor**	20	**XTPAXNT**	

④ Orders must be placed in multiples of package quantity listed.

Metric Cable Glands to EN 50262

- With locknut and internal strain relief
- IP68 up to 5 bar, hydrogen free

Table B-167. Metric Cable Glands

Description	Pkg. Qty.	Catalogue Number	Price ⑤
20.5 mm Metric Cable Gland 6 – 13 mm Wire	20	**XTPAXMCG20**	
25.5 mm Metric Cable Gland 9 – 17 mm Wire	20	**XTPAXMCG25**	
32.5 mm Metric Cable Gland 13 – 21 mm Wire	10	**XTPAXMCG32**	
32.5 mm Metric Cable Gland 18 – 25 mm wire	10	**XTPAXMCG32G**	

⑤ Orders must be placed in multiples of package quantity listed.

IP65 Metric Diaphragm Grommet ⑥

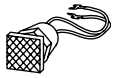
- IP65
- With internal push-through diaphragm

Table B-168. IP65 Metric Diaphragm Grommet

Description	Pkg. Qty.	Catalogue Number	Price ⑦
20.5 mm Diaphragm Grommet 1 – 13 mm Wire	100	**XTPAXMDG20**	
25.5 mm Diaphragm Grommet 1 – 18 mm Wire	100	**XTPAXMDG25**	
32.5 mm Diaphragm Grommet 1 – 24 mm Wire	100	**XTPAXMDG32**	

⑥ With integral push-through diaphragm.
⑦ Orders must be placed in multiples of package quantity listed.

Indicating Lights with Neon Bulb



- For use with XTPR and XTPB enclosures
- Lights do not carry individual IP or NEMA rating. All enclosure ratings remain valid when using indicating lights.

Table B-169. Indicating Lights

Color	Description — Indicating Light	Pkg. Qty.	Catalogue Number	Price ⑧
White	110 – 230V 230 – 240V 415 – 500V	10 10 10	**XTPAXILWB** **XTPAXILWN** **XTPAXILWC**	
Green	110 – 230V 230 – 240V 415 – 500V	10 10 10	**XTPAXILGB** **XTPAXILGN** **XTPAXILGC**	
Red	110 – 230V 230 – 240V 415 – 500V	10 10 10	**XTPAXILRB** **XTPAXILRN** **XTPAXILRC**	

⑧ Orders must be placed in multiples of package quantity listed.

Discount Symbol **MC7**

Technical Data and Specifications

Table B-170. *XT* Manual Motor Protectors — Technical Data and Specifications

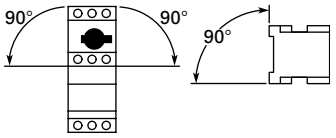
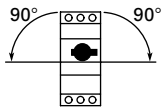
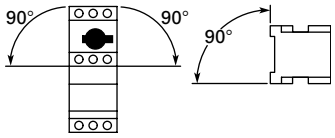
	XTPBP16B – XTPB016B	XTPRP16B – XTPR032B	XTPR016D – XTPR063D	XTPMP16B – XTPM032B	XTPTP16B – XTPT025B
General					
Standards	IEC/EN 60947, VDE 0660, UL 508, CSA C 22.2 No. 14				
Climatic proofing	Damp heat, constant, to IEC 60068-2-78; damp heat, cyclic, to IEC 60068-2-30				
Ambient temperature, °C Storage Open Enclosed	 -25 / 80 -25 / 55 -25 / 40	 -25 / 80 -25 / 55 -25 / 40	 -25 / 70 -25 / 55 -25 / 40	 -25 / 80 -25 / 55 -25 / 40	 -25 / 80 -25 / 55 -25 / 40
Mounting position					
Direction of incoming supply	As required	As required	As required	As required	As required
Degree of protection Device Terminals	 IP20 IP00	 IP20 IP00	 IP20 IP00	 IP20 IP00	 IP20 IP00
Protection against direct contact	Finger- and back-of-hand proof				
Shock resistance half-sinusoidal shock 10 mS to IEC 60068-2-27 (g)	25	25	15	25	25
Altitude (m), maximum	2000	2000	2000	2000	2000
Terminal capacity Solid (mm^2) Flexible with ferrule to DIN 46228, (mm^2) Solid or stranded (AWG)	 1 x (1 – 6) 2 x (1 – 6) 1 x (1 – 6) 2 x (1 – 6) 18 – 10	 1 x (1 – 6) 2 x (1 – 6) 1 x (1 – 6) 2 x (1 – 6) 18 – 10	 1 x (1 – 50) 2 x (1 – 35) 1 x (1 – 35) 2 x (1 – 35) 14 – 2	 1 x (1 – 6) 2 x (1 – 6) 1 x (1 – 6) 2 x (1 – 6) 18 – 10	 1 x (1 – 6) 2 x (1 – 6) 1 x (1 – 6) 2 x (1 – 6) 18 – 10
Terminal screw tightening torque Main cable, Nm Main cable, lb-in Control circuit cable, Nm Control circuit cable, lb-in	 1.7 15.0 1 8.9	 1.7 15.0 1 8.9	 3 26.6 1 8.9	 1.7 15.0 1 8.9	 1.7 15.0 1 8.9
Main contacts					
Rated impulse withstand voltage (U_{imp}), V AC	6000	6000	6000	6000	6000
Overvoltage category / pollution degree	III / 3	III / 3	III / 3	III / 3	III / 3
Rated operational voltage (U_e), V AC	690	690	690	690	690
Rated uninterrupted current = rated operational current ($I_u = I_e$) in amperes	25 or current setting of the overcurrent release	32 or current setting of the overcurrent release	63 or current setting of the overcurrent release	32 or current setting of the overcurrent release	25 or current setting of the overcurrent release
Rated frequency, Hz	40 – 60	40 – 60	40 – 60	40 – 60	40 – 60
Current heat loss (3-pole at operating temperature), W	6	6	22	6	6
Lifespan, mechanical (ops)	50,000	100,000	30,000	100,000	100,000
Lifespan, electrical (AC-3 at 400 V) (ops)	50,000	100,000	30,000	100,000	100,000
Maximum operating frequency, operations/hr	25	40	40	40	40
Short-circuit rating AC DC (kA)	 See **Page B-135**. 60	 60 (up to XTPR016B) 40 (XTPR020B – XTPR032B)	 60	 60 (up to XTPM016B) 40 (XTPM020B – XTPR032B)	 60 (up to XTPT016B) 40 (XTPT020B – XTPT025B)
Motor switching capacity AC-3 (up to 690 V) in amperes DC-5 (up to 250 V) in amperes	 25 25	 32 25 (3 contacts in series)	 65 63 (3 contacts in series)	 32	 25

Table B-170. *XT* Manual Motor Protectors — Technical Data and Specifications (Continued)

	XTPBP16B – XTPB016B	XTPRP16B – XTPR032B	XTPR016D – XTPR063D	XTPMP16B – XTPM032B	XTPTP16B – XTPT025B
Releases					
Overload release setting range (x I_u)	0.6 – 1.0	0.6 – 1.0	0.6 – 1.0	—	0.6 – 1.0
Fixed short-circuit release (x I_u)	14	14	14	14	20
Short-circuit release tolerance	± 20%	± 20%	± 20%	± 20%	± 20%
Phase-failure sensitivity	IEC/EN 60947-1-1, VDE 0660 Part 102			—	IEC/EN 60947-1-1, VDE 0660 Part 102
Temperature compensation to IEC/EN 60947, VDE 0660, °C Operating range, °C	 -5 / 40 -25 / 55	 -5 / 40 -25 / 55	 -5 / 40 -25 / 55	 -5 / 40 -25 / 55	 -5 / 40 -25 / 55
Temperature compensation residual error for T > 20°C, %/K	≤ 0.25	≤ 0.25	≤ 0.25	≤ 0.25	≤ 0.25

Table B-171. Auxiliary Contacts — Technical Data and Specifications

Description	XTPAXSA_ _	XTPAXFA_ _	XTPA(B)XFAEM_ _	XTPAXSATR_ _
Rated Impulse withstand voltage, U_{imp} (V AC)	6000	4000	4000	6000
Overvoltage category/pollution degree	III/3	III/3	III/3	III/3
Rated operational voltage U_e (VAC) U_e (VDC)	 500 250	 440 250	 440 250	 500 250
Safe isolation to VDE 0106 Part 101 and Part 101/A1 Between auxiliary contacts and main contacts (V AC)	690	690	690	690
Rated operational current				
AC-15 220 – 240 V, I_e (A) 380 – 415 V, I_e (A) 440 – 500 V, I_e (A)	 3.5 2 1	 1 — —	 1 — —	 3.5 2 1
DC-13 L/R < 100 ms 24 V, I_e (A) 60 V, I_e (A) 110 V, I_e (A) 220 V, I_e (A)	 2 1.5 1 0.25	 2 — — —	 2 — — —	 2 1.5 1 0.25
Lifespan				
Mechanical, operations (x 10^6)	0.1	0.1	0.1	0.01
Electrical, operations (x 10^6)	0.05	0.1	0.1	0.005
Contact reliability (@ U_e = 24V DC, U_{min} – 17V, I_{min} = 5.4 mA, fault probability (λ)	< 10^{-8} < 1 fault at 1 x 10^8 operations			
Positively driven contacts to ZH 1/457	Yes	—	—	—
Short-circuit rating without welding				
Fuseless	FAZ-B4/1-HI	—	—	FAZ-B4/1-HI
Fuse (A gG/gL)	10	10	10	10
Terminal Capacity				
Solid or flexible conductor with ferrule (mm^2)	0.75 –2.5	0.75 – 1.5	0.75 – 1.5	0.75 – 2.5
Solid or stranded (AWG)	18 – 14	18 – 16	18 – 16	18 – 14

B

Table B-172. Undervoltage Release — Technical Data and Specifications

Description	XTPAXUVR...
Cross-sections	
Solid or flexible conductor with ferrule (mm^2)	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)
Solid or stranded (AWG)	1 x (18 – 14) 2 x (18 – 14)
Main Contacts	
Rated operational voltage, U_e (V AC)	42 – 480
Rated operational voltage, U_e (V DC)	24 – 250
Pick-up voltage, x U_s	0.85 – 1.1
Drop-out voltage, x U_s	0.7 – 0.35
Power Consumption	
Pick-up AC (VA)	5
Sealing AC (VA)	3

Table B-173. Current Limiter

Description	XTPAXCL
Rated Impulse withstand Voltage (U_{imp}), V AC	6000
Overvoltage Category/ Pollution Degree	III/3
Rated operational voltage, U_e (V AC)	690
Rated interrupted current = Rated operational current ($I_u = I_e$) in amperes	63

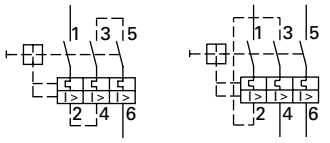


Figure B-97. XTPB, XTPR 1- and 2-Pole Circuits with DC and AC Current

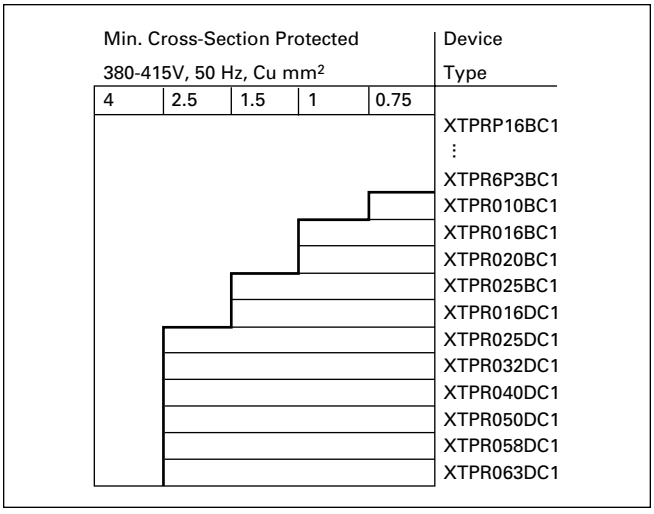


Figure B-98. Protection of PVC Insulated Cables Against Thermal Overload at Short Circuit

The table indicates which minimum cable cross-sections are protected by XTPR motor protective circuit breakers up to their rated conditional short circuit current I_q.

Table B-174. Shunt Release — Technical Data and Specifications

Description	XTPAXSR __
Cross-sections	
Solid or flexible conductor with ferrule (mm^2)	1 x (0.75 – 2.5) 2 x (0.75 – 2.5)
Solid or stranded (AWG)	1 x (18 – 14) 2 x (18 – 14)
Main Contacts	
Rated operational voltage, U_e (V AC)	42 – 480
Rated operational voltage, U_e (V DC)	24 – 250
AC Operating Range, x U_s	0.7 – 1.1
DC Operating Range, x U_s (intermittent operation 5s)	0.7 – 1.1
Power Consumption	
Pick-up AC (VA)	5
Sealing AC (VA)	3
Pick-up DC (VA)	3
Sealing DC (VA)	3

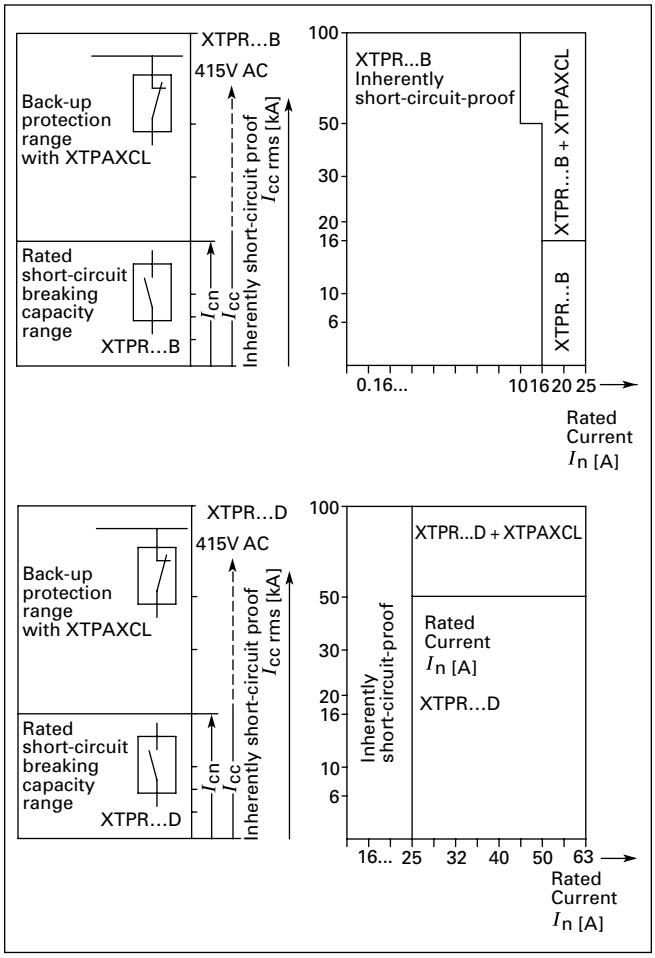


Figure B-99. Fuseless Installation with XTPR, Back-Up Protection Diagrams

B

Time/Current Curve

Characteristics

The time/current characteristic, the current limiting characteristics and the I^2t characteristics were determined in accordance with DIN VDE 0660 and IEC 60 947.

The tripping characteristic of the **inverse-time delayed overload releases** (thermal overload releases or "a" releases) for DC and AC with a frequency of 0 to 400 Hz also apply to the time/current characteristic.

The characteristics apply to the cold state. At operating temperature, the tripping times of the thermal releases are reduced to approximately 25%.

Under normal operating conditions, all three poles of the device must be loaded. The three main conducting paths must be connected in series in order to protect single-phase or DC loads.

With 3-pole loading, the maximum deviation in the tripping time for 3 times the setting current and upwards is ±20% and thus in accordance with DIN VDE 0165.

The tripping characteristics for the instantaneous, electromagnetic overcurrent releases (short-circuit releases or "n" releases) are based on the rated current I_n, which is also the maximum value of the setting range for circuit-breakers with adjustable overload releases. If the current is set to a lower value, the tripping current of the "n" release is increased by a corresponding factor.

The characteristics of the electromagnetic overcurrent releases apply to frequencies of 50/60 Hz. Appropriate correction factors must be used for lower frequencies up to 16-2/3 Hz, for higher frequencies up to 400 Hz and for DC.

Time/current characteristics, current limiting characteristics and I^2t characteristics are available on request.

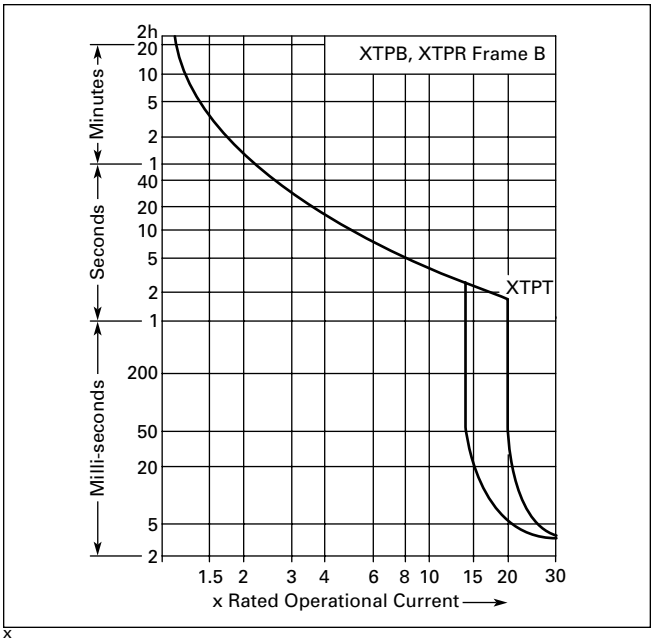


Figure B-100. MMP Tripping Characteristics — XTPB, XTPR Frame B and XTPT (not for XTPM)

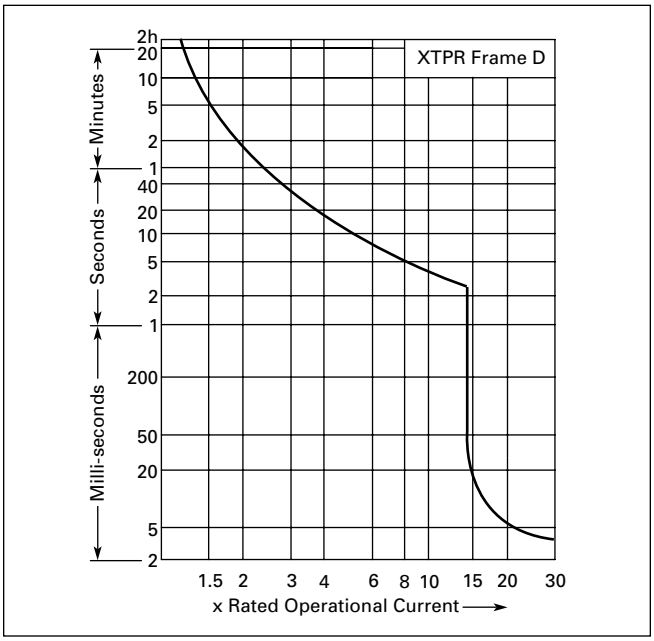


Figure B-101. MMP Tripping Characteristics — XTPR Frame D

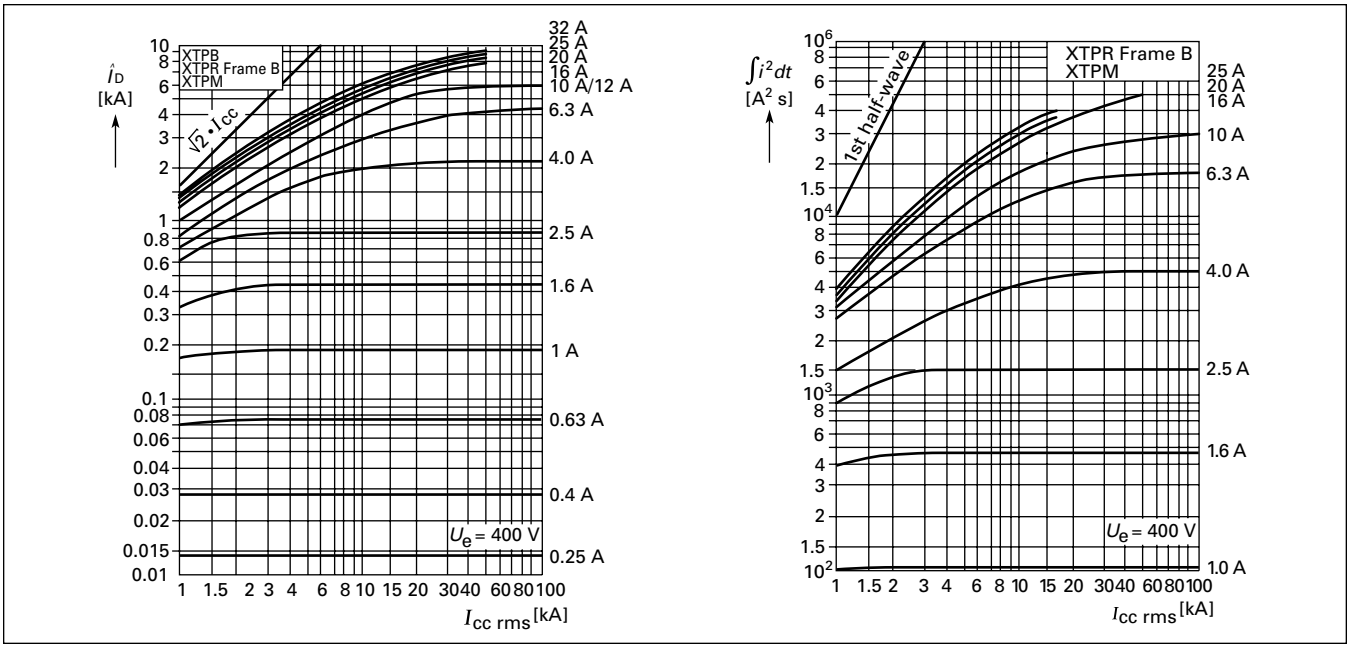


Figure B-102. MMP Let-Through Tripping Characteristics — XTPB, XTPR Frame B, XTPT, XTPM

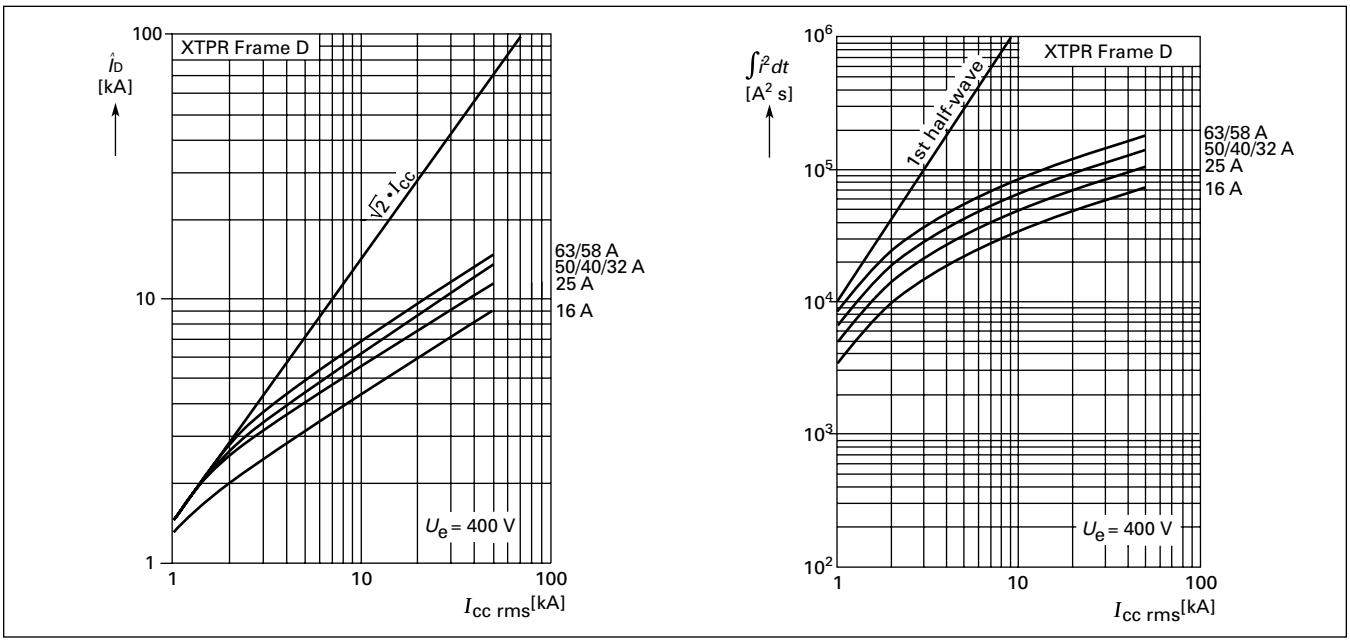


Figure B-103. MMP Let-Through Tripping Characteristics — XTPR Frame D

Manual Motor Protector Short Circuit Ratings

Rated uninterrupted current I_u = Rated operational current I_e.
Rated conditional short circuit current I_q — IEC/EN 60947-4-1.
Rated ultimate short circuit breaking capacity I_{cu} — IEC/EN 60947-2.
Rated operational short circuit breaking capacity I_{cs} — IEC/EN 60947-2.

Table B-175. Manual Motor Protector Short Circuit Ratings — Global Use, IEC/EN 60947

I_u	230V				400V				440V				500V				690V			
	I_q	I_{cu}	I_{cs}	Fuse ②③	I_q	I_{cu}	I_{cs}	Fuse ②③	I_q	I_{cu}	I_{cs}	Fuse ②③	I_q	I_{cu}	I_{cs}	Fuse ②③	I_q	I_{cu}	I_{cs}	Fuse ②③
A	kA	kA	kA	A	kA	kA	kA	A	kA	kA	kA	A	kA	kA	kA	A	kA	kA	kA	A
XTPB with classification Type "1" and Type "2"																				
0.16 – 1	50	50	50	50	50	50	50	50	50	50	50	50								
1.6	50	50	50	50	50	50	50	50	50	50	50	50								
2.5	50	50	50	50	50	50	50	50	50	50	50	50								
4	50	50	50	50	50	50	50	50	50	50	50	50								
6.3	50	50	50	50	50	50	50	50	50	50	50	50								
10	50	50	50	50	50	50	50	50	42	42	10	50								
12	50	50	10	50	50	50	10	50	15	15	10	50								
16	50	50	10	50	50	50	10	50	15	15	10	50								
20	50	50	10	50	50	50	10	50	10	10	10	50								
25	50	50	10	50	50	50	10	50	10	10	10	50								
XTPR…BC1, XTPT, XTPM with classification Type "1" and Type "2"																				
0.16 – 1	150 ①	150 ①	150 ①	N	150 ①	150 ①	150 ①	N	①	①	①	N	①	①	①	N	①	①	①	N
1.6	150 ①	150 ①	150 ①	N	150 ①	150 ①	150 ①	N	①	①	①	N	①	①	①	N	①	①	①	N
2.5	150 ①	150 ①	150 ①	N	150 ①	150 ①	150 ①	N	①	①	①	N	①	①	①	N	5	5	5	50
4	150 ①	150 ①	150 ①	N	150 ①	150 ①	150 ①	N	①	①	①	N	①	①	①	N	3	3	3	50
6.3	150 ①	150 ①	150 ①	N	150 ①	150 ①	150 ①	N	①	①	①	N	42	42	6	50	3	3	2	50
10	150 ①	150 ①	150 ①	N	150 ①	150 ①	150 ①	N	42	42	10	50	42	42	6	50	3	3	2	50
12	50	50	10	50	50	50	10	50	15	15	10	50	15	15	6	50	3	3	2	50
16	50	50	10	50	50	50	10	50	15	15	10	50	15	15	6	50	3	3	2	50
20	50	50	10	50	50	50	10	50	15	15	10	50	6	6	6	50	3	3	2	50
25	50	50	10	50	50	50	10	50	10	10	10	50	6	6	6	50	3	3	2	50
32	50	50	10	50	50	50	10	50	10	10	10	50	6	6	6	50	3	3	2	50
XTPR…DC1 with classification Type "1" and Type "2"																				
16	150 ①	150 ①	25	N	150 ①	150 ①	25	N	45	45	25	100	15	15		100	8	8	2.5	100
25	150 ①	150 ①	25	N	150 ①	150 ①	25	N	45	45	25	100	15	15		100	8	8	2.5	100
32	50	50	25	100	50	50	25	100	45	45	25	100	15	15		100	5	5	2.5	100
40	50	50	25	100	50	50	25	100	45	45	25	100	15	15		100	5	5	2.5	100
50	50	50	25	100	50	50	25	100	45	45	25	100	15	15		100	5	5	2.5	100
58	50	50	25	160	50	50	25	160	45	45	25	160	15	15		160	5	5	2.5	160
63	50	50	25	160	50	50	25	160	45	45	25	160	15	15		160	5	5	2.5	160
XTPR…BC1, XTPT, XTPM with Current Limiter XTPAXCL																				
0.16 – 1	①	①	①	N	①	①	①	N	①	①	①	N	①	①	①	N	①	①	20	N
1.6	①	①	①	N	①	①	①	N	①	①	①	N	①	①	①	N	①	①	20	N
2.5	①	①	①	N	①	①	①	N	①	①	①	N	①	①	①	N	20	20	20	N
4	①	①	①	N	①	①	①	N	①	①	①	N	①	①	①	N	20	20	20	N
6.3	①	①	①	N	①	①	①	N	①	①	①	N	①	①	50	N	20	20	20	N
10	①	①	①	N	①	①	①	N	①	①	①	N	①	①	20	N	20	20	20	N
12	①	①	①	N	①	①	①	N	①	①	①	N	①	①	20	N	5	5	2.5	N
16	①	①	①	N	①	①	①	N	①	①	①	N	①	①	20	N	5	5	2.5	N
20	①	①	①	N	①	①	①	N	①	①	①	N	10	10	10	N	5	5	2.5	N
25	①	①	①	N	①	①	①	N	①	①	①	N	10	10	10	N	5	5	2.5	N
32	①	①	①	N	①	①	①	N	①	①	①	N	10	10	10	N	5	5	2.5	N
XTPR…BC1, XTPT, XTPM with (2) Current Limiters XTPAXCL																				
0.16 – 1	①	①	①	N	①	①	①	N	①	①	①	N	①	①	①	N	①	①	20	N
1.6	①	①	①	N	①	①	①	N	①	①	①	N	①	①	①	N	①	①	20	N
2.5	①	①	①	N	①	①	①	N	①	①	①	N	①	①	①	N	40	40	20	N
4	①	①	①	N	①	①	①	N	①	①	①	N	①	①	①	N	40	40	20	N
6.3	①	①	①	N	①	①	①	N	①	①	①	N	①	①	50	N	20	20	20	N
10	①	①	①	N	①	①	①	N	①	①	①	N	①	①	40	N	20	20	20	N
12	①	①	①	N	①	①	①	N	①	①	①	N	①	①	40	N	10	10	2.5	N
16	①	①	①	N	①	①	①	N	①	①	①	N	①	①	40	N	10	10	2.5	N
20	①	①	①	N	①	①	①	N	①	①	①	N	20	20	20	N	10	10	2.5	N
25	①	①	①	N	①	①	①	N	①	①	①	N	20	20	20	N	10	10	2.5	N
32	①	①	①	N	①	①	①	N	①	①	①	N	20	20	20	N	10	10	2.5	N

① No upstream protective device required, as it is the auto-protected range (100/150 kA — Frame B, 150 kA — Frame D).
② N = Not required.
③ XTPR…BC1, XTPT, XTPM — Required back-up fuse if the short circuit current exceeds the rated conditional short circuit current ($I_{cc} > I_q$); XTPB, XTPR…DC1 — Fuse (A gG/gL) for enhancing the switching capacity of the motor protective circuit breaker to 100 kA.

Table B-176. Ratings for Group Motor Applications — UL 508 / CSA C22.2 No. 14

Catalogue Number	Rated Uninterrupted Current — I_u (Amps)	FLA Adjustment Range / Overload Release — I_r (Amps)	Short Circuit Release — I_{rm} (Amps)	Maximum Protective Device for UL/CSA Group Protection					
				Max. RMS Sym Current — 600V (kA)		Maximum Fuse Rating (A)		Circuit Breaker Max (A)	
					w/Current Limiter — XTPAXCL		w/Current Limiter — XTPAXCL		w/Current Limiter — XTPAXCL
XTPB — Frame B, Manual Motor Protector with Thermal and Magnetic Trip									
XTPBP16BC1	0.16	0.1 – 0.16	2.2	50	—	600	—	600	—
XTPBP25BC1	0.25	0.16 – 0.25	3.5	50	—	600	—	600	—
XTPBP40BC1	0.4	0.25 – 0.4	5.6	50	—	600	—	600	—
XTPBP63BC1	0.63	0.4 – 0.63	8.8	50	—	600	—	600	—
XTPB001BC1	1	0.63 – 1	14	50	—	600	—	600	—
XTPB1P6BC1	1.6	1 – 1.6	22	50	—	600	—	600	—
XTPB2P5BC1	2.5	1.6 – 2.5	35	50	—	600	—	600	—
XTPB004BC1	4	2.5 – 4	56	50	—	600	—	600	—
XTPB6P3BC1	6.3	4 – 6.3	88	50	—	600	—	600	—
XTPB010BC1	10	6.3 – 10	140	10	50	150	600	125 ②	600
XTPB012BC1	12	8 – 12	168	10	50	150	600	125 ②	600
XTPB016BC1	16	10 – 16	224	10 ①	50 ①	150 ①	600 ①	125 ①②	600 ①
XTPB020BC1 ③	20	16 – 20	280	10 ①	18 ①	150 ①	600 ①	125 ①	600 ①
XTPB025BC1 ③	25	20 – 25	350	10 ①	18 ①	150 ①	600 ①	125 ①	600 ①
XTPR — Frame B (all Screw and Spring Cage terminal options), Manual Motor Protector with Thermal and Magnetic Trip									
XTPRP16BC1	0.16	0.1 – 0.16	2.2	50	—	600	—	600	—
XTPRP25BC1	0.25	0.16 – 0.25	3.5	50	—	600	—	600	—
XTPRP40BC1	0.4	0.25 – 0.4	5.6	50	—	600	—	600	—
XTPRP63BC1	0.63	0.4 – 0.63	8.8	50	—	600	—	600	—
XTPR001BC1	1	0.63 – 1	14	50	—	600	—	600	—
XTPR1P6BC1	1.6	1 – 1.6	22	50	—	600	—	600	—
XTPR2P5BC1	2.5	1.6 – 2.5	35	50	—	600	—	600	—
XTPR004BC1	4	2.5 – 4	56	50	—	600	—	600	—
XTPR6P3BC1	6.3	4 – 6.3	88	50	—	600	—	600	—
XTPR010BC1	10	6.3 – 10	140	10	50	150	600	125 ②	600
XTPR012BC1	12	8 – 12	168	10	50	150	600	125	600
XTPR016BC1	16	10 – 16	224	10	50	150	600	125 ②	600
XTPR020BC1	20	16 – 20	280	10	18	150	600	125	600
XTPR025BC1	25	20 – 25	350	10	18	150	600	125	600
XTPR032BC1	32	25 – 32	448	10	18	150	600	125	600
XTPR — Frame D, Manual Motor Protector with Thermal and Magnetic Trip									
XTPR016DC1	16	10 – 16	224	10	—	600	—	600	—
XTPR025DC1	25	16 – 25	350	10	—	600	—	600	—
XTPR032DC1	32	25 – 32	448	10	—	600	—	600	—
XTPR040DC1	40	32 – 40	560	10	—	600	—	600	—
XTPR050DC1	50	40 – 50	700	10 ①	—	600 ①	—	600 ①	—
XTPR058DC1	58	50 – 58	812	10 ①	—	600 ①	—	600 ①	—
XTPR063DC1	65	55 – 63	882	10 ①	—	600 ①	—	600 ①	—
XTPT — Frame D, Manual Motor Protector with Thermal and Magnetic Trip									
XTPTP16BC1	0.16	0.1 – 0.16	2.4	50	—	600	—	600	—
XTPTP25BC1	0.25	0.16 – 0.25	4.25	50	—	600	—	600	—
XTPTP40BC1	0.4	0.25 – 0.4	6.8	50	—	600	—	600	—
XTPTP63BC1	0.63	0.4 – 0.63	12	50	—	600	—	600	—
XTPT001BC1	1	0.63 – 1	20	50	—	600	—	600	—
XTPT1P6BC1	1.6	1 – 1.6	32	50	—	600	—	600	—
XTPT2P5BC1	2.5	1.6 – 2.5	50	50	—	600	—	600	—
XTPT004BC1	4	2.5 – 4	84	50	—	600	—	600	—
XTPT6P3BC1	6.3	4 – 6.3	141	50	—	600	—	600	—
XTPT010BC1	10	6.3 – 10	224	10	50	150	600	125 ②	600
XTPT012BC1	12	8 – 12	224	10	50	150	600	125	600
XTPT016BC1	16	10 – 16	358	10	50	150	600	125	600
XTPT020BC1	20	16 – 20	380	10	18	150	600	125	600
XTPT025BC1	25	20 – 25	420	10	18	150	600	125	600

① Rating is pending UL approval. Contact Eaton for availability.
② 22kA 600V AC
③ IEC/EN 60947-4-1

Table B-177. UL 508 Type E Ratings

Manual Motor Protector — Screw Terminals	Line Side Adapter	FLA Adjustment Range / Overload Release — I_r (Amps)	Short-Circuit Release — I_{rm} (Amps)	UL508 Type F Application				
				Max. RMS Symmetrical Short-Circuit Ratings (kA)			Maximum Upstream Protective Device (A) ①	
Catalogue Number	Catalogue Number			240V	480/277V	600/347V	Maximum Fuse 600V	Maximum Circuit Breaker 600V
XTPR Frame B + XTPAXLSA								
XTPRP16BB1	**XTPAXLSA**	0.1 – 0.16	2.2	50	50	18	Not Required	Not Required
XTPRP16BC1	**XTPAXLSA**	0.16 – 0.25	3.5	50	50	18	Not Required	Not Required
XTPRP25BC1	**XTPAXLSA**	0.25 – 0.4	5.6	50	50	18	Not Required	Not Required
XTPRP40BC1	**XTPAXLSA**	0.4 – 0.63	8.82	50	50	18	Not Required	Not Required
XTPRP63BC1	**XTPAXLSA**	0.63 – 1	14	50	50	18	Not Required	Not Required
XTPR001BC1	**XTPAXLSA**	1 – 1.6	22.4	50	50	18	Not Required	Not Required
XTPR1P6BC1	**XTPAXLSA**	1.6 – 2.5	35	50	50	18	Not Required	Not Required
XTPR2P5BC1	**XTPAXLSA**	2.5 – 4	56	50	50	18	Not Required	Not Required
XTPR004BC1	**XTPAXLSA**	4 – 6.3	88.2	50	50	18	Not Required	Not Required
XTPR6P3BC1	**XTPAXLSA**	6.3 – 10	140	50	50	18	Not Required	Not Required
XTPR010BC1	**XTPAXLSA**	8 – 12	168	42	42	—	Not Required	Not Required
XTPR012BC1	**XTPAXLSA**	10 – 16	224	42	42	—	Not Required	Not Required
XTPR016BC1	**XTPAXLSA**	10 – 16	224	18	18	—	Not Required	Not Required
XTPR020BC1	**XTPAXLSA**	16 – 20	280	18	18	—	Not Required	Not Required
XTPR025BC1	**XTPAXLSA**	20 – 25	350	18	18	—	Not Required	Not Required
XTPR032BC1	**XTPAXLSA**	25 – 32	448	18	18	—	Not Required	Not Required
XTPR Frame D + XTPAXLSAD								
XTPR016DC1	**XTPAXLSAD**	10 – 16	224	50	50	50	Not Required	Not Required
XTPR025DC1	**XTPAXLSAD**	16 – 25	350	50	50	50	Not Required	Not Required
XTPR032DC1	**XTPAXLSAD**	25 – 32	448	50	50	50	Not Required	Not Required
XTPR040DC1	**XTPAXLSAD**	32 – 40	560	50	50	50	Not Required	Not Required

① For UL508 Type F applications, the Manual Motor Protector assembly does not require a dedicated upstream protective device in the panel, thus a maximum rating is not required.

B

Dimensions

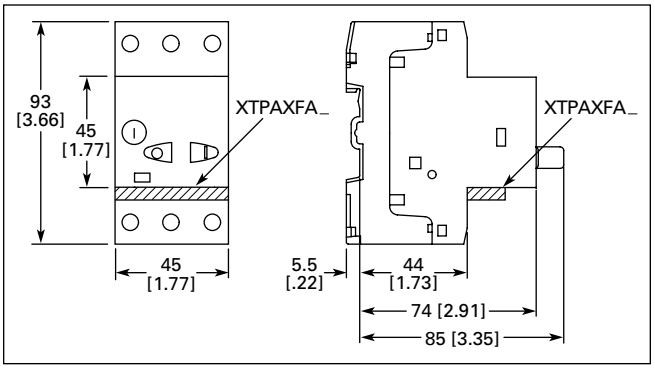


Figure B-104. Manual Motor Protectors — XTPB (Approximate Dimensions in mm [in])

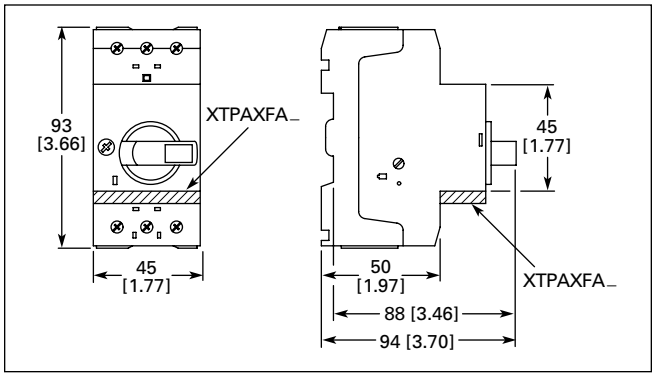


Figure B-105. Manual Motor Protectors, Manual Transformer Protectors — XTPR…B, XTPT and XTPM (Approximate Dimensions in mm [in])

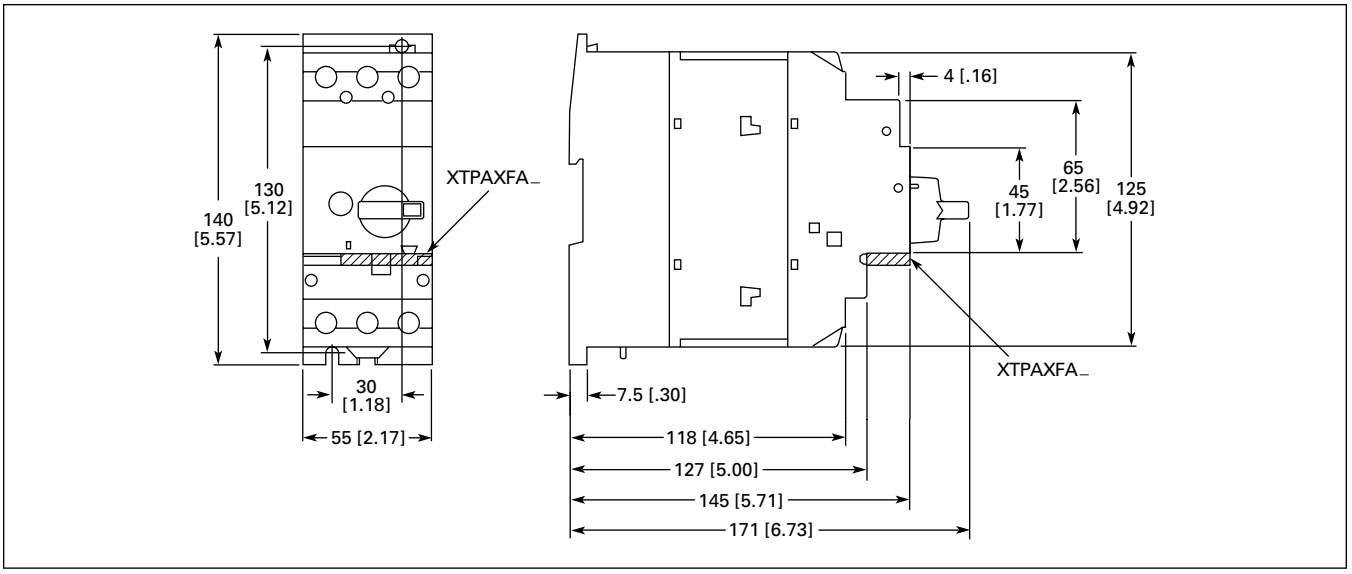


Figure B-106. Manual Motor Protector — XTPR…DC1 (Approximate Dimensions in mm [in])

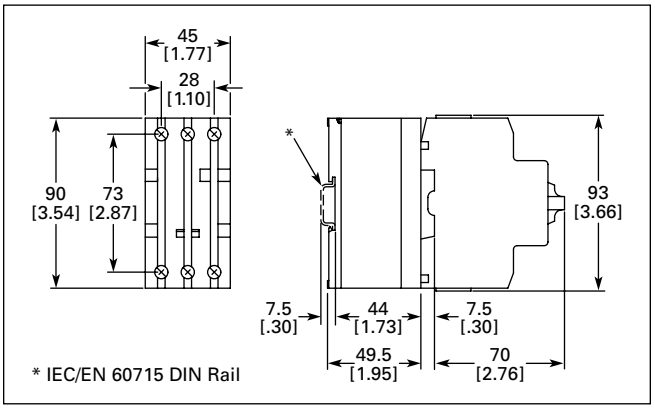


Figure B-107. Current Limiter — XTPAXCL (Approximate Dimensions in mm [in])

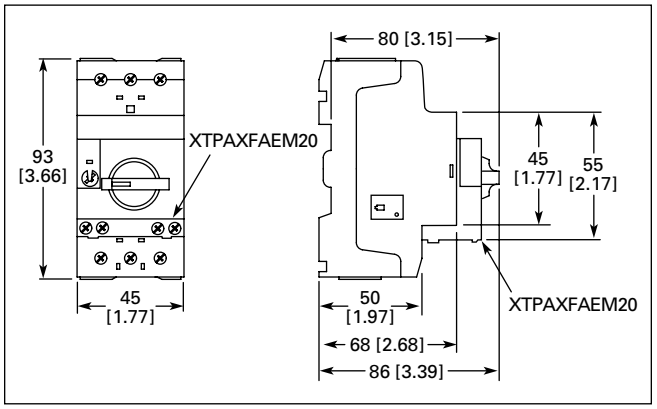


Figure B-108. MMPs with Early-Make Auxiliary Contacts — XTPR…BC1 + XTPAXFAEM20 (Approximate Dimensions in mm [in])

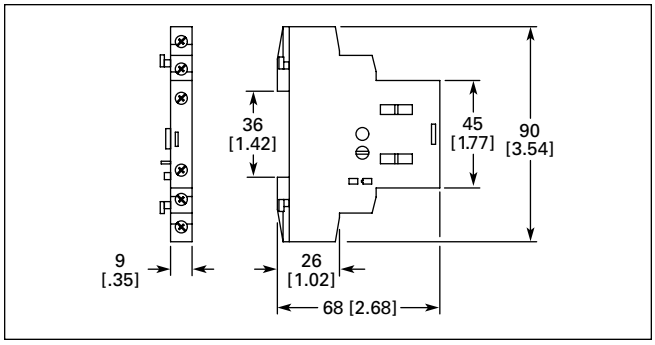


Figure B-109. Standard Auxiliary Contact — XTPAXSA… (Approximate Dimensions in mm [in])

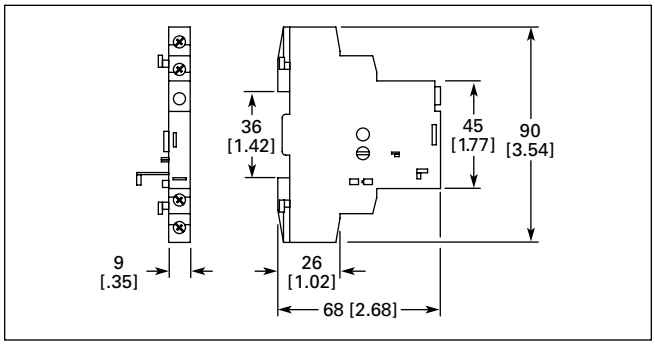


Figure B-110. Trip Indicating Auxiliary Contact — XTPAXSATR… (Approximate Dimensions in mm [in])

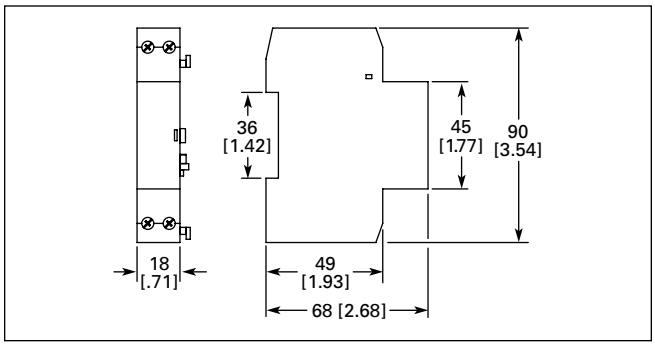


Figure B-111. Undervoltage / Shunt Release — XTPAXUVR…, XTPAXSR… (Approximate Dimensions in mm [in])

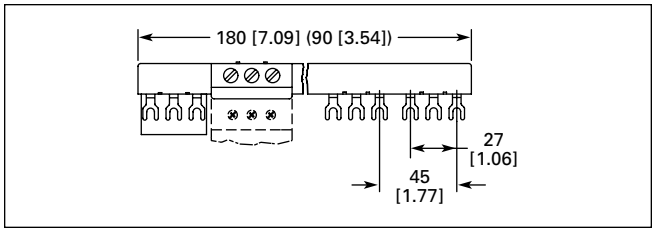


Figure B-112. Three-Phase Commoning Link — XTPAXCLKA4, XTPAXCLKA2 (Approximate Dimensions in mm [in])

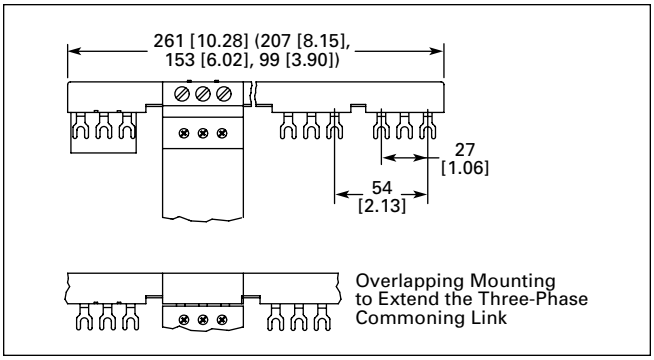


Figure B-113. Three-Phase Commoning Link — XTPAXCLKB5, XTPAXCLKB4, XTPAXCLKB3, and XTPAXCLKB2 (Approximate Dimensions in mm [in])

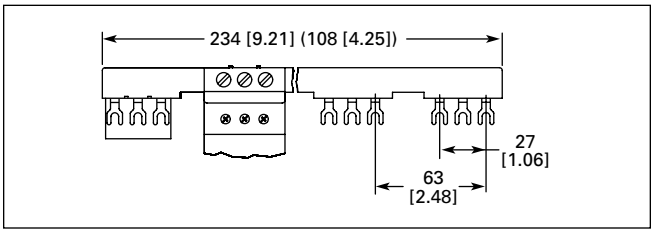


Figure B-114. Three-Phase Commoning Link — XTPAXCLKC4, XTPAXCLKC2 (Approximate Dimensions in mm [in])

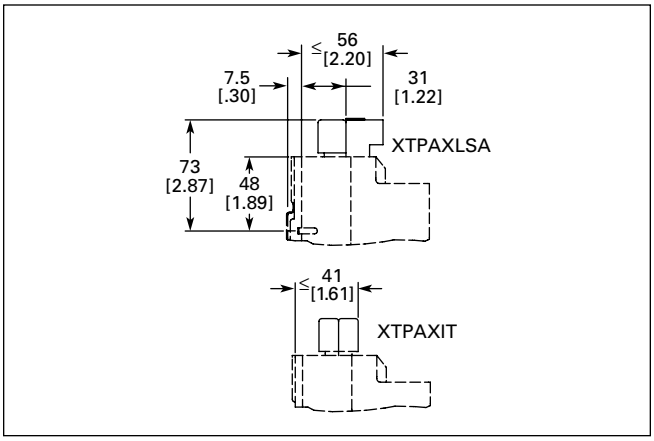


Figure B-115. Incoming Terminal, Line Side Adapter — XTPAXIT, XTPAXLSA (Approximate Dimensions in mm [in])

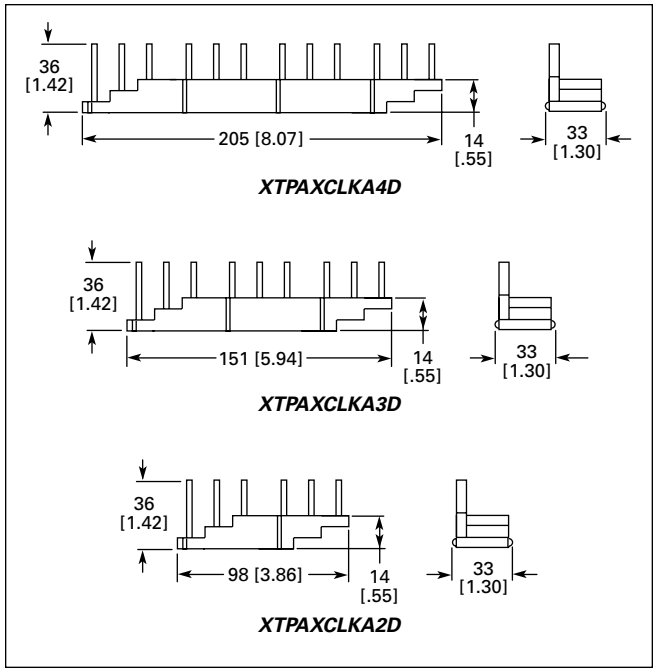


Figure B-116. Three-Phase Commoning Link — XTPAXCLKA4D, XTPAXCLKA3D and XTPAXCLKA2D (Approximate Dimensions in mm [in])

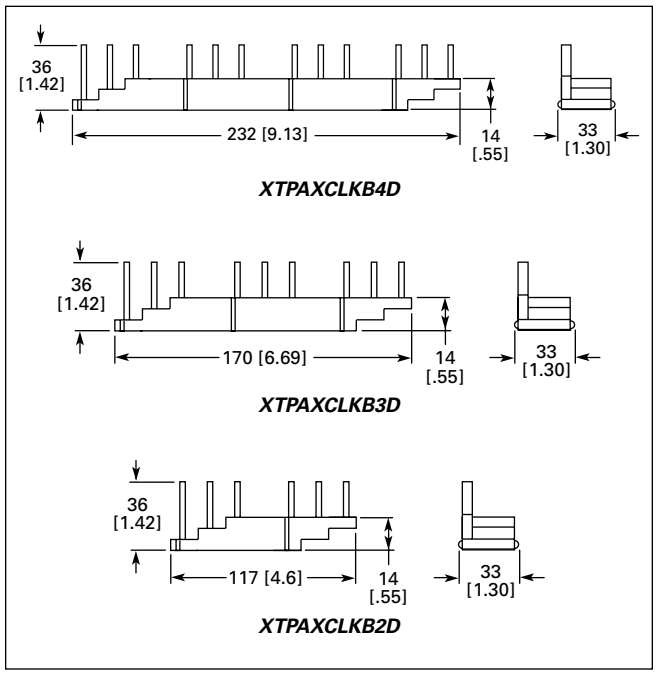


Figure B-117. Three-Phase Commoning Link — XTPAXCLKB4D, XTPAXCLKB3D and XTPAXCLKB2D (Approximate Dimensions in mm [in])

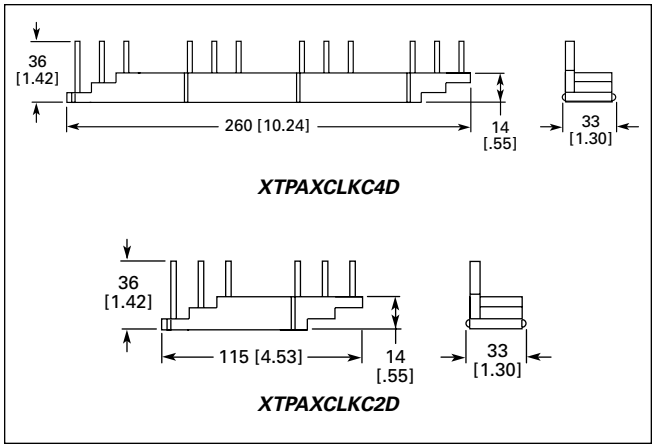


Figure B-118. Three-Phase Commoning Link — XTPAXCLKC4D and XTPAXCLKC2D (Approximate Dimensions in mm [in])

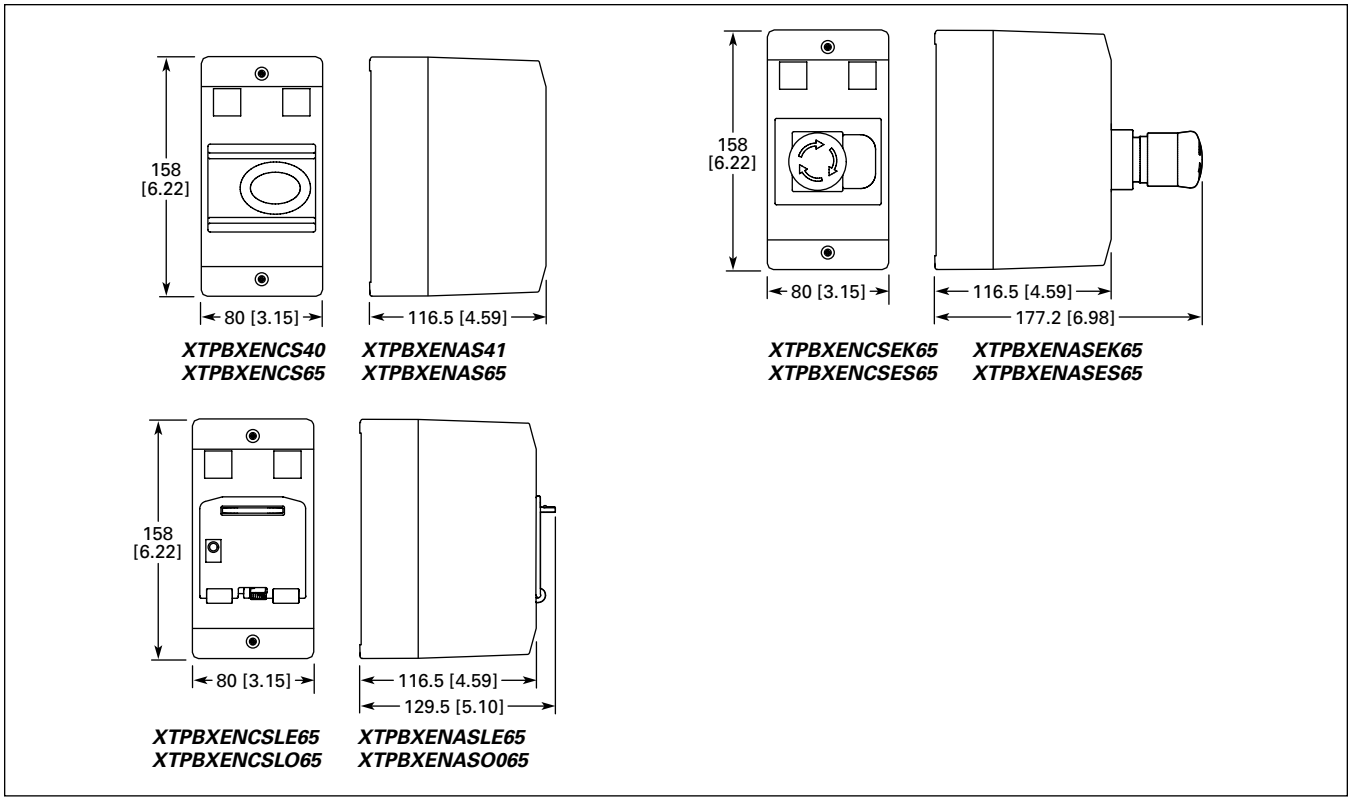


Figure B-119. Insulated Enclosures for Surface Mounting of XTPB Manual Motor Protectors (Approximate Dimensions in mm [in])

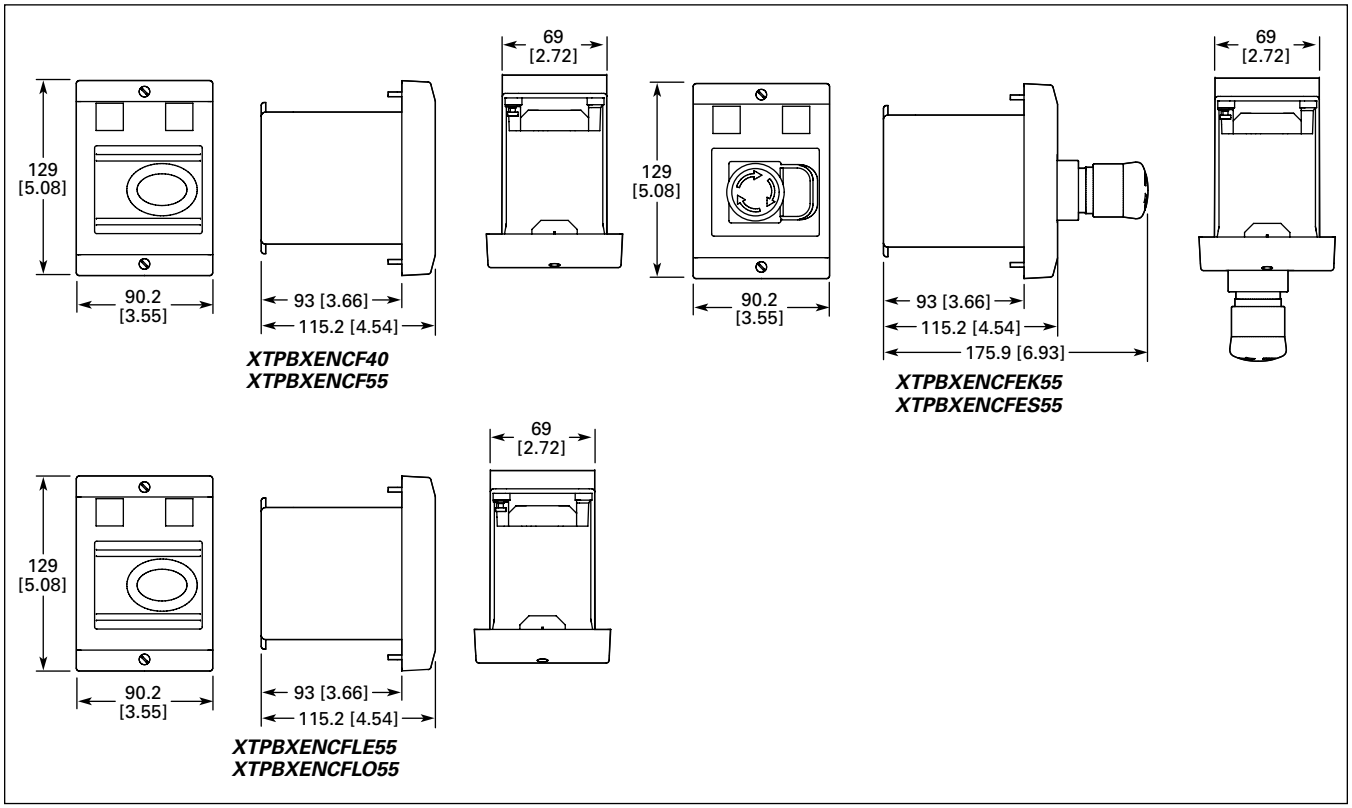


Figure B-120. Insulated Enclosures for Flush Mounting of XTPB Manual Motor Protectors (Approximate Dimensions in mm [in])

B

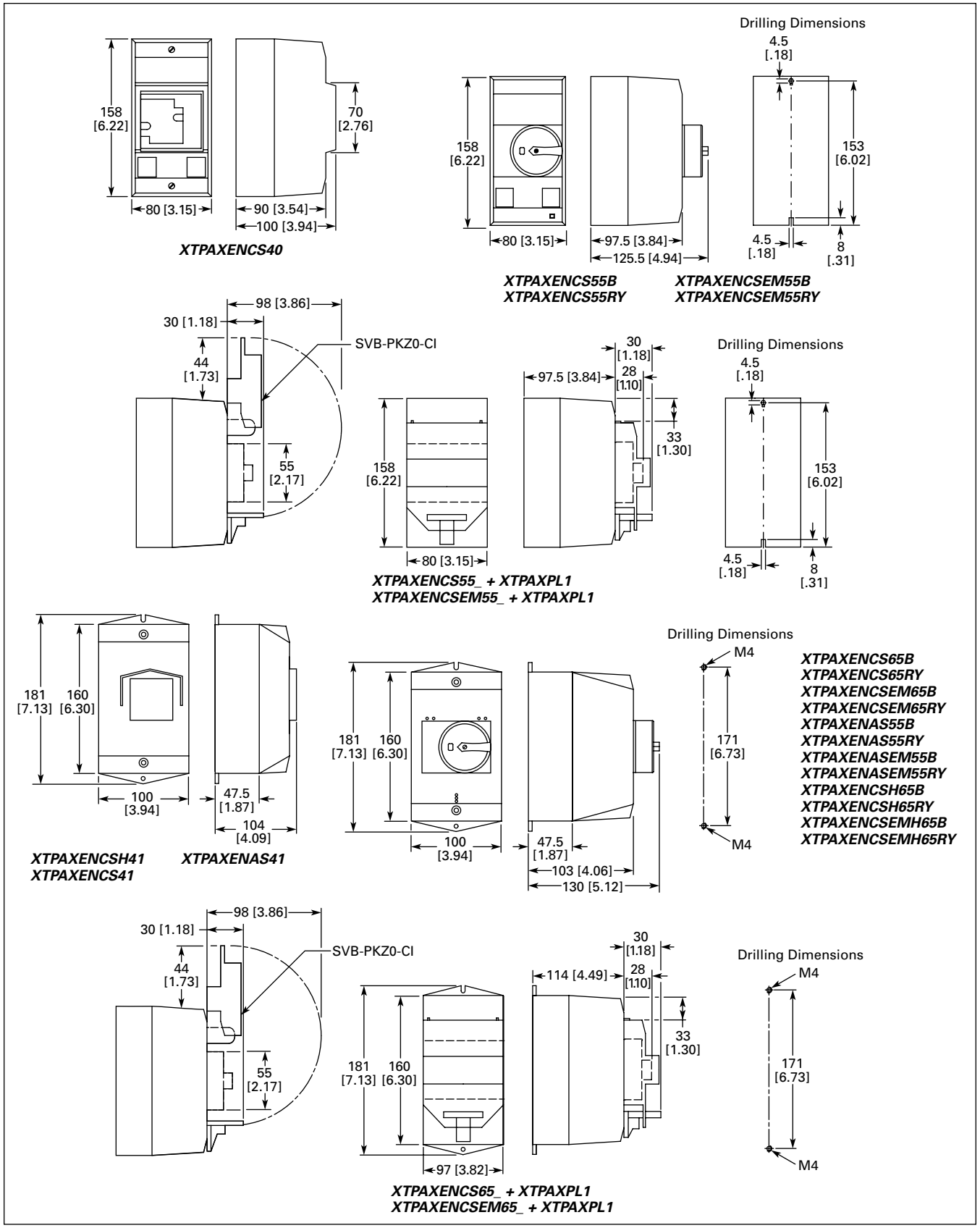
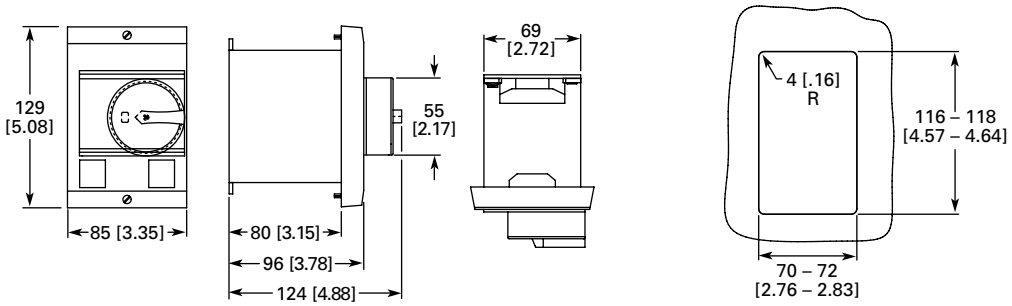
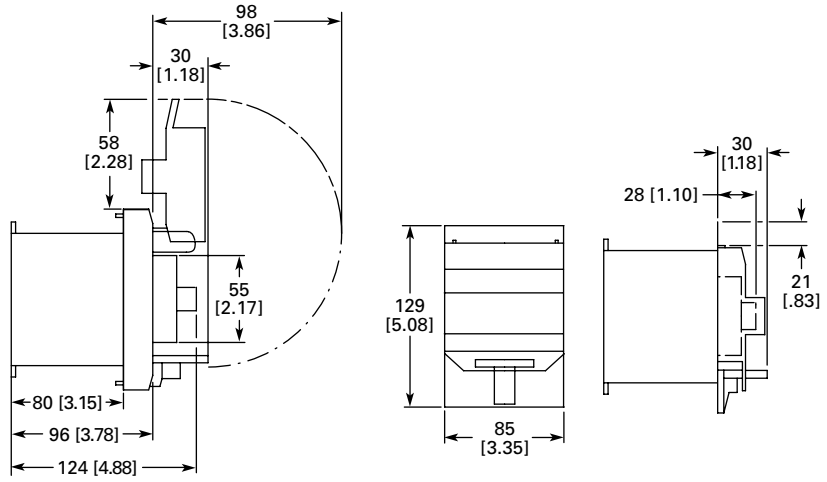


Figure B-121. Insulated Enclosures for Surface Mounting of XTPR...B Manual Motor Protectors (Approximate Dimensions in mm [in])



XTPAXENCF40
XTPAXENCF55B
XTPAXENCF55RY

Mounting Cutout XTPAXENCF..



XTPAXENCF55_ + XTPAXPL3

Figure B-122. Insulated Enclosures for Flush Mounting of XTPR...B Manual Motor Protectors (Approximate Dimensions in mm [in])

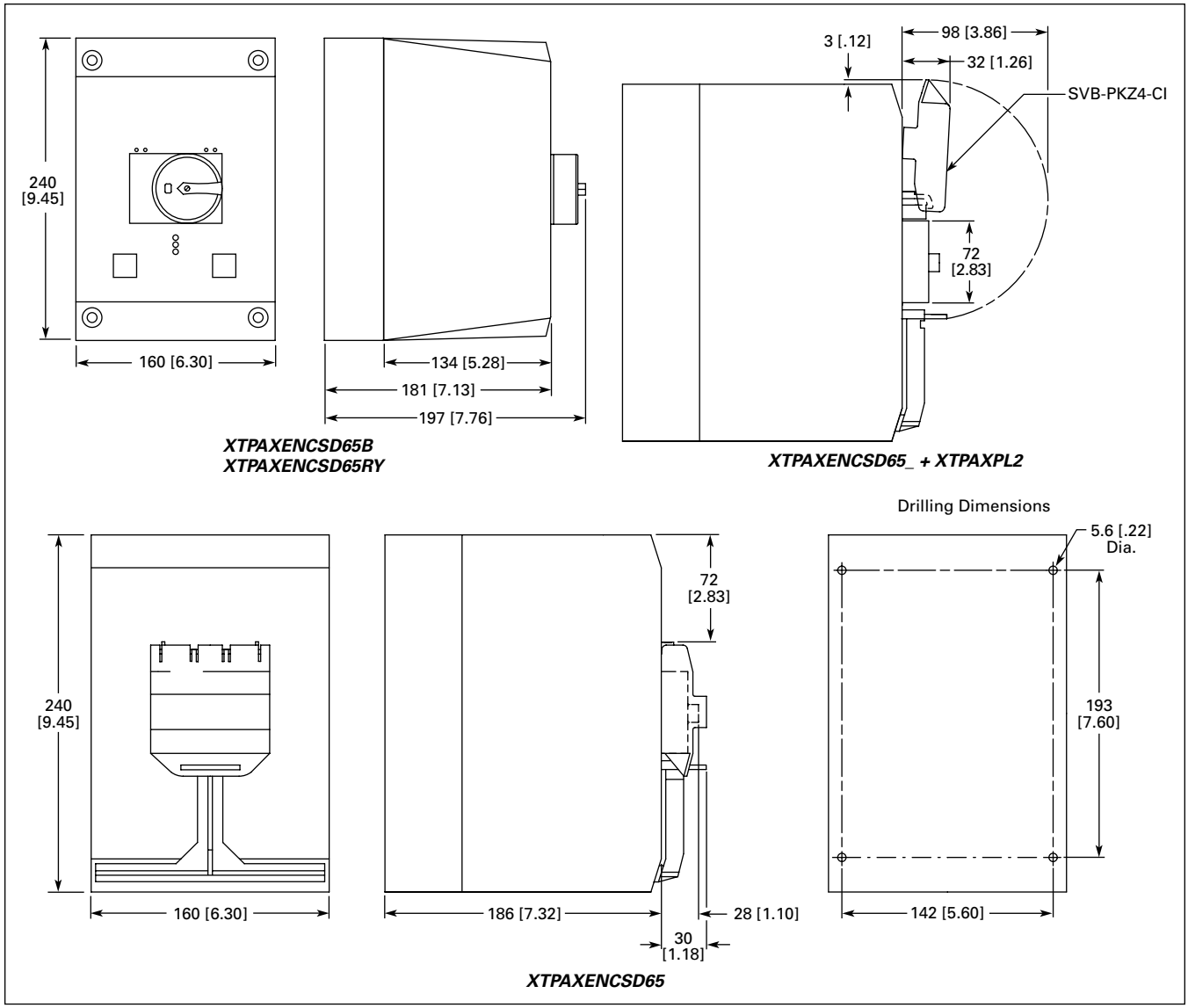


Figure B-123. Insulated Enclosures for Surface Mounting of XTPR...D Manual Motor Protectors (Approximate Dimensions in mm [in])

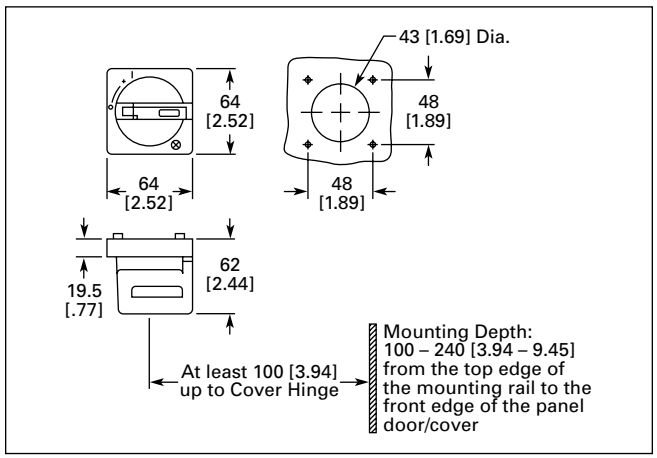


**Figure B-124. Rotary Handle Mechanism — XTPAXRHM...
(Approximate Dimensions in mm [in])**

Contents

XT Combination Motor Controller and Manual Motor Controller

Product Description

The new Cutler-Hammer® ***XT*** IEC Open Non-reversing and Reversing Manual Motor Controllers from Eaton's electrical business combine a Manual Motor Protector with an IEC Contactor(s) to provide a complete motor protection solution by combining motor disconnect function, thermal overload protection, magnetic short circuit protection and remote control operation in one compact, assembled unit. These assembled Manual Motor Controllers cover motors with FLA ratings from 0.10A to 63A.

The UL 508 Type F labeled Combination Motor Controller (CMC) includes a Line Side Adapter (LSA). These assembled Combination Motor Controllers cover motors with FLA ratings from 0.10A to 52A.

Application Description

The ***XT*** IEC Non-reversing and Reversing Manual and Combination Motor Controllers can be used in the following applications:

XTSC and XTSR

- Manual Motor Controller for Single and Multi Motor Panels — The preassembled ***XT*** Manual Motor Controllers (MMC) combine a Manual Motor Protector, a Wiring Connector Link and IEC Contactor. MMCs can also be field installed with separate MMP, WCL and Contactor(s). An IEC magnetic contactor has been added to allow for remote operation of the motor circuit.

XTFC and XTFR

- Combination Motor Controller (UL 508, Type F), for Single and Multi Motor Panels — The preassembled IEC Combination Motor Controllers combine a Line Side Adapter, Manual Motor Protector, Wiring Connector Link and IEC Contactor. The XTPR Manual Motor Protectors are UL listed as UL 508, Type E Self-Protected Manual Combination Starters. This UL listing allows these devices to be used in motor circuits without having to add separate branch short circuit protection. An IEC magnetic contactor has been added to allow for remote operation of the motor circuit.
- Group Motor Installations — Since the Manual Motor Protectors (Manual Combination Starters) are UL listed for Group Motor Installations, the IEC Manual Motor Controllers provide a compact, assembled package for Group Motor Installations up to 600V.

For Group Installations (in-panel SCPD) applying the traditional 1/3 tap rule, the Manual Motor Protectors and Combination Motor Controllers July be used on 480V Delta systems along with 480Y/277V and 600Y/347V slash rated Wye systems. For Group Installations, applying the more recent 1/10 tap conductor rule, a maximum 240V Delta is permitted or 480Y/277V and 600Y/347V slash rated Wye systems.

For actual UL 508 Type E/F applications (out-of-panel upstream feeder Short-Circuit Protective Device [SCPD] only), a maximum 240V Delta is permitted or 480Y/277V and 600Y/347V slash rated Wye systems.

For Manual "At Motor" Disconnect applications, a maximum 240V Delta is permitted or 480Y/277V and 600Y/347V slash rated Wye systems.

B

Features

- ON/OFF rotary handle with lockout provision
- Visible trip indication
- Test trip function
- Motor applications from 0.10A to 63A
- Class 10 overload protection
- Built-in heater and magnetic trip elements to protect the motor
- Phase loss sensitivity
- Type 2 coordination
- Ambient compensated up to 55°C [140°F]
- Control inputs located at front of starter for easy access and wiring
- Wide range of coils
- DIN Rail mount — XTSC...BB_
- Mounting plates — XTSC...BC_, XTSC...D motor controllers
- Adjustment dial for setting motor FLA
- Short circuit trip at 14 times the maximum setting of the FLA adjustment dial
- UL 508 Type F CMC High Fault Short Circuit Ratings: Refer to **Table B-189**.
- 1NO-1NC Auxiliary Contact as standard on Manual Motor Controller and Combination Motor Controller

Standards and Certifications

UL 508 Type F Combination Motor Controller

- IEC Type 2 Approved per IEC 60947-4-1
- UL Listed File No. E245398
- CE Mark

Note: For Type 2 Coordination of MMCs, see **Tables B-190** through **B-192** on **Pages B-162** and **B-163**.

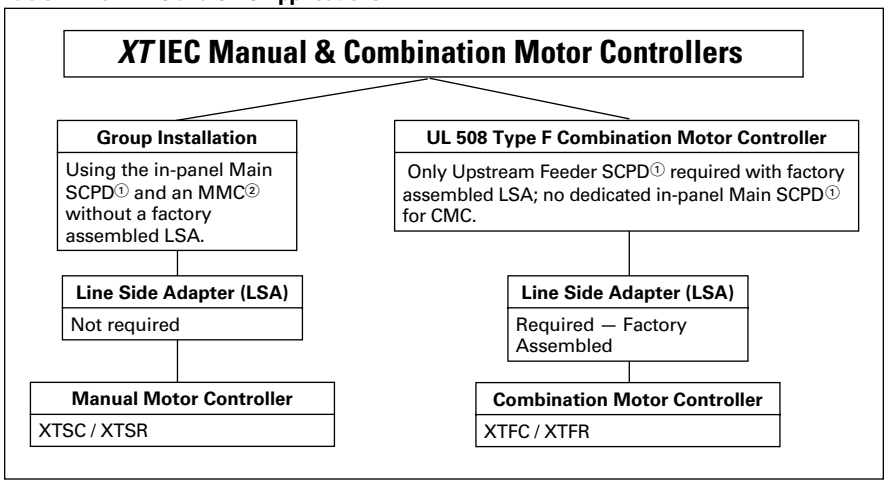
Protection in Different Controller Types

A UL 508 Type E Self-protected Manual Combination Starter/Motor Controller consists of a single device having integral short circuit protection, a main set of contacts, motor overload protection, and July also include a UL listed Line Side Adapter (See **Table B-178**). This type of controller is a legitimate short circuit protective device and disconnect means for the downstream motor. It does require an upstream feeder short circuit protective device, but does not require a dedicated branch circuit protection or a disconnect means if used with a Line Side Adapter. A UL 508 Type E rating means that the unit clears a fault and does not experience any welding of the power poles. A UL 508 Type E self-protected manual motor controller will remain fully functional should a short circuit within its ratings occur. *E.g.* XTPR.

*An **XT** UL 508 Type F Self-protected Combination Motor Controller* consists of a UL Listed Type E Self-protected Manual Combination Starter/Motor Controller, a UL Listed Contactor, and a UL Listed Line Side Adapter (See **Table B-178**). While the UL 508 Type E self-protected manual motor protector of this combination motor controller device is a legitimate short circuit protective device and disconnect means for the downstream motor, the contactor is *not* "self-protected." *E.g.* XTFC, XTFR.

In addition, as a complete assembly or modular components, the device should have Type 2 Coordination certification. Type 2 Coordination means the Starter or the Controller must exhibit little or no damage following a major short circuit fault and should be able to be returned to proper service without replacing any parts.

Table B-178. MMC and CMC Applications



① SCPD = Short Circuit Protective Device (Circuit Breaker, Fuses).
② MMC = Manual Motor Controller

Reference: Technical Paper AP03402001E.

Note: Line Side Adapters are not required for non-U.S. applications. Most countries outside of the U.S. classify the MMP as a thermal magnetic circuit breaker.

Catalogue Number Selection

Table B-179. Combination Motor Controllers — Catalogue Numbering System

XT SC 012 B B A

Design
XT = ***XT*** IEC Power Control

Type
SC = Manual Motor Controller — FVNR
SR = Manual Motor Controller — FVR
FC = Combination Motor Controller, UL 508 Type F — FVNR
FR = Combination Motor Controller, UL 508 Type F — FVR

Rated Current of MMP	
B-Frame	**D-Frame**
P16 = 0.16A	**016** = 16A
P25 = 0.25A	**025** = 25A
P40 = 0.40A	**032** = 32A
P63 = 0.63A	**040** = 40A
001 = 1A	**050** = 50A
1P6 = 1.6A	**058** = 58A
2P5 = 2.5A	**063** = 63A
004 = 4A	
6P3 = 6.3A	
010 = 10A	
012 = 12A	
016 = 16A	
020 = 20A	
025 = 25A	
032 = 32A	

Coil Voltage
A = 110V 50 Hz, 120V 60 Hz
B = 220V 50 Hz, 240V 60 Hz
C = 415V 50 Hz, 480V 60 Hz
D = 550V 50 Hz, 600V 60 Hz
E = 208V 50 Hz
F = 230V 50 Hz
G = 190V 50 Hz, 220V 60 Hz
H = 240V 50 Hz, 277V 60 Hz
L = 380V 50 Hz, 440V 60 Hz
N = 400V 50 Hz
P = 380V 60 Hz
R = 12V 50/60 Hz
T = 24V 50/60 Hz
U = 24V 50 Hz
W = 42V 50 Hz, 48V 60 Hz
Y = 48V 50 Hz
AD = 120V DC
BD = 220V DC
RD = 12V DC
TD = 24V DC
WD = 48V DC

Frame Size — Contactor
B = 45 mm, 7 to 15A
C = 45 mm, 18 to 32A
D = 55 mm, 40 to 65A

Frame Size — MMP
B = 45 mm, 0.1 to 32A
D = 55 mm, 16 to 63A

XTSC FVNR
Frame B MMP
& Frame B Contactor

XTSC FVNR
Frame B MMP
& Frame C Contactor

XTSC FVNR
Frame D MMP
& Frame C Contactor

XTSC FVNR
Frame D MMP
& Frame D Contactor

XTSR FVR
Frame B MMP
& (2) Frame B Contactors

XTSR FVR
Frame B MMP
& (2) Frame C Contactors

XTSR FVR
Frame D MMP
& (2) Frame C Contactors

XTSR FVR
Frame D MMP
& (2) Frame D Contactors

B

Product Selection

Table B-180. XTSC and XTSR Manual Motor Controllers (MMC) / Starter Combinations

Factory Assembled Motor Protective Device with Thermal and Magnetic Trip + Contactor															
FLA Adjustment Range / Overload Release — I_r (Amps)	Short-Circuit Release — I_{rm} (Amps)	Maximum Motor Ratings — P ①								Assembled Manual Motor Controller ③					
		Maximum Motor kW Rating AC-3 — P (kW)				Maximum hp Rating — P (hp)									
		Three-Phase				Three-Phase				Non-reversing			Reversing		
		220 – 240V	380 – 415V	500V	660 – 690V	200V	240V	480V	600V	Catalogue Number	Price AC Coil	Price DC Coil	Catalogue Number	Price AC Coil	Price DC Coil
Frame B MMP + Frame B Contactor															
0.1 – 0.16	3.2	—	—	—	0.06	②	②	1/2	1/2	**XTSCP16BB_**			**XTSRP16BB_**		
0.16 – 0.25	3.5	—	0.06	0.06	0.12	②	②	1/2	1/2	**XTSCP25BB_**			**XTSRP25BB_**		
0.25 – 0.4	5.6	0.06	0.09	0.12	0.18	②	②	1/2	1/2	**XTSCP40BB_**			**XTSRP40BB_**		
0.4 – 0.63	8.82	0.09	0.18	0.25	0.25	②	②	1/2	1/2	**XTSCP63BB_**			**XTSRP63BB_**		
0.63 – 1	14	0.12	0.25	0.37	0.55	②	②	1/2	1/2	**XTSC001BB_**			**XTSR001BB_**		
1 – 1.6	22.4	0.25	0.55	0.75	1.1	②	②	3/4	1	**XTSC1P6BB_**			**XTSR1P6BB_**		
1.6 – 2.5	35	0.37	0.75	1.1	1.5	1/2	1/2	1	1-1/2	**XTSC2P5BB_**			**XTSR2P5BB_**		
2.5 – 4	56	0.75	1.5	2.2	3	1	1	2	3	**XTSC004BB_**			**XTSR004BB_**		
4 – 6.3	88.2	1.1	2.2	3	4	1-1/2	1-1/2	3	5	**XTSC6P3BB_**			**XTSR6P3BB_**		
6.3 – 10	140	2.2	4	4	7.5	3	3	7-1/2	10	**XTSC010BB_**			**XTSR010BB_**		
8 – 12	168	3	5.5	5.5	11	3	3	7-1/2	10	**XTSC012BB_**			**XTSR012BB_**		
10 – 16	224	4	7.5	9	12.5	3	3	10	10	**XTSC016BB_**			—		
Frame B MMP + Frame C Contactor															
10 – 16	224	4	7.5	9	12.5	3	3	10	10	**XTSC016BC_**			**XTSR016BC_**		
16 – 20	280	5.5	9	12.5	15	5	5	10	15	**XTSC020BC_**			**XTSR020BC_**		
20 – 25	350	5.5	11	15	22	5	7-1/2	15	20	**XTSC025BC_**			**XTSR025BC_**		
25 – 32	448	7.5	15	22	30	7-1/2	10	20	25	**XTSC032BC_**			**XTSR032BC_**		
Frame D MMP + Frame C Contactor															
10 – 16	224	4	7.5	9	12.5	3	5	10	15	**XTSC016DC_**			**XTSR016DC_**		
16 – 25	350	5.5	12.5	12.5	22	7-1/2	7-1/2	20	25	**XTSC025DC_**			**XTSR025DC_**		
25 – 32	448	7.5	15	17.5	22	10	10	25	30	**XTSC032DC_**			**XTSR032DC_**		
Frame D MMP + Frame D Contactor															
32 – 40	560	11	20	22	30	10	—	30	30	**XTSC040DD_**			**XTSR040DD_**		
40 – 50	700	14	25	30	45	15	15	30	40	**XTSC050DD_**			**XTSR050DD_**		
50 – 58	812	17	30	37	55	—	—	40	—	**XTSC058DD_**			**XTSR058DD_**		
55 – 63	882	18.5	34	37	55	—	—	40	—	**XTSC063DD_**			**XTSR063DD_**		

① Select Manual Motor Protectors by full load amperes. Maximum Motor Ratings (kW, hp) are for reference only. For additional voltages not listed, see **Table B-185** on **Page B-153**.

② In this range, calculate motor rating according to rated current. Specified values to NEC Table 430-150.

③ Underscore (_) indicates Magnetic Coil Suffix required. See **Table B-182** on **Page B-150**.

Notes:

The assembled Manual Motor Controller (MMC) consists of an XTPR Manual Motor Protector (MMP) and an XTCE contactor. For Frame B MMP + Frame B Contactor assemblies, the XTSC and XTSR can be mounted directly on DIN rail without an adapter. The contactors are supported mechanically with a mechanical connection element (included in XTPAXTPCB, XTPAXRPCRB). For 16A and above, the assembly is mounted via a DIN Rail Adapter Plate (XTPAXTPCPC, XTPAXTPCPD) and the electrical connection is made with electrical contact modules (XTPAXECMC, XTPAXECMD), both included in XTPAXTPCC and XTPAXTPCD. For detailed component lists, see **Table B-186**, **Page B-154**.

Service Factor Settings: Setting I_r of current scale in dependence of load factor:

SF = 1.15 ➔ $I_r = 1 \times I_{n\ mot}$

SF = 1 ➔ $I_r = 0.9 \times I_{n\ mot}$

Single-phasing sensitivity to IEC/EN 60947-4-1, VDE 0660 Part 102.

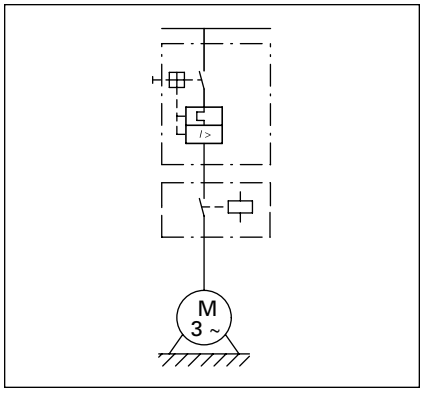


Figure B-125. XTSC Manual Motor Controller

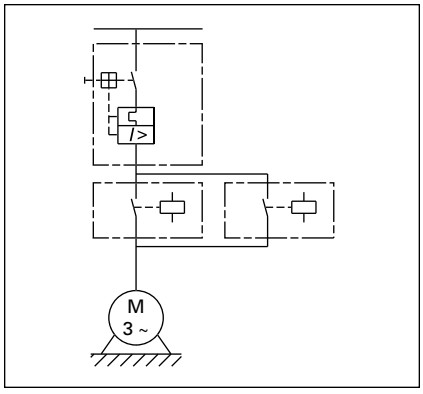


Figure B-126. XTSR Manual Motor Controller

Accessories ..... **Page B-118**
Technical Data ..... **Page B-153**
Discount Symbol **MC7**

Table B-181. XTFC and XTFR Combination Motor Controllers (CMC), UL508 Type F

Factory Assembled Motor Protective Device with Thermal and Magnetic Trip + Contactor + Required Line Side Adapter															
FLA Adjustment Range / Overload Release — I_r (Amps)	Short-Circuit Release — I_{rm} (Amps)	Maximum Motor Ratings ①								Assembled Combination Motor Controller ③					
		Maximum Motor kW Rating AC-3 — P (kW)				Maximum hp Rating — P (hp)									
		Three-Phase				Three-Phase				Non-reversing			Reversing		
		220 – 240V	380 – 415V	500V	660 – 690V	200V	240V	480V	600V	Catalogue Number	Price AC Coil	Price DC Coil	Catalogue Number	Price AC Coil	Price DC Coil
Frame B MMP + Frame B Contactor															
0.1 – 0.16	2.2	—	—	—	0.06	②	②	1/2	1/2	**XTFCP16BB_**			**XTFRP16BB_**		
0.16 – 0.25	3.5	—	0.06	0.06	0.12	②	②	1/2	1/2	**XTFCP25BB_**			**XTFRP25BB_**		
0.25 – 0.4	5.6	0.06	0.09	0.12	0.18	②	②	1/2	1/2	**XTFCP40BB_**			**XTFRP40BB_**		
0.4 – 0.63	8.82	0.09	0.18	0.25	0.25	②	②	1/2	1/2	**XTFCP63BB_**			**XTFRP63BB_**		
0.63 – 1	14	0.12	0.25	0.37	0.55	②	②	1/2	1/2	**XTFC001BB_**			**XTFR001BB_**		
1 – 1.6	22.4	0.25	0.55	0.75	1.1	②	②	3/4	1	**XTFC1P6BB_**			**XTFR1P6BB_**		
1.6 – 2.5	35	0.37	0.75	1.1	1.5	1/2	1/2	1	1-1/2	**XTFC2P5BB_**			**XTFR2P5BB_**		
2.5 – 4	56	0.75	1.5	2.2	3	1	1	2	3	**XTFC004BB_**			**XTFR004BB_**		
4 – 6.3	88.2	1.1	2.2	3	4	1-1/2	1-1/2	3	5	**XTFC6P3BB_**			**XTFR6P3BB_**		
6.3 – 10	140	2.2	4	4	7.5	3	3	7-1/2	10	**XTFC010BB_**			**XTFR010BB_**		
8 – 12	168	3	5.5	5.5	11	3	3	7-1/2	—	**XTFC012BB_**			**XTFR012BB_**		
10 – 16	224	4	7.5	9	12.5	3	3	10	—	**XTFC016BB_**			—		
Frame B MMP + Frame C Contactor															
10 – 16	224	4	7.5	9	12.5	3	5	10	—	**XTFC016BC_**			**XTFR016BC_**		
16 – 20	280	5.5	9	12.5	15	5	5	10	—	**XTFC020BC_**			**XTFR020BC_**		
20 – 25	350	5.5	11	15	22	5	7-1/2	15	—	**XTFC025BC_**			**XTFR025BC_**		
25 – 32	448	7.5	15	22	30	7-1/2	10	20	—	**XTFC032BC_**			**XTFR032BC_**		
Frame D MMP + Frame C Contactor															
10 – 16	224	4	7.5	9	12.5	3	5	10	15	**XTFC016DC_**			**XTFR016DC_**		
16 – 25	350	5.5	12.5	12.5	22	7-1/2	7-1/2	20	25	**XTFC025DC_**			**XTFR025DC_**		
25 – 32	448	7.5	15	17.5	22	10	10	25	30	**XTFC032DC_**			**XTFR032DC_**		
Frame D MMP + Frame D Contactor															
32 – 40	560	11	20	22	30	10	—	30	30	**XTFC040DD_**			**XTFR040DD_**		

① Select Combination Motor Controllers by full load amperes. Maximum Motor Ratings (kW, hp) are for reference only. For additional voltages not listed, see **Table B-185** on **Page B-153**.

② In this range, calculate motor rating according to rated current. Specified values to NEC Table 430-150.

③ Underscore (_) indicates Magnetic Coil Suffix required. See **Table B-182** on **Page B-150**.

Notes:

The assembled Combination Motor Controller (CMC) consists of an XTPR Manual Motor Protector (MMP) and an XTCE contactor and a required Line Side Adapter. For Frame B MMP + Frame B Contactor assemblies, the XTFC and XTFR can be mounted directly on DIN rail without an adapter. The contactors are supported mechanically with a mechanical connection element (included in XTPAXTPCB, XTPAXRPCRB). For 16A and above, the assembly is mounted via a DIN Rail Adapter Plate (XTPAXTPCPC, XTPAXTPCPD) and the electrical connection is made with electrical contact modules (XTPAXECMC, XTPAXECMD), both included in XTPAXTPCC and XTPAXTPCD. For detailed component lists, see **Table B-187**, **Page B-155**.

Service Factor Settings: Setting I_r of current scale in dependence of load factor:

SF = 1.15 ➔ $I_r = 1 \times I_{n\ mot}$

SF = 1 ➔ $I_r = 0.9 \times I_{n\ mot}$

Single-phasing sensitivity to IEC/EN 60947-4-1, VDE 0660 Part 102.

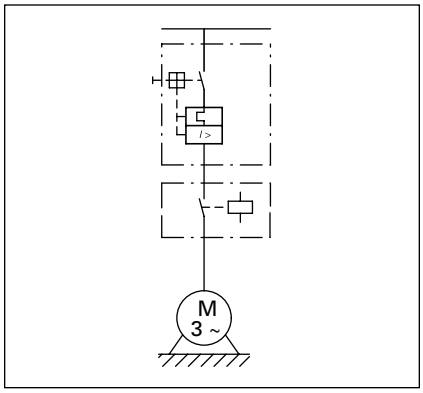


Figure B-127. XTFC Combination Motor Controller

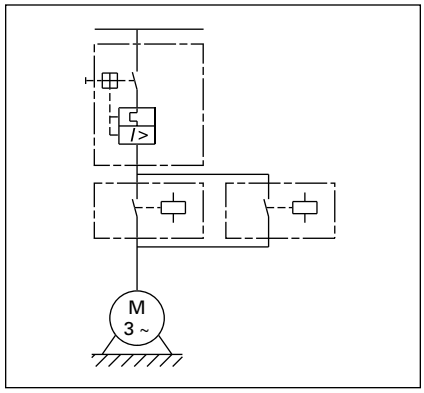


Figure B-128. XTFR Combination Motor Controller

Discount Symbol **MC7**

B

Table B-182. AC and DC Coil Suffixes

Coil Voltage	Suffix Code
Frame B Contactors	
110V 50 Hz, 120V 60 Hz	**A**
220V 50 Hz, 240V 60 Hz	**B**
230V 50 Hz	**F**
24V 50/60 Hz	**T**
24V DC	**TD**
415V 50 Hz, 480V 60 Hz	**C**
550V 50 Hz, 600V 60 Hz	**D**
208V 60 Hz	**E**
190V 50 Hz, 220V 60 Hz	**G**
240V 50 Hz, 277V 60 Hz	**H**
380V 50 Hz, 440V 60 Hz	**L**
400V 50 Hz	**N**
380V 60 Hz	**P**
12V 50/60 Hz	**R**
24V 50 Hz	**U**
42V 50 Hz, 48V 60 Hz	**W**
48V 50 Hz	**Y**
120V DC	**AD**
220V DC	**BD**
12V DC	**RD**
48V DC	**WD**

Coil Voltage	Suffix Code
Frame C and D Contactors	
110V 50 Hz, 120V 60 Hz	**A**
220V 50 Hz, 240V 60 Hz	**B**
230V 50 Hz	**F**
24V 50/60 Hz	**T**
24 – 27V DC	**TD**
415V 50 Hz, 480V 60 Hz	**C**
550V 50 Hz, 600V 60 Hz	**D**
208V 60 Hz	**E**
190V 50 Hz, 220V 60 Hz	**G**
240V 50 Hz, 277V 60 Hz	**H**
380V 50 Hz, 440V 60 Hz	**L**
400V 50 Hz	**N**
380V 60 Hz	**P**
12V 50/60 Hz	**R**
24V 50 Hz	**U**
42V 50 Hz, 48V 60 Hz	**W**
48V 50 Hz	**Y**
110 – 130V DC	**AD**
200 – 240V DC	**BD**
12 – 14V DC	**RD**
48 – 60V DC	**WD**

Accessories

Line Side Adapters

Line Side Adapters are required for use with XTPR MMPs only when used as Type E Self-Protected Manual Combination Starters or as part of XTFC or XTFR Type F Combination Motor Controllers. Not required for Group Installation.

Table B-183. Line Side Adapters

	Description	Catalogue Number	Price
	For use with Frame B MMPs (up to 32A)	**XTPAXLSA**	
	For use with Frame D MMPs (up to 40A)	**XTPAXLSAD**	

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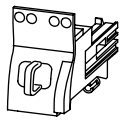
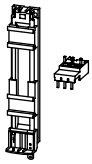
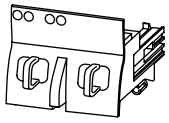
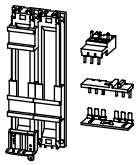
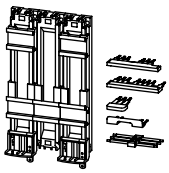
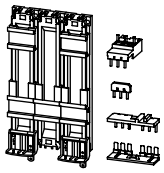
Combination Connection Kits

Combination Connection Kits include the necessary components to field assemble a Manual Motor Controller with an MMP (XTPR) and Contactor (XTCE).

Table B-184. Combination Connection Kits

	For Use with…	Description	Std. Pack	Catalogue Number	Price
Non-reversing Starters					
	XTPR...B + XTCE...B	Comprised of: ■ Mechanical connection element for XTPR...B and contactor ■ Main current wiring between XTPR...B and contactor in tool-less plug connection ■ Cable guidance Use as contactor auxiliary switch XTCEXFAT_. Control cable guidance: max. 6 cables up to 2.5 mm^2 external diameter or 4 cables up to 3.5 mm^2 external diameter.	1	**XTPAXTPCB**	
	XTPR...B + XTCE...C	Comprised of: ■ DIN rail adapter plate ■ Main current wiring between XTPR and contactor	1	**XTPAXTPCC**	
	XTPR...D + XTCE...D		1	**XTPAXTPCD**	
Reversing Starters					
	XTPR...B + XTCE...B01_	Comprised of: ■ Mechanical connection element for XTPR...B and contactor ■ Reversing starter main current wiring in tool-less plug connection ■ Control cables for electrical interlocking in tool-less plug connection: – K1M: A1 – K2M: 21 – K1M: 21 – K2M: A1 – K1M: A2 – K2M: A2 ■ Cable guidance Use as contactor auxiliary switch XTCEXFAT_. Control cable guidance: max. 6 cables up to 2.5 mm^2 external diameter or 4 cables up to 3.5 mm^2 external diameter.	1	**XTPAXTPCRB**	
	XTPR...B + XTCE...C	Comprised of: ■ DIN rail adapter plate ■ Reversing starter main current wiring	1	**XTPAXTPCRC**	
Star-Delta Starter Sets					
	XTPR...B + XTCE...B	Comprised of: ■ DIN rail adapter plate ■ Main current wiring between XTPR...B and contactor ■ Electrical interlock between delta and star contactor ■ Use as contactor auxiliary switch XTCEXFAT_	1	**XTPAXSDSB**	
	XTPR...B + XTCE...C	Comprised of: ■ DIN rail adapter plate ■ Main current wiring between XTPR...B and contactor	1	**XTPAXSDSC**	

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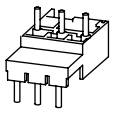
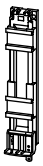
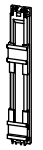
B

Combination Connection Kits

Table B-184. Combination Connection Kits (Continued)

	For Use with…	Description	Std. Pack	Catalogue Number	Price ①
Electric Contact Module					
	XTPR...B + XTCE...C	Comprised of: ■ Main current wiring between XTPR...B and contactor ■ Use only in combination with busbar adapter	5	**XTPAXECMC**	
	XTPR...D + XTCE...D	Comprised of: ■ Main current wiring between XTPR...D and contactor ■ Use only in combination with busbar adapter	5	**XTPAXECMD**	
DIN Rail Adapter Plates					
	XTPAXTPCB XTPAXTPCRB	Comprised of: ■ 45 mm wide adapter plate with one DIN rail ■ Connection element for side-by-side positioning of further plates	4	**XTPAXTPCPB**	
	XTPR...B + XTCE...C XTPAXECMC	Comprised of: ■ 45 mm wide adapter plate with two DIN rails ■ Connection element for side-by-side positioning of further plates	4	**XTPAXTPCRPB**	
	XTPAXECMD XTPR...D + XTCE...C XTPR...D + XTCE...D	Comprised of: ■ 55 mm wide adapter plate with two DIN rails ■ Connection cams for further plates ■ For use with reversing and star-delta starters	4	**XTPAXTPCPD**	
Lateral Module					
	—	■ Can be grouped on the DIN rail adapter ■ Expansion of the mounting width by 9 mm	10	**XTPAXLM**	
Connection Element					
	—	■ For connection of several DIN rail adapters	50	**XTPAXCNE**	

① Orders must be placed in multiples of package quantity listed.

Discount Symbol **MC7**

Technical Data and Specifications

Table B-185. Manual and Combination Motor Controllers Motor Ratings

Assembled Controller ③		FLA Adjustment Range / Overload Release — I_r (Amps)	Maximum Motor Ratings — P ①														
			Maximum Motor kW Rating AC-3 — P (kW)					Maximum hp Rating — P (hp)									
			Three-Phase					Single-Phase				Three-Phase					
Non-reversing	Reversing		220 – 240V	380 – 415V	440V	500V	660 – 690V	115V	200V	208V	240V	200V	208V	240V	480V	600V	
XTSC & XTSR Manual Motor Controllers (MMC) / Starter Combinations																	
XTSC & XTSR Frame B MMP + Frame B Contactor																	
XTSCP16BB_	XTSRP16BB_	0.1 – 0.16	—	—	—	—	0.06	②	②	②	②	②	②	②	1/2	1/2	
XTSCP25BB_	XTSRP25BB_	0.16 – 0.25	—	0.06	0.06	0.06	0.12	②	②	②	②	②	②	②	1/2	1/2	
XTSCP40BB_	XTSRP40BB_	0.25 – 0.4	0.06	0.09	0.12	0.12	0.18	②	②	②	②	②	②	②	1/2	1/2	
XTSCP63BB_	XTSRP63BB_	0.4 – 0.63	0.09	0.18	0.18	0.25	0.25	②	②	②	②	②	②	②	1/2	1/2	
XTSC001BB_	XTSR001BB_	0.63 – 1	0.12	0.25	0.25	0.37	0.55	②	②	②	②	②	②	②	1/2	1/2	
XTSC1P6BB_	XTSR1P6BB_	1 – 1.6	0.25	0.55	0.55	0.75	1.1	②	②	②	1/10	②	②	②	3/4	1	
XTSC2P5BB_	XTSR2P5BB_	1.6 – 2.5	0.37	0.75	1.1	1.1	1.5	—	1/8	1/8	1/6	1/2	1/2	1/2	1	1-1/2	
XTSC004BB_	XTSR004BB_	2.5 – 4	0.75	1.5	1.5	2.2	3	1/8	1/4	1/4	1/3	1	1	1	2	3	
XTSC6P3BB_	XTSR6P3BB_	4 – 6.3	1.1	2.2	3	3	4	1/4	1/2	1/2	1/2	1-1/2	1-1/2	1-1/2	3	5	
XTSC010BB_	XTSR010BB_	6.3 – 10	2.2	4	4	4	7.5	1/2	1	1	1-1/2	3	3	3	7-1/2	10	
XTSC012BB_	XTSR012BB_	8 – 12	3	5.5	5.5	5.5	11	1/2	1-1/2	1-1/2	2	3	3	3	7-1/2	10	
XTSC016BB_	—	10 – 16	4	7.5	9	9	12.5	1	2	2	2	3	3	3	10	10	
XTSC & XTSR Frame B MMP + Frame C Contactor																	
XTSC016BC_	XTSR016BC_	10 – 16	4	7.5	9	9	12.5	1	2	2	2	3	3	5	10	10	
XTSC020BC_	XTSR020BC_	16 – 20	5.5	9	11	12.5	15	1-1/2	3	3	3	5	5	5	10	15	
XTSC025BC_	XTSR025BC_	20 – 25	5.5	11	12.5	15	22	1-1/2	3	3	3	5	5	7-1/2	15	20	
XTSC032BC_	XTSR032BC_	25 – 32	7.5	15	15	22	30	2	3	3	5	7-1/2	7-1/2	10	20	25	
XTSC & XTSR Frame D MMP + Frame C Contactor																	
XTSC016DC_	XTSR016DC_	10 – 16	4	7.5	9	9	12.5	1	2	2	3	3	5	5	10	15	
XTSC025DC_	XTSR025DC_	16 – 25	5.5	12.5	12.5	12.5	22	2	3	3	3	7-1/2	7-1/2	7-1/2	20	25	
XTSC032DC_	XTSR032DC_	25 – 32	7.5	15	17.5	17.5	22	3	5	5	5	10	10	10	25	30	
XTSC & XTSR Frame D MMP + Frame D Contactor																	
XTSC040DD_	XTSR040DD_	32 – 40	11	20	22	22	30	3	5	—	7-1/2	10	—	—	30	30	
XTSC050DD_	XTSR050DD_	40 – 50	14	25	30	30	45	—	7-1/2	7-1/2	—	15	15	15	30	40	
XTSC058DD_	XTSR058DD_	50 – 58	17	30	37	37	55	—	—	—	10	—	—	—	40	—	
XTSC063DD_	XTSR063DD_	55 – 63	18.5	34	37	37	55	—	—	—	—	—	—	—	40	—	
XTFC & XTFR Combination Motor Controllers (CMC), UL508 Type F																	
XTFC & XTFR Frame B MMP + Frame B Contactor																	
XTFCP16BB_	XTFRP16BB_	0.1 – 0.16	—	—	—	—	0.06	②	②	②	②	②	②	②	1/2	1/2	
XTFCP25BB_	XTFRP25BB_	0.16 – 0.25	—	0.06	0.06	0.06	0.12	②	②	②	②	②	②	②	1/2	1/2	
XTFCP40BB_	XTFRP40BB_	0.25 – 0.4	0.06	0.09	0.12	0.12	0.18	②	②	②	②	②	②	②	1/2	1/2	
XTFCP63BB_	XTFRP63BB_	0.4 – 0.63	0.09	0.18	0.18	0.25	0.25	②	②	②	②	②	②	②	1/2	1/2	
XTFC001BB_	XTFR001BB_	0.63 – 1	0.12	0.25	0.25	0.37	0.55	②	②	②	②	②	②	②	1/2	1/2	
XTFC1P6BB_	XTFR1P6BB_	1 – 1.6	0.25	0.55	0.55	0.75	1.1	②	②	②	1/10	②	②	②	3/4	1	
XTFC2P5BB_	XTFR2P5BB_	1.6 – 2.5	0.37	0.75	1.1	1.1	1.5	—	1/8	1/8	1/6	1/2	1/2	1/2	1	1-1/2	
XTFC004BB_	XTFR004BB_	2.5 – 4	0.75	1.5	1.5	2.2	3	1/8	1/4	1/4	1/3	1	1	1	2	3	
XTFC6P3BB_	XTFR6P3BB_	4 – 6.3	1.1	2.2	3	3	4	1/4	1/2	1/2	1/2	1-1/2	1-1/2	1-1/2	3	5	
XTFC010BB_	XTFR010BB_	6.3 – 10	2.2	4	4	4	7.5	1/2	1	1	1-1/2	3	3	3	7-1/2	10	
XTFC012BB_	XTFR012BB_	8 – 12	3	5.5	5.5	5.5	11	1/2	1-1/2	1-1/2	2	3	3	3	7-1/2	—	
XTFC016BB_	—	10 – 16	4	7.5	9	9	12.5	1	2	2	2	3	3	3	10	—	
XTFC & XTFR Frame B MMP + Frame C Contactor																	
XTFC016BC_	XTFR016BC_	10 – 16	4	7.5	9	9	12.5	1	2	2	2	3	3	5	10	—	
XTFC020BC_	XTFR020BC_	16 – 20	5.5	9	11	12.5	15	1-1/2	3	3	3	5	5	5	10	—	
XTFC025BC_	XTFR025BC_	20 – 25	5.5	11	12.5	15	22	1-1/2	3	3	3	5	5	7-1/2	15	—	
XTFC032BC_	XTFR032BC_	25 – 32	7.5	15	15	22	30	2	3	3	5	7-1/2	7-1/2	10	20	—	
XTFC & XTFR Frame D MMP + Frame C Contactor																	
XTFC016DC_	XTFR016DC_	10 – 16	4	7.5	9	9	12.5	1	2	2	3	3	5	5	10	15	
XTFC025DC_	XTFR025DC_	16 – 25	5.5	12.5	12.5	12.5	22	2	3	3	3	7-1/2	7-1/2	7-1/2	20	25	
XTFC032DC_	XTFR032DC_	25 – 32	7.5	15	17.5	17.5	22	3	5	5	5	10	10	10	25	30	
XTFC & XTFR Frame D MMP + Frame D Contactor																	
XTFC040DD_	XTFR040DD_	32 – 40	11	20	22	22	30	3	5	—	7-1/2	10	—	—	30	30	

① Select Manual Motor Protectors by full load amperes. Maximum Motor Ratings (kW, hp) are for reference only.

② In this range, calculate motor rating according to rated current. Specified values to NEC Table 430-150.

③ Underscore (_) indicates Magnetic Coil Suffix required. See **Table B-182** on **Page B-150**.

Notes:

Service Factor Settings: Setting I_r of current scale in dependence of load factor:

SF = 1.15 ➔ $I_r = 1 \times I_{n\ mot}$

SF = 1 ➔ $I_r = 0.9 \times I_{n\ mot}$

Single-phasing sensitivity to IEC/EN 60947-4-1, VDE 0660 Part 102.

Table B-186. XTSC and XTSR Manual Motor Controllers (MMC) / Starter Combinations — Component Bill of Material

Factory Assembled Motor Protective Device with Thermal and Magnetic Trip + Contactor					
Assembled Manual Motor Controller ①	**FLA Adjustment Range / Overload Release — I_r (Amps)**	**Component Catalogue Numbers**			
		Manual Motor Protector	**Combination Connection Kit**	**Contactor** ①	**Manual Motor Protector Auxiliary Contact**
Non-reversing					
XTSC Frame B MMP + Frame B Contactor					
XTSCP16BB_	0.1 – 0.16	XTPRP16BC1	XTPAXTPCB	XTCE007B10_	XTPAXFA11
XTSCP25BB_	0.16 – 0.25	XTPRP25BC1	XTPAXTPCB	XTCE007B10_	XTPAXFA11
XTSCP40BB_	0.25 – 0.4	XTPRP40BC1	XTPAXTPCB	XTCE007B10_	XTPAXFA11
XTSCP63BB_	0.4 – 0.63	XTPRP63BC1	XTPAXTPCB	XTCE007B10_	XTPAXFA11
XTSC001BB_	0.63 – 1	XTPR001BC1	XTPAXTPCB	XTCE007B10_	XTPAXFA11
XTSC1P6BB_	1 – 1.6	XTPR1P6BC1	XTPAXTPCB	XTCE007B10_	XTPAXFA11
XTSC2P5BB_	1.6 – 2.5	XTPR2P5BC1	XTPAXTPCB	XTCE007B10_	XTPAXFA11
XTSC004BB_	2.5 – 4	XTPR004BC1	XTPAXTPCB	XTCE007B10_	XTPAXFA11
XTSC6P3BB_	4 – 6.3	XTPR6P3BC1	XTPAXTPCB	XTCE007B10_	XTPAXFA11
XTSC010BB_	6.3 – 10	XTPR010BC1	XTPAXTPCB	XTCE009B10_	XTPAXFA11
XTSC012BB_	8 – 12	XTPR012BC1	XTPAXTPCB	XTCE012B10_	XTPAXFA11
XTSC016BB_	10 – 16	XTPR016BC1	XTPAXTPCB	XTCE015B10_	XTPAXFA11
XTSC Frame B MMP + Frame C Contactor					
XTSC016BC_	10 – 16	XTPR016BC1	XTPAXTPCC	XTCE018C10_	XTPAXFA11
XTSC020BC_	16 – 20	XTPR020BC1	XTPAXTPCC	XTCE025C10_	XTPAXFA11
XTSC025BC_	20 – 25	XTPR025BC1	XTPAXTPCC	XTCE025C10_	XTPAXFA11
XTSC032BC_	25 – 32	XTPR032BC1	XTPAXTPCC	XTCE032C10_	XTPAXFA11
XTSC Frame D MMP + Frame C Contactor					
XTSC016DC_	10 – 16	XTPR016DC1	②	XTCE018C10_	XTPAXFA11
XTSC025DC_	16 – 25	XTPR025DC1	②	XTCE025C10_	XTPAXFA11
XTSC032DC_	25 – 32	XTPR032DC1	②	XTCE032C10_	XTPAXFA11
XTSC Frame D MMP + Frame D Contactor					
XTSC040DD_	32 – 40	XTPR040DC1	XTPAXTPCD ③	XTCE040D00_	XTPAXFA11
XTSC050DD_	40 – 50	XTPR050DC1	XTPAXTPCD ③	XTCE050D00_	XTPAXFA11
XTSC058DD_	50 – 58	XTPR058DC1	XTPAXTPCD ③	XTCE065D00_	XTPAXFA11
XTSC063DD_	55 – 63	XTPR063DC1	XTPAXTPCD ③	XTCE065D00_	XTPAXFA11
Reversing					
XTSR Frame B MMP + Frame B Contactor					
XTSRP16BB_	0.1 – 0.16	XTPBP16BC1	XTPAXTPCRB	(2) XTCE007B10_	XTPAXFA11
XTSRP25BB_	0.16 – 0.25	XTPRP25BC1	XTPAXTPCRB	(2) XTCE007B10_	XTPAXFA11
XTSRP40BB_	0.25 – 0.4	XTPRP40BC1	XTPAXTPCRB	(2) XTCE007B10_	XTPAXFA11
XTSRP63BB_	0.4 – 0.63	XTPRP63BC1	XTPAXTPCRB	(2) XTCE007B10_	XTPAXFA11
XTSR001BB_	0.63 – 1	XTPR001BC1	XTPAXTPCRB	(2) XTCE007B10_	XTPAXFA11
XTSR1P6BB_	1 – 1.6	XTPR1P6BC1	XTPAXTPCRB	(2) XTCE007B10_	XTPAXFA11
XTSR2P5BB_	1.6 – 2.5	XTPR2P5BC1	XTPAXTPCRB	(2) XTCE007B10_	XTPAXFA11
XTSR004BB_	2.5 – 4	XTPR004BC1	XTPAXTPCRB	(2) XTCE007B10_	XTPAXFA11
XTSR6P3BB_	4 – 6.3	XTPR6P3BC1	XTPAXTPCRB	(2) XTCE007B10_	XTPAXFA11
XTSR010BB_	6.3 – 10	XTPR010BC1	XTPAXTPCRB	(2) XTCE009B10_	XTPAXFA11
XTSR012BB_	8 – 12	XTPR012BC1	XTPAXTPCRB	(2) XTCE012B10_	XTPAXFA11
XTSR Frame B MMP + Frame C Contactor					
XTSR016BC_	10 – 16	XTPR016BC1	XTPAXTPCRC	(2) XTCE018C10_	XTPAXFA11
XTSR020BC_	16 – 20	XTPR020BC1	XTPAXTPCRC	(2) XTCE025C10_	XTPAXFA11
XTSR025BC_	20 – 25	XTPR025BC1	XTPAXTPCRC	(2) XTCE025C10_	XTPAXFA11
XTSR032BC_	25 – 32	XTPR032BC1	XTPAXTPCRC	(2) XTCE032C10_	XTPAXFA11
XTSR Frame D MMP + Frame C Contactor					
XTSR016DC_	10 – 16	XTPR016DC1	②	(2) XTCE018C10_	XTPAXFA11
XTSR025DC_	16 – 25	XTPR025DC1	②	(2) XTCE025C10_	XTPAXFA11
XTSR032DC_	25 – 32	XTPR032DC1	②	(2) XTCE032C10_	XTPAXFA11
XTSR Frame D MMP + Frame D Contactor					
XTSR040DD_	32 – 40	XTPR040DC1	③	(2) XTCE040D00_	XTPAXFA11
XTSR050DD_	40 – 50	XTPR050DC1	③	(2) XTCE050D00_	XTPAXFA11
XTSR058DD_	50 – 58	XTPR058DC1	③	(2) XTCE065D00_	XTPAXFA11
XTSR063DD_	55 – 63	XTPR063DC1	③	(2) XTCE065D00_	XTPAXFA11

① Underscore (_) indicates Magnetic Coil Suffix required. See **Table B-182** on **Page B-150**.

② The connection between the XTPR…DC1 and the XTCE…C... contactor will be made with flexible wire and mounted to the DIN Rail Adapter Plate (XTPAXTPCPD).

③ The reversing connection between the XTPR…DC1 and the (2) XTCE…C… contactors will be accomplised by using the non-reversing combination connection kit (XTPAXTPCD), Frame D reversing link kit (XTCEXRLD), additional DIN Rail Adapter Plate (XTPAXTPCPD), and DIN Adapter Connection Element (XTPAXCNE).

Table B-187. XTFC and XTFR Combination Motor Controllers (CMC), UL508 Type F — Component Bill of Material

Factory Assembled Motor Protective Device with Thermal and Magnetic Trip + Contactor + Required Line Side Adapter						
Assembled Combination Motor Controller ①	FLA Adjustment Range / Overload Release — I_r (Amps)	Component Catalogue Numbers				
		Line Side Adapter	Manual Motor Protector	Combination Connection Kit	Contactor ①	Manual Motor Protector Auxiliary Contact
Non-reversing						
XTFC Frame B MMP + Frame B Contactor						
XTFCP16BB_	0.1 – 0.16	XTPAXLSA	XTPRP16BC1	XTPAXTPCB	XTCE007B10_	XTPAXFA11
XTFCP25BB_	0.16 – 0.25	XTPAXLSA	XTPRP25BC1	XTPAXTPCB	XTCE007B10_	XTPAXFA11
XTFCP40BB_	0.25 – 0.4	XTPAXLSA	XTPRP40BC1	XTPAXTPCB	XTCE007B10_	XTPAXFA11
XTFCP63BB_	0.4 – 0.63	XTPAXLSA	XTPRP63BC1	XTPAXTPCB	XTCE007B10_	XTPAXFA11
XTFC001BB_	0.63 – 1	XTPAXLSA	XTPR001BC1	XTPAXTPCB	XTCE007B10_	XTPAXFA11
XTFC1P6BB_	1 – 1.6	XTPAXLSA	XTPR1P6BC1	XTPAXTPCB	XTCE007B10_	XTPAXFA11
XTFC2P5BB_	1.6 – 2.5	XTPAXLSA	XTPR2P5BC1	XTPAXTPCB	XTCE007B10_	XTPAXFA11
XTFC004BB_	2.5 – 4	XTPAXLSA	XTPR004BC1	XTPAXTPCB	XTCE007B10_	XTPAXFA11
XTFC6P3BB_	4 – 6.3	XTPAXLSA	XTPR6P3BC1	XTPAXTPCB	XTCE007B10_	XTPAXFA11
XTFC010BB_	6.3 – 10	XTPAXLSA	XTPR010BC1	XTPAXTPCB	XTCE009B10_	XTPAXFA11
XTFC012BB_	8 – 12	XTPAXLSA	XTPR012BC1	XTPAXTPCB	XTCE012B10_	XTPAXFA11
XTFC016BB_	10 – 16	XTPAXLSA	XTPR016BC1	XTPAXTPCB	XTCE015B10_	XTPAXFA11
XTFC Frame B MMP + Frame C Contactor						
XTFC016BC_	10 – 16	XTPAXLSA	XTPR016BC1	XTPAXTPCC	XTCE018C10_	XTPAXFA11
XTFC020BC_	16 – 20	XTPAXLSA	XTPR020BC1	XTPAXTPCC	XTCE025C10_	XTPAXFA11
XTFC025BC_	20 – 25	XTPAXLSA	XTPR025BC1	XTPAXTPCC	XTCE025C10_	XTPAXFA11
XTFC032BC_	25 – 32	XTPAXLSA	XTPR032BC1	XTPAXTPCC	XTCE032C10_	XTPAXFA11
XTFC Frame D MMP + Frame C Contactor						
XTFC016DC_	10 – 16	XTPAXLSAD	XTPR016DC1	②	XTCE018C10_	XTPAXFA11
XTFC025DC_	16 – 25	XTPAXLSAD	XTPR025DC1	②	XTCE025C10_	XTPAXFA11
XTFC032DC_	25 – 32	XTPAXLSAD	XTPR032DC1	②	XTCE032C10_	XTPAXFA11
XTFC Frame D MMP + Frame D Contactor						
XTFC040DD_	32 – 40	XTPAXLSAD	XTPR040DC1	XTPAXTPCD ③	XTCE040D00_	XTPAXFA11
XTFC050DD_	40 – 50	XTPAXLSAD	XTPR050DC1	XTPAXTPCD ③	XTCE050D00_	XTPAXFA11
XTFC058DD_	50 – 58	XTPAXLSAD	XTPR058DC1	XTPAXTPCD ③	XTCE065D00_	XTPAXFA11
XTFC063DD_	55 – 63	XTPAXLSAD	XTPR063DC1	XTPAXTPCD ③	XTCE065D00_	XTPAXFA11
Reversing						
XTFR Frame B MMP + Frame B Contactor						
XTFRP16BB_	0.1 – 0.16	XTPAXLSA	XTPRP16BC1	XTPAXTPCRB	(2) XTCE007B10_	XTPAXFA11
XTFRP25BB_	0.16 – 0.25	XTPAXLSA	XTPRP25BC1	XTPAXTPCRB	(2) XTCE007B10_	XTPAXFA11
XTFRP40BB_	0.25 – 0.4	XTPAXLSA	XTPRP40BC1	XTPAXTPCRB	(2) XTCE007B10_	XTPAXFA11
XTFRP63BB_	0.4 – 0.63	XTPAXLSA	XTPRP63BC1	XTPAXTPCRB	(2) XTCE007B10_	XTPAXFA11
XTFR001BB_	0.63 – 1	XTPAXLSA	XTPR001BC1	XTPAXTPCRB	(2) XTCE007B10_	XTPAXFA11
XTFR1P6BB_	1 – 1.6	XTPAXLSA	XTPR1P6BC1	XTPAXTPCRB	(2) XTCE007B10_	XTPAXFA11
XTFR2P5BB_	1.6 – 2.5	XTPAXLSA	XTPR2P5BC1	XTPAXTPCRB	(2) XTCE007B10_	XTPAXFA11
XTFR004BB_	2.5 – 4	XTPAXLSA	XTPR004BC1	XTPAXTPCRB	(2) XTCE007B10_	XTPAXFA11
XTFR6P3BB_	4 – 6.3	XTPAXLSA	XTPR6P3BC1	XTPAXTPCRB	(2) XTCE007B10_	XTPAXFA11
XTFR010BB_	6.3 – 10	XTPAXLSA	XTPR010BC1	XTPAXTPCRB	(2) XTCE009B10_	XTPAXFA11
XTFR012BB_	8 – 12	XTPAXLSA	XTPR012BC1	XTPAXTPCRB	(2) XTCE012B10_	XTPAXFA11
XTFR Frame B MMP + Frame C Contactor						
XTFR016BC_	10 – 16	XTPAXLSA	XTPR016BC1	XTPAXTPCRC	(2) XTCE018C10_	XTPAXFA11
XTFR020BC_	16 – 20	XTPAXLSA	XTPR020BC1	XTPAXTPCRC	(2) XTCE025C10_	XTPAXFA11
XTFR025BC_	20 – 25	XTPAXLSA	XTPR025BC1	XTPAXTPCRC	(2) XTCE025C10_	XTPAXFA11
XTFR032BC_	25 – 32	XTPAXLSA	XTPR032BC1	XTPAXTPCRC	(2) XTCE032C10_	XTPAXFA11
XTFR Frame D MMP + Frame C Contactor						
XTFR016DC_	10 – 16	XTPAXLSAD	XTPR016DC1	②	(2) XTCE018C10_	XTPAXFA11
XTFR025DC_	16 – 25	XTPAXLSAD	XTPR025DC1	②	(2) XTCE025C10_	XTPAXFA11
XTFR032DC_	25 – 32	XTPAXLSAD	XTPR032DC1	②	(2) XTCE032C10_	XTPAXFA11
XTFR Frame D MMP + Frame D Contactor						
XTFR040DD_	32 – 40	XTPAXLSAD	XTPR040DC1	③	(2) XTCE040D00_	XTPAXFA11
XTFR050DD_	40 – 50	XTPAXLSAD	XTPR050DC1	③	(2) XTCE050D00_	XTPAXFA11
XTFR058DD_	50 – 58	XTPAXLSAD	XTPR058DC1	③	(2) XTCE065D00_	XTPAXFA11
XTFR063DD_	55 – 63	XTPAXLSAD	XTPR063DC1	③	(2) XTCE065D00_	XTPAXFA11

① Underscore (_) indicates Magnetic Coil Suffix required. See **Table B-182** on **Page B-150**.

② The connection between the XTPR…DC1 and the XTCE…C... contactor will be made with flexible wire and mounted to the DIN Rail Adapter Plate (XTPAXTPCPD).

③ The reversing connection between the XTPR…DC1 and the (2) XTCE…C... contactors will be accomplised by using the non-reversing combination connection kit (XTPAXTPCD), Frame D reversing link kit (XTCEXRLD), additional DIN Rail Adapter Plate (XTPAXTPCPD), and DIN Adapter Connection Element (XTPAXCNE).

Table B-188. Manual Motor Controllers Short-Circuit Ratings for UL/CSA Group Installations

XTSC & XTSR Manual Motor Controllers (MMC) / Starter Combinations								
Assembled Controller ①		FLA Adjustment Range / Overload Release — I_r (Amps)	Short-Circuit Release — I_{rm} (Amps)	Group Installation, UL/CSA				
				Max. RMS Symmetrical Short-Circuit Ratings (kA / kA with Current Limiter)			Maximum Upstream Protective Device (A / A with Current Limiter)	
Non-reversing	Reversing			240V	480V	600V	Maximum Fuse 600V	Maximum Circuit Breaker 600V
XTSC & XTSR Frame B MMP + Frame B Contactor								
XTSCP16BB_	XTSRP16BB_	0.,1 – 0.16	2.2	50	50	50	600	600
XTSCP25BB_	XTSRP25BB_	0.16 – 0.25	3.5	50	50	50	600	600
XTSCP40BB_	XTSRP40BB_	0.25 – 0.4	5.6	50	50	50	600	600
XTSCP63BB_	XTSRP63BB_	0.4 – 0.63	8.82	50	50	50	600	600
XTSC001BB_	XTSR001BB_	0.63 – 1	14	50	50	50	600	600
XTSC1P6BB_	XTSR1P6BB_	1 – 1.6	22.4	50	50	50	600	600
XTSC2P5BB_	XTSR2P5BB_	1.6 – 2.5	35	50	50	50	600	600
XTSC004BB_	XTSR004BB_	2.5 – 4	56	50	50	50	600	600
XTSC6P3BB_	XTSR6P3BB_	4 – 6.3	88.2	50	50	50	600	600
XTSC010BB_	XTSR010BB_	6.3 – 10	140	22	22	22	150 / 600	125 / 600
XTSC012BB_	XTSR012BB_	8 – 12	168	10 / 50	10 / 50	10 / 50	150 / 600	125 / 600
XTSC016BB_	—	10 – 16	224	10 / 50	10 / 50	10 / 50	150 / 600	125 / 600
XTSC & XTSR Frame B MMP + Frame C Contactor								
XTSC016BC_	XTSR016BC_	10 – 16	224	10 / 50	10 / 50	10 / 50	150 / 600	125 / 600
XTSC020BC_	XTSR020BC_	16 – 20	280	10 / 18	10 / 18	10 / 18	150 / 600	125 / 600
XTSC025BC_	XTSR025BC_	20 – 25	350	10 / 18	10 / 18	10 / 18	150 / 600	125 / 600
XTSC032BC_	XTSR032BC_	25 – 32	448	5 / 18	5 / 18	5 / 18	150 / 600	125 / 600
XTSC & XTSR Frame D MMP + Frame C Contactor								
XTSC016DC_	XTSR016DC_	10 – 16	224	50	50	10	600	600
XTSC025DC_	XTSR025DC_	16 – 25	350	50	50	10	600	600
XTSC032DC_	XTSR032DC_	25 – 32	448	50	50	10	600	600
XTSC & XTSR Frame D MMP + Frame D Contactor								
XTSC040DD_	XTSR040DD_	32 – 40	560	50	50	10	600	600
XTSC050DD_	XTSR050DD_	40 – 50	700	50	50	10	600	600
XTSC058DD_	XTSR058DD_	50 – 58	812	50	50	—	—	—
XTSC063DD_	XTSR063DD_	55 – 63	882	50	50	—	—	—

① Underscore (_) indicates Magnetic Coil Suffix required. See **Table B-182** on **Page B-150**.

Table B-189. Combination Motor Controllers Short Circuit Ratings for UL508 Type F Application

XTFC & XTFR Combination Motor Controllers (CMC), UL508 Type F								
Assembled Controller ②		FLA Adjustment Range / Overload Release — I_r (Amps)	Short-Circuit Release — I_{rm} (Amps)	UL508 Type F Application				
				Max. RMS Symmetrical Short-Circuit Ratings (kA)			Maximum Upstream Protective Device (A) ③	
Non-reversing	Reversing			240V	480/277V	600/347V	Maximum Fuse 600V	Maximum Circuit Breaker 600V
XTFC & XTFR Frame B MMP + Frame B Contactor								
XTFCP16BB_	XTFRP16BB_	0.1 – 0.16	2.2	50	50	18	Not Required	Not Required
XTFCP25BB_	XTFRP25BB_	0.16 – 0.25	3.5	50	50	18	Not Required	Not Required
XTFCP40BB_	XTFRP40BB_	0.25 – 0.4	5.6	50	50	18	Not Required	Not Required
XTFCP63BB_	XTFRP63BB_	0.4 – 0.63	8.82	50	50	18	Not Required	Not Required
XTFC001BB_	XTFR001BB_	0.63 – 1	14	50	50	18	Not Required	Not Required
XTFC1P6BB_	XTFR1P6BB_	1 – 1.6	22.4	50	50	18	Not Required	Not Required
XTFC2P5BB_	XTFR2P5BB_	1.6 – 2.5	35	50	50	18	Not Required	Not Required
XTFC004BB_	XTFR004BB_	2.5 – 4	56	50	50	18	Not Required	Not Required
XTFC6P3BB_	XTFR6P3BB_	4 – 6.3	88.2	50	50	18	Not Required	Not Required
XTFC010BB_	XTFR010BB_	6.3 – 10	140	50	50	18	Not Required	Not Required
XTFC012BB_	XTFR012BB_	8 – 12	168	42	42	—	Not Required	Not Required
XTFC016BB_	—	10 – 16	224	42	42	—	Not Required	Not Required
XTFC & XTFR Frame B MMP + Frame C Contactor								
XTFC016BC_	XTFR016BC_	10 – 16	224	18	18	—	Not Required	Not Required
XTFC020BC_	XTFR020BC_	16 – 20	280	18	18	—	Not Required	Not Required
XTFC025BC_	XTFR025BC_	20 – 25	350	18	18	—	Not Required	Not Required
XTFC032BC_	XTFR032BC_	25 – 32	448	18	18	—	Not Required	Not Required
XTFC & XTFR Frame D MMP + Frame C Contactor								
XTFC016DC_	XTFR016DC_	10 – 16	224	50	50	50	Not Required	Not Required
XTFC025DC_	XTFR025DC_	16 – 25	350	50	50	50	Not Required	Not Required
XTFC032DC_	XTFR032DC_	25 – 32	448	50	50	50	Not Required	Not Required
XTFC & XTFR Frame D MMP + Frame D Contactor								
XTFC040DD_	XTFR040DD_	32 – 40	560	50	50	50	Not Required	Not Required

② Underscore (_) indicates Magnetic Coil Suffix required. See **Table B-182** on **Page B-150**.

③ For UL508 Type F applications, the Combination Motor Controller assembly does not require a dedicated upstream protective device in the panel, thus a maximum rating is not required.

B

Dimensions

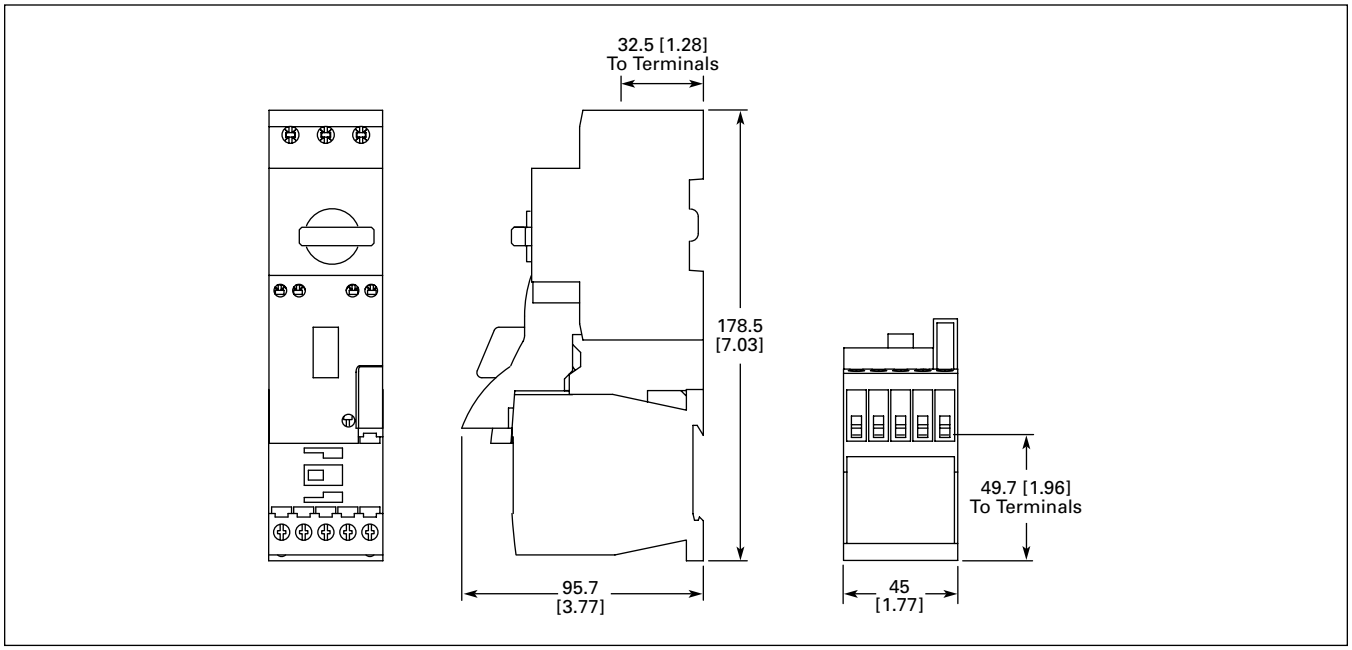


Figure B-129. XTSC…BB_ — Approximate Dimensions in mm [in]

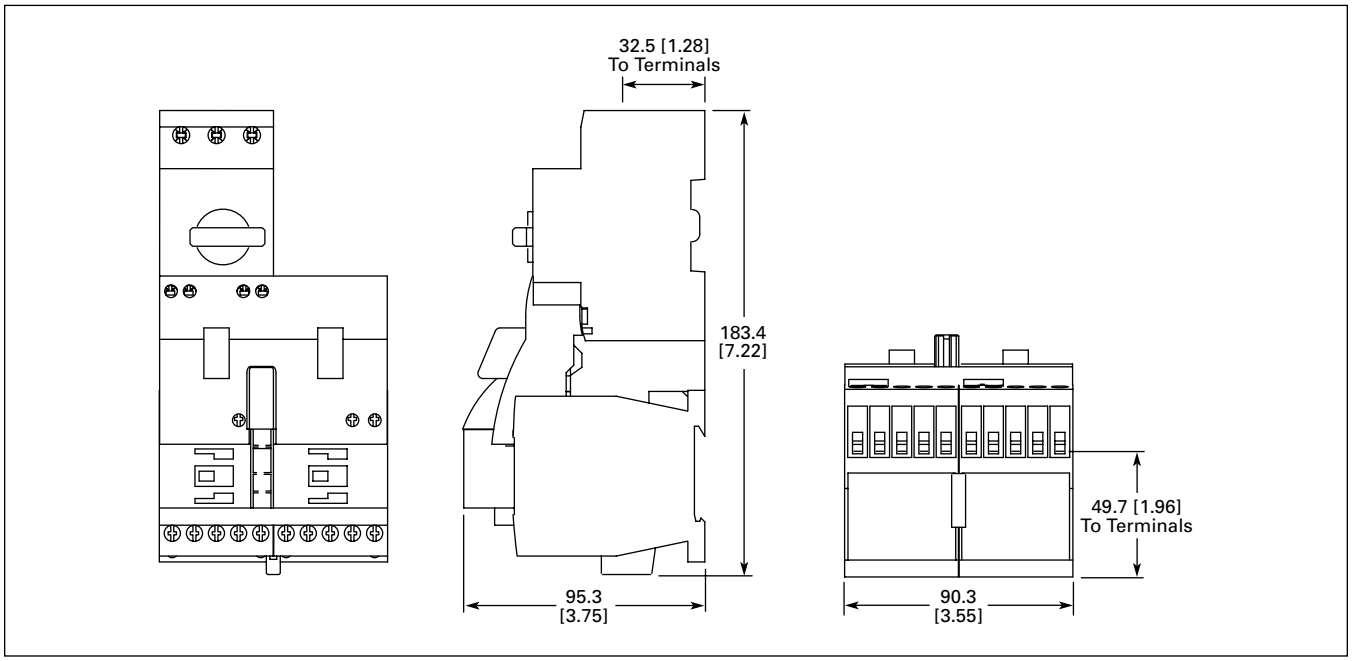


Figure B-130. XTSR…BB_ — Approximate Dimensions in mm [in]

B

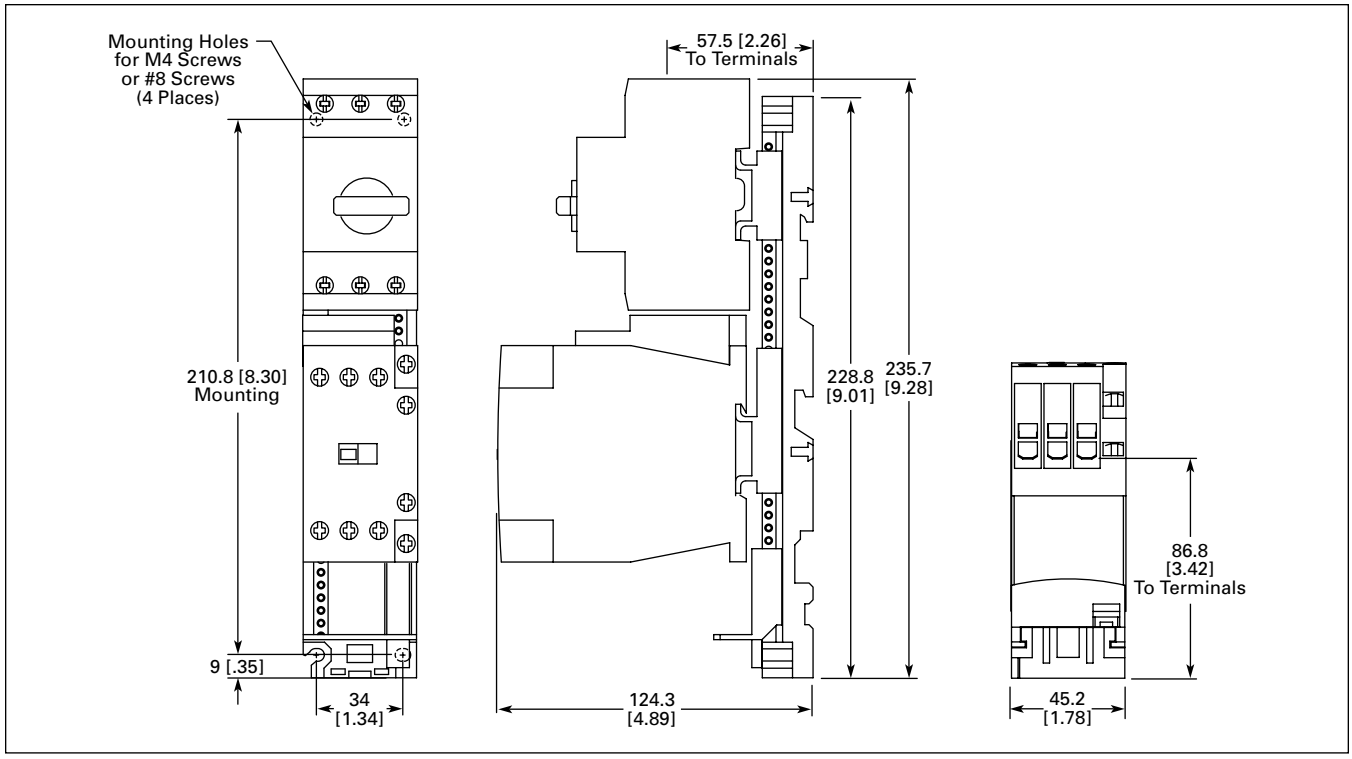


Figure B-131. XTSC…BC_ — Approximate Dimensions in mm [in]

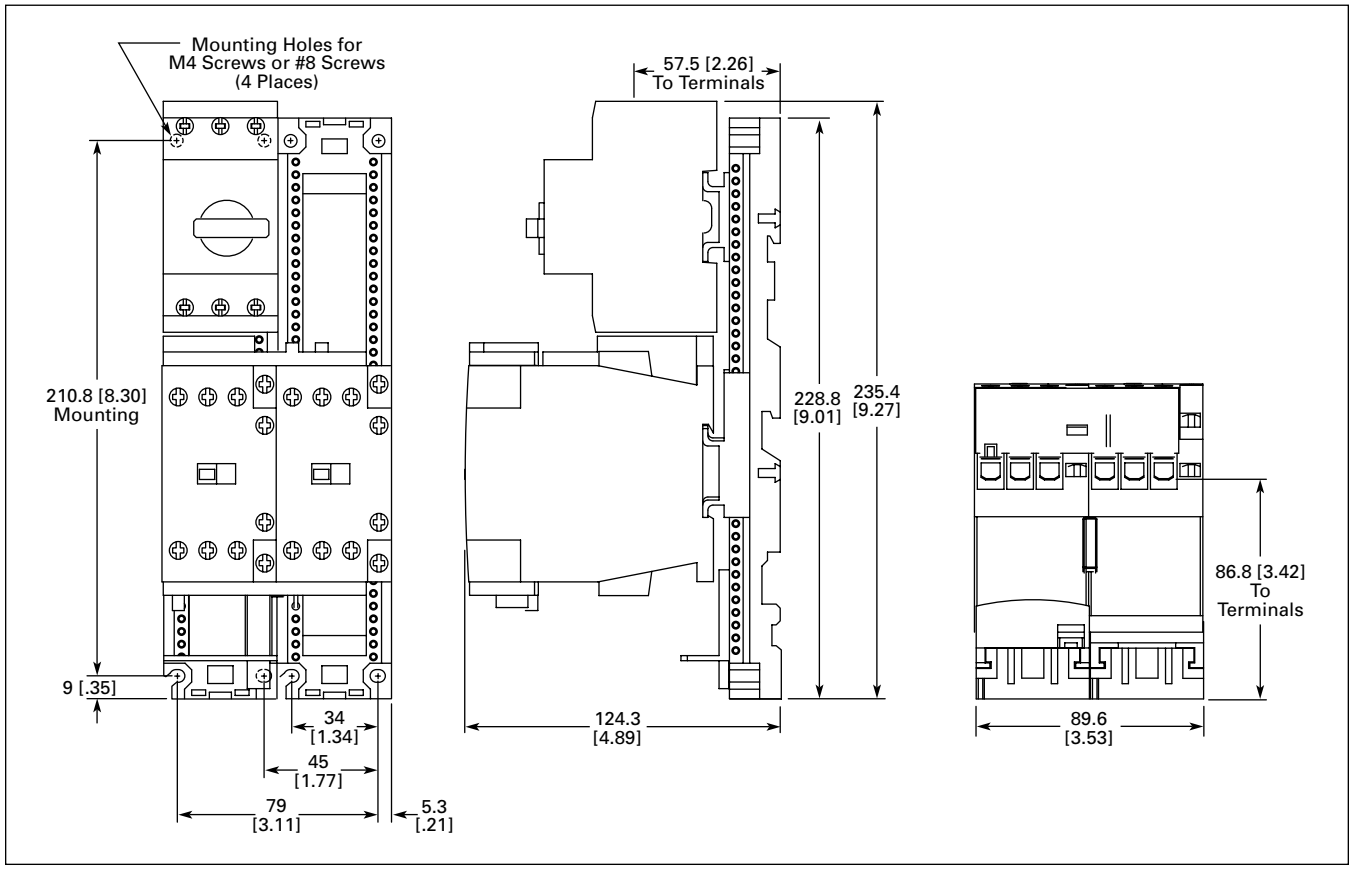


Figure B-132. XTSR…BC_ — Approximate Dimensions in mm [in]

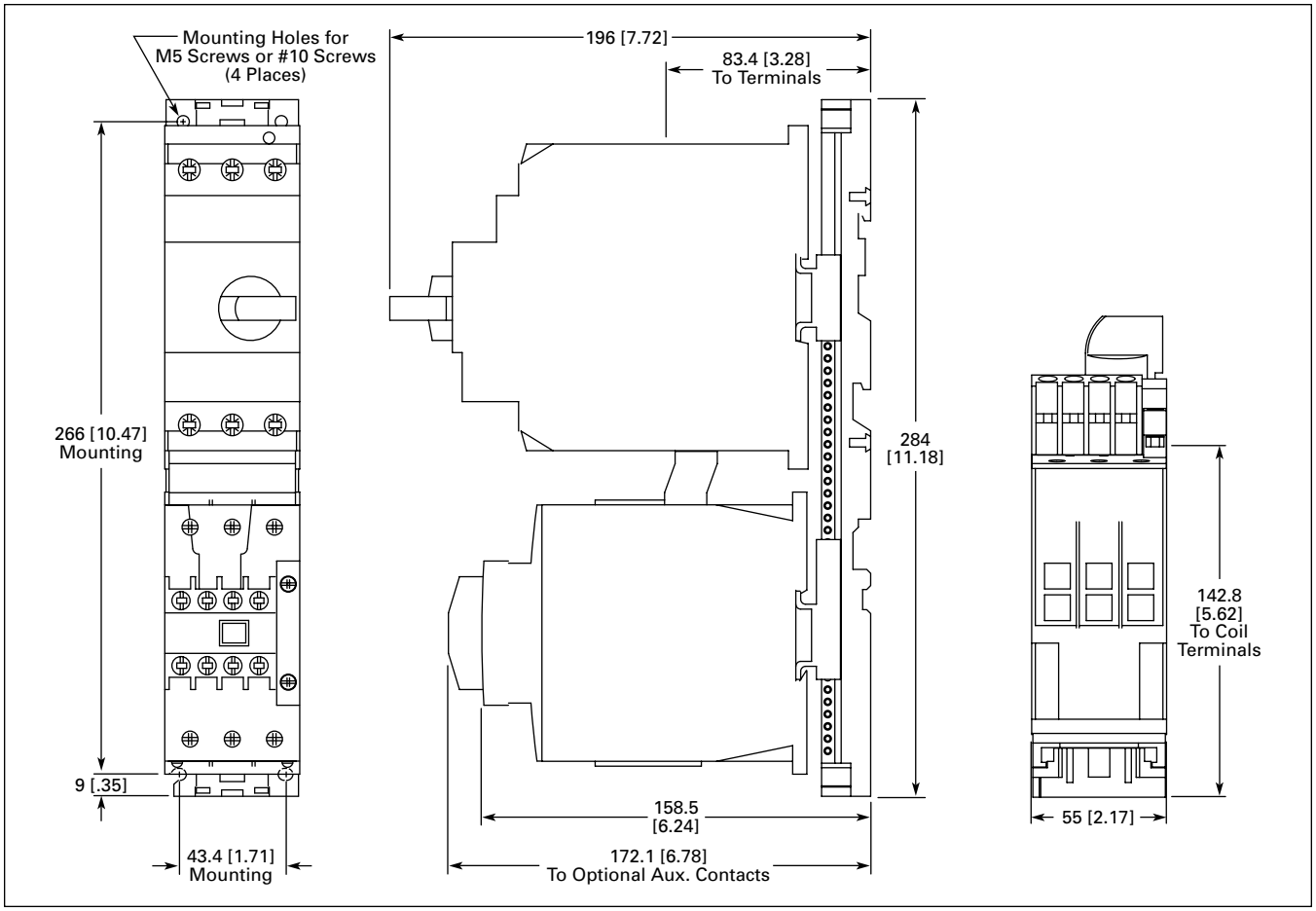


Figure B-133. XTSC…DD_ — Approximate Dimensions in mm [in]

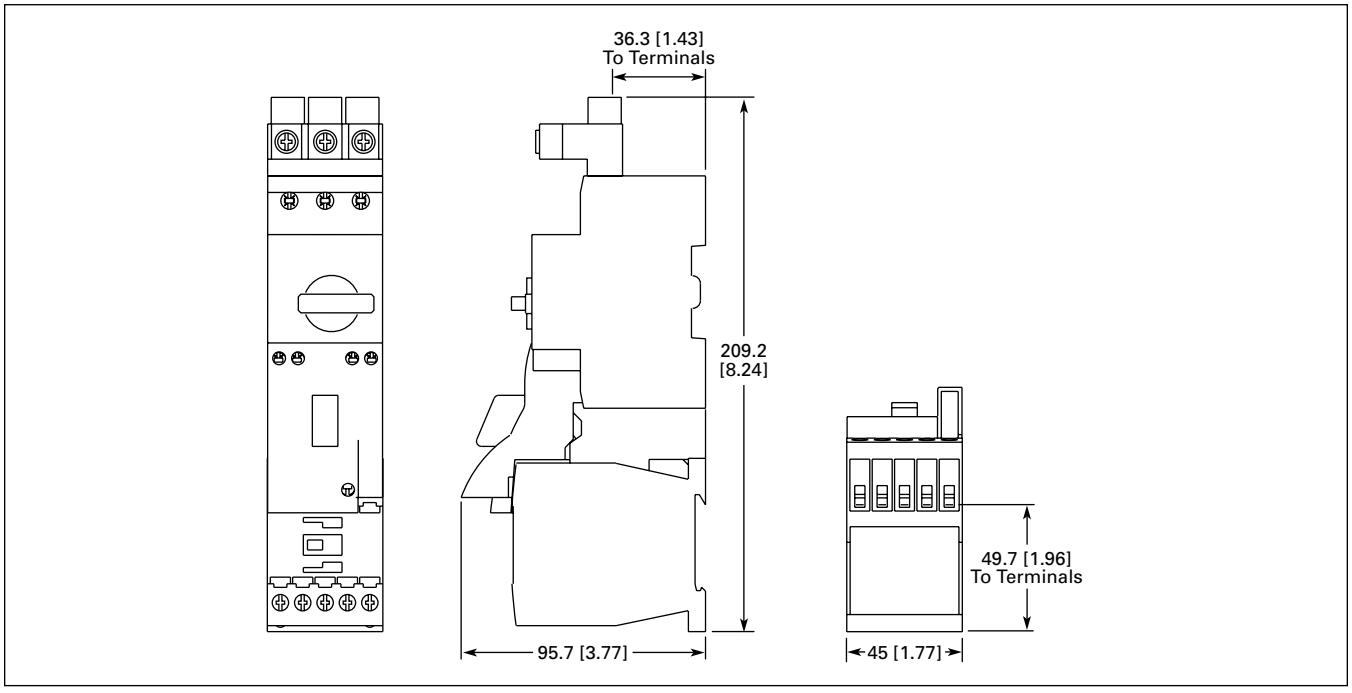


Figure B-134. XTFC…BB_ — Approximate Dimensions in mm [in]

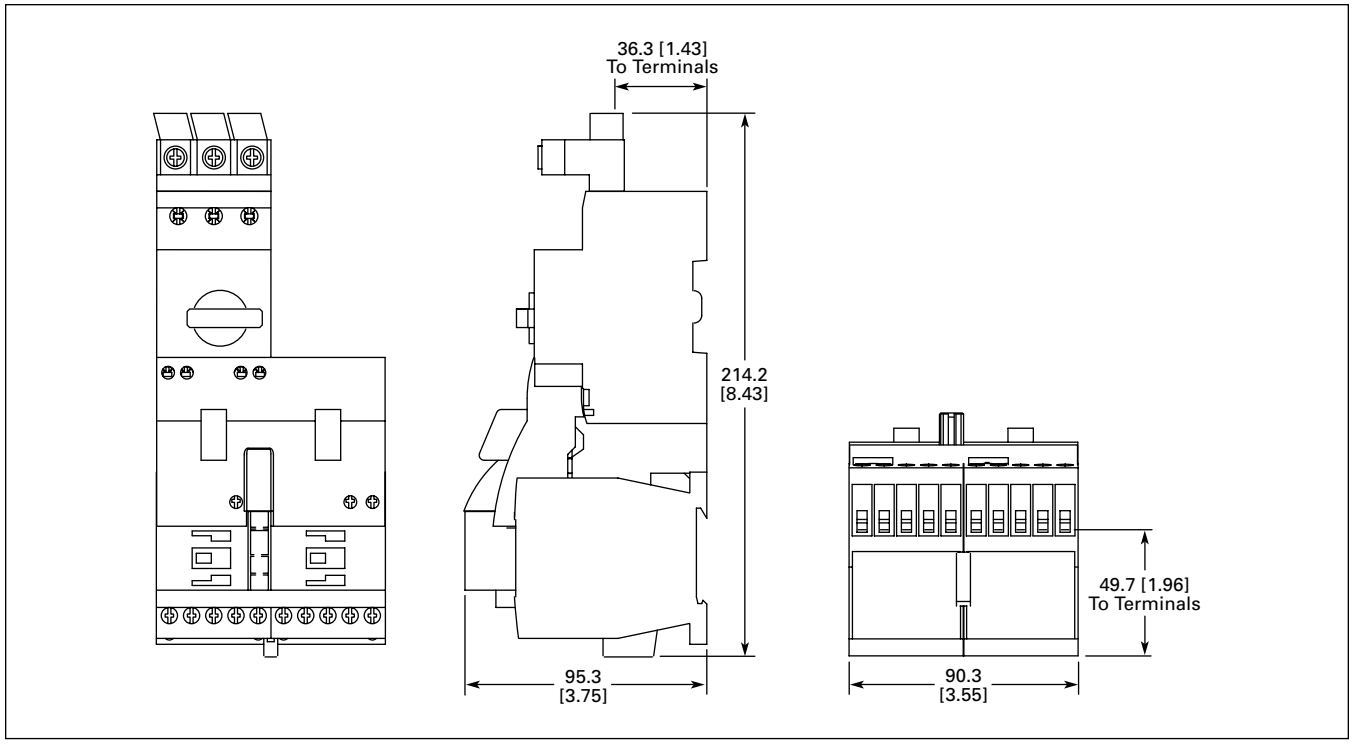


Figure B-135. XTFR…BB_ — Approximate Dimensions in mm [in]

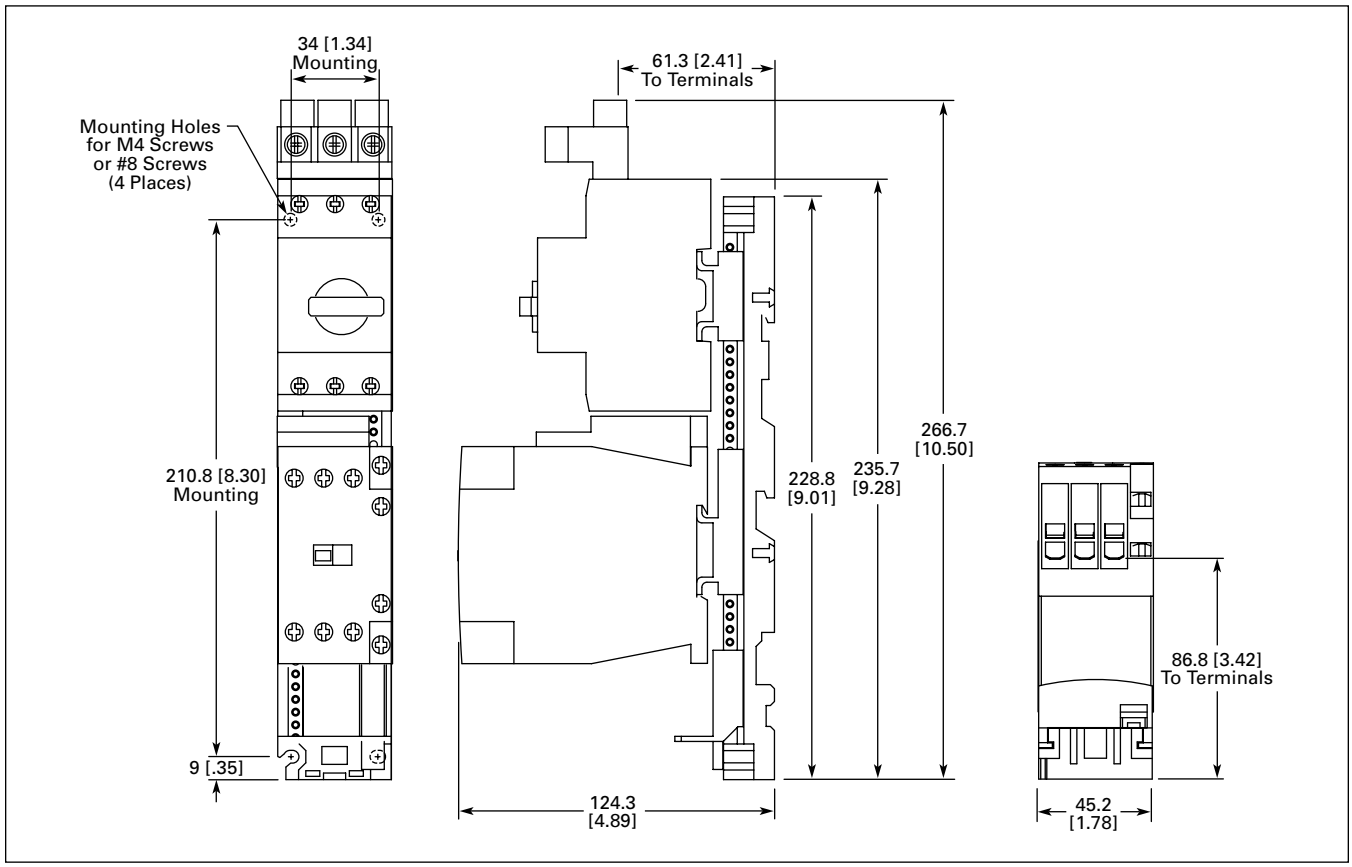


Figure B-136. XTFC…BC_ — Approximate Dimensions in mm [in]

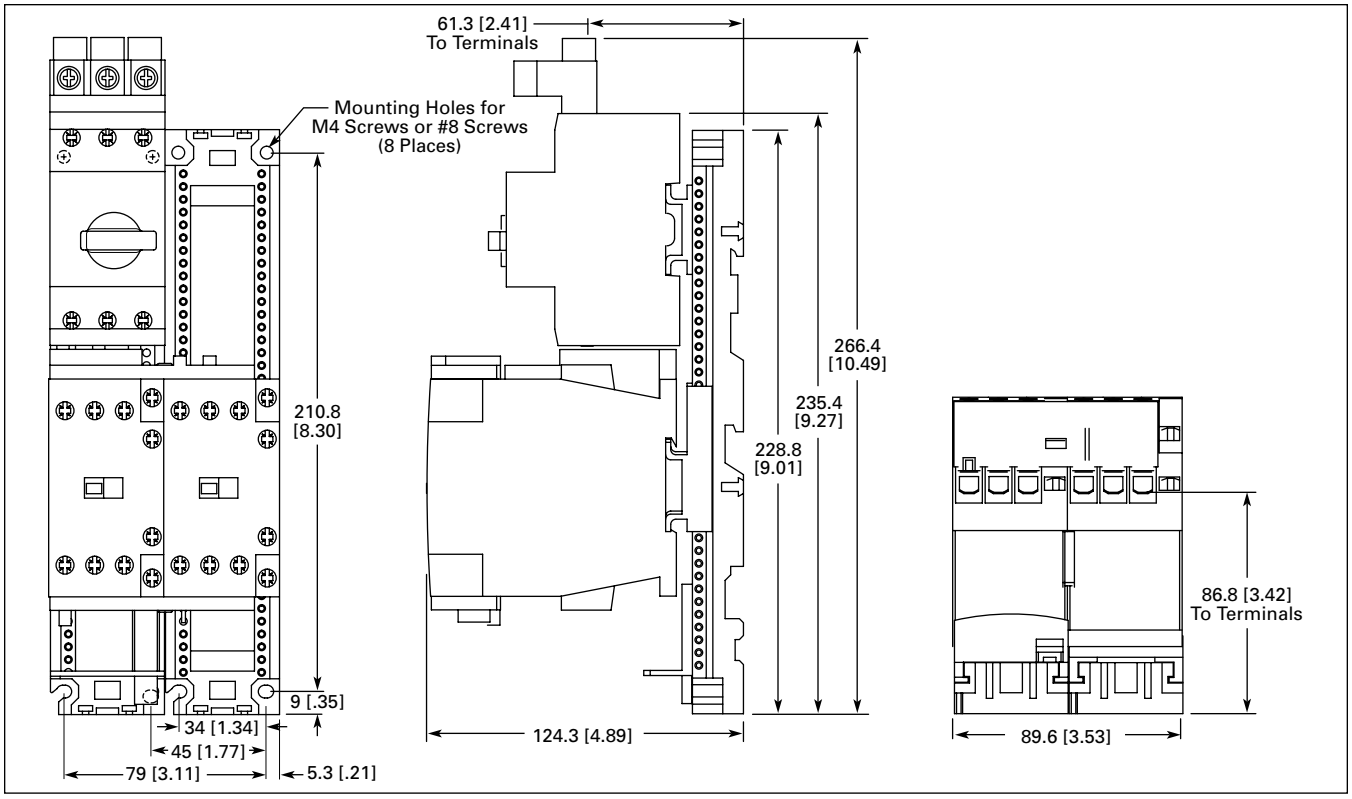


Figure B-137. XTFR…BC_ — Approximate Dimensions in mm [in]

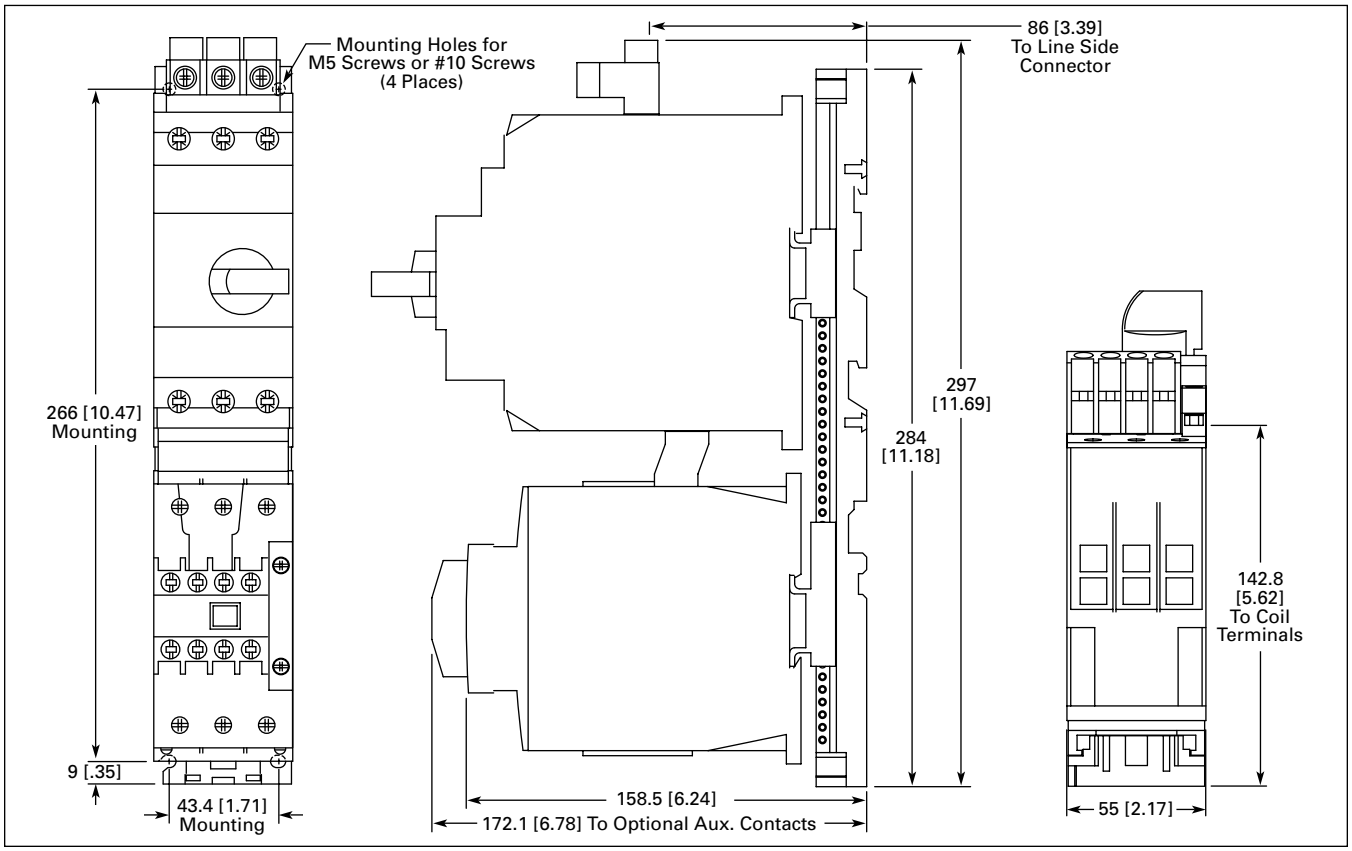


Figure B-138. XTFC…DD_ — Approximate Dimensions in mm [in]

B

Type 2 Coordination

What is it?

The International Electrotechnical Commission (IEC) developed short circuit performance criteria for contactors and starters called Type 1 coordination and Type 2 coordination. This defines motor controller protection levels following a short circuit fault. In order to achieve this performance, the combination of a motor controller (contactor or starter) and short circuit protective device (manual motor protector, circuit breaker or fuse) must meet the following criteria as specified by IEC 60947-4-1 — Low voltage switchgear and controlgear — Part 4-1: Contactors and motor-starters — Electromechanical contactors and motor-starters:

Type 1 Coordination requires that under short circuit conditions, the contactor or starter shall cause no danger to persons or installation and may not be suitable for further service without repair and replacement of parts.

In this case, *significant damage is allowed* to the contactor/starter (e.g. contact welding, burning, or disintegration) and the overload relay (e.g. component harm or heater element burn-out).

Type 2 Coordination requires that under short circuit conditions, the contactor or starter shall cause no danger to persons or installation and shall be suitable for further use. The risk of contact welding is recognized, in which case the manufacturer shall indicate the measures to be taken as regards to the maintenance of the equipment.

In this case, the contactor/starter is *able to continue use* after the occurrence of a short circuit fault. Light contact burning or tack welding may occur provided the contacts are easily separable.

Table B-190. 400, 415V Type 2 Coordination — MMC

P (kW)	I_e (A)	I_q (kA)	MMP Catalogue Number	Contactor Catalogue Number ②	MMC Catalogue Number ②
0.06	0.21	50 (150) ①	XTPRP25BC1	XTCE007B10_	XTSCP25BB_
0.09	0.31	50 (150) ①	XTPRP40BC1	XTCE007B10_	XTSCP40BB_
0.12	0.41	50 (150) ①	XTPRP63BC1	XTCE007B10_	XTSCP63BB_
0.18	0.60	50 (150) ①	XTPRP63BC1	XTCE007B10_	XTSCP63BB_
0.25	0.80	50 (150) ①	XTPR001BC1	XTCE007B10_	XTSC001BB_
0.37	1.10	50 (150) ①	XTPR1P6BC1	XTCE007B10_	XTSC1P6BB_
0.55	1.50	50 (150) ①	XTPR1P6BC1	XTCE007B10_	XTSC1P6BB_
0.75	1.90	50 (150) ①	XTPR2P5BC1	XTCE007B10_	XTSC2P5BB_
1.10	2.60	50 (150) ①	XTPR004BC1	XTCE007B10_	XTSC004BB_
1.50	3.60	50 (150) ①	XTPR004BC1	XTCE007B10_	XTSC004BB_
2.20	5.00	50 (150) ①	XTPR6P3BC1	XTCE007B10_	XTSC6P3BB_
3.00	6.60	50 (150) ①	XTPR010BC1	XTCE018C10_	XTSC010BC_
4.00	8.50	50 (150) ①	XTPR010BC1	XTCE018C10_	XTSC010BC_
5.50	11.3	50	XTPR012BC1	XTCE018C10_	XTSC012BC_
7.50	16.0	50	XTPR016BC1	XTCE018C10_	XTSC016BC_
11.0	21.7	50	XTPR025BC1	XTCE025C10_	XTSC025BC_
15.0	29.3	50	XTPR032BC1	XTCE032C10_	XTSC032BC_
5.50	11.3	50	XTPR016DC1	XTCE018C10_	XTSC016DC_
7.50	16.0	50	XTPR016DC1	XTCE018C10_	XTSC016DC_
11.0	21.7	50	XTPR025DC1	XTCE025C10_	XTSC025DC_
15.0	29.3	50	XTPR032DC1	XTCE032C10_	XTSC032DC_
18.5	36.0	50	XTPR040DC1	XTCE040D00_	XTSC040DD_
22.0	41.0	50	XTPR050DC1	XTCE050D00_	XTSC050DD_
30.0	55.0	50	XTPR058DC1	XTCE065D00_	XTSC058DD_
34.0	63.0	50	XTPR063DC1	XTCE065D00_	XTSC063DD_

① Values in parentheses ( ) are for Type 1 Coordination.

② Underscore (_) indicates magnet coil suffix required. See **Table B-198**, **Page B-166**.

Table B-191. 480V Type 2 Coordination — MMC

P (hp)	I_e (A)	I_q (kA)	MMP Catalogue Number	Current Limiter Catalogue Number	Contactor Catalogue Number ②	MMC Catalogue Number ②
1/2	0.24	65	XTPRP25BC1		XTCE007B10_	XTSCP25BB_
1/2	0.32	65	XTPRP40BC1		XTCE007B10_	XTSCP40BB_
1/2	0.51	65	XTPRP63BC1		XTCE007B10_	XTSCP63BB_
1/2	0.74	65	XTPR001BC1		XTCE007B10_	XTSC001BB_
1/2	0.94	65	XTPR001BC1		XTCE007B10_	XTSC001BB_
3/4	1.32	65	XTPR1P6BC1		XTCE007B10_	XTSC1P6BB_
1	1.72	65	XTPR2P5BC1		XTCE018C10_	XTSC2P5BC_
2	2.55	65	XTPR004BC1		XTCE018C10_	XTSC004BC_
2	3.10	65	XTPR004BC1		XTCE018C10_	XTSC004BC_
3	4.55	65 (50) ①	XTPR6P3BC1	XTPAXCL	XTCE018C10_	XTSC6P3BC_
3	6.15	65 (50) ①	XTPR6P3BC1	XTPAXCL	XTCE018C10_	XTSC6P3BC_
7-1/2	8.40	65 (50) ①	XTPR010BC1	XTPAXCL	XTCE018C10_	XTSC010BC_
7-1/2	11.0	65 (50) ①	XTPR012BC1	XTPAXCL	XTCE018C10_	XTSC012BC_
10	14.5	65 (50) ①	XTPR016BC1	XTPAXCL	XTCE018C10_	XTSC016BC_
10	20.0	65 (50) ①	XTPR020BC1	XTPAXCL	XTCE025C10_	XTSC020BC_
20	20.0	65	XTPR025DC1		XTCE040D00_	XTSC025DD_
25	27.0	65	XTPR032DC1		XTCE040D00_	XTSC032DD_
25	32.0	65	XTPR032DC1		XTCE040D00_	XTSC032DD_
30	37.5	65	XTPR040DC1		XTCE040D00_	XTSC040DD_
40	40.5	65	XTPR050DC1		XTCE050D00_	XTSC050DD_
40	50.5	65	XTPR058DC1		XTCE065D00_	XTSC058DD_
40	64.0	65	XTPR063DC1		XTCE065D00_	XTSC063DD_

① Values in parentheses ( ) are achieved without the current limiter.
② Underscore (_) indicates magnet coil suffix required. See **Table B-198**, **Page B-166**.

Table B-192. 600V Type 2 Coordination — MMC

P (hp)	I_e (A)	I_q (kA)	MMP Catalogue Number	Current Limiter Catalogue Number	Contactor Catalogue Number ④	MMC Catalogue Number ④
1/2	0.19	50	XTPRP25BC1		XTCE007B10_	XTSCP25BB_
1/2	0.26	50	XTPRP40BC1		XTCE007B10_	XTSCP40BB_
1/2	0.41	50	XTPRP63BC1		XTCE007B10_	XTSCP63BB_
1/2	0.59	50	XTPRP63BC1		XTCE007B10_	XTSCP63BB_
1/2	0.75	50	XTPR001BC1		XTCE007B10_	XTSC001BB_
1	1.06	50	XTPR1P6BC1		XTCE007B10_	XTSC1P6BB_
1	1.38	50	XTPR1P6BC1		XTCE007B10_	XTSC1P6BB_
1-1/2	2.04	50	XTPR2P5BC1		XTCE018C10_	XTSC2P5BC_
1-1/2	2.48	50	XTPR2P5BC1		XTCE018C10_	XTSC2P5BC_
3	3.64	50	XTPR004BC1		XTCE018C10_	XTSC004BC_
5	4.92	50 (18) ③	XTPR6P3BC1	XTPAXCL	XTCE018C10_	XTSC6P3BC_
10	6.72	50 (18) ③	XTPR010BC1	XTPAXCL	XTCE018C10_	XTSC010BC_
10	8.60	50 (18) ③	XTPR010BC1	XTPAXCL	XTCE018C10_	XTSC010BC_
10	11.5	50 (18) ③	XTPR012BC1	XTPAXCL	XTCE018C10_	XTSC012BC_
10	16.0	50 (18) ③	XTPR016BC1	XTPAXCL	XTCE018C10_	XTSC016BC_
25	21.5	50	XTPR025DC1		XTCE040D00_	XTSC025DD_
30	25.5	50	XTPR032DC1		XTCE040D00_	XTSC032DD_
30	30.0	50	XTPR032DC1		XTCE040D00_	XTSC032DD_
30	37.5	50	XTPR040DC1		XTCE040D00_	XTSC050DD_
40	40.5	50	XTPR050DC1		XTCE050D00_	XTSC050DD_
40	51.0	42	XTPR058DC1		XTCE065D00_	XTSC058DD_
50	61.0	42	XTPR063DC1		XTCE065D00_	XTSC063DD_

③ Values in parentheses ( ) are achieved without the current limiter.
④ Underscore (_) indicates magnet coil suffix required. See **Table B-198**, **Page B-166**.

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Table B-193. 400, 415V Type 2 Coordination — Contactor and Overload Relay (Motor Starter) with Fused Disconnect

P (kW)	I_e (A)	I_q (kA)	Fuses Class gG/gL	Contactor Catalogue Number ①	Overload Relay Catalogue Number	Assembled Starter Catalogue Number ①
0.12	0.41	100	2	XTCE007B10_	XTOBP60BC1	XTAE007B10_P60
0.18	0.60	100	2	XTCE007B10_	XTOB001BC1	XTAE007B10_001
0.25	0.80	100	4	XTCE007B10_	XTOB001BC1	XTAE007B10_001
0.37	1.10	100	4	XTCE007B10_	XTOB1P6BC1	XTAE007B10_1P6
0.55	1.50	100	4	XTCE007B10_	XTOB1P6BC1	XTAE007B10_1P6
0.75	1.90	100	6	XTCE007B10_	XTOB2P4BC1	XTAE007B10_2P4
1.10	2.60	100	6	XTCE007B10_	XTOB004BC1	XTAE007B10_004
1.50	3.60	100	6	XTCE007B10_	XTOB004BC1	XTAE007B10_004
2.20	5.00	100	10	XTCE007B10_	XTOB006BC1	XTAE007B10_006
3.00	6.60	100	16	XTCE007B10_	XTOB010BC1	XTAE007B10_010
4.00	8.50	100	20	XTCE009B10_	XTOB010BC1	XTAE009B10_010
5.50	11.3	100	25	XTCE018C10_	XTOB016CC1	XTAE018C10_016
7.50	16.0	100	32	XTCE018C10_	XTOB016CC1	XTAE018C10_016
11.0	21.7	100	40	XTCE025C10_	XTOB024CC1	XTAE032C10_024
15.0	29.3	100	63	XTCE032C10_	XTOB032CC1	XTAE032C10_032
18.5	36.0	100	63	XTCE040D00_	XTOB040DC1	XTAE040D00_040
22.0	41.0	100	80	XTCE050D00_	XTOB057DC1	XTAE065D00_057
30.0	55.0	100	100	XTCE065D00_	XTOB057DC1	XTAE065D00_057
37.0	68.0	100	125	XTCE080F00_	XTOB070GC1	XTAE080F00_070
45.0	81.0	100	160	XTCE095F00_	XTOB100GC1	XTAE095F00_100
55.0	99.0	100	200	XTCE115G00_	XTOB100GC1	XTAE115G00_100
75.0	134.	100	200	XTCE150G00_	XTOB150GC1	XTAE150G00_150
90.0	161.	100	250	XTCE185L22_	XTOB220LC1	XTAE185L22_220
110.	196.	100	315	XTCE225L22_	XTOB220LC1	XTAE225L22_220
132.	231.	100	400	XTCE250L22_	XTOB250LC1	XTAE250L22_250

① Underscore (_) indicates magnet coil code required. See **Table B-198**, **Page B-166**.

Table B-194. 500V Type 2 Coordination — Contactor and Overload Relay (Motor Starter) with Fused Disconnect

P (kW)	I_e (A)	I_q (kA)	Fuses Class gG/gL	Contactor Catalogue Number ②	Overload Relay Catalogue Number	Assembled Starter Catalogue Number ②
0.12	0.33	100	2	XTCE007B10_	XTOBP40BC1	XTAE007B10_P40
0.18	0.48	100	2	XTCE007B10_	XTOBP60BC1	XTAE007B10_P60
0.25	0.70	100	2	XTCE007B10_	XTOB001BC1	XTAE007B10_001
0.37	0.90	100	2	XTCE007B10_	XTOB001BC1	XTAE007B10_001
0.55	1.20	100	4	XTCE007B10_	XTOB1P6BC1	XTAE007B10_1P6
0.75	1.50	100	4	XTCE007B10_	XTOB1P6BC1	XTAE007B10_1P6
1.10	2.10	100	6	XTCE007B10_	XTOB2P4BC1	XTAE007B10_2P4
1.50	2.90	100	6	XTCE007B10_	XTOB004BC1	XTAE007B10_004
2.20	4.00	100	10	XTCE007B10_	XTOB006BC1	XTAE007B10_006
3.00	5.30	100	16	XTCE009B10_	XTOB006BC1	XTAE009B10_006
4.00	6.80	100	16	XTCE009B10_	XTOB010BC1	XTAE009B10_010
5.50	9.00	100	20	XTCE012B10_	XTOB010BC1	XTAE012B10_010
7.50	12.1	100	25	XTCE018C10_	XTOB016CC1	XTAE018C10_016
11.0	17.4	100	32	XTCE025C10_	XTOB024CC1	XTAE025C10_024
15.0	23.4	100	50	XTCE040D00_	XTOB024DC1	XTAE040D00_024
18.5	28.9	100	50	XTCE040D00_	XTOB040DC1	XTAE040D00_040
22.0	33.0	100	63	XTCE050D00_	XTOB040DC1	XTAE050D00_040
30.0	44.0	100	80	XTCE065D00_	XTOB057DC1	XTAE065D00_057
37.0	54.0	100	100	XTCE080F00_	XTOB070GC1	XTAE080F00_070
45.0	65.0	100	125	XTCE095F00_	XTOB070GC1	XTAE095F00_070
55.0	79.0	100	160	XTCE115G00_	XTOB100GC1	XTAE115G00_100
75.0	107.	100	200	XTCE185L22_	XTOB125LC1	XTAE185L22_125
90.0	129.	100	200	XTCE185L22_	XTOB125LC1	XTAE185L22_125
110.	157.	100	250	XTCE185L22_	XTOB160LC1	XTAE185L22_160
132.	184.	100	250	XTCE185L22_	XTOB220LC1	XTAE185L22_220
160.	224.	100	315	XTCE225L22_	XTOB250LC1	XTAE225L22_250

② Underscore (_) indicates magnet coil code required. See **Table B-198**, **Page B-166**.

Table B-195. 690V Type 2 Coordination — Contactor and Overload Relay (Motor Starter) with Fused Disconnect

P (kW)	I_e (A)	I_q (kA)	Fuses Class gG/gL	Contactor Catalogue Number ①	Overload Relay Catalogue Number	Assembled Starter Catalogue Number ①
0.12	0.24	100	1	XTCE007B10_	XTOBP40BC1	XTAE007B10_P40
0.18	0.35	100	2	XTCE007B10_	XTOBP40BC1	XTAE007B10_P40
0.25	0.50	100	2	XTCE007B10_	XTOBP60BC1	XTAE007B10_P60
0.37	0.70	100	2	XTCE007B10_	XTOB001BC1	XTAE007B10_001
0.55	0.90	100	4	XTCE007B10_	XTOB001BC1	XTAE007B10_001
0.75	1.10	100	4	XTCE007B10_	XTOB1P6BC1	XTAE007B10_1P6
1.10	1.50	100	4	XTCE007B10_	XTOB1P6BC1	XTAE007B10_1P6
1.50	2.10	100	6	XTCE007B10_	XTOB2P4BC1	XTAE007B10_2P4
2.20	2.90	100	10	XTCE007B10_	XTOB004BC1	XTAE007B10_004
3.00	3.80	100	10	XTCE007B10_	XTOB004BC1	XTAE007B10_004
4.00	4.90	100	16	XTCE009B10_	XTOB006BC1	XTAE009B10_006
5.50	6.50	100	16	XTCE012B10_	XTOB010BC1	XTAE012B10_010
7.50	8.80	100	20	XTCE018C10_	XTOB010CC1	XTAE018C10_010
11.0	12.6	100	25	XTCE025C10_	XTOB016CC1	XTAE025C10_016
15.0	17.0	100	32	XTCE032C10_	XTOB024CC1	XTAE032C10_024
18.5	20.9	100	32	XTCE040D00_	XTOB024DC1	XTAE040D00_024
22.0	23.8	100	50	XTCE040D00_	XTOB040DC1	XTAE040D00_040
30.0	32.0	100	63	XTCE065D00_	XTOB040DC1	XTAE065D00_040
37.0	39.0	100	80	XTCE080F00_	XTOB050GC1	XTAE080F00_050
45.0	47.0	100	80	XTCE080F00_	XTOB050GC1	XTAE080F00_050
55.0	58.0	100	100	XTCE080F00_	XTOB070GC1	XTAE080F00_070
75.0	78.0	100	160	XTCE095F00_	XTOB100GC1	XTAE095F00_100
90.0	93.0	100	160	XTCE115G00_	XTOB100GC1	XTAE115G00_100
110.	114.	100	200	XTCE185L22_	XTOB125LC1	XTAE185L22_125
132.	134.	100	250	XTCE185L22_	XTOB160LC1	XTAE185L22_160
160.	162.	100	250	XTCE185L22_	XTOB220LC1	XTAE185L22_220

① Underscore (_) indicates magnet coil code required. See **Table B-198**, **Page B-166**.

Table B-196. 400, 415V Type 2 Coordination — Contactor and Overload Relay (Motor Starter) with Circuit Breaker

P (kW)	I_e (A)	I_q (kA)	Circuit Breaker	Contactor Catalogue Number ②	Overload Relay Catalogue Number	Assembled Starter Catalogue Number ②
0.12	0.41	15	③	③	③	③
0.18	0.60	15	③	③	③	③
0.25	0.80	15	③	③	③	③
0.37	1.10	15	③	③	③	③
0.55	1.50	15	③	③	③	③
0.75	1.90	15	③	③	③	③
1.10	2.60	15	③	③	③	③
1.50	3.60	15	③	③	③	③
2.20	5.00	15	③	③	③	③
3.00	6.60	15	③	③	③	③
4.00	8.50	15 ④	HMCPE015E0C	XTCE040D00_ ④	XTOB010DC1 ④	XTAE040D00_010 ④
5.50	11.3	15 ④	HMCPE015E0C	XTCE040D00_ ④	XTOB016DC1 ④	XTAE040D00_016 ④
7.50	16.0	15 ④	HMCPE030H1C	XTCE040D00_ ④	XTOB024DC1 ④	XTAE040D00_024 ④
11.0	21.7	15 ④	HMCPE030H1C	XTCE040D00_ ④	XTOB024DC1 ④	XTAE040D00_024 ④
15.0	29.3	15 ④	HMCPE050K2C	XTCE040D00_ ④	XTOB032DC1 ④	XTAE040D00_032 ④
18.5	36.0	50	HMCPE100R3C	XTCE040D00_	XTOB040DC1	XTAE040D00_040
22.0	41.0	50	HMCPE100R3C	XTCE050D00_	XTOB057DC1	XTAE065D00_057
30.0	55.0	50	HMCPE100R3C	XTCE065D00_	XTOB065DC1	XTAE065D00_065
37.0	68.0	80	HMCPJ250D5L	XTCE080F00_	XTOB070GC1	XTAE080F00_070
45.0	81.0	80	HMCPJ250F5L	XTCE095F00_	XTOB100GC1	XTAE095F00_100
55.0	99.0	80	HMCPJ250G5L	XTCE115G00_	XTOB125GC1	XTAE115G00_125
75.0	134.	80	HMCPJ250W5L	XTCE150G00_	XTOB150GC1	XTAE150G00_150
90.0	161.	80	HMCPJ250W5L	XTCE185L22_	XTOB220LC1	XTAE185L22_220
110.	196.	70	HMCPL600N6G	XTCE300M22_	XTOT240C3S	XTAE300M22_240
132.	231.	70	HMCPL600R6G	XTCE300M22_	XTOT290C3S	XTAE300M22_290
160.	279.	70	HMCPL600X6G	XTCE300M22_	XTOT400C3S	XTAE300M22_400
200.	349.	70	HMCPL600P6G	XTCE400M22_	XTOT400C3S	XTAE400M22_400

② Underscore (_) indicates magnet coil code required. See **Table B-198**, **Page B-166**.

③ Use MMP contactor combination. See **Table B-190**, **Page B-162**.

④ Pending KEMA Certification. Consult Eaton for values.

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Table B-197. 525V Type 2 Coordination — Contactor and Overload Relay (Motor Starter) with Circuit Breaker ①

P (kW)	I_e (A)	I_q (kA)	Circuit Breaker	Contactor Catalogue Number ②	Overload Relay Catalogue Number	Assembled Starter Catalogue Number ②
0.37	1.02	50	③	③	③	③
0.55	1.22	50	③	③	③	③
0.75	1.66	50	③	③	③	③
1.10	2.22	50	③	③	③	③
1.50	3.16	50	③	③	③	③
2.20	4.25	50	③	③	③	③
3.00	5.60	50	③	③	③	③
4.00	7.50	50	③	③	③	③
5.50	9.90	50	③	③	③	③
7.50	14.1	50	③	③	③	③
11.0	19.3	50	③	③	③	③
15.0	23.5	50	③	③	③	③
18.5	27.2	50	③	③	③	③
22.0	37.0	50	③	③	③	③
30.0	45.0	50	③	③	③	③
37.0	54.0	50	HMCP100R3C	XTCE080F00_	XTOB070GC1	XTAE080F00_070
45.0	66.0	50	HMCPJ250D5L	XTCE080F00_	XTOB070GC1	XTAE080F00_070
55.0	79.0	50	HMCPJ250F5L	XTCE115G00_	XTOB100GC1	XTAE115G00_100
75.0	111.	50	HMCPJ250J5L	XTCE115G00_	XTOB125GC1	XTAE115G00_125
90.0	130.	50	HMCPJ250K5L	XTCE185L00_	XTOB160LC1	XTAE185L00_160
110.	159.	50	HMCPJ250W5L	XTCE185L00_	XTOB160LC1	XTAE185L00_160
132.	185.	50	HMCPL600N6G	XTCE185L22_	XTOB220LC1	XTAE185L22_220
160.	225.	50	HMCPL600R6G	XTCE225L22_	XTOB250LC1	XTAE225L22_250
200.	270.	50	HMCPL600X6G	XTCE300M22_	XTOT290C3S	XTAE300M22_290

① All Type 2 circuit breaker combinations are pending KEMA certification.
② Underscore (_) indicates magnet coil code required. See **Table B-198**, **Page B-166**.
③ Use MMP contactor combination. See **Table B-192**, **Page B-163**.

IMPORTANT: Additional testing at 480V, 525V, 600V, and 690V is in progress. Please contact Eaton Corporation for results.

Table B-198. Magnet Coil Suffix

Coil Voltage	Suffix Code
Frame A – B	
110V 50 Hz, 120V 60 Hz	**A**
220V 50 Hz, 240V 60 Hz	**B**
230V 50 Hz	**F**
24V 50/60 Hz	**T**
24V DC	**TD**
415V 50 Hz, 480V 60 Hz	**C**
550V 50 Hz, 600V 60 Hz	**D**
208V 60 Hz	**E**
190V 50 Hz, 220V 60 Hz	**G**
240V 50 Hz, 277V 60 Hz	**H**
380V 50 Hz, 440V 60 Hz	**L**
400V 50 Hz	**N**
380V 60 Hz	**P**
12V 50/60 Hz	**R**
24V 50 Hz	**U**
42V 50 Hz, 48V 60 Hz	**W**
48V 50 Hz	**Y**
120V DC	**AD**
220V DC	**BD**
12V DC	**RD**
48V DC	**WD**

Coil Voltage	Suffix Code
Frame C – F	
110V 50 Hz, 120V 60 Hz	**A**
220V 50 Hz, 240V 60 Hz	**B**
230V 50 Hz	**F**
24V 50/60 Hz	**T**
24 – 27V DC	**TD**
415V 50 Hz, 480V 60 Hz	**C**
550V 50 Hz, 600V 60 Hz	**D**
208V 60 Hz	**E**
190V 50 Hz, 220V 60 Hz	**G**
240V 50 Hz, 277V 60 Hz	**H**
380V 50 Hz, 440V 60 Hz	**L**
400V 50 Hz	**N**
380V 60 Hz	**P**
12V 50/60 Hz	**R**
24V 50 Hz	**U**
42V 50 Hz, 48V 60 Hz	**W**
48V 50 Hz	**Y**
110 – 130V DC	**AD**
200 – 240V DC	**BD**
12 – 14V DC	**RD**
48 – 60V DC	**WD**

Coil Voltage	Suffix Code
Frame G	
100 – 120V 50/60 Hz	**A**
190 – 240V 50/60 Hz	**B**
24V 50/60 Hz	**T**
24 – 27V DC	**TD**
480 – 500V 50/60 Hz	**C**
380 – 440V 50/60 Hz	**L**
42 – 48V 50/60 Hz	**W**
110 – 130V DC	**AD**
200 – 240V DC	**BD**
48 – 60V DC	**WD**
Frame L – M	
110 – 250V 40 – 60 Hz/DC	**A**
250 – 500V 40 – 60 Hz/DC	**C**
48 – 110V 40 – 60 Hz/DC	**Y**
24 – 48V DC	**TD**

Approvals for World Markets

Overview

The ***XT*** line of products is approved for use throughout the world, including the USA and Canada. As such, they can be used without restriction as devices for world markets.

The majority of countries permit the import of devices on the manufacturer's undertaking that they have been constructed in accordance with the pertinent specifications. In the USA and Canada, however, there is a legal obligation to obtain official approval. In these countries, devices and enclosures — sometimes even complete control systems — are tested and approved by independent bodies.

In Europe, there also used to be a legal obligation to obtain official approval for low-voltage switchgear and controlgear. For industrial control gear, this legal obligation has now been abolished, provided the devices have been manufactured and tested in accordance with harmonized European standards (such as IEC/EN 60947). There is then no longer a requirement for them to carry their country's own approval mark.

Since January 1997, all devices must conform to the European Low-Voltage Directive and, where intended for sale within the European Union, must carry the CE mark.

Europe
Conformité Européen
(CE)

This mark denotes that the device carrying it conforms to all relevant requirements and specifications. The mandatory application of this mark therefore enables the unrestricted use of marked devices within the European economic area.

Since January 1996, all devices sold within the European union must comply with the Electromagnetic Compatibility (EMC) Directive. ***XT*** has passed the required tests to these Directives, and the devices carry the CE mark, demonstrating compliance with the EMC Directive. *Because devices bearing the CE mark comply with the harmonized standards, approval and the associated marking is no longer required in the following countries:*

Belgium
Comité Electro-technique Belge
Belgisch Elektro-technisch Comité
(CEBEC)

Denmark
Danmarks Elektriske Materielkontrol
(DEMKO)

Finland
(FIMKO)

France
Union Technique de l'Electricité
(UTE)

Netherlands
Naamloze Vennootschap tot Keuring van Electrotechnische Materialien
(KEMA)

Norway
Norges Elektriske Materiellkontrol
(NEMKO)

Sweden
Svenska Elektriska Materiel-Kontrollanstalten
(SEMKO)

Switzerland
Schweizerischer Elektrotechischer Verein
(SEV)

Devices the USA and Canada have UL and CSA approval.

USA
Underwriters Laboratories
(UL)

Listing

Recognition

Canada
Canadian Standards Association
(CSA)

Recently introduced is the mandatory approval of electrical products for:

- Slovakia
- Poland
- South Africa
- China
- Russia
- Turkey
- Argentina

Marking is partly mandatory for these countries. The IEC rating data is accepted as in other European countries.

Approval is not mandatory in the Czech Republic and Hungary. The manufacturer's declaration of conformity is sufficient here.

Romania requires that components that are to be used in public buildings must be approved by the Romanian test authority ICECON.

Russia
Devices for Russia must bear the appropriate marking.

Russia
Goststandart
(GOST-R)

South Africa
ZA
SABS

Argentina

Selection of Devices

"Selection appropriate for export" does not mean merely meeting the requisite approvals and conformity to relevant specifications. The meaning of the term goes a great deal further by even including that equipment and installations must be designed to a concept with export in mind.

B

The following are important criteria for selecting switchgear suitable for export:

- **For motor-protective circuit-breakers**
  Use inherently short-circuit proof switches capable of controlling the highest prospective fault levels at the point of installation without the need for back-up protection.
  - ❑ **Advantage:**
    - – No restrictions whatsoever for installation
    - – Complete independence from the on-site protective system
    - – No problems getting spare parts
- **For circuit-breakers**
  Use types with visible contacts, quick-make and quick-break operation as standard. Use current-limiting circuit-breakers for high short-circuit levels. Selective switches are recommended for the selective graduation of networks.
  - ❑ **Advantage:**
    - – Independence from local accident prevention regulations requiring visible contacts, and safety faults caused by inexperienced operating personnel.
    - – The effects of short-circuits are kept to a minimum.
    - – Fuseless installations offer greater safety and reliability in plant operation. In the event of a fault, only the faulty section of the system is isolated.
- **For contactors**
  Use contactors whose entire range provides consistently reliable operation in the event of voltage drops (consistently down to 80% U_n should be aimed for) and whose contact system will not assume an indeterminate position either on closing or on opening in such conditions.
  - ❑ **Advantage:**
    - – During the electrification work in areas such as Africa and the Middle East, an insufficient voltage stability is — at least for a certain time — likely in many applications (for example due to long spur lines or small local generators). The use of devices that fulfill the above requirements will eliminate one of the main failure causes related to contactors.
- **For enclosures**
  Use insulated enclosures with transparent covers (i.e. "totally insulated" enclosures).
  - ❑ **Advantage:**
    - – Total insulation is the best possible protective measure from the user's point of view, avoiding reliance on the possibly doubtful skills of unknown installation personnel. Furthermore, protective measures based on earthing are often extremely difficult, if not impossible (in the Middle East, for example, due to the dryness of the ground).
    - – Insulated enclosures completely eliminate the need for any additional protection against corrosion. The transparent covers contribute significantly to the correct operation of a system, because switchgear operation can be monitored even with the doors or covers closed, thus virtually eliminating the possibility of these being left open through carelessness. The transparent cover is an important contribution to safety, especially where exports to areas of uncertain skills are concerned.
- **For overcurrent protective devices**
  Always use circuit-breakers and motor-protective circuit-breakers. Avoid fuses as far as possible.
  - ❑ **Advantage:**
    - – The operational reliability of a system is especially important for export contracts. Circuit-breakers and motor-protective circuit-breakers provide this reliability in full measure since they can be immediately reclosed once a fault has been cleared, they disconnect all poles, they have ideal protection through high tripping accuracy and they can be used for selective operation. Because they have no fuses or other consumables, they also greatly reduce the problem of obtaining replacement parts. The advantages of fuseless design for export are especially evident in this case. No complicated investigation is needed to find out which fusing system is used in the respective location and which specifications have to be followed to select the correct fuses. Often several different fuse systems with widely varying characteristics are used side-by-side in the same country. For the uninitiated, it July be almost impossible to find the right fuse in these circumstances. These problems do not arise where a circuit-breaker is used.
- **For main switches and safety switches**
  Use devices with positive contact separation and clear switch position indication.
  - ❑ **Advantage:**
    - – The mechanical coupling of the actuating element with the contacts ensues that the OFF position is indicated only when all main contacts are separated by the prescribed distance, and only in this position can the switch be padlocked. This ensures safety when carrying out maintenance and repair work on the installation or machinery.

Test Authorities

USA
USA
UL

Canada
CDN
CSA

Romania
RO
ICECON
ML PAT

Russia
RUS
GOST-R

South Africa
ZA
SABS

Slovakia
SK
SKTC

Poland
PL
BBJ-SEP

Turkey
TR
TSE

China
PRC
CCC

Ukraine
UA
Ukrain-GOST

Shipping Classifications

Germany
Germanischer Lloyd
(GL)

Great Britain
Lloyd's Register of
Shipping (LR)

France
Bureau Veritas (BV)

Russia
Russian Maritime
Register of Shipping
(RS)

Italy
Registro Italiano Navale
(RINA)

Norway
Det Norske Veritas
(DNV)

Poland
Polski Rejestr Statkow
(PRS)

Approvals for North America

In the USA, the legally established OSHA (Occupational Safety and Health Act) and the NEC (National Electrical Code) require the use of approved devices and systems.

In Canada, all electrical apparatus must comply with the CEC (Canadian Electrical Code), requires that all equipment and installations have CSA approval.

In addition to the normal UL and CSA approvals, the trade regulations originating from the NAFTA agreements allow the application for a joint UL and CSA approval. The devices then carry a logo that is recognized in both countries.

Some local inspectors and end users still refuse to accept the joint listing.

Table B-199. Approvals for North America

Type of Approval	Approval Mark
The device is UL- and CSA-approved as discrete device.	
The device is CSA-approved as discrete device.	
The device is UL-approved as discrete device.	
The device contains UL-approved components; its approval conditions must be maintained in use (UL Recognized). The device is CSA-approved as discrete device.	

IEC Utilization Categories

(See also IEC/EN 60947-1; 2.1.18/IEV 441-17-19)

A combination of specified requirements relating to the condition in which the switching device or fuse fulfills its purpose and selected to represent a characteristic group of real-life applications. The specified requirements may, for example, relate to the values of making and breaking capacity and other characteristic values, data concerning associated circuits and the applicable conditions of use and operational behavior.

B

Table B-200. Used in Technical Data & Formulas

Code	Descriptions
DF	Duty factory
$I_{\Delta n}$	Response value of earth-fault release
I_{cm}	Rated short-circuit making capacity
I_{cn}	Rated short-circuit breaking capacity
I_{cs}	Rated service short-circuit breaking capacity
I_{cu}	Rated ultimate short-circuit breaking capacity
I_{cw}	Rated short-time withstand current
I_e	Rated operational current
I_k	Transformer initial short-circuit AC current
I_L	Load monitoring response value
I_n	Rated current
I_{NT}	Transformer rated current
I_{PK}	Rated peak withstand current
I_q	Rated conditional short-circuit current
I_r	Overcurrent release set value
I_{rm}	Response value of non-delayed short-circuit release
I_i	Response value of non-delayed short-circuit release
I_{rmf}	Response value of fixed, non-delayed short-circuit release
I_{rmv}	Response value of short-time delayed short-circuit release
I_{sd}	Response value of short-time delayed short-circuit release
I_T	Response value of earth-fault release
I_g	Response value of earth-fault release
I_{th}	Conventional free air thermal current
I_{the}	Conventional thermal current of enclosed devices
I_u	Rated uninterrupted current
S_{NT}	Transformer rating
t_r	Time delay of overload release response
t_T	Time delay of earth-fault release response
t_g	Time delay of earth-fault release response
t_v	Time delay of short-circuit release response
U_c	Rated actuating voltage
U_e	Rated operational voltage
U_i	Rated insulation voltage
U_{imp}	Rated impulse withstand voltage
U_k	Transformer short-circuit voltage
U_s	Rated control voltage

Annex A (informative)

Table B-201. Examples of Utilization Categories for Low-Voltage Switchgear and Controlgear ①

Category	Typical Applications	Relevant IEC Product Standard
Nature of Current — AC		
AC-1	Non-inductive or slightly inductive loads, resistance furnaces	60947-4-1
AC-2	Slip-ring motors: starting, switching off	60947-4-1
AC-3	Squirrel-cage motors: starting, switching off motors during running	60947-4-1
AC-4	Squirrel-cage motors: starting, plugging ②, inching ③	60947-4-1
AC-5a	Switching of electric discharge lamp controls	60947-4-1
AC-5b	Switching of incandescent lamps	60947-4-1
AC-6a	Switching of transformers	60947-4-1
AC-6b	Switching of capacitor banks	60947-4-1
AC-7a	Slightly inductive loads for household appliances and similar applications	61095
AC-7b	Motor-loads for household applications	61095
AC-8a	Hermetic refrigerant compressor motor control with manual resetting of overload releases	60947-4-1
AC-8b	Hermetic refrigerant compressor motor control with automatic resetting of overload releases	60947-4-1
AC-12	Control of resistive loads and solid-state loads with isolation by optocouplers	60947-5-1
AC-12	Control of resistive loads and solid-state loads with optical isolation	60947-5-2
AC-13	Control of solid-state loads with transformer isolation	60947-5-1
AC-14	Control of small electromagnetic loads	60947-5-1
AC-15	Control of AC electromagnetic loads	60947-5-1
AC-20	Connecting and disconnecting under no-load conditions	60947-3
AC-21	Switching of resistive loads, including moderate overloads	60947-3
AC-22	Switching of mixed resistive and inductive loads, including moderate overloads	60947-3
AC-23	Switching of motor loads or other highly inductive loads	60947-3

① 60947-1 © IEC: 2004.

② By plugging is understood stopping or reversing the motor rapidly by reversing motor primary connections while the motor is running.

③ By inching (jogging) is understood energizing a motor once or repeatedly for short periods to obtain small movements of the driven mechanism.

Annex A (informative)

Table B-201. Examples of Utilization Categories for Low-Voltage Switchgear and Controlgear ① (Continued)

Category	Typical Applications	Relevant IEC Product Standard
Nature of Current — AC (Continued)		
AC-31	Non inductive or slightly inductive loads	60947-6-1
AC-33	Motor loads or mixed loads including motors, resistive loads and up to 30% incandescent lamp loads	60947-6-1
AC-35	Electric discharge lamp loads	60947-6-1
AC-36	Incandescent lamp loads	60947-6-1
AC-40	Distribution circuits comprising mixed resistive and reactive loads having a resultant inductive reactance	60947-6-2
AC-41	Non-inductive or slightly inductive loads, resistance furnaces	60947-6-2
AC-42	Slip-ring motors: starting, switching off	60947-6-2
AC-43	Squirrel-cage motors: starting, switching off motors during running	60947-6-2
AC-44	Squirrel-cage motors: starting, plugging ②, inching ③	60947-6-2
AC-45a	Switching of electric discharge lamp controls	60947-6-2
AC-45b	Switching of incandescent lamps	60947-6-2
AC-51	Non-inductive or slightly inductive loads, resistance furnaces	60947-4-3
AC-52a	Control of slip ring motor stators: 8 h duty with on-load currents for start, acceleration, run	60947-4-2
AC-52b	Control of slip ring motor stators: intermittent duty	60947-4-2
AC-53a	Control of squirrel-cage motors: 8 h duty with on-load currents for start, acceleration, run	60947-4-2
AC-53b	Control of squirrel-cage motors: intermittent duty	60947-4-2
AC-55a	Switching of electric discharge lamp controls	60947-4-3
AC-55b	Switching of incandescent lamps	60947-4-3
AC-56a	Switching of transformers	60947-4-3
AC-56b	Switching of capacitor banks	60947-4-3
AC-58a	Control of hermetic refrigerant compressor motors with automatic resetting of overload releases: 8 h duty with on-load currents for start, acceleration, run	60947-4-2
AC-58b	Control of hermetic refrigerant compressor motors with automatic resetting of overload releases: intermittent duty	60947-4-2
AC-140	Control of small electromagnetic loads with holding (closed) current ≤ 0,2 A, e.g. contactor relays	60947-5-2
Nature of Current — AC and DC		
A	Protection of circuits, with no rated short-time withstand current	60947-2
B	Protection of circuits, with a rated short-time withstand current	60947-2
Nature of Current — DC		
DC-1	Non-inductive or slightly inductive loads, resistance furnaces	60947-4-1
DC-3	Shunt-motors: starting, plugging ②, inching ③, Dynamic breaking of motors	60947-4-1
DC-5	Series-motors: starting, plugging ②, inching ③, Dynamic breaking of motors	60947-4-1
DC-6	Switching of incandescent lamps	60947-4-1
DC-12	Control of resistive loads and solid-state loads with isolation by optocouplers	60947-5-1
DC-12	Control of resistive loads and solid-state loads with optical isolation	60947-5-2
DC-13	Control of electromagnets	60947-5-1
DC-13	Control of electromagnets	60947-5-2
DC-14	Control of electromagnetic loads having economy resistors in circuit	60947-5-1
DC-20	Connecting and disconnecting under no-load conditions	60947-3
DC-21	Switching of resistive loads, including moderate overloads	60947-3
DC-22	Switching of mixed resistive and inductive loads, including moderate overloads (e.g. shunt motors)	60947-3
DC-23	Switching of motor loads or other highly inductive loads (e.g. series motors)	60947-3
DC-31	Resistive loads	60947-6-1
DC-33	Motor loads or mixed loads including motors	60947-6-1
DC-36	Incandescent lamp loads	60947-6-1
DC-40	Distribution circuits comprising mixed resistive and reactive loads having a resultant inductive reactance	60947-6-2
DC-41	Non-inductive or slightly inductive loads, resistance furnaces	60947-6-2
DC-43	Shunt-motors: starting, plugging ②, inching ③, Dynamic breaking of DC	60947-6-2
DC-45	Series-motors: starting, plugging ②, inching ③, Dynamic breaking of DC	60947-6-2
DC-46	Switching of incandescent lamps	60947-6-2

① 60947-1 © IEC: 2004.

② By plugging is understood stopping or reversing the motor rapidly by reversing motor primary connections while the motor is running.

③ By inching (jogging) is understood energizing a motor once or repeatedly for short periods to obtain small movements of the driven mechanism.

Motor Ratings Data

Ampere Rating of AC and DC Motors

Ampere ratings of motors vary somewhat, depending upon the type of motor. The values given below are for drip-proof, Class B insulated (T Frame) where available, 1.15 service factor, NEMA Design B motors. These values represent an average full load motor current which was calculated from the motor performance data published by several motor manufacturers. In the case of high torque squirrel cage motors, the ampere ratings will be at least 10% greater than the values given below.

Caution — These average ratings could be high or low for a specific motor and therefore heater coil selection on this basis always involves risk. For fully reliable motor protection, select heater coils on the basis of full load current rating as shown on the motor nameplate.

Ampere Ratings of Three-Phase, 60 Hz, AC Induction Motor

hp	Syn. Speed RPM	Current in Amperes					
		200V	230V	380V ①	460V	575V	2200V
1/4	1800	1.09	.95	.55	.48	.38	—
	1200	1.61	1.40	.81	.70	.56	—
	900	1.84	1.60	.93	.80	.64	—
1/3	1800	1.37	1.19	.69	.60	.48	—
	1200	1.83	1.59	.92	.80	.64	—
	900	2.07	1.80	1.04	.90	.72	—
1/2	1800	1.98	1.72	.99	.86	.69	—
	1200	2.47	2.15	1.24	1.08	.86	—
	900	2.74	2.38	1.38	1.19	.95	—
3/4	1800	2.83	2.46	1.42	1.23	.98	—
	1200	3.36	2.92	1.69	1.46	1.17	—
	900	3.75	3.26	1.88	1.63	1.30	—
1	3600	3.22	2.80	1.70	1.40	1.12	—
	1800	4.09	3.56	2.06	1.78	1.42	—
	1200	4.32	3.76	2.28	1.88	1.50	—
	900	4.95	4.30	2.60	2.15	1.72	—
1-1/2	3600	5.01	4.36	2.64	2.18	1.74	—
	1800	5.59	4.86	2.94	2.43	1.94	—
	1200	6.07	5.28	3.20	2.64	2.11	—
	900	6.44	5.60	3.39	2.80	2.24	—
2	3600	6.44	5.60	3.39	2.80	2.24	—
	1800	7.36	6.40	3.87	3.20	2.56	—
	1200	7.87	6.84	4.14	3.42	2.74	—
	900	9.09	7.90	4.77	3.95	3.16	—
3	3600	9.59	8.34	5.02	4.17	3.34	—
	1800	10.8	9.40	5.70	4.70	3.76	—
	1200	11.7	10.2	6.20	5.12	4.10	—
	900	13.1	11.4	6.90	5.70	4.55	—
5	3600	15.5	13.5	8.20	6.76	5.41	—
	1800	16.6	14.4	8.74	7.21	5.78	—
	1200	18.2	15.8	9.59	7.91	6.32	—
	900	18.3	15.9	9.60	7.92	6.33	—
7-1/2	3600	22.4	19.5	11.8	9.79	7.81	—
	1800	24.7	21.5	13.0	10.7	8.55	—
	1200	25.1	21.8	13.2	10.9	8.70	—
	900	26.5	23.0	13.9	11.5	9.19	—
10	3600	29.2	25.4	15.4	12.7	10.1	—
	1800	30.8	26.8	16.3	13.4	10.7	—
	1200	32.2	28.0	16.9	14.0	11.2	—
	900	35.1	30.5	18.5	15.2	12.2	—
15	3600	41.9	36.4	22.0	18.2	14.5	—
	1800	45.1	39.2	23.7	19.6	15.7	—
	1200	47.6	41.4	25.0	20.7	16.5	—
	900	51.2	44.5	26.9	22.2	17.8	—
20	3600	58.0	50.4	30.5	25.2	20.1	—
	1800	58.9	51.2	31.0	25.6	20.5	—
	1200	60.7	52.8	31.9	26.4	21.1	—
	900	63.1	54.9	33.2	27.4	21.9	—
25	3600	69.9	60.8	36.8	30.4	24.3	—
	1800	74.5	64.8	39.2	32.4	25.9	—
	1200	75.4	65.6	39.6	32.8	26.2	—
	900	77.4	67.3	40.7	33.7	27.0	—
30	3600	84.8	73.7	44.4	36.8	29.4	—
	1800	86.9	75.6	45.7	37.8	30.2	—
	1200	90.6	78.8	47.6	39.4	31.5	—
	900	94.1	81.8	49.5	40.9	32.7	—
40	3600	111	96.4	58.2	48.2	38.5	—
	1800	116	101	61.0	50.4	40.3	—
	1200	117	102	61.2	50.6	40.4	—
	900	121	105	63.2	52.2	41.7	—
50	3600	138	120	72.9	60.1	48.2	—
	1800	143	124	75.2	62.2	49.7	—
	1200	145	126	76.2	63.0	50.4	—
	900	150	130	78.5	65.0	52.0	—
60	3600	164	143	86.8	71.7	57.3	—
	1800	171	140	90.0	74.5	59.4	—
	1200	173	150	91.0	75.0	60.0	—
	900	177	154	93.1	77.0	61.5	—
75	3600	206	179	108	89.6	71.7	—
	1800	210	183	111	91.6	73.2	—
	1200	212	184	112	92.0	73.5	—
	900	222	193	117	96.5	77.5	—
100	3600	266	231	140	115	92.2	—
	1800	271	236	144	118	94.8	23.6
	1200	275	239	145	120	95.6	24.2
	900	290	252	153	126	101	24.8
125	3600	—	292	176	146	116	—
	1800	—	293	177	147	117	29.2
	1200	—	298	180	149	119	29.9
	900	—	305	186	153	122	30.9
150	3600	—	343	208	171	137	—
	1800	—	348	210	174	139	34.8
	1200	—	350	210	174	139	35.5
	900	—	365	211	183	146	37.0
200	3600	—	452	257	226	181	—
	1800	—	458	265	229	184	46.7
	1200	—	460	266	230	184	47.0
	900	—	482	279	241	193	49.4
250	3600	—	559	338	279	223	—
	1800	—	568	343	284	227	57.5
	1200	—	573	345	287	229	58.5
	900	—	600	347	300	240	60.5
300	1800	—	678	392	339	271	69.0
	1200	—	684	395	342	274	70.0
400	1800	—	896	518	448	358	91.8
500	1800	—	1110	642	555	444	116

① 380V 50 Hz.

Single-Phase AC Motors

Table 430.248. **Full-Load Currents in Amperes, Single-Phase Alternating-Current Motors**
The following values of full-load currents are for motors running at usual speeds and motors with normal torque characteristics. Motors built for especially low speeds or high torques July have higher full-load currents and multispeed motors will have full-load current varying with speed, in which case the nameplate current ratings shall be used.

The voltages listed are rated motor voltages. The currents listed shall be permitted for system voltage ranges of 110 to 120 and 220 to 240V.

hp	115V	200V	208V	230V
1/6	4.4	2.5	2.4	2.2
1/4	5.8	3.3	3.2	2.9
1/3	7.2	4.1	4.0	3.6
1/2	9.8	5.6	5.4	4.9
3/4	13.8	7.9	7.6	6.9
1	16	9.2	8.8	8
1-1/2	20	11.5	11	10
2	24	13.8	13.2	12
3	34	19.6	18.7	17
5	56	32.2	30.8	28
7-1/2	80	46	44	40
10	100	57.5	55	50

Three-Phase AC Motors

The following values of full-load currents are typical for motors running at speeds usual for belted motors and motors with normal torque characteristics.

Motors built for low speeds (1,200 RPM or less) or high torques July require more running current and multispeed motors will have full-load current varying with speed. In these cases the nameplate current rating shall be used.

The voltages listed are rated motor voltages. The currents listed shall be permitted for system voltage ranges of 110 to 120, 220 to 240, 440 to 480 and 550 to 600V.

DC Motors

Table 430.247. **Full-Load Current in Amperes, Direct-Current Motors**
The following values of full-load currents are for motors running at base speed.

Note: These are average direct-current quantities.

hp	Armature Voltage Rating ②		Ampere Capacity of Fuses for Motors	
			Recommended Values	
	120V	240V	120V	240V
1/4	3.1	1.6	5	3
1/3	4.1	2.0	5	3
1/2	5.4	2.7	7	3
3/4	7.6	3.8	10	5
1	9.5	4.7	15	7
1-1/2	13.2	6.6	20	10
2	17	8.5	25	12
3	25	12.2	30	15
5	40	20	50	25
7-1/2	58	29	80	40
10	76	38	100	50
15	—	55	—	75
20	—	72	—	100
25	—	89	—	125
30	—	106	—	150
40	—	140	—	200
50	—	173	—	250
60	—	206	—	275
75	—	255	—	350
100	—	341	—	500
125	—	425	—	600
150	—	506	—	—
200	—	675	—	—

② These are average direct-current quantities.

Table 430.250. **Full-Load Current Three-Phase Alternating-Current Motors**

hp	Induction Type Squirrel-Cage and Wound-Rotor Amperes							Synchronous Type Unity Power Factor ① Amperes			
	115V	200V	208V	230V	460V	575V	2300V	230V	460V	575V	2300V
1/2	4.4	2.5	2.4	2.2	1.1	.9	—	—	—	—	—
3/4	6.4	3.7	3.5	3.2	1.6	1.3	—	—	—	—	—
1	8.4	4.8	4.6	4.2	2.1	1.7	—	—	—	—	—
1-1/2	12.0	6.9	6.6	6.0	3.0	2.4	—	—	—	—	—
2	13.6	7.8	7.5	6.8	3.4	2.7	—	—	—	—	—
3	—	11.0	10.6	9.6	4.8	3.9	—	—	—	—	—
5	—	17.5	16.7	15.2	7.6	6.1	—	—	—	—	—
7-1/2	—	25.3	24.2	22	11	9	—	—	—	—	—
10	—	32.2	30.8	28	14	11	—	—	—	—	—
15	—	48.3	46.2	42	21	17	—	—	—	—	—
20	—	62.1	59.4	54	27	22	—	—	—	—	—
25	—	78.2	74.8	68	34	27	—	53	26	21	—
30	—	92	88	80	40	32	—	63	32	26	—
40	—	120	114	104	52	41	—	83	41	33	—
50	—	150	143	130	65	52	—	104	52	42	—
60	—	177	169	154	77	62	16	123	61	49	12
75	—	221	211	192	96	77	20	155	78	62	15
100	—	285	273	248	124	99	26	202	101	81	20
125	—	359	343	312	156	125	31	253	126	101	25
150	—	414	396	360	180	144	37	302	151	121	30
200	—	552	528	480	240	192	49	400	201	161	40
250	—	—	—	—	302	242	60	—	—	—	—
300	—	—	—	—	361	289	72	—	—	—	—
350	—	—	—	—	414	336	83	—	—	—	—
400	—	—	—	—	477	382	95	—	—	—	—
450	—	—	—	—	515	412	103	—	—	—	—
500	—	—	—	—	590	472	118	—	—	—	—

① For 90 and 80 percent power factor, the above figures shall be multiplied by 1.1 and 1.25 respectively.

Ampacities of Insulated Conductors (Based on 2005 NEC ①)

Table 310.16. **Allowable Ampacities of Insulated Conductors Rated 0 – 2000V, 60° – 90°C (140° – 194°F), Not More Than Three Current-Carrying Conductors in Raceway or Cable or Earth (Directly Buried), Based on Ambient Temperature of 30°C (86°F)**

Size	Temperature Rating of Conductor. See NEC Table 310-13.						Size
AWG kcmil	60°C (140°F)	75°C (167°F)	90°C (194°F)	60°C (140°F)	75°C (167°F)	90°C (194°F)	AWG kcmil
	Types TW†, UF†	Types FEPW†, RH†, RHW†, THHW†, THW†, THWN†, XHHW†, USE†, ZW†	Types TBS, SA, SIS, FEP†, FEPB†, MI, RHH†, RHW-2, THHN†, THHW†, THW-2†, THWN-2†, USE-2, XHH, XHHW†, XHHW-2, ZW-2	Types TW†, UF†	Types RH†, RHW†, THHW†, THW†, THWN†, XHHW†, USE†	Types TBS, SA, SIS, THHN†, THHW†, THW-2, THWN-2, RHH†, RHW-2, USE-2, XHH, XHHW, XHHW-2, ZW-2	
	Copper			Aluminum or Copper-Clad Aluminum			
18	—	—	14	—	—	—	—
16	—	—	18	—	—	—	—
14	20†	20†	25†	—	—	—	—
12	25†	25†	30†	20†	20†	25†	12
10	30	35†	40†	25	30†	35†	10
8	40	50	55	30	40	45	8
6	55	65	75	40	50	60	6
4	70	85	95	55	65	75	4
3	85	100	110	65	75	85	3
2	95	115	130	75	90	100	2
1	110	130	150	85	100	115	1
1/0	125	150	170	100	120	135	1/0
2/0	145	175	195	115	135	150	2/0
3/0	165	200	225	130	155	175	3/0
4/0	195	230	260	150	180	205	4/0
250	215	255	290	170	205	230	250
300	240	285	320	190	230	255	300
350	260	310	350	210	250	280	350
400	280	335	380	225	270	305	400
500	320	380	430	260	310	350	500
600	355	420	475	285	340	385	600
700	385	460	520	310	375	420	700
750	400	475	535	320	385	435	750
800	410	490	555	330	395	450	800
900	435	520	585	355	425	480	900
1000	455	545	615	375	445	500	1000
1250	495	590	665	405	485	545	1250
1500	520	625	705	435	520	585	1500
1750	545	650	735	455	545	615	1750
2000	560	665	750	470	560	630	2000

Correction Factors

Ambient Temp. °C	For Ambient Temperatures Other Than 30°C (86°F), Multiply the Allowable Ampacities Shown Above by the Appropriate Factor Shown Below						Ambient Temp. °F
21 – 25	1.08	1.05	1.04	1.08	1.05	1.04	70 – 77
26 – 30	1.00	1.00	1.00	1.00	1.00	1.00	78 – 86
31 – 35	.91	.94	.96	.91	.94	.96	87 – 95
36 – 40	.82	.88	.91	.82	.88	.91	96 – 104
41 – 45	.71	.82	.87	.71	.82	.87	105 – 113
46 – 50	.58	.75	.82	.58	.75	.82	114 – 122
51 – 55	.41	.67	.76	.41	.67	.76	123 – 131
56 – 60	—	.58	.71	—	.58	.71	132 – 140
61 – 70	—	.33	.58	—	.33	.58	141 – 158
71 – 80	—	—	.41	—	—	.41	159 – 176

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† Unless otherwise specifically permitted elsewhere in this *Code*, the overcurrent protection for conductor types marked with an obelisk (†) shall not exceed 15A for No. 14, 20A for No. 12 and 30A for No. 10 copper; or 15A for No. 12 and 25A for No. 10 aluminum and copper-clad aluminum after any correction factors for ambient temperature and number of conductors have been applied.

Table 310.15 (B)(z)(a). **Adjustment Factor for More Than Three Current-Carrying Conductors in Raceway or Cable**

Where the number of current-carrying conductors in a raceway or cable exceeds three, the allowable ampacities shall be reduced as shown in the following table:

Number of Current-Carrying Conductors	Percent of Values in Tables as Adjusted for Ambient Temperature if Necessary
4 – 6	80
7 – 9	70
10 – 20	50
21 – 30	45
31 – 40	40
41 and above	35

Where single conductors or multiconductor cables are stacked or bundled longer than 24 in. (610 mm) without maintaining spacing and are not installed in raceways, the allowable ampacity of each conductor shall be reduced as shown in the above table.

Ampacities of Insulated Conductors (Based on 2005 NEC ①) — Continued

Table 310.18. **Allowable Ampacities of Three Single Insulated Conductors Rated 0 – 2000V, 150° – 250°C (302° – 482°F), in Raceway or Cable Based on Ambient Air Temperature of 40°C (104°F)**

Size	Temperature Rating of Conductor. See NEC Table 310-13.				Size
AWG kcmil	150°C (302°F)	200°C (392°F)	250°C (482°F)	150°C (302°F)	AWG kcmil
	Type Z	Types FEP, FEPB, PFA	Types PFAH, TFE	Type Z	
	Copper		Nickel or Nickel-Coated Copper	Aluminum or Copper-Clad Aluminum	
14	34	36	39	—	14
12	43	45	54	30	12
10	55	60	73	44	10
8	76	83	93	57	8
6	96	110	117	75	6
4	120	125	148	94	4
3	143	152	166	109	3
2	160	171	191	124	2
1	186	197	215	145	1
1/0	215	229	244	169	1/0
2/0	251	260	273	198	2/0
3/0	288	297	308	227	3/0
4/0	332	346	361	260	4/0
250	—	—	—	—	250
300	—	—	—	—	300
350	—	—	—	—	350
400	—	—	—	—	400
500	—	—	—	—	500
600	—	—	—	—	600
700	—	—	—	—	700
750	—	—	—	—	750
800	—	—	—	—	800
1000	—	—	—	—	1000
1500	—	—	—	—	1500
2000	—	—	—	—	2000

Correction Factors

Ambient Temp. °C	For Ambient Temperatures Other Than 40°C (104°F), Multiply the Allowable Ampacities Shown Above By the Appropriate Factor Shown Below				Ambient Temp. °F
41 – 50	.95	.97	.98	.95	105 – 122
51 – 60	.90	.94	.95	.90	123 – 140
61 – 70	.85	.90	.93	.85	141 – 158
71 – 80	.80	.87	.90	.80	159 – 176
81 – 90	.74	.83	.87	.74	177 – 194
91 – 100	.67	.79	.85	.67	195 – 212
101 – 120	.52	.71	.79	.52	213 – 248
121 – 140	.30	.61	.72	.30	249 – 284
141 – 160	—	.50	.65	—	285 – 320
161 – 180	—	.35	.58	—	321 – 356
181 – 200	—	—	.49	—	357 – 392
201 – 225	—	—	.35	—	393 – 437

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B

Enclosure Ratings

The UL, NEMA and IEC organizations (and other international groups) define degrees of protection provided by electrical enclosures with respect to personnel, equipment within the housing and the ingress of water.

Subtle differences do exist between the test procedures and specifications of these organizations.

To claim ratings to NEMA specifications, the testing is performed and certified by the manufacturers themselves.

To comply to UL and IEC specifications, the manufacturers must submit product samples, materials used and other data to an independent testing laboratory before ratings can be claimed.

In addition, IEC "IP" ratings differ from NEMA in that they do not apply to protection against the risk of explosion or conditions such as humidity, corrosive gases, fungi or vermin. In addition, different parts of the equipment can have different degrees of protection and still comply.

Table B-202 is a comparison of the NEMA/UL/IEC enclosure specifications to be used as an approximate reference only. **Do not use the table to convert from IEC to NEMA designations.** For a definition of the ratings listed, see examples below and tables on **Page B-177**.

Table B-202. NEMA/UL/IEC Enclosure Type Cross-Reference — Approximate

NEMA Enclosure Rating	IP10	IP20	IP21	IP22	IP23	IP30	IP31	IP32	IP33	IP40	IP41	IP42	IP43	IP50	IP51	IP52	IP53	IP54	IP55	IP56	IP60	IP61	IP62	IP63	IP64	IP65	IP66	IP67	IP68
1	X	X	X	X	X																								
2	X	X	X	X	X																								
3	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X				
3R	X	X	X	X	X	X	X	X																					
3S	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X				
4	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
4X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
6	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
6P	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
12	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X				
13	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X				

Note: IEC 529 does not specify equivalents to NEMA Enclosure Types 7, 8, 9 or 10.

Table B-203. IEC Environmental Enclosure Ratings — Examples of Designations

IP 4 4

Characteristic letters
1st characteristic numeral
(See **Table B-204** Next Page)

2nd characteristic numeral
(See **Table B-205** Next Page)

An enclosure with this designation is protected against the penetration of solid objects greater than 1.0 mm and against splashing water.

IP 2 3

Characteristic letters
1st characteristic numeral
(See **Table B-204** Next Page)

2nd characteristic numeral
(See **Table B-205** Next Page)

An enclosure with this designation is protected against the penetration of solid objects greater than 12 mm and against rain.

Index of Enclosure Ratings — IEC

Table B-204. 1st Characteristic Numeral

Protected against contact and penetration of solid bodies.	
0	Not protected.
1	Protection against solid objects greater than 50 mm.
2	Protection against solid objects greater than 12 mm.
3	Protection against solid objects greater than 2.5 mm.
4	Protection against solid objects greater than 1.0 mm.
5	Dust protected.
6	Dust-tight.

Table B-205. 2nd Characteristic Numeral

0	Not protected.
1	Protection against dripping water.
2	Protection against dripping water when tilted up to 15 degrees.
3	Protection against rain.
4	Protection against splashing water.
5	Protection against water jets.
6	Protection against heavy seas.
7	Protection against the effects of immersion.
8	Protection against submersion.

NEMA Definitions Pertaining to Non-hazardous Locations — NEMA Standard 250

Type 1

Enclosures are intended for indoor use, primarily to provide a degree of protection against contact with the enclosed equipment.

Type 3

Enclosures are intended for outdoor use, primarily to provide a degree of protection against windblown dust, rain, sleet and external ice formation.

Type 3R

Enclosures are intended for outdoor use, primarily to provide a degree of protection against falling rain, sleet and external ice formation.

Type 4

Enclosures are intended for indoor or outdoor use, primarily to provide a degree of protection against windblown dust and rain, splashing water and hose-directed water.

Type 4X

Enclosures are intended for indoor or outdoor use, primarily to provide a degree of protection against corrosion, windblown dust and rain, splashing water and hose-directed water.

Type 6

Enclosures are intended for indoor or outdoor use, primarily to provide a degree of protection against the entry of water during occasional temporary submersion at a limited depth.

Type 6P

Enclosures are intended for indoor or outdoor use, primarily to provide a degree of protection against the entry of water during prolonged submersion at a limited depth.

Type 12

Enclosures are intended for indoor use, primarily to provide a degree of protection against dust, falling dirt, and dripping non-corrosive liquids.

Type 13

Enclosures are intended for indoor use, primarily to provide a degree of protection against dust, spraying of water, oil and non-corrosive coolant.

B

IEC, A Frame, Full Voltage
Non-reversing and Reversing Starters

Product Description

Eaton's Cutler-Hammer® Intelligent Technologies (***IT.***) Electro-Mechanical line of Contactors and Starters is the result of a substantial engineering, manufacturing and marketing effort involving extensive customer input, combined with new advances in solid-state technology. ***IT.*** Electro-Mechanical products have greatly increased functionality, significantly reduced size and utilize the benefits of 24V DC control. The exclusive Pulse Width Modulation (PWM) control and digital microprocessor generate a minimized DC value which reduces energy to the contact block and provides the most compact system available.

Standards and Certifications

- Designed to meet or exceed UL, IEC and CSA
- UL Listed: UL File #E1491, Guide #NLDX — Open, UL 508
- CSA Certified: CSA File #156828, Class #3211 04 Open, C22.2 No. 14-95
- IEC: A – F Frames, IEC 60947-4-1, EN 60947-4-1
- 45 mm – 76 mm CSA Certified for Elevator Duty
- CE
- EMC IEC 61000-4
- KEMA

ISO 9002 Certification

When you turn to Eaton's Cutler-Hammer Products, you turn to quality. The International Standards Organization (ISO) has established a series of standards acknowledged by 91 industrialized nations to bring harmony to the international quest for quality. The ISO Certification process covers 20 quality system elements in design, production and installation that must conform to achieve registration. This commitment to quality will result in increased product reliability and total customer satisfaction.

Publications

Pub. 49601	***IT.*** IEC Overload Relay 27 mm (A-Frame) Quick Setup Guide
Pub. 49602	***IT.*** IEC Overload Relay (B – F Frames) Quick Setup Guide
Pub. 49320	***IT.*** IEC Non-reversing Contactor 27 mm (A-Frame) Installation Guide
Pub. 49640	***IT.*** IEC Non-reversing Contactor 45 mm (B-Frame) Installation Guide
Pub. 49650	***IT.*** IEC Non-reversing Contactor 54 mm (C-Frame) Installation Guide
Pub. 49660	***IT.*** IEC Non-reversing Contactor 76 mm (D-Frame) Installation Guide
Pub. 49670	***IT.*** IEC Non-reversing Contactor 105 mm (E-Frame) Installation Guide
Pub. 49680	***IT.*** IEC Non-reversing Contactor 140 mm (F-Frame) Installation Guide
Pub. 49321	***IT.*** IEC Reversing Contactor 27 mm (A-Frame) Installation Guide
Pub. 49641	***IT.*** IEC Reversing Contactor 45 mm (B-Frame) Installation Guide
Pub. 49651	***IT.*** IEC Reversing Contactor 54 mm (C-Frame) Installation Guide
Pub. 49661	***IT.*** IEC Reversing Contactor 76 mm (D-Frame) Installation Guide
Pub. 49671	***IT.*** IEC Reversing Contactor 105 mm (E-Frame) Installation Guide
Pub. 49681	***IT.*** IEC Reversing Contactor 140 mm (F-Frame) Installation Guide
Pub. 49322	***IT.*** IEC Non-reversing Starter 27 mm (A-Frame) Installation Guide
Pub. 49642	***IT.*** IEC Non-reversing Starter 45 mm (B-Frame) Installation Guide
Pub. 49652	***IT.*** IEC Non-reversing Starter 54 mm (C-Frame) Installation Guide
Pub. 49662	***IT.*** IEC Non-reversing Starter 76 mm (D-Frame) Installation Guide
Pub. 49672	***IT.*** IEC Non-reversing Starter 105 mm (E-Frame) Installation Guide
Pub. 49682	***IT.*** IEC Non-reversing Starter 140 mm (F-Frame) Installation Guide
Pub. 49323	***IT.*** IEC Reversing Starter 27 mm (A-Frame) Installation Guide
Pub. 49643	***IT.*** IEC Reversing Starter 45 mm (B-Frame) Installation Guide
Pub. 49653	***IT.*** IEC Reversing Starter 54 mm (C-Frame) Installation Guide
Pub. 49663	***IT.*** IEC Reversing Starter 76 mm (D-Frame) Installation Guide
Pub. 49673	***IT.*** IEC Reversing Starter 105 mm (E-Frame) Installation Guide
Pub. 49683	***IT.*** IEC Reversing Starter 140 mm (F-Frame) Installation Guide
Pub. 49645	***IT.*** IEC Non-reversing Contactor Assembly Instructions (45 mm & 54 mm)
Pub. 49665	***IT.*** IEC Non-reversing Contactor & Starter Assembly Instructions (76 mm Contactor/Starter) (45 mm & 54 mm Starter)
Pub. 49325	***IT.*** IEC Non-reversing Starter 27 mm (A-Frame) Assembly Instructions
Pub. 49685	***IT.*** IEC Non-reversing Starter 140 mm (F-Frame) Assembly Instructions
Pub. 49326	***IT.*** IEC Reversing Starter 27 mm (A-Frame) Assembly Instructions
Pub. 49686	***IT.*** IEC Reversing Contactor & Starter 140 mm (F-Frame) Assembly Instructions
Pub. 49410	***IT.*** Front Mountable Auxiliary Contact Assembly Instructions
Pub. 49415	***IT.*** IEC Contact Blocks (B – E Frames)
Pub. 282782	***IT.*** Sinking Control Input Connections
Pub. 282719	***IT.*** Overload Trip/Alarm Output (Sourcing/Sinking)

Catalogue Number Selection (Open Components)

Table B-206. *IT.* Electro-Mechanical Catalogue Numbering System

E 101 A 12 A 3 A

Standard
E = IEC

Configuration (Open Type)
02N = FVNR Coil Controller
03N = FVR Coil Controller
04N = Contact Block
05N = Solid-State Non-reversing Overload Relay
06N = Solid-State Reversing Overload Relay
101 = FVNR Starter
111 = FVNR Contactor
501 = FVR Starter
511 = FVR Contactor

Frame Size
A = 27 mm
B = 45 mm
C = 54 mm
D = 76 mm
E = 105 mm
F = 140 mm

Designator (IEC)	
(A) **06** = 6 Amps. **09** = 9 Amps. **12** = 12 Amps.	(E) **12** = 125 Amps. **16** = 160 Amps. **20** = 200 Amps.
(B) **18** = 18 Amps. **25** = 25 Amps. **32** = 32 Amps.	(F) **25** = 250 Amps. **31** = 315 Amps. **42** = 420 Amps.
(C) **40** = 40 Amps. **50** = 50 Amps.	**XC** = Coil Controller **XR** = Overload
(D) **65** = 65 Amps. **85** = 85 Amps. **10** = 100 Amps.	

Overload Type
A = Standard (3-phase, 45 mm – 105 mm; 1- or 3-phase, 27 mm)
N = Contactor or Not Applicable

Pole Selection
3 = 3-Pole

Overload Amperes Adjustment	
(27 mm) **A** = .25 – .8 **B** = .59 – 1.9 **C** = 1.4 – 4.4 **D** = 2.8 – 9.0 **E** = 3.8 – 12	(76 mm) **F** = 5.0 – 16 **H** = 8.4 – 27 **K** = 14 – 45 **N** = 31 – 100
(45 mm) **A** = .25 – .8 **B** = .59 – 1.9 **C** = 1.4 – 4.4 **D** = 2.8 – 9.0 **G** = 6.3 – 20 **J** = 10 – 32	(105 mm) **K** = 14 – 45 **M** = 28 – 90 **P** = 42 – 135 **R** = 63 – 200
(54 mm) **A** = .25 – .8 **B** = .59 – 1.9 **C** = 1.4 – 4.4 **D** = 2.8 – 9.0 **F** = 5.0 – 16 **H** = 8.4 – 27 **L** = 16 – 50	(140 mm) **P** = 42 – 135 **S** = 84 – 270 **T** = 131 – 420 **X** = Contact Block, Coil Controller, Contactor or Not Applicable

Note: When using the Catalogue Numbering System for Eaton's Cutler-Hammer *IT.* Electro-Mechanical products, care should be exercised to assure that the Catalogue Number for the Overload Relay aligns with the *IT.* Contact Block selected for type, frame size and ampacity, if purchased as separate components. **Example**: Select an **E05N_XR_3A** *IT.* Overload Relay for an IEC non-reversing application or an **E06N_XR_3A** for an IEC reversing application.

Examples:

E02NCXCXNN — FVNR Coil Controller, 54 mm
E04NB18X3N — Contact Block, 45 mm, 18 Amps
E05NCXRL3A — Solid-State Non-reversing Overload Relay, 16 – 50 Amps
E101B32J3A — FVNR B-Frame Starter, 32 Amps, with Solid-State Overload, 10 – 32 Amps
E111F25X3N — FVNR F-Frame Contactor, 250 Amps
E501D10K3A — FVR D-Frame Starter, 100 Amps, with Solid-State Overload, 14 – 45 Amps
E511B18X3N — FVR B-Frame Contactor, 18 Amps

B

Contents

IEC Full Voltage Non-reversing Contactor, C-Frame
Cat. No. E111C50X3N

IEC Full Voltage Reversing Contactor, D-Frame
Cat. No. E511D10X3N

Product Description

The Cutler-Hammer® Intelligent Technologies (***IT.***) Electro-Mechanical Contactor from Eaton's electrical business consists of an ***IT.*** Electro-Mechanical Contact Block and ***IT.*** Electro-Mechanical Coil Controller as a Full Voltage Non-reversing (FVNR) or Full Voltage Reversing (FVR) device. B-Frame (45 mm) to E-Frame (105 mm) Contact Blocks combined with Coil Controllers (factory or field assembled) are stand-alone Contactors. Only the A-Frame (27 mm) and F-Frame (140 mm) Contactors have internal factory assembled coil controllers.

Also available are the ***IT.*** Manual and Combination Motor Controllers which combine a Manual Motor Protector, Wiring Connector Link and ***IT.*** Contactor.

Application Description

When selecting an IEC Contactor, the user must consider the specific load, utilization category and required electrical life. Actual application life July vary depending on environmental conditions and duty cycle.

Features

- 115V AC – 600V AC, 1/4 – 350 hp/ 3/4 – 250 kW, 50/60 Hz
- 24V DC Coil Control — safe, reliable global standard
- Most compact DC operated contactors available — e.g., A-Frame 27 mm wide, 7-1/2 hp @ 12A, 460V
- Frame sizes (mm): 27, 45, 54, 76, 105, 140
- No laminations, shading coils or magnet noise
- -40 to 149°F (-40 to 65°C) operating temperature
- No seal in auxiliary contacts required — control wiring is not needed between the contactor and overload relay
- Unique Pulse Width Modulated (PWM) coil controller minimizes energy and coil power consumption
- Conformal coated PWM board (coil controller) for environmental toughness
- Microprocessor-based control
- 95% humidity non-condensing (99% consult factory)
- Easily accessible mounting feet for panel mounting
- High immunity to ESD, harmonics — minimal Total Harmonic Distortion
- Front and side mounted Auxiliary Contacts: 1NO, 1NC, 2NO, 2NC, 1NO/1NC and logic level
- Built-in logic to provide either 2- or 3-wire control, eliminating the need to provide and wire auxiliary contacts to seal in and interlock the contactor coils
- Easy field assembly of control wiring — plug and unplug lockable control connector
- DIN rail mounting, 6 – 100A (A – D Frames)
- Common accessories
- Long-life silver nickel (A – B Frames) and silver tin oxide (C – F Frames) contacts provide excellent conductivity and superior resistance to welding and arc erosion
- Environmentally friendly materials
- IP20 Finger Protection
- Low wattage coils and minimal heat dissipation

Reversing Contactors

- Includes Reversing Power Wiring and bus bars
- Mounting plates for B-Frame (45 mm) to E-Frame (105 mm)
- Exclusive internal electronic interlock for reversing
- Unique coil controller energizes both forward and reverse contactors — one control point for wiring

B

Product Selection

When Ordering

Select required contactor by amp rating, frame size, kW/hp, voltage and non-reversing or reversing.

Non-reversing Contactors

Note:

- An **E111** (45 – 105 mm) consists of an **E04N** (Contact Block) and an **E02N** (FVNR Coil Controller), factory assembled.
- An **E111** (27 and 140 mm) has an internal coil controller, factory assembled.

IEC A-Frame FVNR Contactor
Cat. No. E111A12X3N

IEC B-Frame FVNR Contactor
Cat. No. E111B32X3N

Table B-207. 3-Pole DC-Operated Full Voltage Non-reversing Contactors ① (A – F Frames)

Max. AC-3 Amp. Rating 480V AC (Ie)	IEC 60947-4-1 AC-1 Thermal Current 480V AC and (I_{th})	Frame Size ②	Maximum kW Rating @ Ue (V) 50/60 Hz						Maximum UL Horsepower (hp) 50/60 Hz							3-Pole Open Type	
			3-Phase						1-Phase		3-Phase						
			220V/ 240V	380V	400V/ 415V	440V/ 460V	500V	550V/ 575V	115V/ 120V	220V/ 230V	200V/ 208V	230V/ 240V	380V/ 415V	460V/ 480V	575V/ 600V	Catalogue Number	Price
6	12	A	1.1	2.2	2.2	3	3	3	1/4	1/2	1	1-1/2	3	3	3	**E111A06X3N**	
9	16	A	2.2	4	4	4	4	4	1/3	1	2	2	3	5	5	**E111A09X3N**	
12	20	A	3	5.5	5.5	6.5	6.5	6.5	1/2	2	3	3	5	7-1/2	7-1/2	**E111A12X3N**	
18	25	B	4	7.5	9	9	10	11	1	3	5	5	10	10	10	**E111B18X3N**	
25	40	B	5.5	12.5	12.5	13	15	15	2	3	5	7-1/2	10	15	15	**E111B25X3N**	
32	50	B	9	15	15	18.5	18.5	18.5	2	5	7-1/2	10	15	20	20	**E111B32X3N**	
40	63	C	11	18.5	22	22	22	25	3	7-1/2	10	10	20	25	25	**E111C40X3N**	
50	85	C	12.5	22	25	30	30	33	3	10	15	15	25	30	30	**E111C50X3N**	
65	100	D	18.5	30	33	40	40	45	5	10	20	20	40	50	50	**E111D65X3N**	
85	115	D	25	45	45	51	51	55	7-1/2	15	25	30	50	60	60	**E111D85X3N**	
100	130	D	25	51	55	59	59	63	10	20	30	30	50	75	75	**E111D10X3N**	
125	200	E	33	63	63	80	80	80	10	25	40	40	60	100	100	**E111E12X3N**	
160	225	E	45	80	80	100	100	100	15	30	50	60	75	125	125	**E111E16X3N**	
200	250	E	59	100	110	110	110	132	—	40	60	75	100	150	150	**E111E20X3N**	
250	300	F	75	132	140	160	160	160	—	50	75	100	150	200	200	**E111F25X3N**	
315	375	F	90	160	160	200	200	200	—	—	100	125	150	250	250	**E111F31X3N**	
420	450	F	110	220	220	257	257	257	—	—	150	150	200	350	350	**E111F42X3N**	

① 24V DC coil voltage.

② **Frame Size**

A = 27 mm
B = 45 mm
C = 54 mm
D = 76 mm
E = 105 mm
F = 140 mm

Note:

- If required, accessories are available starting on **Page B-194**.
- Integral solid-state auxiliary hold-in circuit.
- 3 main contacts.
- See **Table B-216** for 24V DC power supply requirements.
- Control inputs (P, F) are rated 24V DC (3 – 5 mA).

Accessories ..... **Pages B-194 – B-197**
Technical Data ..... **Pages B-190 – B-193**
Dimensions ..... **Pages B-200 – B-202**
Discount Symbol **MC7**

B

Reversing Contactors

Note:

- An **E511** (45 – 105 mm) consists of two **E04N** (Contact Blocks), an **E03N** (FVR Coil Controller), Mechanical Interlock, Fanning Strips and Mounting Plate, factory assembled.
- An **E511F** (140 mm) consists of two **E111F** (Contactors), Mechanical Interlock, Crossover Bus Bars and Wiring Harness, factory assembled.
- An **E511A** (27 mm) Contactor is factory assembled only.

IEC B-Frame FVR Contactor
Cat. No. E511B32X3N

Table B-208. 3-Pole DC-Operated Full Voltage Reversing Contactors ① (A – F Frames)

Max. AC-3 Amp. Rating 480V AC (Ie)	IEC 60947-4-1 AC-1 Thermal Current 480V AC and (I_{th})	Frame Size ②	Maximum kW Rating @ Ue (V) 50/60 Hz						Maximum UL Horsepower (hp) 50/60 Hz							3-Pole Open Type	
			3-Phase						1-Phase		3-Phase						
			220V/ 240V	380V	400V/ 415V	440V/ 460V	500V	550V/ 575V	115V/ 120V	220V/ 230V	200V/ 208V	230V/ 240V	380V/ 415V	460V/ 480V	575V/ 600V	Catalogue Number	Price
6	12	A	1.1	2.2	2.2	3	3	3	1/4	1/2	1	1-1/2	3	3	3	**E511A06X3N**	
9	16	A	2.2	4	4	4	4	4	1/3	1	2	2	3	5	5	**E511A09X3N**	
12	20	A	3	5.5	5.5	6.5	6.5	6.5	1/2	2	3	3	5	7-1/2	7-1/2	**E511A12X3N**	
18	25	B	4	7.5	9	9	10	11	1	3	5	5	10	10	10	**E511B18X3N**	
25	40	B	5.5	12.5	12.5	13	15	15	2	3	5	7-1/2	10	15	15	**E511B25X3N**	
32	50	B	9	15	15	18.5	18.5	18.5	2	5	7-1/2	10	15	20	20	**E511B32X3N**	
40	63	C	11	18.5	22	22	22	25	3	7-1/2	10	10	20	25	25	**E511C40X3N**	
50	85	C	12.5	22	25	30	30	33	3	10	15	15	25	30	30	**E511C50X3N**	
65	100	D	18.5	30	33	40	40	45	5	10	20	20	40	50	50	**E511D65X3N**	
85	115	D	25	45	45	51	51	55	7-1/2	15	25	30	50	60	60	**E511D85X3N**	
100	130	D	25	51	55	59	59	63	10	20	30	30	50	75	75	**E511D10X3N**	
125	200	E	33	63	63	80	80	80	10	25	40	40	60	100	100	**E511E12X3N**	
160	225	E	45	80	80	100	100	100	15	30	50	60	75	125	125	**E511E16X3N**	
200	250	E	59	100	110	110	110	132	—	40	60	75	100	150	150	**E511E20X3N**	
250	300	F	75	132	140	160	160	160	—	50	75	100	150	200	200	**E511F25X3N**	
315	375	F	90	160	160	200	200	200	—	—	100	125	150	250	250	**E511F31X3N**	
420	450	F	110	220	220	257	257	257	—	—	150	150	200	350	350	**E511F42X3N**	

① 24V DC coil voltage.

② **Frame Size**

A = 27 mm
B = 45 mm
C = 54 mm
D = 76 mm
E = 105 mm
F = 140 mm

Note:

- If required, accessories are available starting on **Page B-194**.
- Integral solid-state auxiliary hold-in circuit.
- 3 main contacts.
- See **Table B-216** for 24V DC power supply requirements.
- Control inputs (P, F, R) are rated 24V DC (3 – 5 mA).

Accessories ..... **Pages B-194 – B-197**
Technical Data ..... **Pages B-190 – B-193**
Dimensions ..... **Pages B-200 – B-202**
Discount Symbol **MC7**

Contents

IEC FVNR Starter, C Frame Cat. No. E101C50L3A

Overload Relay with Cover Open — FLA/Trip Class/ Phase Protection Dial

TEST Button ***RESET Button***

Overload Relay with Cover Closed (front view)

IEC Full Voltage Reversing Starter, E Frame Cat. No. E501E20R3A

Product Description

The Cutler-Hammer® Intelligent Technologies (***IT.***) Electro-Mechanical Starter from Eaton's electrical business consists of an ***IT.*** Electro-Mechanical Contact Block or Contactor and ***IT.*** Electro-Mechanical Solid-State Overload Relay as a Full Voltage Non-reversing (FVNR) or Full Voltage Reversing (FVR) device. A-Frame (27 mm) to F-Frame (140 mm) Starters are factory or field assembled.

Features

- 115V AC – 600V AC, 1/4 – 350 hp/ .75 – 250 kW, .25A – 420A Overload Amperes range, 50/60 Hz
- 24V DC coil control power — safe, reliable, global standard
- Unique Pulse Width Modulated (PWM) coil controller minimizes energy and coil power consumption
- Microprocessor based control
- Phase loss and current unbalance protection, user selectable
- Standard user-selectable Trip Class 10 (factory default), 20 or 30 — no individual part numbers — no programming software
- Ambient compensated
- Motor temperature and power-up protection with thermal memory
- Easily accessible mounting feet for panel mounting
- For use on the load side of an Adjustable Frequency Drive, consult the factory.
- LED status indication — trip, trip class, motor thermal state, reset, overload state
- Unique "Alarm without Trip" option for critical must run applications
- Lockable overload cover protects against unauthorized adjustment and reset functions
- No control wiring needed between contactor and overload relay — eliminates seal in auxiliary contacts
- Minimal heat — no full voltage coils
- -40° to 149°F (-40° to 65°C) operating temperature
- Wide 3.2:1 current adjustment range
- Exclusive internal 24-bit floating point math calculations with RMS calibrated current measurement
- High immunity to ESD, harmonics — minimal Total Harmonic Distortion
- IP20 Finger Protection
- Motor running thermal utilization indication
- Manual, Automatic or Remote Reset
- Easy field assembly of control wiring — plug and unplug lockable control connector
- DIN rail mounting, 6A – 100A (A – D Frames)
- Communication Interface with Starter Network Adapter Product (SNAP)
- 2- or 3-wire control
- Solid-state alarm output indication
- Front and side mounted Auxiliary Contacts: 1NO, 1NC, 2NO, 2NC, 1NO/1NC, logic level (1NO/1NC)
- Type 2 Coordination
- Conformal coated PWM overload board for environmental toughness

Reversing Starters

- Includes Reversing Power Wiring and bus bars
- Mounting plates for B-Frame (45 mm) to E-Frame (105 mm)
- Built-in electronic interlock for FVR units
- Unique overload board energizes both forward and reverse starters — one control point for wiring

Product Selection

When Ordering

Select required Starter by kW/hp rating, voltage, phase and overload adjustment range (amperes).

B

IEC A-Frame, Full Voltage Non-reversing Starter

IEC B-Frame, Full Voltage Non-reversing Starter

Non-reversing Starters

Table B-209. Full Voltage Non-reversing DC-Operated, Open Type Starters (A – B Frames), with 3-Pole Solid-State Overload Protection

Max. AC-3 Amp. Rating 480V AC (Ie)	Overload Adjustment Range (Amperes)	Maximum kW Rating @ Ue (V) 50/60 Hz						Maximum UL Horsepower (hp) Rating 50/60 Hz							Catalogue Number	Price
		3-Phase						1-Phase		3-Phase						
		220V/ 240V	380V	400V/ 415V	460V	500V	550V/ 575V	115V/ 120V	220V/ 230V	200V/ 208V	230V/ 240V	380V/ 415V	460V/ 480V	575V/ 600V		
A-Frame 27 mm																
6	.25 – .8 .59 – 1.9 1.4 – 4.4 2.8 – 9.0 3.8 – 12	1.1	2.2	2.2	3	3	3	1/4	1/2	1	1-1/2	3	3	3	**E101A06A3A** **E101A06B3A** **E101A06C3A** **E101A06D3A** **E101A06E3A**	
9	.25 – .8 .59 – 1.9 1.4 – 4.4 2.8 – 9.0 3.8 – 12	2.2	4	4	4	4	4	1/3	1	2	2	3	5	5	**E101A09A3A** **E101A09B3A** **E101A09C3A** **E101A09D3A** **E101A09E3A**	
12	.25 – .8 .59 – 1.9 1.4 – 4.4 2.8 – 9.0 3.8 – 12	3	5.5	5.5	6.5	6.5	6.5	1/2	2	3	3	5	7-1/2	7-1/2	**E101A12A3A** **E101A12B3A** **E101A12C3A** **E101A12D3A** **E101A12E3A**	
B-Frame 45 mm																
18	.25 – .8 .59 – 1.9 1.4 – 4.4 2.8 – 9.0 6.3 – 20 10 – 32	4	7.5	9	9	10	11	—	—	5	5	10	10	10	**E101B18A3A** **E101B18B3A** **E101B18C3A** **E101B18D3A** **E101B18G3A** **E101B18J3A**	
25	.25 – .8 .59 – 1.9 1.4 – 4.4 2.8 – 9.0 6.3 – 20 10 – 32	5.5	12.5	12.5	13	15	15	—	—	5	7-1/2	10	15	15	**E101B25A3A** **E101B25B3A** **E101B25C3A** **E101B25D3A** **E101B25G3A** **E101B25J3A**	
32	.25 – .8 .59 – 1.9 1.4 – 4.4 2.8 – 9.0 6.3 – 20 10 – 32	9	15	15	18.5	18.5	18.5	—	—	7-1/2	10	15	20	20	**E101B32A3A** **E101B32B3A** **E101B32C3A** **E101B32D3A** **E101B32G3A** **E101B32J3A**	

Note:

- If required, accessories are available starting on **Page B-194**.
- A-Frame 27 mm ***IT.*** Starter is for 1 – or 3-phase applications.
- The standard B – F-Frame (45 mm to 140 mm) ***IT.*** Starters are for 3-phase applications.
- Class 10 (factory default), 20 and 30 Trip Times see **Figure B-141** on **Page B-193**.
- An **E101** (27 – 105 mm) consists of an **E04N** (Contact Block) or **E111A** (Contactor) and an **E05N** (Non-reversing Overload Relay), factory assembled. An **E101F** (140 mm) consists of an **E111** (Contactor) and an **E05N** (Non-reversing Overload Relay), factory assembled.
- See **Table B-216** for 24V DC power supply requirements.
- Control inputs (P, F, 1) are rated 24V DC (3 – 5 mA).

Accessories ..... **Pages B-194 – B-197**
Technical Data ..... **Pages B-190 – B-193**
Dimensions ..... **Pages B-203 – B-205**
Discount Symbol **MC7**

IEC C-Frame
FVNR Starter

Non-reversing Starters, continued

Table B-210. Full Voltage Non-reversing DC-Operated, Open Type Starters (C – D Frames), with 3-Pole Solid-State Overload Protection

Max. AC-3 Amp. Rating 480V AC (Ie)	Overload Adjustment Range (Amperes)	Maximum kW Rating @ Ue (V) 50/60 Hz						Maximum UL Horsepower (hp) Rating 50/60 Hz							Catalogue Number	Price
		3-Phase						1-Phase		3-Phase						
		220V/ 240V	380V	400V/ 415V	460V	500V	550V/ 575V	115V/ 120V	220V/ 230V	200V/ 208V	230V/ 240V	380V/ 415V	460V/ 480V	575V/ 600V		
C-Frame 54 mm																
40	.25 – .8 .59 – 1.9 1.4 – 4.4 2.8 – 9.0 5.0 – 16 8.4 – 27 16 – 50	11	18.5	22	22	22	25	—	—	10	10	20	25	25	**E101C40A3A** **E101C40B3A** **E101C40C3A** **E101C40D3A** **E101C40F3A** **E101C40H3A** **E101C40L3A**	
50	.25 – .8 .59 – 1.9 1.4 – 4.4 2.8 – 9.0 5.0 – 16 8.4 – 27 16 – 50	12.5	22	25	30	30	33	—	—	15	15	25	30	30	**E101C50A3A** **E101C50B3A** **E101C50C3A** **E101C50D3A** **E101C50F3A** **E101C50H3A** **E101C50L3A**	
D-Frame 76 mm																
65	5.0 – 16 8.4 – 27 14 – 45 31 – 100	18.5	30	33	40	40	45	—	—	20	20	40	50	50	**E101D65F3A** **E101D65H3A** **E101D65K3A** **E101D65N3A**	
85	5.0 – 16 8.4 – 27 14 – 45 31 – 100	25	45	45	51	51	55	—	—	25	30	50	60	60	**E101D85F3A** **E101D85H3A** **E101D85K3A** **E101D85N3A**	
100	5.0 – 16 8.4 – 27 14 – 45 31 – 100	25	51	55	59	59	63	—	—	30	30	50	75	75	**E101D10F3A** **E101D10H3A** **E101D10K3A** **E101D10N3A**	

Note:

- If required, accessories are available starting on **Page B-194**.
- A-Frame 27 mm ***IT.*** Starter is for 1 – or 3-phase applications.
- The standard B – F-Frame (45 mm to 140 mm) ***IT.*** Starters are for 3-phase applications.
- Class 10 (factory default), 20 and 30TripTimes see **Figure B-141** on **Page B-193**.
- An **E101** (27 – 105 mm) consists of an **E04N** (Contact Block) or **E111A** (Contactor) and an **E05N** (Non-reversing Overload Relay), factory assembled. An **E101F** (140 mm) consists of an **E111** (Contactor) and an **E05N** (Non-reversing Overload Relay), factory assembled.
- See **Table B-216** for 24V DC power supply requirements.
- Control inputs (P, F, 1) are rated 24V DC (3 – 5 mA).

Accessories ..... **Pages B-194 – B-197**
Technical Data ..... **Pages B-190 – B-193**
Dimensions ..... **Pages B-203 – B-205**
Discount Symbol **MC7**

B

IEC F- and E-Frame (105 mm and 140 mm)
Full Voltage Non-reversing Starters

Non-reversing Starters, continued

Table B-211. Full Voltage Non-reversing DC-Operated, Open Type Starters (E – F Frames) with 3-Pole Solid-State Overload Protection

Max. AC-3 Amp. Rating 480V AC (Ie)	Overload Adjustment Range (Amperes)	Maximum kW Rating @ Ue (V) 50/60 Hz						Maximum UL Horsepower (hp) Rating 50/60 Hz							Catalogue Number	Price
		3-Phase						1-Phase		3-Phase						
		220V/ 240V	380V	400V/ 415V	460V	500V	550V/ 575V	115V/ 120V	220V/ 230V	200V/ 208V	230V/ 240V	380V/ 415V	460V/ 480V	575V/ 600V		
E-Frame 105 mm																
125	14 – 45 28 – 90 42 – 135 63 – 200	33	63	63	80	80	80	—	—	40	40	60	100	100	**E101E12K3A** **E101E12M3A** **E101E12P3A** **E101E12R3A**	
160	14 – 45 28 – 90 42 – 135 63 – 200	45	80	80	100	100	100	—	—	50	60	75	125	125	**E101E16K3A** **E101E16M3A** **E101E16P3A** **E101E16R3A**	
200	14 – 45 28 – 90 42 – 135 63 – 200	59	100	110	110	110	132	—	—	60	75	100	150	150	**E101E20K3A** **E101E20M3A** **E101E20P3A** **E101E20R3A**	
F-Frame 140 mm																
250	42 – 135 84 – 270 131 – 420	75	132	140	160	160	160	—	—	75	100	150	200	200	**E101F25P3A** **E101F25S3A** **E101F25T3A**	
315	42 – 135 84 – 270 131 – 420	90	160	160	200	200	200	—	—	100	125	150	250	250	**E101F31P3A** **E101F31S3A** **E101F31T3A**	
420	42 – 135 84 – 270 131 – 420	110	220	220	257	257	257	—	—	150	150	200	350	350	**E101F42P3A** **E101F42S3A** **E101F42T3A**	

Note:

- If required, accessories are available starting on **Page B-194**.
- A-Frame 27 mm ***IT.*** Starter is for 1 – or 3-phase applications.
- The standard B – F-Frame (45 mm to 140 mm) ***IT.*** Starters are for 3-phase applications.
- Class 10 (factory default), 20 and 30TripTimes see **Figure B-141** on **Page B-193**.
- An **E101** (27 – 105 mm) consists of an **E04N** (Contact Block) or **E111A** (Contactor) and an **E05N** (Non-reversing Overload Relay), factory assembled. An **E101F** (140 mm) consists of an **E111** (Contactor) and an **E05N** (Non-reversing Overload Relay), factory assembled.
- See **Table B-216** for 24V DC power supply requirements.
- Control inputs (P, F, 1) are rated 24V DC (3 – 5 mA).

Accessories ..... **Pages B-194 – B-197**
Technical Data ..... **Pages B-190 – B-193**
Dimensions ..... **Pages B-203 – B-205**
Discount Symbol **MC7**

IEC A-Frame
Reversing Starter

Reversing Starters

Table B-212. Full Voltage Reversing DC-Operated, Open Type Starters (A – B Frames) with 3-Pole Solid-State Overload Protection ①

Max. AC-3 Amp. Rating 480V AC (Ie)	Overload Adjustment Range (Amperes)	Maximum kW Rating @ Ue (V) 50/60 Hz						Maximum UL Horsepower (hp) Rating 50/60 Hz							Catalogue Number	Price
		3-Phase						1-Phase		3-Phase						
		220V/ 240V	380V	400V/ 415V	440V/ 460V	500V	550V/ 575V	115V/ 120V	220V/ 230V	200V/ 208V	230V/ 240V	380V/ 415V	460V/ 480V	575V/ 600V		
A-Frame 27 mm																
6	.25 – .8 .59 – 1.9 1.4 – 4.4 2.8 – 9.0 3.8 – 12	1.1	2.2	2.2	3	3	3	1/4	1/2	1	1-1/2	3	3	3	**E501A06A3A** **E501A06B3A** **E501A06C3A** **E501A06D3A** **E501A06E3A**	
9	.25 – .8 .59 – 1.9 1.4 – 4.4 2.8 – 9.0 3.8 – 12	2.2	4	4	4	4	4	1/3	1	2	2	3	5	5	**E501A09A3A** **E501A09B3A** **E501A09C3A** **E501A09D3A** **E501A09E3A**	
12	.25 – .8 .59 – 1.9 1.4 – 4.4 2.8 – 9.0 3.8 – 12	3	5.5	5.5	6.5	6.5	6.5	1/2	2	3	3	5	7-1/2	7-1/2	**E501A12A3A** **E501A12B3A** **E501A12C3A** **E501A12D3A** **E501A12E3A**	
B-Frame 45 mm																
18	.25 – .8 .59 – 1.9 1.4 – 4.4 2.8 – 9.0 6.3 – 20 10 – 32	4	7.5	9	9	10	11	—	—	5	5	10	10	10	**E501B18A3A** **E501B18B3A** **E501B18C3A** **E501B18D3A** **E501B18G3A** **E501B18J3A**	
25	.25 – .8 .59 – 1.9 1.4 – 4.4 2.8 – 9.0 6.3 – 20 10 – 32	5.5	12.5	12.5	13	15	15	—	—	5	7-1/2	10	15	15	**E501B25A3A** **E501B25B3A** **E501B25C3A** **E501B25D3A** **E501B25G3A** **E501B25J3A**	
32	.25 – .8 .59 – 1.9 1.4 – 4.4 2.8 – 9.0 6.3 – 20 10 – 32	9	15	15	18.5	18.5	18.5	—	—	7-1/2	10	15	20	20	**E501B32A3A** **E501B32B3A** **E501B32C3A** **E501B32D3A** **E501B32G3A** **E501B32J3A**	

① 24V DC coil voltage.

Note:

- If required, accessories are available starting on **Page B-194**.
- A-Frame 27 mm ***IT.*** Starter is for 1 – or 3-phase applications.
- The standard B – F-Frame (45 mm to 140 mm) ***IT.*** Starters are for 3-phase applications.
- An **E501** (45 – 105 mm) consists of two **E04N** (Contact Blocks), an **E06N** (Reversing Overload Relay), Fanning Strips, Mechanical Interlock and Mounting Plate. An **E501F** (140 mm) consists of two **E111F** (Contactors), an **E06NF** (Reversing Overload Relay), Mechanical Interlock, Crossover Bus Bars and Reversing Wiring Harness.
- An **E501A** (27 mm) consists of an **E511A** (Contactor) and **E06NA** (Reversing Overload Relay).
- See **Table B-216** for 24V DC power supply requirements.
- Control inputs (P, F, R, 1) are rated 24V DC (3 – 5 mA).

Accessories ..... **Pages B-194 – B-197**
Technical Data ..... **Pages B-190 – B-193**
Dimensions ..... **Pages B-203 – B-205**
Discount Symbol **MC7**

B

IEC C-Frame
Reversing Starter

Reversing Starters, continued

Table B-213. Full Voltage Reversing DC-Operated, Open Type Starters (C – D Frames) with 3-Pole Solid-State Overload Protection ①

Max. AC-3 Amp. Rating 480V AC (Ie)	Overload Adjustment Range (Amperes)	Maximum kW Rating @ Ue (V) 50/60 Hz						Maximum UL Horsepower (hp) Rating 50/60 Hz							Catalogue Number	Price
		3-Phase						1-Phase		3-Phase						
		220V/ 240V	380V	400V/ 415V	440V/ 460V	500V	550V/ 575V	115V/ 120V	220V/ 230V	200V/ 208V	230V/ 240V	380V/ 415V	460V/ 480V	575V/ 600V		
C-Frame 54 mm																
40	.25 – .8 .59 – 1.9 1.4 – 4.4 2.8 – 9.0 5.0 – 16 8.4 – 27 16 – 50	11	18.5	22	22	22	25	—	—	10	10	20	25	25	**E501C40A3A** **E501C40B3A** **E501C40C3A** **E501C40D3A** **E501C40F3A** **E501C40H3A** **E501C40L3A**	
50	.25 – .8 .59 – 1.9 1.4 – 4.4 2.8 – 9.0 5.0 – 16 8.4 – 27 16 – 50	12.5	22	25	30	30	33	—	—	15	15	25	30	30	**E501C50A3A** **E501C50B3A** **E501C50C3A** **E501C50D3A** **E501C50F3A** **E501C50H3A** **E501C50L3A**	
D-Frame 76 mm																
65	5.0 – 16 8.4 – 27 14 – 45 31 – 100	18.5	30	33	40	40	45	—	—	20	20	40	50	50	**E501D65F3A** **E501D65H3A** **E501D65K3A** **E501D65N3A**	
85	5.0 – 16 8.4 – 27 14 – 45 31 – 100	25	45	45	51	51	55	—	—	25	30	50	60	60	**E501D85F3A** **E501D85H3A** **E501D85K3A** **E501D85N3A**	
100	5.0 – 16 8.4 – 27 14 – 45 31 – 100	25	51	55	59	59	63	—	—	30	30	50	75	75	**E501D10F3A** **E501D10H3A** **E501D10K3A** **E501D10N3A**	

① 24V DC coil voltage.

Note:

- If required, accessories are available starting on **Page B-194**.
- A-Frame 27 mm ***IT.*** Starter is for 1 – or 3-phase applications.
- The standard B – F-Frame (45 mm to 140 mm) ***IT.*** Starters are for 3-phase applications.
- An **E501** (45 – 105 mm) consists of two **E04N** (Contact Blocks), an **E06N** (Reversing Overload Relay), Fanning Strips, Mechanical Interlock and Mounting Plate. An **E501F** (140 mm) consists of two **E111F** (Contactors), an **E06NF** (Reversing Overload Relay), Mechanical Interlock, Crossover Bus Bars and Reversing Wiring Harness.
- An **E501A** (27 mm) consists of an **E511A** (Contactor) and **E06NA** (Reversing Overload Relay).
- See **Table B-216** for 24V DC power supply requirements.
- Control inputs (P, F, R, 1) are rated 24V DC (3 – 5 mA).

Accessories ..... **Pages B-194 – B-197**
Technical Data ..... **Pages B-190 – B-193**
Dimensions ..... **Pages B-203 – B-205**
Discount Symbol **MC7**

IEC E-Frame FVR Starter
Cat. No. E501E20P3A

IEC F-Frame
Reversing Starter

Reversing Starters, continued

Table B-214. Full Voltage Reversing DC-Operated, Open Type Starters (E – F Frames) with 3-Pole Solid-State Overload Protection ①

Max. AC-3 Amp. Rating 480V AC (Ie)	Overload Adjustment Range (Amperes)	Maximum kW Rating @ Ue (V) 50/60 Hz						Maximum UL Horsepower (hp) Rating 50/60 Hz							Catalogue Number	Price
		3-Phase						1-Phase		3-Phase						
		220V/ 240V	380V	400V/ 415V	440V/ 460V	500V	550V/ 575V	115V/ 120V	220V/ 230V	200V/ 208V	230V/ 240V	380V/ 415V	460V/ 480V	575V/ 600V		
E-Frame 105 mm																
125	14 – 45 28 – 90 42 – 135 63 – 200	33	63	63	80	80	80	—	—	40	40	60	100	100	**E501E12K3A** **E501E12M3A** **E501E12P3A** **E501E12R3A**	
160	14 – 45 28 – 90 42 – 135 63 – 200	45	80	80	100	100	100	—	—	50	60	75	125	125	**E501E16K3A** **E501E16M3A** **E501E16P3A** **E501E16R3A**	
200	14 – 45 28 – 90 42 – 135 63 – 200	59	100	110	110	110	132	—	—	60	75	100	150	150	**E501E20K3A** **E501E20M3A** **E501E20P3A** **E501E20R3A**	
F-Frame 140 mm																
250	42 – 135 84 – 270 131 – 420	75	132	140	160	160	160	—	—	75	100	150	200	200	**E501F25P3A** **E501F25S3A** **E501F25T3A**	
315	42 – 135 84 – 270 131 – 420	90	160	160	200	200	200	—	—	100	125	150	250	250	**E501F31P3A** **E501F31S3A** **E501F31T3A**	
420	42 – 135 84 – 270 131 – 420	110	220	220	257	257	257	—	—	150	150	200	350	350	**E501F42P3A** **E501F42S3A** **E501F42T3A**	

① 24V DC coil voltage.

Note:

- If required, accessories are available on **Page B-194**.
- A-Frame 27 mm *IT.* Starter is for 1 – or 3-phase applications.
- The standard B – F-Frame (45 mm to 140 mm) *IT.* Starters are for 3-phase applications.
- An **E501** (45 – 105 mm) consists of two **E04N** (Contact Blocks), an **E06N** (Reversing Overload Relay), Fanning Strips, Mechanical Interlock and Mounting Plate. An **E501F** (140 mm) consists of two **E111F** (Contactors), an **E06NF** (Reversing Overload Relay), Mechanical Interlock, Crossover Bus Bars and Reversing Wiring Harness.
- An **E501A** (27 mm) consists of an **E511A** (Contactor) and **E06NA** (Reversing Overload Relay).
- See **Table B-216** for 24V DC power supply requirements.
- Control inputs (P, F, R 1) are rated 24V DC (3 – 5 mA).

Accessories ..... **Pages B-194 – B-197**
Technical Data ..... **Pages B-190 – B-193**
Dimensions ..... **Pages B-203 – B-205**
Discount Symbol **MC7**

B

Table B-215. Specifications

Description	A-Frame 27 mm	B-Frame 45 mm	C-Frame 54 mm	D-Frame 76 mm	E-Frame 105 mm	F-Frame 140 mm
Overall Dimensions in Inches (mm) ① — *w* x *h* x *d*						
Non-reversing Contactor	1.1 x 3.0 x 2.4 (27 x 75 x 60)	1.8 x 4.4 x 2.4 (45 x 111 x 60)	2.1 x 4.4 x 2.4 (54 x 113 x 60)	3.0 x 5.9 x 3.1 (76 x 150 x 79)	4.1 x 8.0 x 3.5 (105 x 203 x 90)	5.6 x 14.0 x 7.0 (142 x 356 x 178)
Reversing Contactor	2.4 x 2.9 x 2.4 (60 x 73 x 60)	3.8 x 5.9 x 2.7 (96 x 149 x 69)	4.5 x 5.9 x 2.6 (114 x 149 x 67)	6.2 x 7.4 x 3.3 (158 x 188 x 84)	8.5 x 9.5 x 3.8 (216 x 242 x 97)	11.7 x 17.2 x 7.0 (297 x 437 x 178)
Non-reversing Starter	1.2 x 4.0 x 3.1 (31 x 102 x 79)	1.8 x 5.0 x 2.5 (45 x 127 x 63)	2.1 x 5.4 x 2.5 (54 x 138 x 63)	3.0 x 5.9 x 3.1 (76 x 150 x 79)	4.1 x 8.0 x 3.5 (105 x 203 x 90)	5.7 x 19.4 x 7.0 (145 x 493 x 178)
Reversing Starter	2.5 x 4.0 x 3.1 (64 x 102 x 79)	3.8 x 5.9 x 2.7 (96 x 149 x 69)	4.5 x 5.9 x 2.6 (114 x 149 x 67)	6.2 x 7.4 x 3.3 (158 x 188 x 84)	8.5 x 9.5 x 3.8 (216 x 242 x 97)	11.8 x 21.0 x 7.0 (300 x 533 x 178)
Mounting Hole Spacing in Inches (mm) — *w* x *h*						
Non-reversing Contactor	.76 x 2.64 (19.2 x 67)	1.33 x 4.0 (33.8 x 101)	1.46 x 4.10 (37 x 104)	.94 x 2.87 (24 x 73)	1.33 x 4.13 (33.8 x 105)	1.75 x 13.0 (44.5 x 330)
Reversing Contactor	1.31 x 2.52 (33.2 x 64)	3.15 x 5.35 (80 x 136)	3.15 x 5.35 (80 x 136)	5.51 x 6.89 (140 x 175)	7.87 x 9.06 (200 x 230)	7.82 x 13.0 (199 x 330)
Non-reversing Starter	.76 x 3.70 (19.3 x 94.0)	1.33 x 4.62 (33.8 x 117.3)	1.46 x 5.04 (37 x 128)	.94 x 2.87 (24 x 73)	1.33 x 4.13 (33.8 x 105)	1.75 x 18.3 (44.5 x 465)
Reversing Starter	1.31 x 3.52 (33.2 x 89.4)	3.15 x 5.35 (80 x 136)	3.15 x 5.35 (80 x 136)	5.51 x 6.89 (140 x 175)	7.87 x 9.06 (200 x 230)	7.82 x 18.3 (198.5 x 465)
Mounting Positions						
Panel-Vertical	Yes	Yes	Yes	Yes	Yes	Yes
Panel-Horizontal	Yes	Yes	Yes	Yes	Yes	Yes
DIN Rail Mountable	Yes	Yes ②	Yes ②	Yes ②	No	No
Weights in Lb. (kg)						
Non-reversing Contactor	.3 (.14)	.7 (.31)	.9 (.42)	2.8 (1.27)	6.7 (3.05)	20 (9.1)
Reversing Contactor	.6 (.27)	1.9 (.86)	2.6 (1.17)	6.9 (3.13)	16.9 (7.67)	48 (21.8)
Non-reversing Starter	.4 (.18)	.9 (.40)	1.2 (.53)	2.9 (1.32)	7.1 (3.20)	27 (12.3)
Reversing Starter	.9 (.40)	2.0 (.90)	2.6 (1.20)	7.1 (3.20)	16.8 (7.60)	55 (25.0)
Mechanical Operating Rate						
Maximum	6/sec	3/sec	3/sec	2/sec	2/sec	1/sec
Mechanical Life						
	23,000,000	10,000,000	10,000,000	8,000,000	8,000,000	5,000,000
Humidity						
③	95% non-condensing	95% non-condensing	95% non-condensing	95% non-condensing	95% non-condensing	95% non-condensing
Insulation Voltage (Ui)						
	690V	690V	690V	690V	690V	690V
Impulse Withstand Voltage (Uimp)						
	6 kV	6 kV	6 kV	6 kV	6 kV	6 kV
Max. Current Ratings @ 480V Ue						
AC-1 Thermal Current (Ith)	20	50	85	130	250	450
AC-2, AC-3 Operating Current (Ie)	12	32	50	100	200	420
AC-4 Operating Current (Ie)	10	32	50	100	150	270
Max. Current Ratings @ 600V Ue						
AC-1 Thermal Current (Ith)	16	40	68	104	200	360
AC-2, AC-3 Operating Current (Ie)	9	25	40	80	160	336
AC-4 Operating Current (Ie)	8	18	34	68	120	150

① Auxiliaries add approximately 1.0" (25 mm) to depth for single, 1.2" (30 mm) for dual.
② Non-reversing contactors and starters only.
③ 99% by application.

Table B-215. Specifications (Continued)

Description	A-Frame 27 mm	B-Frame 45 mm	C-Frame 54 mm	D-Frame 76 mm	E-Frame 105 mm	F-Frame 140 mm
Finger Protection						
Front	IP20	IP20	IP20	IP20	IP20	IP20
At Terminals	IP20	IP10	IP10	IP00	IP00	IP00
At Terminals with max. size wire installed	IP20	IP20	IP10	IP10	IP00	IP00
Terminals L1, L2, L3/T1, T2, T3 ①						
1 Wire per Terminal (stranded or solid)	16 – 12 AWG (1.5 – 2.5 mm^2)	14 – 8 AWG (1.5 – 10 mm^2)	14 – 4 AWG (1.5 – 16 mm^2)	14 – 1 AWG (1.5 – 35 mm^2)	6 – 250 MCM (16 – 120 mm^2)	4 – 750 MCM (25 – 420 mm^2)
2 Wires per Terminal (stranded or solid)	16 – 12 AWG ② (1.5 – 2.5 mm^2)	14 – 10 AWG (1.5 – 4 mm^2)	14 – 6 AWG (1.5 – 16 mm^2)	14 – 2 AWG (1.5 – 25 mm^2)	6 – 3/0 AWG (16 – 70 mm^2)	1/0 – 300 MCM (50 – 150 mm^2)
Strip Length	.32" (8 mm)	.45" (11 mm)	.5" (12 mm)	.7" (18 mm)	.8" (21 mm)	1.5" (40 mm)
Torque (max.)	18 lb-in (2.0 Nm)	20 lb-in (2.2 Nm) for 14 – 10 AWG (1.5 – 6 mm^2); 25 lb-in (2.8 Nm) for 8 AWG (10 mm^2)	35 lb-in (4.0 Nm) for 14 – 10 AWG (1.5 – 6 mm^2); 40 lb-in (4.5 Nm) for 8 AWG (10 mm^2); 45 lb-in (5.0 Nm) for 6 – 4 AWG (16 mm^2)	45 lb-in (5.0 Nm) for Single 14 – 8 AWG (1.5 – 10 mm^2); 100 lb-in (11 Nm) for Single 6 – 1 AWG (16 – 35 mm^2) and Dual Wire Combinations	250 lb-in (28 Nm)	550 lb-in (62 Nm)
Driver Flat Hex Key	 PZ1 or 3/16" —	 — 2.5 mm	 — 3 mm	 — 4 mm [5/32"]	 — 8 mm [5/16"]	 — 8 mm [5/16"]
Operation Performance						
Coil Voltage (nominal)	24V DC	24V DC	24V DC	24V DC	24V DC	24V DC
Coil Operating Voltage Range (VDC)	20 – 28	20 – 28	20 – 28	20 – 28	20 – 28	20 – 28
Control Terminals						
(- and +) 1 Wire per Terminal	14 – 12 AWG ③ (1.5 – 2.5 mm^2)	14 – 12 AWG (1.5 – 2.5 mm^2)	14 – 12 AWG (1.5 – 2.5 mm^2)	14 – 12 AWG (1.5 – 2.5 mm^2)	14 – 12 AWG (1.5 – 2.5 mm^2)	14 – 12 AWG (1.5 – 2.5 mm^2)
(- and +) 2 Wires per Terminal	14 AWG ③ (1.5 mm^2)	14 AWG (1.5 mm^2)	14 AWG (1.5 mm^2)	14 AWG (1.5 mm^2)	14 AWG (1.5 mm^2)	14 AWG (1.5 mm^2)
(P, F, R, 1, 2, 3) 1 Wire per Terminal	22 – 12 AWG ③ (0.5 – 2.5 mm^2)	22 – 12 AWG (0.5 – 2.5 mm^2)	22 – 12 AWG (0.5 – 2.5 mm^2)	22 – 12 AWG (0.5 – 2.5 mm^2)	22 – 12 AWG (0.5 – 2.5 mm^2)	22 – 12 AWG (0.5 – 2.5 mm^2)
(P, F, R, 1, 2, 3) 2 Wires per Terminal	18 – 14 AWG ③ (0.75 – 1.5 mm^2)	18 – 14 AWG (0.75 – 1.5 mm^2)	18 – 14 AWG (0.75 – 1.5 mm^2)	18 – 14 AWG (0.75 – 1.5 mm^2)	18 – 14 AWG (0.75 – 1.5 mm^2)	18 – 14 AWG (0.75 – 1.5 mm^2)
Torque (max.)	4.5 lb-in (.5 Nm)	4.5 lb-in (.5 Nm)	4.5 lb-in (.5 Nm)	4.5 lb-in (.5 Nm)	4.5 lb-in (.5 Nm)	4.5 lb-in (.5 Nm)
Strip Length	.25 (7 mm)	.25 (7 mm)	.25 (7 mm)	.25 (7 mm)	.25 (7 mm)	.25 (7 mm)
Driver (Flat)	.13 (3.5 mm) ③	.13 (3.5 mm)	.13 (3.5 mm)	.13 (3.5 mm)	.13 (3.5 mm)	.13 (3.5 mm)
Temperature ④						
Operating	-40° to +149°F (-40° to +65°C)	-40° to +149°F (-40° to +65°C)	-40° to +149°F (-40° to +65°C)	-40° to +149°F (-40° to +65°C)	-40° to +149°F (-40° to +65°C)	-40° to +149°F (-40° to +65°C)
Storage	-58° to +176°F (-50° to +80°C)	-58° to +176°F (-50° to +80°C)	-58° to +176°F (-50° to +80°C)	-58° to +176°F (-50° to +80°C)	-58° to +176°F (-50° to +80°C)	-58° to +176°F (-50° to +80°C)

① Use Class B 75°C copper wire only (or 90°C copper wire sized for 75°C operation per NEC).

② Not applicable to starter T1, T2, T3. One wire per terminal.

③ 27 mm Non-reversing Starter —
- (- and +) 14 AWG (1.5 mm^2) only
- P, F, 1, A: 1 wire per terminal only, 22 – 14 AWG (0.5 – 1.5 mm^2)
- Torque: 2.25 lb-in (.25 Nm)
- Driver: .09 in (2.5 mm)

④ Consult Eaton for higher ratings.

B

Table B-215. Specifications (Continued)

Description	A-Frame 27 mm	B-Frame 45 mm	C-Frame 54 mm	D-Frame 76 mm	E-Frame 105 mm	F-Frame 140 mm
Environmental						
Shock/Vibration	15G/5G	15G/5G	15G/5G	15G/5G	15G/5G	15G/5G ③
Pollution Degree ① EMC Environment	2 1	2 1	2 1	2 1	2 1	2 1
Altitude ① in Ft. (m)	6600 (2000)	6600 (2000)	6600 (2000)	6600 (2000)	6600 (2000)	6600 (2000)
Pull-In Time (mS) @ 24V DC						
Excl. DebounceTime	15	15	15	25	30	70 – 200
Incl. DebounceTime	67 ②	75	80	88	95	120 – 250 ②
Dropout Time (mS) @ 24V DC						
Excl. DebounceTime	8	5	5	12	15	50 – 150
Incl. DebounceTime	60 ②	65	70	75	80	70 – 200 ②

① Consult factory for higher ratings.
② Add 50 mS for 27 and 140 mm Starters for additional microprocessor.
③ The Non-reversing Starter requires the use of all six mounting screws for the maximum rating.

Note: At other temperatures expressed in °C, for either inrush or sealed, use the 20°C value from the table in the following:

$$\text{Watts} = W_{20}\,[1.1 - .005(T)] \text{ and}$$
$$\text{Amps} = A_{20}\,[1.1 - .005(T)]$$

For example, inrush requirements for a D-Frame Starter at -25°C would be:
Watts = 130 [1.1 – .005 (-25)] = 160
Amps = 5.4 [1.1 – .005 (-25)] = 6.6

Note:
- Response time for Control Inputs = DebounceTime
- The time between operating forward and reverse must be greater than the DebounceTime.

Table B-216. 24V DC Power Supply Requirements @ 68°F (20°C) (see Note at bottom left) ④⑤

Contactor/Starter Size		Sealed In		Inrush		
Catalogue Number ⑥	Frame/ mm	Wattage	Amps	Wattage	Amps	Duration (mS)
E_11A__X3N	A/27	1.3	.054	20	.83	30
E_01A___3A	A/27	2.0	.083	20	.83	30
E_11B__X3N	B/45	3.7	.15	80	3.3	50
E_01B___3A	B/45	3.2	.13	80	3.3	50
E_11C__X3N	C/54	4.2	.18	90	3.8	50
E_01C___3A	C/54	3.6	.15	90	3.8	50
E__1D___3_	D/76	5.0	.21	130	5.4	65
E__1E___3_	E/105	5.6	.23	140	5.8	85
E__1F__X3N	F/140	12.0	.50	200	8.3	250
E_01F___3A	F/140	13.0	.54	200	8.3	250

④ The sum of the sealed in values of the contactors/starters must be less than the power supply sealed in value. The largest contactor/starter inrush value must be less than the power supply inrush value.
⑤ Refer to **Tab I** for further power supply information.
⑥ _ indicates missing digit/character of the Catalogue Number; July have multiple values.

Electrical Life — AC-1, AC-2, AC-3 and AC-4 Utilization Categories

Table B-217. Utilization Categories

The International Electrotechnical Commission (IEC) has developed utilization categories for contactors and auxiliary contacts. The categories describe the type of electrical load and the conditions for making and breaking the current.	
Category	**Typical Application**
AC-1	Non-inductive or slightly inductive loads: Resistance furnaces, heating.
AC-2	Slip-ring motors: Starting and stopping of running motors
AC-3	Squirrel cage motors: Starting, switching off motors during running (motors in most industrial applications typically fall into this category).
AC-4	Squirrel cage motors: Starting, plugging ①, inching ② (very few applications in industry are totally AC-4).

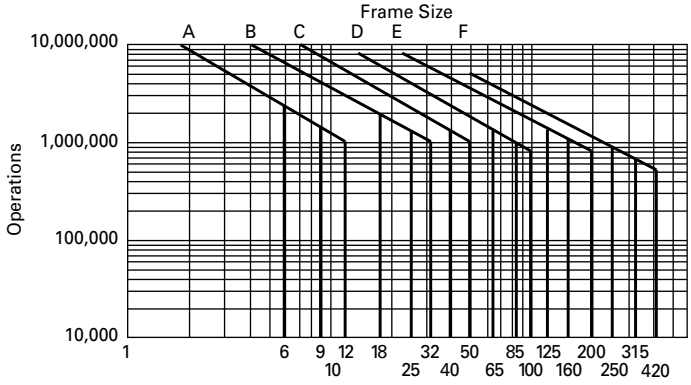
① Plugging is stopping or reversing the motor rapidly by reversing the connections while the motor is running.

② Inching or jogging is energizing the motor once or repeatedly for short durations to obtain small movements of the motor driven load.

Life Load Curves — Eaton's Cutler-Hammer *IT.* Electro-Mechanical Series IEC contactors have been designed and manufactured for superior life performance. All testing has been based on requirements as found in IEC 60947-4-1 and conducted by us. When selecting a contactor designed to IEC requirements, the specifier must give attention to the specific load, utilization category and the required electrical life. For a definition of Utilization Categories, see **Table B-217** above.

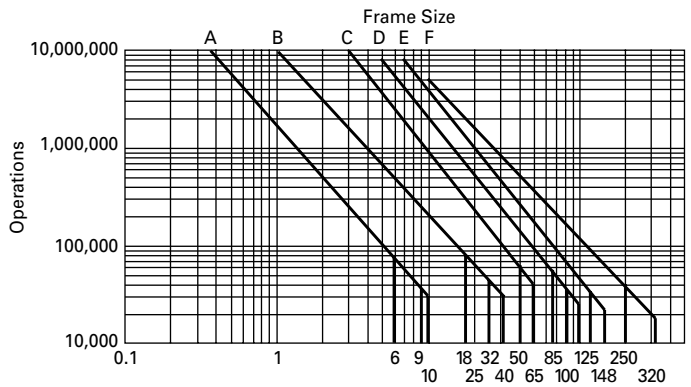
Note: AC-3 tests are conducted at rated device currents and AC-4 tests are conducted at six-times rated device currents. All tests have been run at 460V, 60 Hz.

Actual application life July vary, depending on environmental conditions and application duty cycle.



Note: Preliminary data.

Figure B-139. Electrical Life — AC-3 Utilization Category



Note: Preliminary data.

Figure B-140. Electrical Life — AC-4 Utilization Category

Trip Times

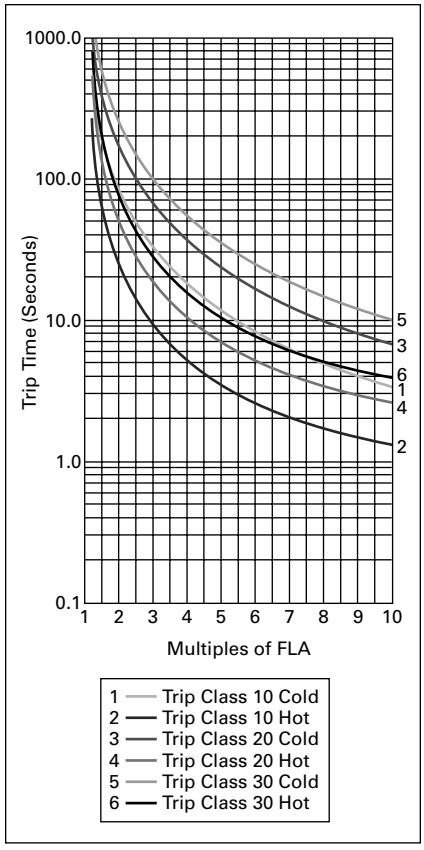


Figure B-141. Class 10, 20 and 30 Trip Curves

Contactor Choice —

- Decide what utilization category the application is and choose the appropriate curve from **Figure B-139** or **Figure B-140**.
- Locate the intersection of the life-load curve with the operational current (Ie) of the application, as found on the horizontal axis.
- Read the estimated contact life along the vertical axis in number of operations.

B

Modular Components — Contactor Field Assembly

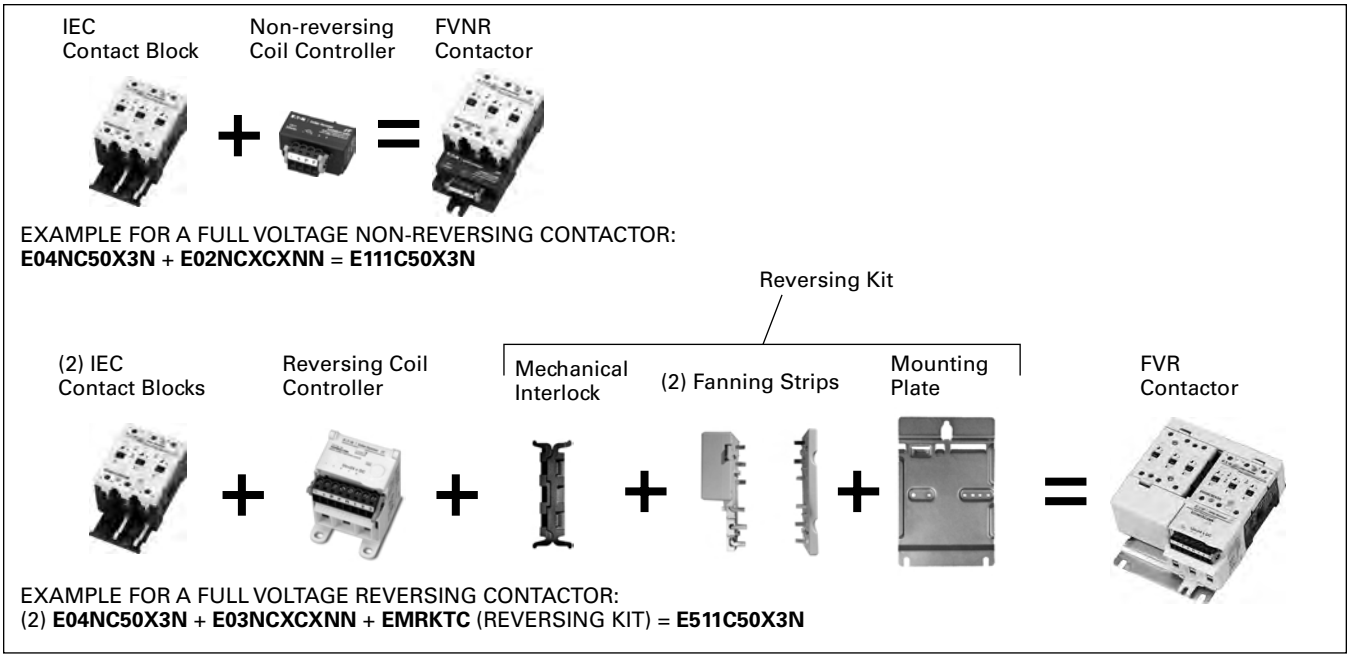


Figure B-142. Modular Contactor Assembly

Modular Components — Starter Field Assembly

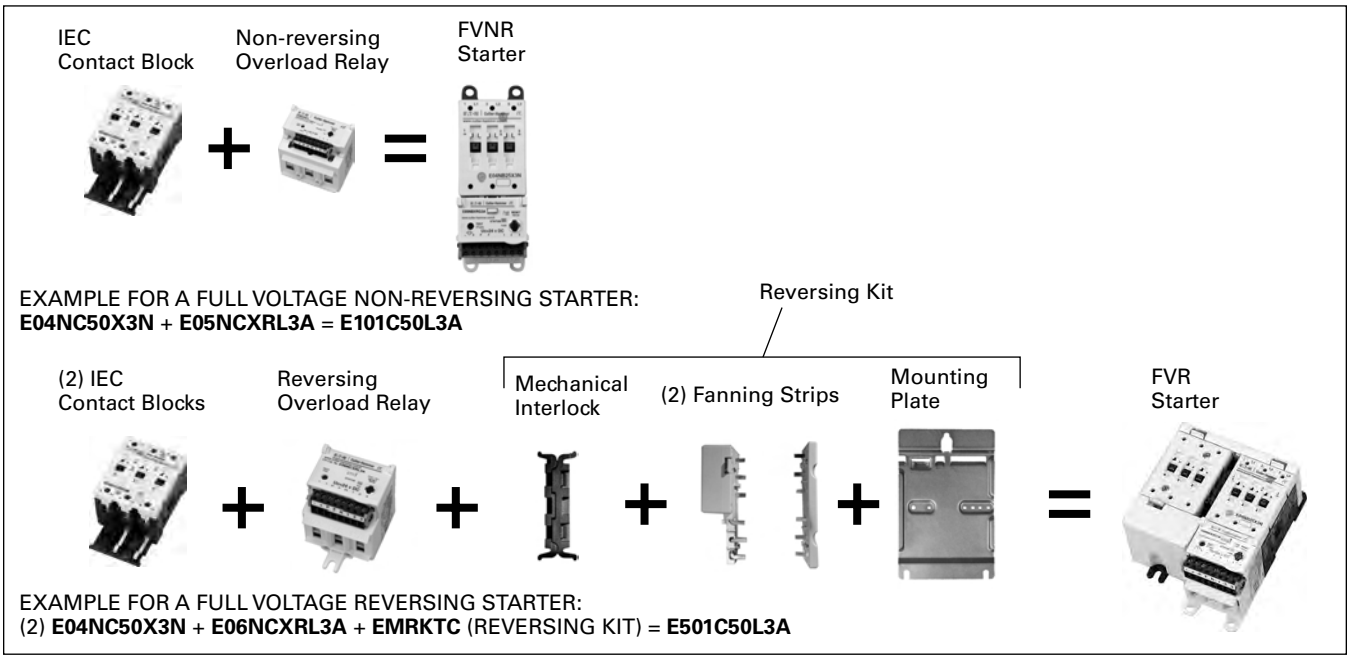
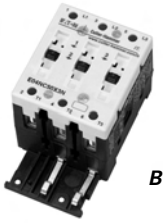


Figure B-143. Modular Starter Assembly

IEC Contact Block



B Frame

Table B-218. IEC Contact Block

Frame	Amperes	Catalogue Number	Price
B-Frame 45 mm	18 25 32	**E04NB18X3N** **E04NB25X3N** **E04NB32X3N**	
C-Frame 54 mm	40 50	**E04NC40X3N** **E04NC50X3N**	
D-Frame 76 mm	65 85 100	**E04ND65X3N** **E04ND85X3N** **E04ND10X3N**	
E-Frame 105 mm	125 160 200	**E04NE12X3N** **E04NE16X3N** **E04NE20X3N**	

Note:

■ E04N + E05N = E101; E04N + E02N = E111 (45 – 105 mm)
■ E04N + E06N = E501; E04N + E03N = E511 (45 – 105 mm)

IEC Coil Controller

B Frame
Non-reversing

Table B-219. IEC Coil Controller

Frame	Catalogue Number	Price
Non-reversing		
B-Frame — 45 mm	**E02NBXCXNN**	
C-Frame — 54 mm	**E02NCXCXNN**	
D-Frame — 76 mm	**E02NDXCXNN**	
E-Frame — 105 mm	**E02NEXCXNN**	
F-Frame — 140 mm	**EMUCCF**	
Reversing		
B-Frame — 45 mm	**E03NBXCXNN**	
C-Frame — 54 mm	**E03NCXCXNN**	
D-Frame — 76 mm	**E03NDXCXNN**	
E-Frame — 105 mm	**E03NEXCXNN**	
F-Frame — 140 mm	**EMUCCF**	

IEC Solid-State Overload Relay

Non-reversing

Reversing

Table B-220. IEC Solid-State Overload Relay

Frame	Overload Adjustment Range (Amperes)	Catalogue Number	Price
Non-reversing			
A-Frame 27 mm	.25 – .8 .59 – 1.9 1.4 – 4.4 2.8 – 9.0 3.8 – 12	**E05NAXRA3A** **E05NAXRB3A** **E05NAXRC3A** **E05NAXRD3A** **E05NAXRE3A**	
B-Frame 45 mm	.25 – .8 .59 – 1.9 1.4 – 4.4 2.8 – 9.0 6.3 – 20 10 – 32	**E05NBXRA3A** **E05NBXRB3A** **E05NBXRC3A** **E05NBXRD3A** **E05NBXRG3A** **E05NBXRJ3A**	
C-Frame 54 mm	.25 – .8 .59 – 1.9 1.4 – 4.4 2.8 – 9.0 5.0 – 16 8.4 – 27 16 – 50	**E05NCXRA3A** **E05NCXRB3A** **E05NCXRC3A** **E05NCXRD3A** **E05NCXRF3A** **E05NCXRH3A** **E05NCXRL3A**	
D-Frame 76 mm	5.0 – 16 8.4 – 27 14 – 45 31 – 100	**E05NDXRF3A** **E05NDXRH3A** **E05NDXRK3A** **E05NDXRN3A**	
E-Frame 105 mm	14 – 45 28 – 90 42 – 135 63 – 200	**E05NEXRK3A** **E05NEXRM3A** **E05NEXRP3A** **E05NEXRR3A**	
F-Frame 140 mm	42 – 135 84 – 270 131 – 420	**E05NFXRP3A** **E05NFXRS3A** **E05NFXRT3A**	
Reversing			
B-Frame 45 mm	.25 – .8 .59 – 1.9 1.4 – 4.4 2.8 – 9.0 6.3 – 20 10 – 32	**E06NBXRA3A** **E06NBXRB3A** **E06NBXRC3A** **E06NBXRD3A** **E06NBXRG3A** **E06NBXRJ3A**	
C-Frame 54 mm	.25 – .8 .59 – 1.9 1.4 – 4.4 2.8 – 9.0 5.0 – 16 8.4 – 27 16 – 50	**E06NCXRA3A** **E06NCXRB3A** **E06NCXRC3A** **E06NCXRD3A** **E06NCXRF3A** **E06NCXRH3A** **E06NCXRL3A**	
D-Frame 76 mm	5.0 – 16 8.4 – 27 14 – 45 31 – 100	**E06NDXRF3A** **E06NDXRH3A** **E06NDXRK3A** **E06NDXRN3A**	
E-Frame 105 mm	14 – 45 28 – 90 42 – 135 63 – 200	**E06NEXRK3A** **E06NEXRM3A** **E06NEXRP3A** **E06NEXRR3A**	

Discount Symbol **MC7**

B

Auxiliary Contacts

Auxiliary Contacts are available for mounting on ***IT.*** Electro-Mechanical Contactors and Starters. The various choices available for non-reversing models are shown in **Tables B-221** and **B-222,** and their ratings in **Tables B-223 – B-226**. For reversing models, the number of auxiliaries indicated is for each of the contactors/starters in the assembly.

Table B-221. Auxiliary Contact Availability — A – F Frames

Front Mounted (Maximum Auxiliaries per Contactor/Starter) ②								
Contactor/Starter Size						Contact Type	Catalogue Number	Price
A-Frame 27 mm	B-Frame 45 mm	C-Frame 54 mm	D-Frame 76 mm	E-Frame 105 mm	F-Frame 140 mm			
1	3	3	3	3	—	1NO	**EMA13**	
1	3	3	3	3	—	1NC	**EMA14**	
—	2	2 ①	3	3	—	1NO-1NC	**EMA15**	
—	2	2 ①	3	3	—	2NO	**EMA16**	
—	2	2 ①	3	3	—	2NC	**EMA17**	
1	2	3	3	3	3	Logic Level 1NO-1NC	**EMA70**	

① Other combinations: "Single, dual, single"; "Dual, single, dual"; "Dual, logic level, dual".
② For reversers, multiply quantities by two.

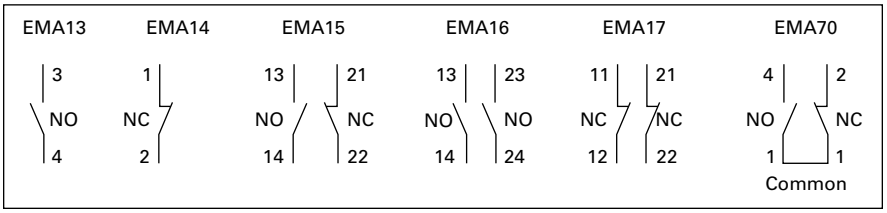


Figure B-144. Connecting Diagram — A – F Frames

Table B-222. Auxiliary Contact Availability — F-Frame 140 mm

Auxiliary Contacts per Non-reversing and Reversing Contactor or Starter				
Max.	Contact Type	Description	Catalogue Number	Price
2	1NO	Base auxiliary (max. 1 per side)	**C320KGS41**	
2	1NO-1NC	Base auxiliary (max. 1 per side)	**C320KGS42**	
6	1NO	C320KGS41 or C320KGS42 required (max. 3 Add-on auxiliaries per side)	**C320KGS20**	
2	1NO Logic Level	C320KGS41 or C320KGS42 required (max. 1 Add-on auxiliary per side)	**C320KGS20L**	
6	1NC	C320KGS41 or C320KGS42 required (max. 2 Add-on auxiliaries per side)	**C320KGS21**	
2	1NC Logic Level	C320KGS41 or C320KGS42 required (max. 1 Add-on auxiliary per side)	**C320KGS21L**	
2	1NO-1NC	C320KGS41 or C320KGS42 required (max. 1 Add-on auxiliary per side)	**C320KGS22**	
2	1NO-1NC Logic Level	C320KGS41 or C320KGS42 required (max. 1 Add-on auxiliary per side)	**C320KGS22L** ③	
3	1NO-1NC Logic Level	Front Mounted Only	**EMA70** ④	

③ Form C Contacts.
④ For reversers, multiply quantities by two.

Note:

- Side Mounted: Maximum (10) total circuits.
- Front Mounted: Maximum (6) total circuits. ④
- Maximum 4 auxiliaries per side (base + 3 side mounted).
- **EMASA/B_** have been superseded by the above Catalogue Numbers.

Table B-223. IEC Ratings

DC-13		AC-15	
Ue Voltage	*Ie* Amps.	*Ue* Voltage	*Ie* Amps.
24	5	48	8
48	2.5	120	6
125	1.1	240	4
250	.55	440	2

Table B-224. NEMA A600 Ratings

Current	AC Voltage			
	120	240	480	600
Make and Interrupting	60	30	15	12
Break	6	3	1.5	1.2
Continuous	10	10	10	10
Thermal	10	10	10	10

Table B-225. NEMA P300 Ratings

Current	DC Voltage	
	125	250
Make and Interrupting	1.1	.55
Break	1.1	.55
Continuous	5	5
Thermal	5	5

Table B-226. EMA70 Auxiliary Contact

DC-12		AC-12	
Ue	Ie	Ue	Ie
30	.1	250	.1

Discount Symbol **MC7**

IEC Reversing Mounting Plates

Table B-227. IEC Reversing Mounting Plates

Frame Size	Catalogue Number	Price
B – C	**EMA9B**	
D	**EMA9D**	
E	**EMA9E**	

IEC Reversing Kits

Table B-228. IEC Reversing Kits

Frame Size	Description	Catalogue Number	Price
B	For Contactor and Starter ①	**EMRKTB**	
C	For Contactor and Starter ①	**EMRKTC**	
D	For Contactor and Starter ①	**EMRKTD**	
E	For Contactor and Starter ①	**EMRKTE**	
F	For Contactor ②	**EMRKTF**	

① Includes Fanning Strips, Mechanical Interlock, Mounting Plate and hardware.
② Includes Fanning Strips (Bus Bar Set), Mechanical Interlock and hardware.

IEC Control Terminals

Table B-232. IEC Control Terminals

No. of Pins	Terminal Markings	IEC Size	Coil Controller		Contactor		Overload		Starter		Catalogue Number	Price
			Non-reversing	Reversing	Non-reversing	Reversing	Non-reversing	Reversing	Non-reversing	Reversing		
8	-+PFR123	A						X		X	**EMA76L**	
		B		X		X	X	X	X	X		
		C		X		X	X	X	X	X		
		D	X	X	X	X	X	X	X	X		
		E	X	X	X	X	X	X	X	X		
		F					X	X	X	X		
5	-+PFR	F	X	X	X	X					**EMA77L**	
5	RFP+-	F		X		X		X		X	**EMA77LR**	
4	-+PF	A			X						**EMA78L**	
		B	X		X							
		C	X		X							
6	-+PF1A	A					X		X		**EMA81** ⑤	
(2) 5	-+PFR and RFP+-	F				X				X	**EMA80L** ⑥	

⑤ Non-locking.
⑥ Consists of (1) EMA77L and (1) EMA77LR inter-wired.

IEC Mechanical Interlock

Table B-229. IEC Mechanical Interlock

Frame Size ③	Catalogue Number	Price
B – E	**EMMB**	
F ④	**C321KM50**	

③ The A-Frame 27 mm does not have a separate mechanical interlock due to its embedded design and board requirements.
④ The F-Frame 140 mm uses the Freedom Series Mechanical Interlock.

IEC 2-Wire Reversing Interface

Table B-230. IEC 2-Wire Reversing Interface

Description	Catalogue Number	Price
8-Pin for 45 – 140 mm (IEC 6A – 420A Reversing Starters) 8-Pin for 45 – 105 mm (IEC 18A – 200A Reversing Contactors)	**EMA2WR8**	

DIN Rail Catch

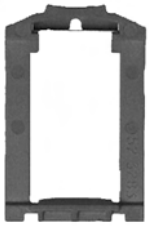


Table B-231. DIN Rail Catch

Frame Size	Description	Catalogue Number	Price
B – C	Catch with Leaf Spring and Pad	**EMDRCB**	
D	Catch with Leaf Spring and Pad	**EMDRCD**	

Discount Symbol **MC7**

B

IEC Contact Kits

Table B-233. IEC Contact Kits

Frame Size	Description	Catalogue Number	Price
C	3-Pole, 40A Hold Open 3-Pole, 40A Non-hold Open	**EMCKT40** **EMCKT40NH**	
	3-Pole, 50A Hold Open 3-Pole, 50A Non-hold Open	**EMCKT50** **EMCKT50NH**	
D	3-Pole, 65A Hold Open 3-Pole, 65A Non-hold Open	**EMCKT65** **EMCKT65NH**	
	3-Pole, 85A Hold Open 3-Pole, 85A Non-hold Open	**EMCKT85** **EMCKT85NH**	
	3-Pole, 100A Hold Open 3-Pole, 100A Non-hold Open	**EMCKT100** **EMCKT100NH**	
E	3-Pole, 125A 3-Pole, 160A 3-Pole, 200A	**EMCKT125** **EMCKT160** **EMCKT200**	
F	3-Pole, 250A 3-Pole, 315A 3-Pole, 420A	**EMCKT250** **EMCKT315** **EMCKT420**	

24V DC Coils

Table B-234. 24V DC Coils

	Frame Size	Catalogue Number	Price
	B	**EMCB**	
	C	**EMCC**	
	D	**EMCD**	
	E	**EMCE**	
	F	**EMCF**	

Fanning Strips

Table B-235. Reversing Fanning Strips

Frame Size	Description	Catalogue Number	Price
A	Line and Load Side Wire Sets	**EMFRA**	
B	Line Side	**EMFRLB**	
	Load Side	**EMFRTB**	
C	Line Side	**EMFRLC**	
	Load Side	**EMFRTC**	
D	Line Side	**EMFRLD**	
	Load Side	**EMFRTD**	
E	Line Side	**EMFRLE**	
	Load Side	**EMFRTE**	
F	Line Side Bus Bar Set	**EMFRLF**	
	Load Side Bus Bar Set	**EMFRTF**	

Lug Kits

Table B-236. Lug Kits

Frame Size	Description	Catalogue Number	Price
C	3 pc.	**EMLUGKTC**	
D	1 pc.	**EMLUGKTD**	
E	1 pc. — For Contactor and Line Side Starter	**EMLUGKTLE**	
	1 pc. — For Load Side Starter	**EMLUGKTTE**	
F	Horizontal Box Lug ①	**EMLUGKTFA**	
	Vertical Box Lug	**EMLUGKTFB**	

① Kit includes Lug Cover — required for contactors only.

Table B-237. Ring Lug Retrofit Kits

Product	IEC A-Frame			IEC E-Frame			IEC F-Frame		
	Catalogue Number			Catalogue Number			Catalogue Number		
	Factory Installed	Retrofit Kits ②	Lug Kits ③	Factory Installed	Retrofit Kits ②	Lug Kits ③	Factory Installed	Retrofit Kits ②	Lug Kits ③
E111		**EMRTXKTA**		Add "**-RTX**"	**EMRTXKTEN**	**EMLUGREN**	Add "**-RTX**"	**EMRTXKTF**	**EMLUGRFC**
E511		**EMRTXKTA**		Add "**-RTX**"	**EMRTXKTER**	**EMLUGRER**	Add "**-RTX**"	**EMRTXKTF**	**EMLUGRFC**
E101		**EMRTXKTA**		Add "**-RTX**"	**EMRTXKTEN**	**EMLUGREN**	Add "**-RTX**"	**EMRTXKTF**	**EMLUGRFS**
E501		**EMRTXKTA**		Add "**-RTX**"	**EMRTXKTER**	**EMLUGRER**	Add "**-RTX**"	**EMRTXKTF**	**EMLUGRFS**
E05N				Add "**-RTX**"			Add "**-RTX**"		
E06N				Add "**-RTX**"			Add "**-RTX**"		
E02N				Add "**-RTX**"					
E03N				Add "**-RTX**"					
E04N				Add "**-RTX**"					

② Retrofit Kits used to field install ring lugs on standard lug units.
③ Lug Kits used to field install standard lugs into factory assembled ring lug units.

Discount Symbol **MC17**

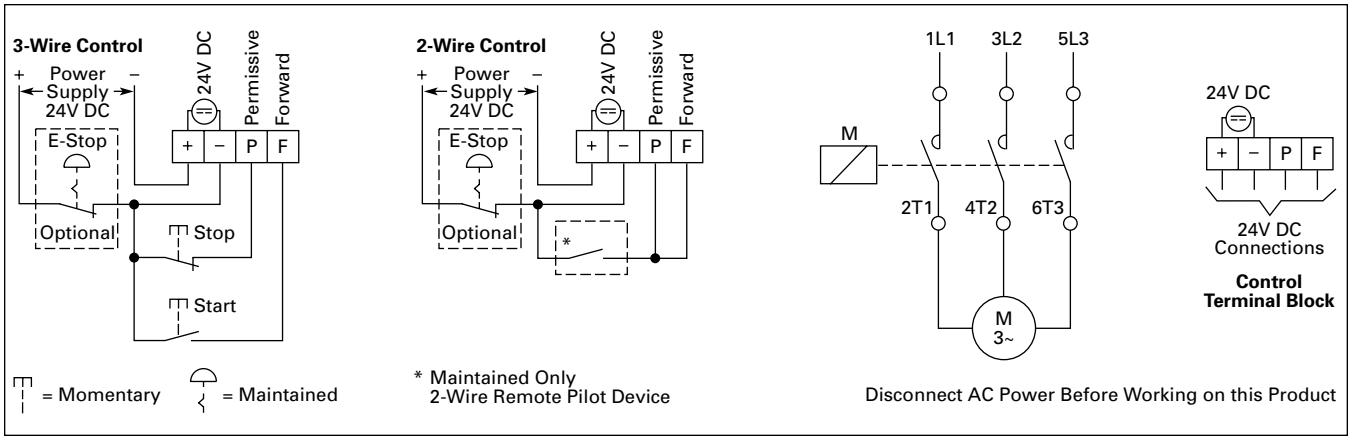


Figure B-145. Wiring – Non-reversing Contactor

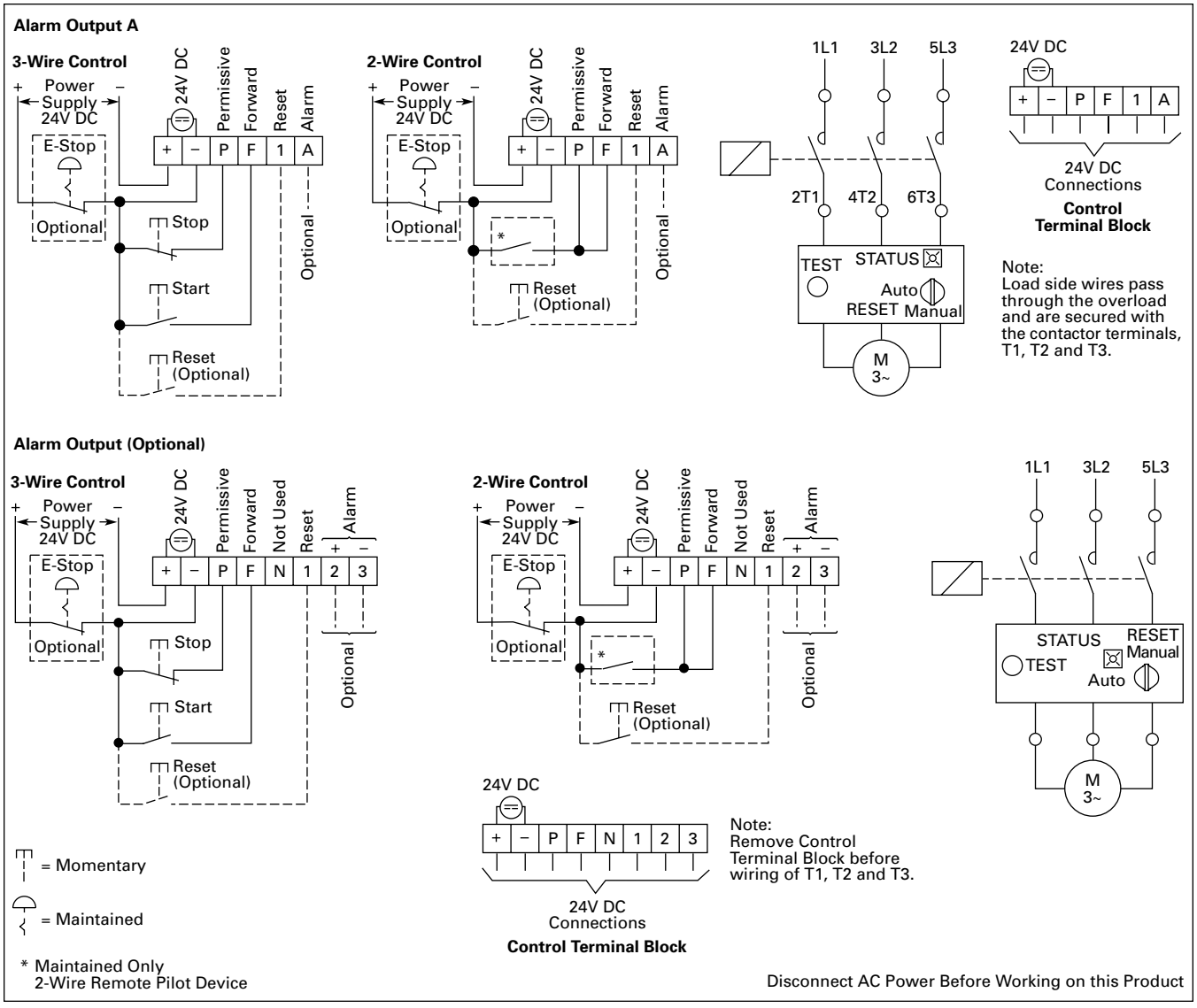


Figure B-146. Wiring – Non-reversing Starters

B

Non-reversing and Reversing Contactors (Frame A)

Table B-238. Approximate Dimensions in Inches (mm)

Frame Size	Overall					Mounting Holes				Req. Mtg. Screws	Terminals		
	Width	Height	Depth	Depth w/ Auxiliary	Depth added w/DIN Rail	Width	Height	Mtg. Hole to Top	DIN Rail to Top		Control	Line	Load
	A	B	C	D	E	F	G	H	J	K	P	Q	R
Non-reversing													
A	1.1 (27)	3.0 (75)	2.4 (60)	3.5 (88)	.2 (5)	.76 (19.2)	2.64 (67)	.1 (3.5)	.6 (15)	(3) #8 M4	.6 (16)	1.7 (43)	1.7 (43)
Reversing													
A	2.4 (60)	2.9 (73)	2.4 (60)	3.5 (88)	.2 (5)	1.31 (33.2)	2.52 (64)	.2 (5)	.5 (13)	(3) #8 M4	.6 (16)	1.7 (43)	1.7 (43)

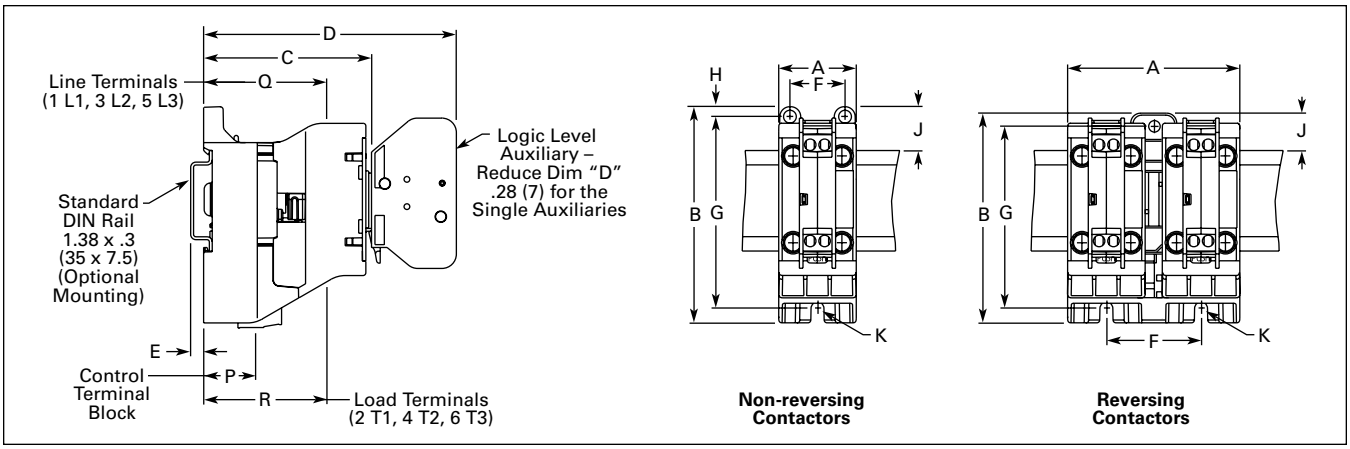


Figure B-147. Approximate Dimensions — Inches (mm)

Non-reversing Contactors (Frames B & C)

Table B-239. Approximate Dimensions in Inches (mm)

Frame Size	Overall					Mounting Holes				Req. Mtg. Screws	Terminals		
	Width	Height	Depth	Depth w/ Auxiliary	Depth added w/DIN Rail	Width	Height	Mtg. Hole to Top	DIN Rail to Top		Control	Line	Load
	A	B	C	D	E	F	G	H	J	K	P	Q	R
B	1.8 (45)	4.4 (111)	2.4 (60)	3.6 (91)	.1 (3)	1.33 (33.8)	4.0 (101)	.2 (5)	.9 (23)	(3) #8 M4	.7 (19)	1.2 (30)	1.2 (30)
C	2.1 (54)	4.45 (113)	2.4 (60)	3.6 (91)	.1 (3)	1.46 (37)	4.1 (104)	.2 (5)	.8 (20)	(3) #8 M4	.7 (19)	1.2 (30)	1.2 (30)

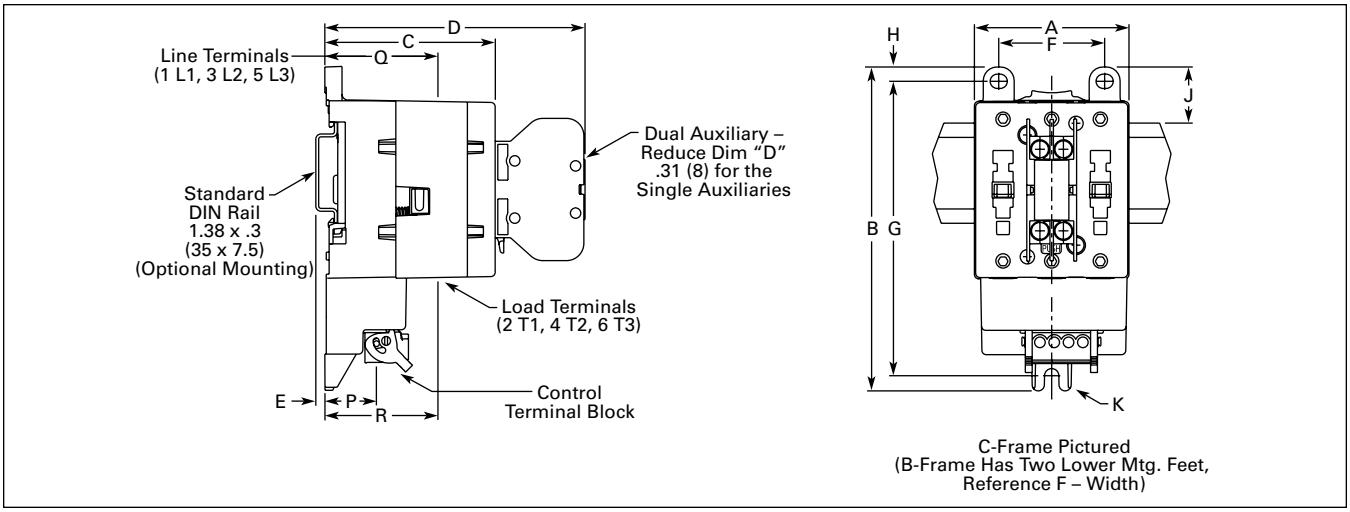


Figure B-148. Approximate Dimensions — Inches (mm)

Non-reversing Contactors (Frames D & E)

Table B-240. Approximate Dimensions in Inches (mm)

Frame Size	Overall					Mounting Holes				Req. Mtg. Screws	Terminals		
	Width	Height	Depth	Depth w/ Auxiliary	Depth added w/DIN Rail	Width	Height	Mtg. Hole to Top	DIN Rail to Top		Control	Line	Load
	A	B	C	D	E	F	G	H	J	K	P	Q	R
D	3.0 (76)	5.9 (150)	3.1 (79)	4.2 (107)	.2 (4)	.94 (24)	2.87 (73)	.5 (13)	.9 (23)	(4) #6 x 2 M3.5 x 50	2.4 (60)	1.5 (37)	.6 (14)
E	4.1 (105)	8.0 (203)	3.5 (90)	4.7 (119)	—	1.33 (33.8)	4.13 (105)	.6 (15)	—	(4) #8 x 1.5 M4 x 40	2.8 (72)	1.7 (42)	.3 (8)

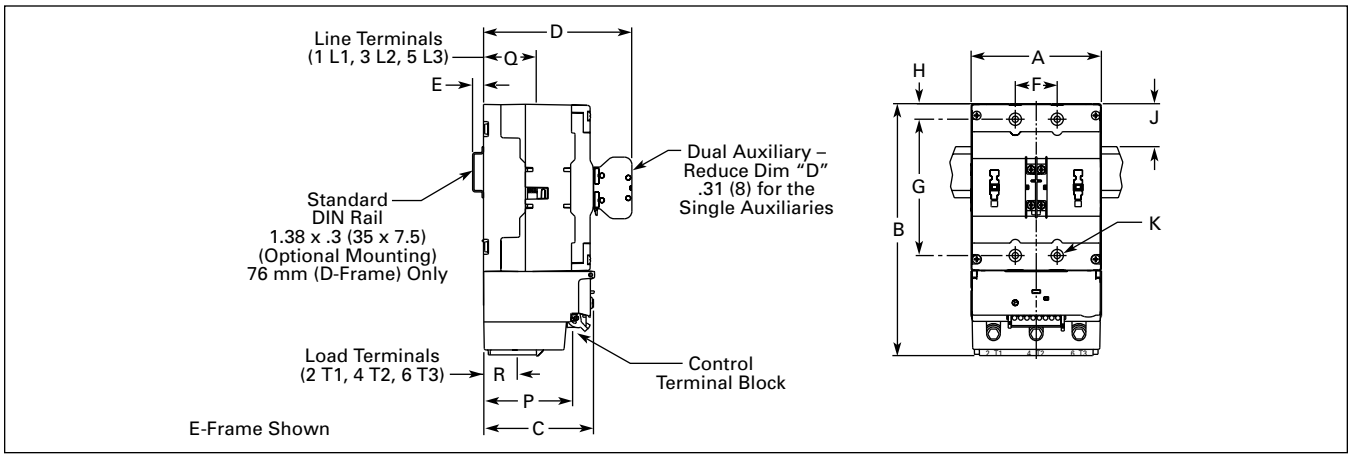


Figure B-149. Approximate Dimensions — Inches (mm)

Non-reversing Contactors (Frame F)

Table B-241. Approximate Dimensions in Inches (mm)

Frame Size	Overall					Mounting Holes			Req. Mtg. Screws	Terminals		
	Width	Height	Depth	Depth w/Logic Level Auxiliary	Width w/Side Auxiliaries	Width	Height	Mounting Hole to Top		Control	Line	Load
	A	B	C	D	E	F	G	H	K	P	Q	R
F	5.6 (142)	14.0 (356)	7.0 (178)	8.2 (208)	6.70 (170)	1.75 (44.5)	13.0 (330)	0.58 (14.7)	(4) 5/16 M8	.8 (20)	4.4 (112)	4.4 (112)

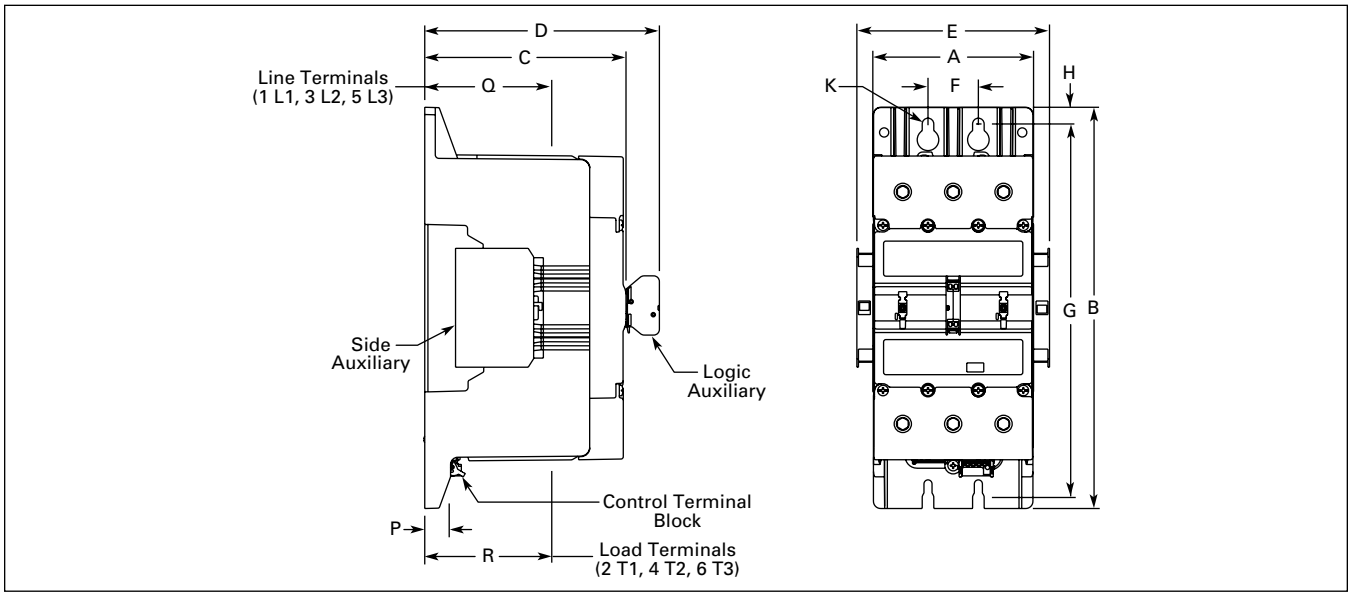


Figure B-150. Approximate Dimensions in Inches (mm)

B

Reversing Contactors (Frames B – E)

Table B-242. Approximate Dimensions in Inches (mm)

Frame Size	Overall				Mounting Holes			Req. Mtg. Screws	Terminals		
	Width	Height	Depth	Depth w/ Auxiliary	Width	Height	Mtg. Hole to Top		Control	Line	Load
	A	B	C	D	F	G	H	K	P	Q	R
B	3.8 (96)	5.9 (149)	2.7 (69)	3.8 (96)	3.15 (80)	5.35 (136)	.3 (7)	(3) #10 M5	2.0 (50)	1.5 (38)	.9 (22)
C	4.5 (114)	5.9 (149)	2.6 (67)	3.8 (96)	3.15 (80)	5.35 (136)	.3 (7)	(3) #10 M5	2.0 (50)	1.5 (38)	.6 (16)
D	6.2 (158)	7.4 (188)	3.3 (84)	4.4 (112)	5.51 (140)	6.89 (175)	.2 (6)	(3) #10 M5	2.6 (67)	1.9 (48)	.9 (22)
E	8.5 (216)	9.5 (242)	3.8 (97)	4.9 (125)	7.87 (200)	9.06 (230)	.2 (6)	(3) #10 M5	3.1 (80)	2.1 (54)	.7 (17)

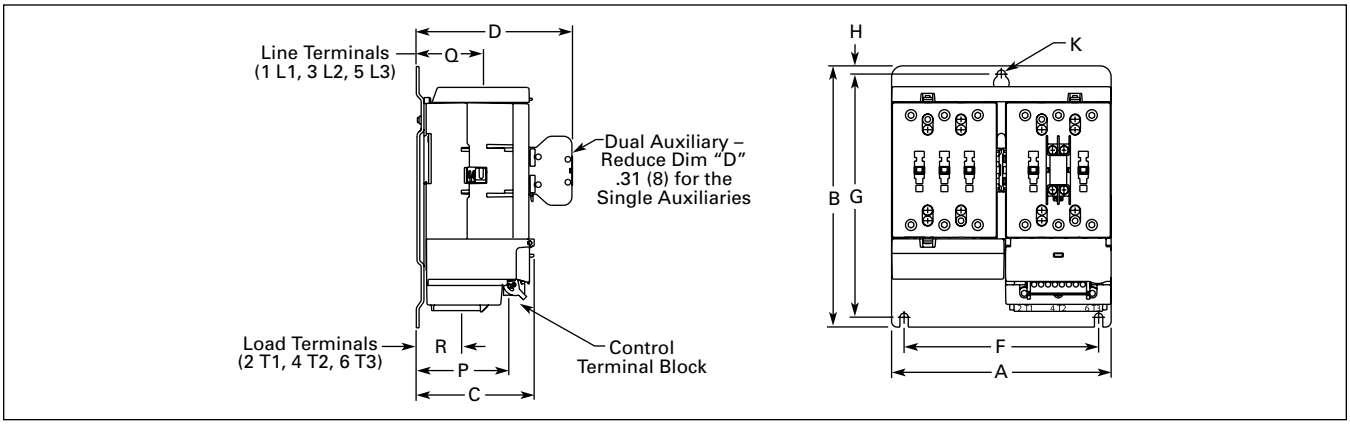


Figure B-151. Approximate Dimensions — Inches (mm)

Reversing Contactors (Frame F)

Table B-243. Approximate Dimensions in Inches (mm)

Frame Size	Overall					Mounting Holes			Req. Mtg. Screws	Terminals		
	Width	Height	Depth	Depth w/Logic Level Auxiliary	Width w/Side Auxiliaries	Width	Height	Mounting Hole to Top		Control	Line	Load
	A	B	C	D	E	F	G	H	K	P	Q	R
F	11.7 (297)	17.2 (437)	7.0 (178)	8.2 (208)	12.8 (325)	7.8 (198.5)	13.0 (330)	2.19 (55.5)	(4) 5/16 M8	.8 (20)	4.4 (112)	4.4 (112)

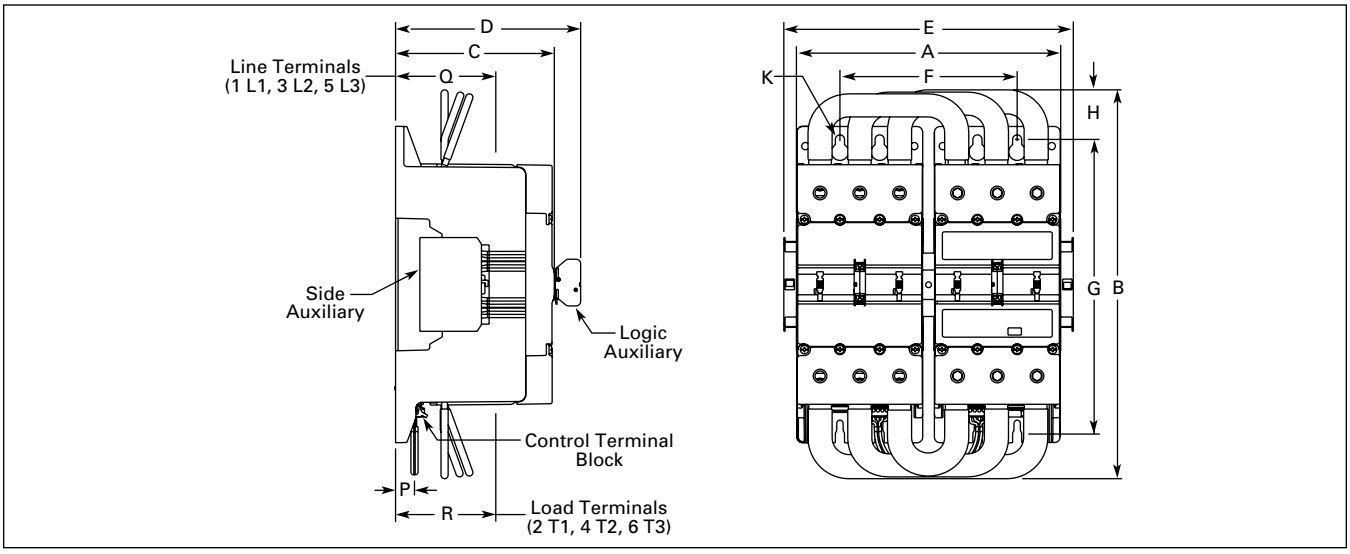


Figure B-152. Approximate Dimensions in Inches (mm)

Non-reversing and Reversing Starters (Frame A)

Table B-244. Approximate Dimensions in Inches (mm)

Frame Size	Overall					Mounting Holes				Req. Mtg. Screws	Reset Button			Terminals		
	Width	Height	Depth	Depth w/ Auxiliary	Depth added w/DIN Rail	Width	Height	Mtg. Hole to Top	DIN Rail to Top		Width	Height	Depth	Control	Line	Load
	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R
Non-reversing																
A	1.20 (31)	4.0 (102)	3.1 (79)	3.5 (89)	.2 (5)	.76 (19.3)	3.70 (94.0)	.1 (3.5)	.6 (15)	(3) #8 M4	.3 (8.0)	2.9 (72.4)	3.1 (78)	2.2 (55)	1.7 (43)	1.8 (45)
Reversing																
A	2.50 (64)	4.0 (102)	3.1 (79)	3.5 (89)	.2 (5)	1.31 (33.2)	3.52 (89.4)	.2 (5)	.5 (13)	(3) #8 M4	.9 (24)	3.0 (76.0)	3.1 (78)	2.2 (55)	1.7 (43)	1.8 (45)

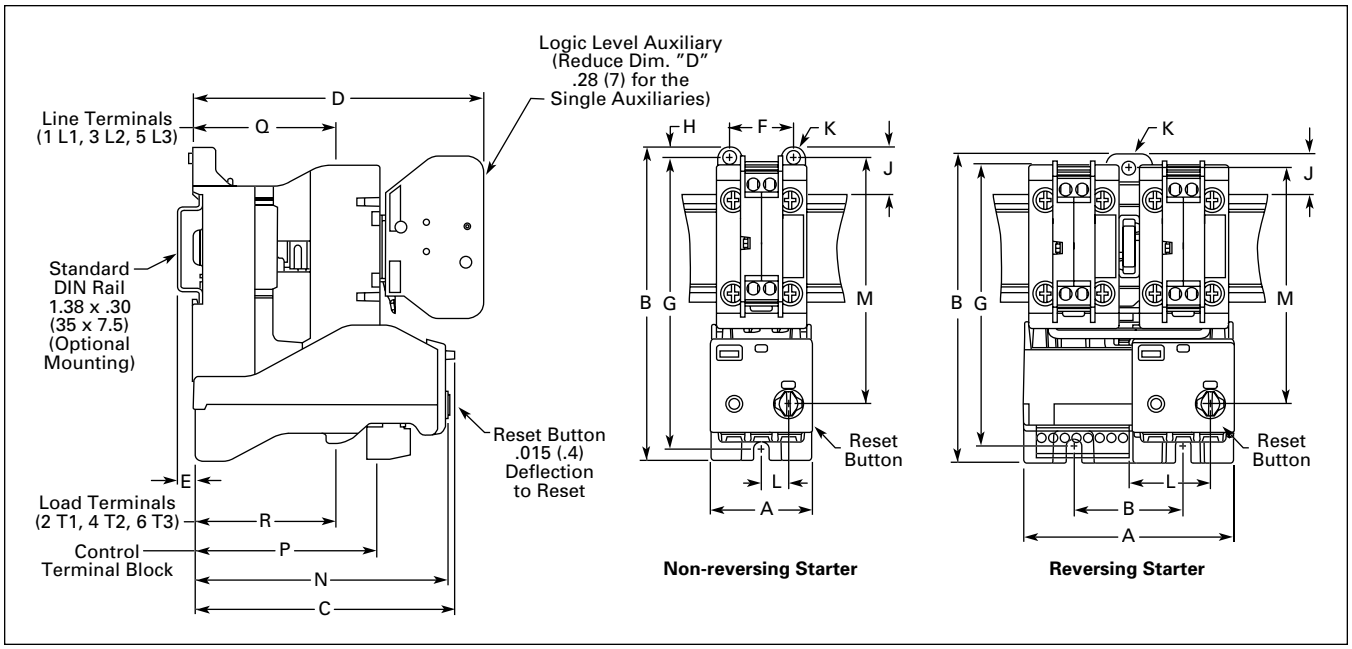


Figure B-153. Approximate Dimensions — Inches (mm)

B

Non-reversing Starters (Frames B – E)

Table B-245. Approximate Dimensions in Inches (mm)

Frame Size	Overall					Mounting Holes		Req. Mtg. Screws	Reset Button			Terminals		
	Width	Height	Depth	Depth w/ Auxiliary	Depth added w/DIN Rail	Width	Height		Width	Height	Depth	Control	Line	Load
	A	B	C	D	E	F	G	K	L	M	N	P	Q	R
B	1.8 (45)	5.0 (127)	2.5 (63)	3.6 (91)	.1 (3)	1.33 (33.8)	4.62 (117.3)	(3) #8 M4	.6 (14)	3.6 (91)	2.5 (63)	1.7 (44)	1.2 (30)	.6 (16)
C	2.1 (54)	5.4 (138)	2.5 (63)	3.6 (91)	.1 (3)	1.46 (37)	5.04 (128)	(3) #8 M4	.7 (17)	3.7 (93)	2.4 (62)	1.8 (45)	1.2 (30)	.3 (8)
D	3.0 (76)	5.9 (150)	3.1 (79)	4.2 (107)	.2 (4)	.94 (24)	2.87 (73)	(4) #6 x 2 M3.5 x 50	.7 (17)	4.2 (106)	3.1 (78)	2.4 (60)	1.5 (37)	.6 (14)
E	4.1 (105)	8.0 (203)	3.5 (90)	4.7 (119)	—	1.33 (33.8)	4.13 (105)	(4) #8 x 1.5 M4 x 40	.7 (17)	5.7 (146)	3.5 (88)	2.8 (72)	1.7 (42)	.3 (8)

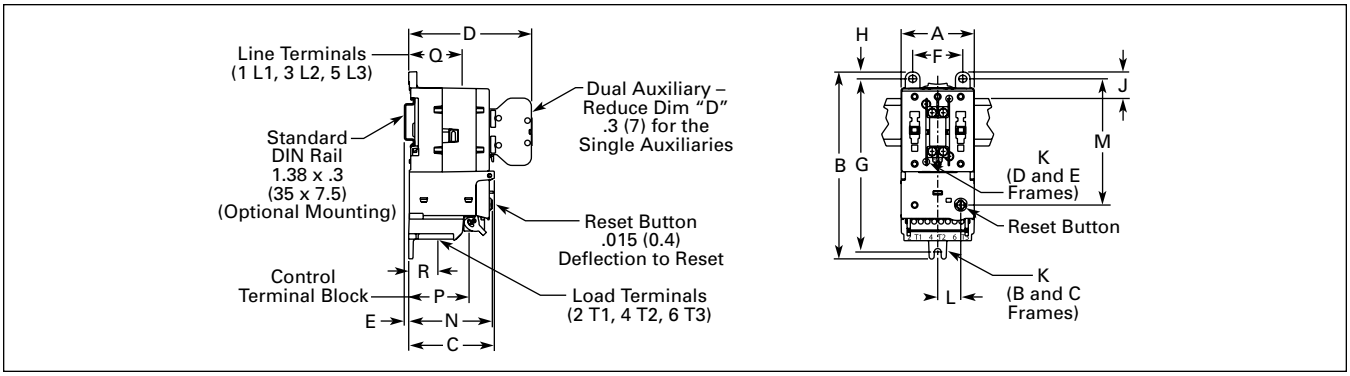


Figure B-154. Approximate Dimensions — Inches (mm)

Non-reversing Starter (Frame F)

Table B-246. Approximate Dimensions in Inches (mm)

Frame Size	Overall					Mounting Holes			Req. Mtg. Screws	Reset Button			Terminals			
	Width	Length	Depth	Depth w/Logic Level Auxiliary	Width w/Side Auxiliaries	Width	Height	Mntg. Hole to Top		Width	Height	Depth	Control	Line	Load	Load
	A	B	C	D	E	F	G	I	K	L	M	N	P	Q	R	S
F	5.7 (145)	19.4 (493)	7.0 (178)	8.2 (208)	6.7 (170)	1.75 (44.5)	18.3 (465)	.58 (14.7)	(4) 5/16 M8	2.4 (61)	12.4 (315)	5.3 (135)	5.0 (126)	4.4 (112)	3.0 (75)	4.0 (101)

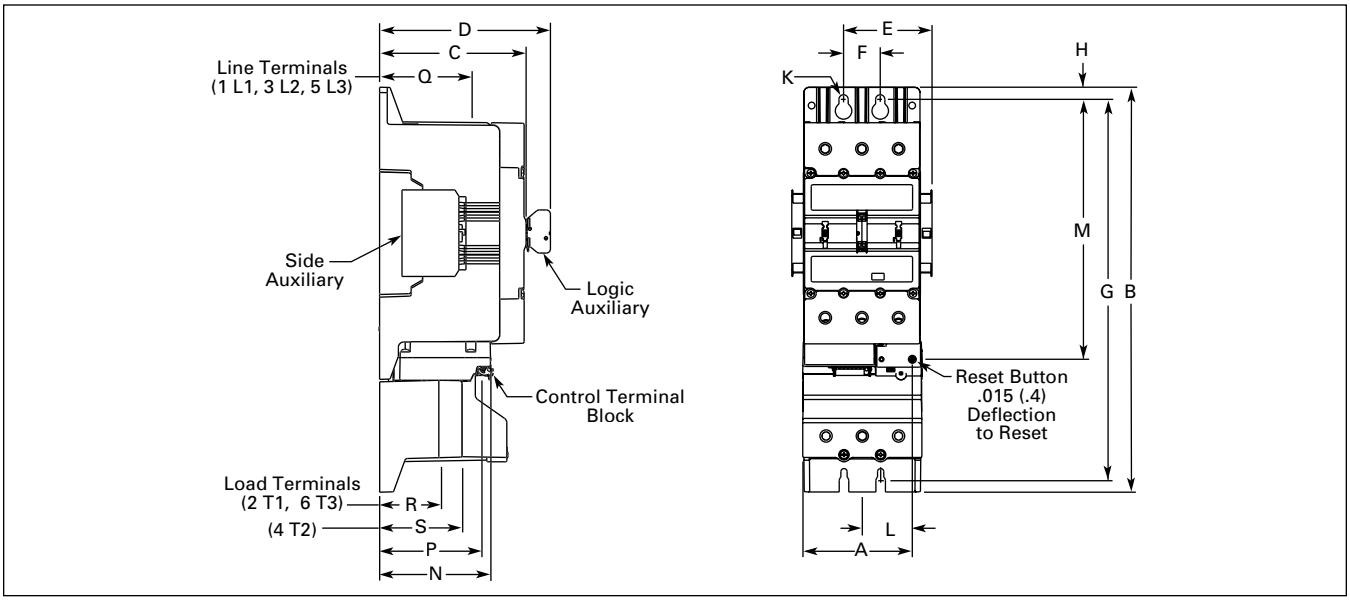


Figure B-155. Approximate Dimensions in Inches (mm)

Reversing Starters (Frames B – E)

Table B-247. Approximate Dimensions in Inches (mm)

Frame Size	Overall				Mounting Holes			Req. Mtg. Screws	Reset Button			Terminals		
	Width	Length	Depth	Depth w/ Auxiliary	Width	Height	Mtg. Hole to Top		Width	Height	Depth	Control	Line	Load
	A	B	C	D	F	G	H	K	L	M	N	P	Q	R
B	3.8 (96)	5.9 (149)	2.7 (69)	3.8 (96)	3.15 (80)	5.35 (136)	.28 (7)	(3) #10 M5	1.6 (40)	3.8 (97)	2.7 (68)	2.0 (50)	1.5 (38)	.9 (22)
C	4.5 (114)	5.9 (149)	2.6 (67)	3.8 (96)	3.15 (80)	5.35 (136)	.28 (7)	(3) #10 M5	1.7 (43)	4.1 (104)	2.6 (65)	2.0 (50)	1.5 (38)	.6 (16)
D	6.2 (158)	7.4 (188)	3.3 (84)	4.4 (112)	5.51 (140)	6.89 (175)	.24 (6)	(3) #10 M5	2.3 (58)	5.5 (139)	3.3 (83)	2.6 (67)	1.9 (48)	.9 (22)
E	8.5 (216)	9.5 (242)	3.8 (97)	4.9 (125)	7.87 (200)	9.06 (230)	.24 (6)	(3) #10 M5	2.9 (73)	7.2 (182)	3.7 (94)	3.1 (80)	2.1 (54)	.7 (17)

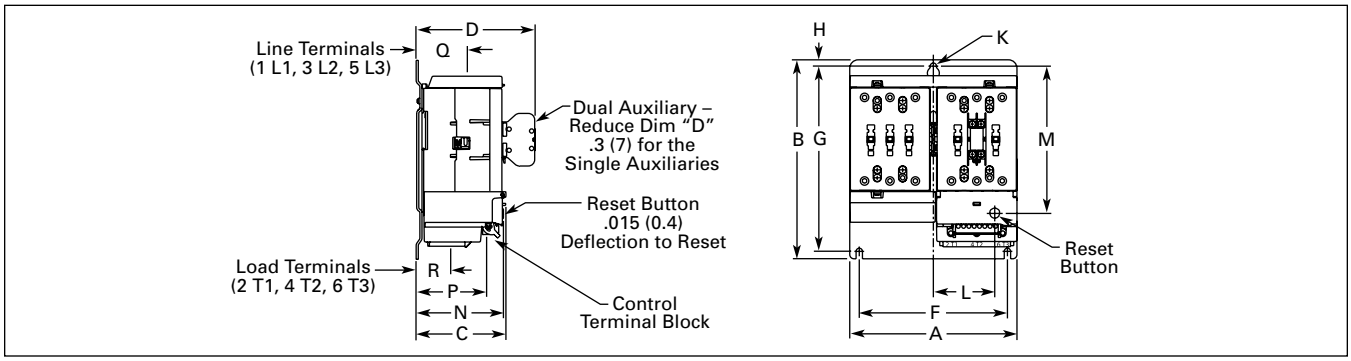


Figure B-156. Approximate Dimensions — Inches (mm)

Reversing Starter (Frame F)

Table B-248. Approximate Dimensions in Inches (mm)

Frame Size	Overall					Mounting Holes				Req. Mtg. Screws	Reset Button			Terminals			
	Width	Length	Depth	Depth w/Logic Level Auxiliary	Width w/Side Auxiliaries	Width	H1	Mntg. Hole to Top	H2		Width	Height	Depth	Control	Line	Load	Load
	A	B	C	D	E	F	G	H	I	K	L	M	N	P	Q	R	S
F	11.8 (300)	21.0 (533)	7.0 (178)	8.2 (208)	12.8 (325)	7.82 (199)	18.3 (465)	2.19 (55.5)	13 (330)	(5) 5/16 M8	5.4 (138)	12.4 (315)	5.3 (135)	5.0 (126)	4.4 (112)	3.0 (75)	4.0 (101)

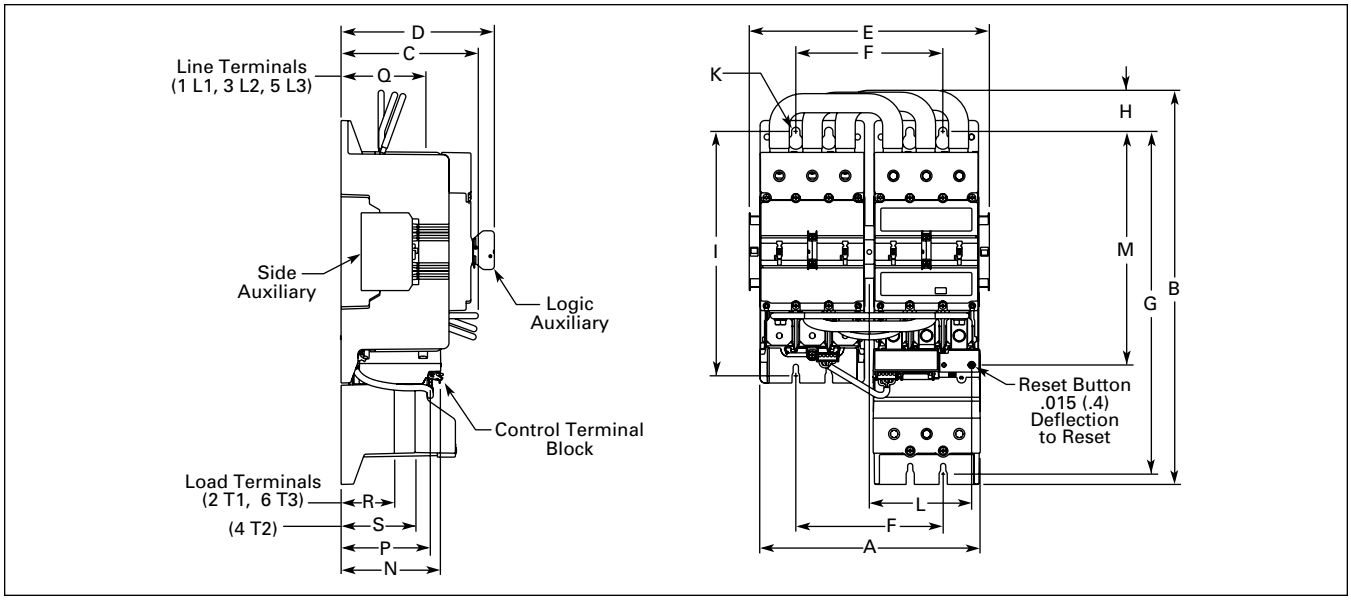


Figure B-157. Approximate Dimensions in Inches (mm)

B

IEC Size B
Cat. No. CE15BNS3AB

IEC Size D
Cat. No. AE16DN0BC

32 Ampere Overload
Cat. No. C306DN3B

Series B
Heater Pack

Product Description

Eaton's electrical business has been supplying quality Industrial Control products for more than 100 years — the Cutler-Hammer® Freedom Series line of Contactors and Starters continue in this tradition. The IEC Freedom Series Contactors and Starters feature a compact space-saving design, using state-of-the-art technology and the latest in high strength, impact and temperature resistant insulating materials.

Features

Freedom IEC Features

Freedom IEC contactors and starters are designed to IEC standards and comply with the International Standard IEC 947-4-1. IEC products are a perfect choice when electrical and mechanical application parameters are known. They are typically smaller in size and provide higher ratings in a smaller package. They are available in 16 sizes to match the contactor to the application.

- Complies with IEC 947-4-1, EN, CENELEC, UL and CSA standards.
- 16 Sizes of contactors through 200 hp.
- DIN rail mountable through 20 hp.
- Adjustable bimetal overload relays

Standards and Certifications

- Standard: Designed to meet or exceed UL, NEMA, IEC, CSA, VDE and BS
- UL Listed: UL File #E1491, Guide #NLDX — Open
- CSA Certified: CSA File #LR353, Class #321104 Open
- IEC: Sizes A – S, IEC 947-4-1

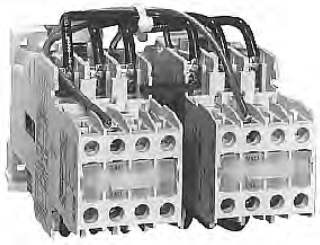
Certified Type 2 Coordination

Eaton's Cutler-Hammer Freedom Series IEC starters are now UL Certified to achieve IEC 947 Type 2 coordination against 100,000A short circuit fault currents. Any brand of properly selected fuse can be used. Type 2 coordination means that the starter will be suitable for further use following a short circuit fault.

Contents

Note: For more information, see CA03402001E.

IEC Size B
Cat. No. CE15BNS3AB



IEC Size D
Cat. No. CE55DN3AB

Product Description

Non-reversing

Contactors are most commonly used to switch motor loads in applications where running over current protection is either not required or is provided separately. Contactors consist of a magnetically actuated switch which can be remotely operated by a push-button station or pilot device such as a proximity switch, limit switch, float switch, auxiliary contacts, etc.

Reversing

Reversing contactors are used primarily for reversing single- or three-phase motors in applications where running over current protection is either not required or is provided separately. They consist of two contactors mechanically and electrically interlocked to prevent line shorts and energization of both contactors simultaneously.

Features

- **EN60947-4-1 IEC 947-4-1 Compliance** — new International Standard for low voltage switchgear and control devices.
- Long life twin break, silver cadmium oxide contacts — provide excellent conductivity and superior resistance to welding and arc erosion.
- Designed to 2,000,000 electrical and 20,000,000 mechanical operations at maximum hp ratings through 20 hp at 460V. Adequate for most general duty control applications.

Non-reversing

- UL listed and CSA certified.
- Highest horsepower rating in a compact, space-saving design, 45 mm frame rated maximum 20 hp at 460V, 65 mm frame rated maximum 50 hp, 90 mm frame rated 100 hp, 180 mm frame rated 200 hp.
- 45 mm open contactors, Sizes A – F, have DIN rail or universal base mounting, 65 mm open contactors have molded feet for panel mounting, and 90 mm to 180 mm have steel mounting plates (optional on smaller sizes).
- DIN rail release mechanism conveniently located on line side of contactor.
- IP20 finger protection shields available.
- Contactor and terminal markings conform to CENELEC EN50011.
- Holding circuit contact(s) supplied as standard:
  - Sizes A – N have a NO auxiliary contact block mounted on right hand side (on Sizes A – C, contact occupies 4th power pole position — no increase in width).
  - Sizes P – S have a NO-NC contact block mounted on the left hand side.
- Lugs supplied standard.

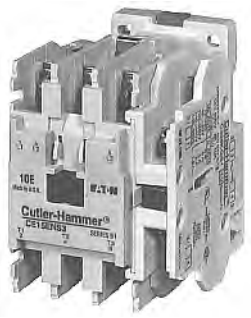
Reversing

- Highest horsepower rating in a compact, space-saving design, 45 mm frame rated maximum 20 hp, 65 mm frame rated maximum 50 hp and 90 mm frame rated maximum 75 hp at 460V. If larger devices are required, order components.
- 45 mm open type reversing contactors, Sizes A – F, have DIN rail or panel mounting capability. DIN rail release mechanism conveniently located on line side of contactor. A steel mounting plate is optional.
- 65 mm reversing contactors, Sizes G – K and 90 mm Sizes L – N are supplied with steel mounting plate as standard.
- Sizes A – K have a wired NC top mounted electrical interlock on each contactor. Sizes L – N have one NO-NC side mounted electrical interlock on each contactor.

Product Selection — 3-Pole Contactors

When Ordering Specify

- Select required contactor by Catalogue Number and replace the magnet coil alpha designation in the Catalogue Number (_) with the proper Code Suffix from **Tables B-251** and , on **Page B-210**.
- For Sizes A – K, the magnet coil alpha designation is the second-to-last digit of the Catalogue Number. Example: for a 240V/60 Hz coil, order CE15ANS3**B**B.



IEC Size E
Cat. No. CE15ENS3AB

IEC Size N
Cat. No. CE15NN3A

Table B-249. Type CE15/CE55 IEC Product Selection — 3-Pole Contactors

Max. UL AC-3 Amp. Rating 600V AC	IEC 947 AC-1 Thermal Current 600V	Maximum kW Rating					Maximum UL Horsepower						3-Pole — Non-reversing ①②		3-Pole — Reversing ③	
		3-Phase					1-Phase		3-Phase				Catalogue Number	Price	Catalogue Number	Price
		220V	380V	415/ 440V	500/ 550V	660V	115V	230V	200V	230V	460V	575V				
7	20	1.1	2.2	2.2	4	1.5	1/4	1/2	1-1/2	1-1/2	3	5	**CE15ANS3_B**		**CE55AN3_B**	
10	20	1.5	4	4	5.5	2.2	1/2	1	2	2	5	7-1/2	**CE15BNS3_B**		**CE55BN3_B**	
12	20	2.2	5.5	5.5	7.5	4	1/2	2	3	3	7-1/2	10	**CE15CNS3_B**		**CE55CN3_B**	
18	32	4	7.5	7.5	11	5.5	1	3	5	5	10	15	**CE15DNS3_B**		**CE55DN3_B**	
25	32	5.5	11	11	15	7.5	2	3	5	7-1/2	15	20	**CE15ENS3_B**		**CE55EN3_B**	
32	32	7.5	15	15	18.5	10	2	5	7-1/2	10	20	25	**CE15FNS3_B**		**CE55FN3_B**	
37	50	—	18.5	18.5	22	11	3	5	7-1/2	10	25	30	**CE15GNS3_B**		**CE55GN3_B**	
44	60	11	22	22	30	15	3	7-1/2	10	15	30	40	**CE15HNS3_B**		**CE55HN3_B**	
60	75	15	30	30	30	18.5	5	10	15	20	40	40	**CE15JNS3_B**		**CE55JN3_B**	
73	80	18.5	37	37	37	22	5	10	20	25	50	50	**CE15KNS3_B**		**CE55KN3_B**	
85	100	22	45	45	55	37	7-1/2	10	25	30	60	75	**CE15LN3_**		**CE55LN3_**	
105	135	30	55	55	75	45	10	10	30	40	75	100	**CE15MN3_**		**CE55MN3_**	
140	175	37	75	75	90	45	10	10	40	50	100	125	**CE15NN3_**		**CE55NN3_**	
170	185	45	90	90	90	45	—	—	50	60	125	125	**CE15PN3_**		—	
200	220	55	110	110	110	55	—	—	60	75	150	150	**CE15RN3_**		—	
300	315	90	160	160	160	75	—	—	75	100	200	200	**CE15SN3_**		—	

① IEC Sizes A – N are supplied with a NO auxiliary contact. On IEC Sizes A – C, the 4th power pole position is used as the auxiliary contact and adds no additional width. Open type Sizes A – K can be ordered with a top mounted auxiliary contact instead of a side mounted contact. To order, change the 7th digit of the listed Catalogue Number from "**S**" to "**T**." Example: CE15AN**T**3AB. On open type Sizes A – K, if the NO auxiliary contact is not required, drop the "**S**" from the listed Catalogue Number.

② Auxiliary contacts: Sizes P – S have 1NO-1NC.

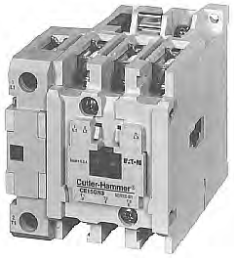
③ Sizes A – K IEC contactors do not include holding circuit contacts. For factory installed NO auxiliary contacts, insert "**S**" (side mounted) or "**T**" (top mounted) after 6th digit of listed Catalogue Number. Example: Change CE55AN3AB to CE55AN**S**3AB. For "T," top mounted NC contact blocks are replaced with NO-NC blocks — for "S," they are replaced with NO-NC side mounted blocks.

Accessories . . . . . **Pages B-218 – B-224**
Discount Symbol **MC7**

Product Selection — 2-, 4- and 5-Pole Contactors

When Ordering Specify

- Select required contactor by Catalogue Number and replace the magnet coil alpha designation in the Catalogue Number (_) with the proper Code Suffix from the adjacent table.
- For Sizes A – K, the magnet coil alpha designation is the second-to-last digit of the Catalogue Number. Example: for a 240V/60 Hz coil, order CE15ANS3**B**B.
- For **DC Magnet Coils**, see Accessories, **Page B-220**.



IEC Size G
4-Pole Contactor
Cat. No. CE15GN4AB

Table B-250. Type CE15 IEC Product Selection — 2-, 4- and 5-Pole Contactors — Non-reversing

Max. UL AC-3 Ampere Rating 600V AC	IEC 947 AC-1 Thermal Current 600V	Maximum kW Rating					Maximum UL Horsepower						Catalogue Number	Price
		3-Phase					1-Phase		3-Phase					
		220V	380V	415/ 440V	500/ 550V	660V	115V	230V	200V	230V	460V	575V		
2-Pole ①														
7	20	1.1	2.2	2.2	4	1.5	1/4	1/2	1-1/2	1-1/2	3	5	**CE15ANS2_B**	
10	20	1.5	4	4	5.5	2.2	1/2	1	2	2	5	7-1/2	**CE15BNS2_B**	
12	20	2.2	5.5	5.5	7.5	4	1/2	2	3	3	7-1/2	10	**CE15CNS2_B**	
18	32	4	7.5	7.5	11	5.5	1	3	5	5	10	15	**CE15DNS2_B**	
25	32	5.5	11	11	15	7.5	2	3	5	7-1/2	15	20	**CE15ENS2_B**	
32	32	7.5	15	15	18.5	10	2	5	7-1/2	10	20	25	**CE15FNS2_B**	
37	50	—	18.5	18.5	22	11	3	5	7-1/2	10	25	30	**CE15GNS2_B**	
44	60	11	22	22	30	15	3	7-1/2	10	15	30	40	**CE15HNS2_B**	
60	75	15	30	30	30	18.5	5	10	15	20	40	40	**CE15JNS2_B**	
73	80	18.5	37	37	37	22	5	10	20	25	50	50	**CE15KNS2_B**	
85	100	22	45	45	55	37	7-1/2	10	25	30	60	75	**CE15LN2_**	
105	135	30	55	55	75	45	10	10	30	40	75	100	**CE15MN2_**	
140	175	37	75	75	90	45	10	10	40	50	100	125	**CE15NN2_**	
4-Pole														
7	20	1.1	2.2	2.2	4	1.5	1/4	1/2	1-1/2	1-1/2	3	5	**CE15AN4_B**	
10	20	1.5	4	4	5.5	2.2	1/2	1	2	2	5	7-1/2	**CE15BN4_B**	
12	20	2.2	5.5	5.5	7.5	4	1/2	2	3	3	7-1/2	10	**CE15CN4_B**	
18	32	4	7.5	7.5	11	5.5	1	3	5	5	10	15	—	
25	32	5.5	11	11	15	7.5	2	3	5	7-1/2	15	20	—	
32	32	7.5	15	15	18.5	10	2	5	7-1/2	10	20	25	—	
37	50	—	18.5	18.5	22	11	3	5	7-1/2	10	25	30	**CE15GN4_B**	
44	60	11	22	22	30	15	3	7-1/2	10	15	30	40	**CE15HN4_B**	
60	75	15	30	30	30	18.5	5	10	15	20	40	40	**CE15JN4_B**	
73	80	18.5	37	37	37	22	5	10	20	25	50	50	—	
5-Pole														
32	32	7.5	15	15	18.5	10	2	5	7-1/2	10	20	25	—	
37	50	—	18.5	18.5	22	11	3	5	7-1/2	10	25	30	**CE15GN5_B**	
44	60	11	22	22	30	15	3	7-1/2	10	15	30	40	**CE15HN5_B**	
60	75	15	30	30	30	18.5	5	10	15	20	40	40	**CE15JN5_B**	
73	80	18.5	37	37	37	22	5	10	20	25	50	50	—	

① Sizes A – N 2-pole contactors are supplied with a NO auxiliary contact. On Sizes A – C, the 4th power pole is used as the auxiliary contact and adds no additional width. Open type Sizes A – K can be ordered with a top mounted auxiliary contact instead of a side mounted contact. To order, change the "**S**" to a "**T**".

Accessories ..... **Pages B-218 – B-224**
Discount Symbol **MC7**

B

Table B-251. AC Coil Suffixes

Coil Volts and Hertz	Code Suffix
120/60 or 110/50	**A**
240/60 or 220/50	**B**
480/60 or 440/50	**C**
600/60 or 550/50	**D**
208/60	**E**
277/60	**H**
208-240/60 ①	**J**
240/50	**K**
380-415/50	**L**
550/50	**N**
380/60	**P**
24/60, 24/50 ②	**T**
24/50	**U**
32/50	**V**
48/60	**W**
48/50	**Y**

① IEC Sizes A – F only.
② IEC Sizes A – F only. Sizes G – S are 24/60 only.

Table B-252. DC Coil Suffixes

Contactor or Starter Size — IEC	Volts	NCI Interlock	Code Suffix
Non-reversing			
A – F	12	**C320KGD1**	**R1**
	24	**C320KGD1**	**T1**
	48	**C320KGD1**	**W1**
	120	**C320KGD1**	**A1**
A – F	12	**C320KGD2** ③	**R4**
	24	**C320KGD2** ③	**T4**
	48	**C320KGD2** ③	**W4**
	120	**C320KGD2** ③	**A4**
G – K	12	**C320KGD5**	**R4**
	24	**C320KGD5**	**T4**
	48	**C320KGD5**	**W4**
	120	**C320KGD5**	**A4**
L – N	12	**C320KGD3**	**R1**
	24	**C320KGD3**	**T1**
	48	**C320KGD3**	**W1**
	120	**C320KGD3**	**A1**
P – S	24	**C320KGD3**	**T1B**
	48	**C320KGD3**	**W1B**
	120	**C320KGD3**	**A1B**
	240	**C320KGD3**	**B1B**
Reversing			
A – F	12	**(2) C320KGD1**	**R1** ④
	24	**(2) C320KGD1**	**T1** ④
	48	**(2) C320KGD1**	**W1** ④
	120	**(2) C320KGD1**	**A1** ④
G – K	12	**(2) C320KGD3**	**R1** ④
	24	**(2) C320KGD3**	**T1** ④
	48	**(2) C320KGD3**	**W1** ④
	120	**(2) C320KGD3**	**A1** ④

③ These kits are supplied with a NO/NCI side mounted auxiliary contact in place of the NCI contact.
④ Factory installed DC coils on IEC contactors and starters include a NC top mounted auxiliary contact on each contactor for electrical interlocking.

Discount Symbol **MC7**

Contents

Note: For more information, see CA03402001E.

IEC Size D
Cat. No. AE16DN0BC

Product Description

Non-reversing

IEC Freedom Series Starters utilize an Interchangeable Heater Pack Overload Relay which allows increased flexibility. Starters are available to cover 3-phase motors with fractional horsepower ratings up to 200 hp at 600V.

Reversing

Three-phase, full voltage magnetic starters are used primarily for reversing of 3-phase squirrel cage motors. They consist of two contactors and a single overload relay assembled together. The contactors are mechanically and electrically interlocked to prevent line shorts and energization of both contactors simultaneously.

Features

- **EN60947-4-1 IEC 947-4-1 Compliance** — International Standard for low voltage switchgear and control devices.
- UL listed and CSA certified.
- Bimetallic Ambient Compensated Overload Relays — available in three basic sizes covering applications up to 200 hp (100 hp Reversing) — reducing number of different contactor/overload relay combinations that have to be stocked.

  These overload relays feature:
  - Selectable Manual or Automatic Reset operation.
  - Interchangeable Heater Packs adjustable ±24% to match motor FLA and calibrated for 1.0 and 1.15 service factors. Heater packs for smaller overload relay will mount in larger overload relay — useful in derating applications such as jogging.
  - Meets UL508 Single-Phasing requirements, Class 20 or Class 10 trip time.
  - Overload trip indication.
  - Electrically isolated NO-NC contacts (pull RESET button to test).
- Long life twin break, silver cadmium oxide contacts — provide excellent conductivity and superior resistance to welding and arc erosion.
- Designed to 2,000,000 electrical and 20,000,000 mechanical operations through 20 hp at 460V. Adequate for most general duty motor control applications.

Non-reversing

- Highest horsepower rating in compact, space-saving designs, 45 mm frame rated maximum 20 hp at 460V, 65 mm frame rated maximum 50 hp, 90 mm frame rated maximum 100 hp, and 180 mm rated maximum 200 hp.
- IP20 finger protection shields available.
- Contactor and terminal markings conform to CENELEC EN50011.
- One NO right-side mounted auxiliary contact supplied as standard on Sizes A – N (on Sizes A – C, contact occupies 4th power pole — no increase in width). Sizes P – S have NO-NC.
- 45 mm open type starters, sizes A – F, have DIN rail or universal base mounting. DIN rail release mechanism conveniently located on line side of starter. A steel mounting plate is optional.
- 65 mm starters, sizes G – K; 90 mm starters, sizes L – N; and P – S 180 mm supplied with steel mounting plate as standard.
- Four basic starter frame widths — 45 mm, 65 mm, 90 mm and 180 mm — simplifying panel layout.

Reversing

- Highest horsepower rating in compact, space-saving designs. 45 mm frame rated maximum 20 hp at 460V, 65 mm frame rated maximum 50 hp, and 90 mm frame rated maximum 100 hp.
- 45 mm open type reversing starters, Sizes A – F, have DIN rail or universal base mounting. DIN rail release mechanisms conveniently located on line side of starters. A steel mounting plate is optional.
- 65 mm reversing starters, Sizes G – K, and 90 mm reversing starters, Sizes L – N, are supplied with steel mounting plate as standard.
- Sizes A – K have a wired NC top mounted electrical interlock on each contactor. Sizes L – N have one NO-NC side mounted electrical interlock on each contactor.
- A full time of snap-on accessories — top and side mounted auxiliary contacts, solid-state and pneumatic timers, etc.
- Straight-through wiring — line lugs at top, load lugs at bottom.
- Horizontal of vertical mounting on upright panel for application freedom.
- Screw type power terminals have captive, backed-out self-lifting pressure plates with ± screws — reducing wiring time.

Product Selection

When Ordering Specify

- Select required starter by Catalogue Number and replace the magnet coil alpha designation in the Catalogue Number (_) with the proper Code Suffix from **Table B-256** on **Page B-213**.
- Example: for a Size B starter with a 480V/60 Hz coil, order AE16BNS0CC.
- For **DC Magnet Coils**, see Accessories, **Page B-220**.

B

Table B-253. Type AE16/AE56 Starters — Interchangeable Heater Overload Relay — 3-Pole — Non-reversing ①

Max. UL AC-3 Ampere Rating	IEC 947 AC-1 Thermal Current 600V	Maximum kW Rating					Maximum UL Horsepower						Catalogue Number	Price
		3-Phase					1-Phase		3-Phase					
		220V	380V	415/ 440V	500/ 550V	660V	115V	230V	208V	240V	480V	600V		
7	20	1.1	2.2	2.2	4	1.5	1/4	1/2	1-1/2	1-1/2	3	5	**AE16ANS0_C**	
10	20	1.5	4	4	5.5	2.2	1/2	1	2	2	5	7-1/2	**AE16BNS0_C**	
12	20	2.2	5.5	5.5	7.5	4	1/2	2	3	3	7-1/2	10	**AE16CNS0_C**	
18	32	4	7.5	7.5	11	5.5	1	3	5	5	10	15	**AE16DNS0_C**	
25	32	5.5	11	11	15	7.5	2	3	5	7-1/2	15	20	**AE16ENS0_C**	
32	32	7.5	15	15	18.5	10	2	5	7-1/2	10	20	25	**AE16FNS0_C**	
37	50	—	18.5	18.5	22	11	3	5	7-1/2	10	25	30	**AE16GNS0_B**	
44	60	11	22	22	30	15	3	7-1/2	10	15	30	40	**AE16HNS0_B**	
60	75	15	30	30	30	18.5	5	10	15	20	40	40	**AE16JNS0_B**	
73	80	18.5	37	37	37	22	5	10	20	25	50	50	**AE16KNS0_B**	
85	100	22	45	45	55	37	7-1/2	10	25	30	60	75	**AE16LN0_**	
105	135	30	55	55	75	45	10	10	30	40	75	100	**AE16MN0_**	
140	175	37	75	75	90	45	10	10	40	50	100	125	**AE16NN0_**	
170	185	45	90	90	90	45	—	—	50	60	125	125	**AE16PN0_**	
200	220	55	110	110	110	55	—	—	60	75	150	150	**AE16RN0_**	
300	315	90	160	160	160	75	—	—	75	100	200	200	**AE16SN0_**	

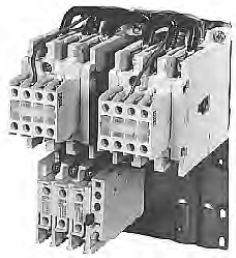
① IEC Sizes A – N, open are supplied with a NO auxiliary contact. On IEC Sizes A – C, the 4th power pole position is used as the auxiliary contact and adds no additional width. Open type Sizes A – K can be ordered with a top mounted auxiliary contact instead of a side mounted contact. To order, change the 7th digit of the listed Catalogue Number from "**S**" to "**T**." Example: AE16AN**T**0AC. On open type Sizes A – K, if the NO auxiliary contact is not required, drop the "**S**" from the listed Catalogue Number. Example: AE16AN0AC. On IEC Sizes P – S, a NO-NC side mounted is standard.

Accessories . . . . . **Pages B-218 – B-224**
Discount Symbol **MC7**

When Ordering Specify

- Select required starter by Catalogue Number and replace the magnet coil alpha designation in the Catalogue Number (_) with the proper Code Suffix from **Table B-256** below.
- Example: for a Size B starter with a 480V/60 Hz coil, order AE16BNS0CC.
- For **DC Magnet Coils**, see Accessories, **Page B-220**.

IEC Size F
Cat. No. AE56DN0BC



IEC Size G
Cat. No. AE56GN0BB

Table B-254. Type AE16/AE56 Starters — Interchangeable Heater Overload Relay — 3-Pole — Reversing ①

Max. UL AC-3 Ampere Rating	IEC 947 AC-1 Thermal Current 600V	Maximum kW Rating					Maximum UL Horsepower						Catalogue Number	Price
		3-Phase					1-Phase		3-Phase					
		220V	380V	415/ 440V	500/ 550V	660V	115V	230V	208V	240V	480V	600V		
7	20	1.1	2.2	2.2	4	1.5	1/4	1/2	1-1/2	1-1/2	3	5	**AE56AN0_C**	
10	20	1.5	4	4	5.5	2.2	1/2	1	2	2	5	7-1/2	**AE56BN0_C**	
12	20	2.2	5.5	5.5	7.5	4	1/2	2	3	3	7-1/2	10	**AE56CN0_C**	
18	32	4	7.5	7.5	11	5.5	1	3	5	5	10	15	**AE56DN0_C**	
25	32	5.5	11	11	15	7.5	2	3	5	7-1/2	15	20	**AE56EN0_C**	
32	32	7.5	15	15	18.5	10	2	5	7-1/2	10	20	25	**AE56FN0_C**	
37	50	—	18.5	18.5	22	11	3	5	7-1/2	10	25	30	**AE56GN0_B**	
44	60	11	22	22	30	15	3	7-1/2	10	15	30	40	**AE56HN0_B**	
60	75	15	30	30	30	18.5	5	10	15	20	40	40	**AE56JN0_B**	
73	80	18.5	37	37	37	22	5	10	20	25	50	50	**AE56KN0_B**	
85	100	22	45	45	55	37	7-1/2	10	25	30	60	75	**AE56LN0_**	
105	135	30	55	55	75	45	10	10	30	40	75	100	**AE56MN0_**	
140	175	37	75	75	90	45	10	10	40	50	100	125	**AE56NN0_**	

① Sizes A – K IEC starters do not include holding circuit contacts. For factory installed NO auxiliary contacts, insert "**S**" (side mounted) or "**T**" (top mounted) after 6th digit of listed Catalogue Number. Example: Change AE56AN0AC to AE56AN**S**0AC. For "T," top mounted NC contact blocks are replaced with NO-NC blocks — for "S" they are replaced with NO-NC side mounted blocks.

Table B-255. Maximum Horsepower Rating of Starters for 380V 50 Hz Application

IEC Size	A	B	C	D	E	F	G	H
hp	3	5	5	10	10	15	20	25

IEC Size	J	K	L	M	N	P	R	S
hp	30	40	50	60	75	100	125	150

Table B-256. AC Coil Suffixes

Coil Volts and Hertz	Code Suffix
120/60 or 110/50	**A**
240/60 or 220/50	**B**
480/60 or 440/50	**C**
600/60 or 550/50	**D**
208/60	**E**
277/60	**H**
208-240/60 ②	**J**
240/50	**K**
380-415/50	**L**
550/50	**N**
24/60, 24/50 ③	**T**
24/50	**U**
32/50	**V**
48/60	**W**
48/50	**Y**

② IEC Sizes A – F only.
③ IEC Sizes A – F only. Sizes G – S are 24/60 only.

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Discount Symbol **MC7**

Contents

Note: For more information, see CA03402001E.

32 Ampere Overload
Cat. No. C306DN3B

Product Description

C306 Overload Relays are designed for use with CE or CN non-reversing and reversing contactors. Four sizes are available for overload protection up to 144 amperes.

Features

- Selectable manual or automatic reset operation.
- Interchangeable heater packs adjustable ±24% to match motor FLA and calibrated for use with 1.0 and 1.15 service factor motors.
  - Heater packs for 32 ampere overload relay will mount in 75 ampere overload relay — useful in derating applications such as jogging.
- Class 10 or 20 heater packs.
- Load lugs built into relay base.
- Bimetallic, ambient compensated operated. Trip free mechanism.
- Electrically isolated NO-NC contacts (pull RESET button to test).
- Overload trip indication.
- Shrouded or "fingerproof" terminals to reduce possibility of electrical shock.
- Meets UL508 single-phasing requirements.

Standards and Certifications

- UL listed
- CSA certified
- NEMA compliance and EN60947-4-1 IEC 947-4-1 and (CE) Mark

Factory Modifications

Cat. No. C306TB1

Table B-257. C306 Thermal Overload Relays with Mounting Adapter

Consists of a thermal overload relay mounted to a terminal base adapter — permits fast and easy installation.		
Description	**Catalogue Number**	**Price**
C306DN3B + C306TB1 C306GN3B + C306TB2B	**C306DT3B** **C306GT3B**	

Accessories

Table B-258. DIN Rail and Panel Mounting Adapter

These adapters are required when component overload relays are to be separately mounted. The terminal base adapter includes line terminals and connects with the overload relays listed in **Table B-257**.		
Description	**Catalogue Number**	**Price**
For 32 Ampere Overload Relay For 75 Ampere Overload Relay	**C306TB1** **C306TB2B** ①	

① This Series "B" adapter will accept Series "A" or "B" overload relays (C306GN3 or C306GN3B). C306TB2 can only be used with C306GN3.

Discount Symbol **MC7**

Table B-259. Locking Cover for Overload Relay — C306 Only

Snap-on transparent or opaque plastic panel for covering access port to the overload relay trip setting dial — helps prevent accidental or unauthorized changes to trip and reset setting.			
Description	**Min. Order Quantity (Std. Pkg.)**	**Catalogue Number**	**Price**
Clear cover, no accessibility	50	**C320PC3**	
Gray cover, no accessibility, with Auto only nib	50	**C320PC4**	
Gray cover, no accessibility, with Manual only nib	50	**C320PC5**	
Gray cover with FLA dial accessibility, A, B, C, D positions and Auto only nib	50	**C320PC6**	
Gray cover with FLA dial accessibility, A, B, C, D positions and Manual only nib	50	**C320PC7**	

Overload Lug Adapter Kit

Cat. No. C306KAL1-3 Overload Relay Lug Adapter Kit

These kits are used in conjunction with Catalogue Numbers H2001B – H2014B or H2101B – H2114B heater packs as a means of utilizing these Series "B" heater packs in Catalogue Numbers C306DN3 and C306GN3 Series "A1" overload relays. The kit consists of 3 lug adapters and installation instructions. When installing Series "B" heater packs plus lug adapters in Series "A" overload relays, refer to heater pack FLA adjustment tables originally supplied with equipment (also supplied with kit).

Table B-260. Product Selection

Description	**Catalogue Number**	**Price**
Series "A1" Overload Relay Lug Adapter Kit	**C306KAL1-3B**	

Replacement Parts

Heater Pack Replacement

The heater pack series is determined by the 6th character of the Catalogue Number. Series A or prior heater packs (identified by either "A" or "-" as the 6th character) have built-in load lugs. Series B or later heater packs do not (load lugs are on overload relay). Replacement of Series A or earlier heater packs with Series B or later heater packs, requires the one time addition of Lug Adapter Kit C3606KAL1-3B to the Series A1 overload relay.

Superseded Series A Heater Pack

Series B Heater Pack

Table B-261. Heater Pack Replacement Requirements

Existing Heater Pack Catalogue Numbers	**Replacement Product Required**
H2001-3 – H2013-3 **H2001A-3 – H2013A-3**	Lug Adapter Kit C3606KAL1-3B and Series B Heater Pack
H2001B-3 – H2013B-3	Series B Heater Pack
H2014-3 **H2014A-3**	When inventory is exhausted, replace with Lug Adapter Kit C3606KAL1-3B and Series B Heater Pack
H2014B-3	Series B Heater Pack
H2015-3 – H2017-3	When inventory is exhausted, replace with heater pack chosen from **Table B-264**
H2015A-3 – H2017A-3	When inventory is exhausted, replace with Lug Adapter Kit C3606KAL1-3B and Series B Heater Pack
H2015B-3 – H2017B-3	Series B Heater Pack

Table B-262. Heater Pack Ratings

Motor Full Load Ampere Rating				**Order Heater Pack Catalogue Number**	**Price**
Dial Position					
A	**B**	**C**	**D**		
29.0 39.6 53.9	32.5 44.3 60.4	36.0 49.1 66.8	39.5 53.8 74.9	**H2015A-3** **H2016A-3** **H2017A-3**	

Overload Relay Replacement — Series "A" Only

When replacing a Catalogue Number C306DN3 (Part Number 10-6044) or C306GN3 (10-6319) Series "A" overload relay on a starter, order a Series "B" overload relay and Series "B" heater packs.

Superseded 32 Ampere Series "A" Overload Relay Cat. No. C306DN3

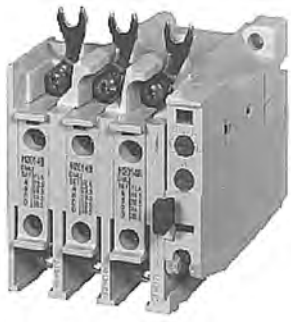
Superseded 75 Ampere Series "A" Overload Relay Cat. No. C306GN3

Discount Symbol **MC7**

B

Product Selection

32A Overload
Cat. No. C306DN3B



75A Overload
Cat. No. C306GN3B

Table B-263. C306 Thermal Overload Relays

For Use with Freedom Series Contactors		Maximum Ampere Rating	Number of Poles	Open Type		Open Type with Adapter for DIN Rail or Panel Mount		NEMA 1 Enclosed	
NEMA	IEC			Catalogue Number	Price	Catalogue Number	Price	Catalogue Number	Price
00, 0	A – F	32 ②	3	**C306DN3B**		**C306DT3B**		**C306DG3B**	
1, 2	G – K	75 ②	3	**C306GN3B**		**C306GT3B**		**C306GG3B**	
3	L – M	105 ③	3	**C306KN3**		—		—	
4	N	144 ③	3	**C306NN3**		—		—	
5 – 8 ①	—	—	—	—		—		—	

① NEMA Sizes 5 – 8 use the 32 ampere overload in conjunction with CTs.
② Series "B" overload relays have load lugs built into relay base and will only accept Series "B" heater packs. These relays can be directly attached to contactor or they can be DIN rail mounted using adapter on **Page B-214**.
③ These relays can be panel mounted only.

Heater Pack Selection

Heater Pack
H2001B – H2017B

Heater Pack
H2101B – H2117B

Heater Pack
H2018 – H2024

Heater packs H2001B to H2017B and H2101B to H2117B are to be used only with Series B overload relays Catalogue Numbers C306DN3B (Part No. 10-7016) and C306GN3B (Part No. 10-7020). The load lugs are built into the overload relay base to allow load wiring prior to heater pack installation. The previous heater design had integral load lugs. The Series B heater packs are electrically equivalent to the previous heater design. Heaters H2018-3 to H2024-3 have not changed.

Table B-264. Starters with Series B Overload Relays

NEMA — AN Type		IEC — AE Type	
Size	Series	Size	Series
00 – 0	**C**	A – F	**C**
1 – 2	**B**	G – K	**B**
5	**B**		
6	**C**		
7 – 8	**B**		

Note: The series of a starter is the last digit of the listed Catalogue Number. EXAMPLE: AE16DN0A**B**.

Discount Symbol **MC7**

Table B-265. Standard Trip — Class 20

Overload Relay Size	Motor Full Load Ampere Rating — Dial Position A	B	C	D	Catalogue Number (Includes 3 Heater Packs)	Price
For Use with NEMA Sizes 00 – 0 Series C, NEMA Sizes 1 – 2 Series B; IEC Sizes A – F Series C, IEC Sizes G – K Series B						
32A or 75A	.254	.306	.359	.411	**H2001B-3**	
	.375	.452	.530	.607	**H2002B-3**	
	.560	.676	.791	.907	**H2003B-3**	
	.814	.983	1.15	1.32	**H2004B-3**	
	1.20	1.45	1.71	1.96	**H2005B-3**	
	1.79	2.16	2.53	2.90	**H2006B-3**	
	2.15	2.60	3.04	3.49	**H2007B-3**	
	3.23	3.90	4.56	5.23	**H2008B-3**	
	4.55	5.50	6.45	7.40	**H2009B-3**	
	6.75	8.17	9.58	11.0	**H2010B-3**	
	9.14	10.8	12.4	14.0	**H2011B-3**	
	14.0	16.9	19.9	22.8	**H2012B-3**	
	18.7	22.7	26.7	30.7	**H2013B-3**	
	23.5	28.5	33.5	38.5	**H2014B-3**	
For Use with NEMA Size 2, IEC Sizes G – K Only — Series B						
75A	29.0	34.0	39.1	44.1	**H2015B-3**	
	39.6	45.5	51.5	57.4	**H2016B-3**	
	53.9	60.9	67.9	74.9	**H2017B-3**	
For Use with NEMA Sizes 3 – 4, IEC Sizes L – N Only — Series A						
105A or 144A	8.0	9.2	10.3	11.5	**H2025-3**	
	11.4	12.8	14.3	15.7	**H2026-3**	
	14.3	15.7	17.4	19.0	**H2027-3**	
	18.0	20.2	22.3	24.5	**H2018-3**	
	24.6	27.6	30.5	33.4	**H2019-3**	
	33.5	37.5	41.5	45.6	**H2020-3**	
	45.7	51.2	56.7	62.1	**H2021-3**	
	62.2	69.7	77.1	84.6	**H2022-3**	
	84.7	95.0	105.0	115.0	**H2023-3**	
	106.0	118.0	131.0	144.0	**H2024-3**	
For Use with Size 5 Starters — Series B and IEC P, R and S with 300/5 CT						
32A ①	49	59	69	79	**H2004B-3**	
	72	87	103	118	**H2005B-3**	
	107	130	152	174	**H2006B-3**	
	129	156	182	209	**H2007B-3**	
	194	234	274	—	**H2008B-3**	
For Use with Size 6 Starters Only — Series B with 600/5 CT						
32A ①	144	174	205	235	**H2005B-3**	
	215	259	304	348	**H2006B-3**	
	258	312	365	419	**H2007B-3**	
	388	468	547	627	**H2008B-3**	
For Use with Size 7 Starters Only — Series B with 1000/5 CT						
32A ①	163	197	230	264	**H2004B-3**	
	240	290	342	392	**H2005B-3**	
	358	432	506	580	**H2006B-3**	
	430	520	608	698	**H2007B-3**	
	646	780	912	—	**H2008B-3**	
For Use with Size 8 Starters Only — Series B with 1500/5 CT						
32A ①	244	295	345	396	**H2004B-3**	
	360	435	513	588	**H2005B-3**	
	537	648	759	870	**H2006B-3**	
	645	780	912	1047	**H2007B-3**	
	969	1170	1368	—	**H2008B-3**	

① Sizes 5 – 8 and IEC P – S use the 32A overload relay with current transformers.

Table B-266. Fast Trip — Class 10

Overload Relay Size	Motor Full Load Ampere Rating — Dial Position A	B	C	D	Catalogue Number (Includes 3 Heater Packs)	Price
For Use with NEMA Sizes 00 – 0 Series C, NEMA Sizes 1 – 2 Series B; IEC Sizes A – F Series C, IEC Sizes G – K Series B						
32A or 75A	.260	.313	.367	.420	**H2101B-3**	
	.384	.464	.543	.623	**H2102B-3**	
	.570	.688	.806	.924	**H2103B-3**	
	.846	1.02	1.20	1.37	**H2104B-3**	
	1.28	1.55	1.83	2.10	**H2105B-3**	
	1.92	2.33	2.74	3.15	**H2106B-3**	
	2.30	2.79	3.28	3.77	**H2107B-3**	
	3.38	4.10	4.82	5.54	**H2108B-3**	
	4.96	6.03	7.09	8.16	**H2109B-3**	
	7.07	8.58	10.1	11.6	**H2110B-3**	
	9.60	11.2	12.8	14.4	**H2111B-3**	
	14.4	17.5	20.7	23.8	**H2112B-3**	
	18.7	21.8	25.0	28.1	**H2113B-3**	
	23.5	27.3	31.0	34.8	**H2114B-3**	
For Use with NEMA Size 2, IEC Sizes G – K Only — Series B						
75A	28.3	32.6	37.0	41.3	**H2115B-3**	
	36.6	42.3	48.1	53.8	**H2116B-3**	
	53.8	60.8	67.9	74.9	**H2117B-3**	
For Use with Size 5 Starters Only — Series B and IEC P, R and S with 300/5 CT						
32A ②	51	61	72	82	**H2104B-3**	
	77	93	110	126	**H2105B-3**	
	115	140	164	189	**H2106B-3**	
	138	167	197	226	**H2107B-3**	
	203	246	289	—	**H2108B-3**	
For Use with Size 6 Starters Only — Series B with 600/5 CT						
32A ②	154	186	220	252	**H2105B-3**	
	230	280	329	378	**H2106B-3**	
	276	335	394	452	**H2107B-3**	
	406	492	578	—	**H2108B-3**	
For Use with Size 7 Starters Only — Series B with 1000/5 CT						
32A ②	169	204	240	274	**H2104B-3**	
	256	310	366	420	**H2105B-3**	
	384	466	543	630	**H2106B-3**	
	460	558	656	754	**H2107B-3**	
	676	820	—	—	**H2108B-3**	
For Use with Size 8 Starters Only — Series B with 1500/5 CT						
32A ②	254	306	360	411	**H2104B-3**	
	384	465	549	630	**H2105B-3**	
	576	699	822	945	**H2106B-3**	
	690	837	984	1131	**H2107B-3**	
	1014	1230	—	—	**H2108B-3**	

② Sizes 5 – 8 and IEC P – S use the 32A overload relay with current transformers.

Note: Heater packs are shipped 3 to a carton. Catalogue Numbers are for 3 heater packs.

Discount Symbol **MC7**

Auxiliary Contacts

NEMA Sizes 00 – 2 — IEC Sizes A – K

The auxiliary contacts listed below are designed for installation on Freedom Series starters and contactors. Snap-on design facilitates quick, easy installation.

B

These bifurcated design contact blocks, featuring silver cadmium alloy contacts, are well suited for use in very low energy (logic level) circuits.

Side Mounted

Top Mounted

Table B-267. Selection Product

Description	Contact Configuration Code ①	Catalogue Number	Price
Side Mounted			
1NO	10	**C320KGS1**	
1NO (Logic Level)	10	**C320KGS1L**	
1NC	01	**C320KGS2**	
1NO-1NC	11	**C320KGS3**	
1NO-1NC (Logic Level)	11	**C320KGS3L**	
2NO	20	**C320KGS4**	
2NO (Logic Level)	20	**C320KGS4L**	
2NC	02	**C320KGS5**	
1NO-1NCI	N/A	**C320KGS6**	
1NO (EC)-1NC (LO)	N/A	**C320KGS7**	
1NCI	N/A	**C320KGS8**	
Top Mounted			
1NO	10	**C320KGT1**	
1NC	01	**C320KGT2**	
1NO-1NC	11	**C320KGT3**	
1NO-1NC (Logic Level)	11	**C320KGT3L**	
2NO	20	**C320KGT4**	
2NC	02	**C320KGT5**	
1NO-1NCI	N/A	**C320KGT6**	
1NO (EC)-1NC (LO)	N/A	**C320KGT7**	
1NCI	N/A	**C320KGT8**	
3NO	30	**C320KGT9**	
2NO-1NC	21	**C320KGT10**	
1NO-2NC	12	**C320KGT11**	
3NC	03	**C320KGT12**	
4NO	40	**C320KGT13**	
3NO-1NC	31	**C320KGT14**	
2NO-2NC	22	**C320KGT15**	
2NO-2NC (Logic Level)	22	**C320KGT15L**	
1NO-3NC	13	**C320KGT16**	
4NC	04	**C320KGT17**	
3NO-1NCI	N/A	**C320KGT18**	
2NO-1NCI-1NC	N/A	**C320KGT19**	
2NO-1NO (EC)-1NC (LO)	N/A	**C320KGT20**	
1NO-1NC-1NO (EC)-1NC (LO)	N/A	**C320KGT21**	

Note: NCI = Normally Closed early opening designed for use in reversing applications. EC = Early Closing. LO = Late Opening.

① For reference only — not part of Catalogue Number. See above right.

Contact Configuration Code

This two-digit code is found on the auxiliary contact to assist in identifying the specific contact configuration. The first digit indicates the quantity of NO contacts and the second indicates the quantity of NC contacts.

NEMA Sizes 3 – 8 — IEC Sizes L – S

Table B-268. Product Selection

Circuit	Contact Configuration Code ②	Catalogue Number		Price
Base Auxiliary Contacts — NEMA Sizes 3 – 5, IEC Sizes L – S				
		NEMA Size 3 IEC Sizes L – N	NEMA Sizes 4 – 5 IEC Sizes P – S	
NO	10	**C320KGS31**	**C320KGS41**	
NO-NC	11	**C320KGS32**	**C320KGS42**	
Auxiliary Contacts — NEMA Sizes 3 – 5, IEC Sizes L – S				
		Catalogue Number		
NO	10	**C320KGS20**		
NC	01	**C320KGS21**		
NO-NC ③	11	**C320KGS22**		
Auxiliary Contacts — NEMA Sizes 6 – 8				
		Size	**Catalogue Number**	
NO-NC	11	NEMA 8	**C320KA5**	
2NO-2NC	22	NEMA 6 – 7	**C320KA6**	
2NO-2NC	22		**C320KA8**	

② For reference only — not part of Catalogue Number. See above.

③ NO-NC occupies two positions — L2 and L3, or R2 and R3. See next page.

Base Auxiliary Contact Cat. No. C320KGS42

Auxiliary Contact Cat. No. C320KGS22

Discount Symbol **MC7**

Auxiliary Contact Location

NEMA Sizes 00 – 2, IEC Sizes A – K

The sketches below illustrate the maximum number of auxiliary contacts that can be assembled to a contactor or starter and their locations.

Table B-269. Auxiliary Contacts

Catalogue Number	Size	Poles	Available Mounting Positions ①②	
			Open Type	Enclosed
AE16	A – K	3	T1, L1	L1
AN16	00 0 – 2	3 3	T1, L1, R1 T1, L1	L1 L1
AE56	A – K	3	L1, R1	L1, R1
AN56	00 – 2	3	T1,T2	—
CE15	A – C D – K G – J G – J	2 – 4 3 4 5	T1, L1, R1 T1, L1 T1, R1 T1	L1, R1 L1 — —
CN15	00 0 – 2 1, 2 1, 2	2 – 4 2 – 3 4 5	T1, L1, R1 T1, L1 T1, L1 T1, L1	L1 L1 — —
CN35	10A 20 – 60A 60A 60A	2 – 4 2 – 3 4 5	T1, L1, R1 T1, L1 T1, L1 T1, L1	L1 L1 — —
CE55	A – K	3	L1, R1	L1, R1
CN55	00 – 2	3	T1,T2	—

① Available positions on contactors or starters other than what is factory installed.

② When a pneumatic timer is mounted on contactor, only side mounted auxiliary contact positions are available. The solid-state timer, when added, takes up side mounted auxiliary contact position.

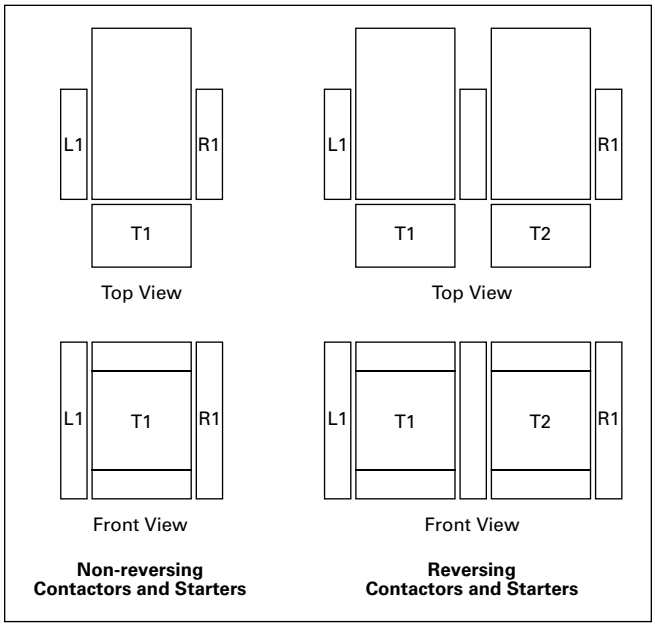


Figure B-158. Auxiliary Contact Location

NEMA Sizes 3 – 8, IEC Sizes L – S

The sketches below illustrate the maximum number of auxiliary contacts that can be assembled to a contactor and their locations.

Note: A Base Auxiliary Contact must be added in position R1 before additional auxiliary contacts can be mounted on NEMA Size 3 and IEC Sizes L – N, or in L1 on NEMA Sizes 4 – 5 and IEC Sizes P – S.

Table B-270. Auxiliary Contacts

Size	Available Mounting Positions ③
NEMA Size 3, IEC Sizes L – N	R2, R3, L1, L2, L3
NEMA Sizes 4 – 5, IEC Sizes P – S	L2, L3, R1, R2, R3
NEMA Sizes 6 – 7	R1
NEMA Size 8	L2, R2

③ Available positions on contactors or starters other than what is factory installed.

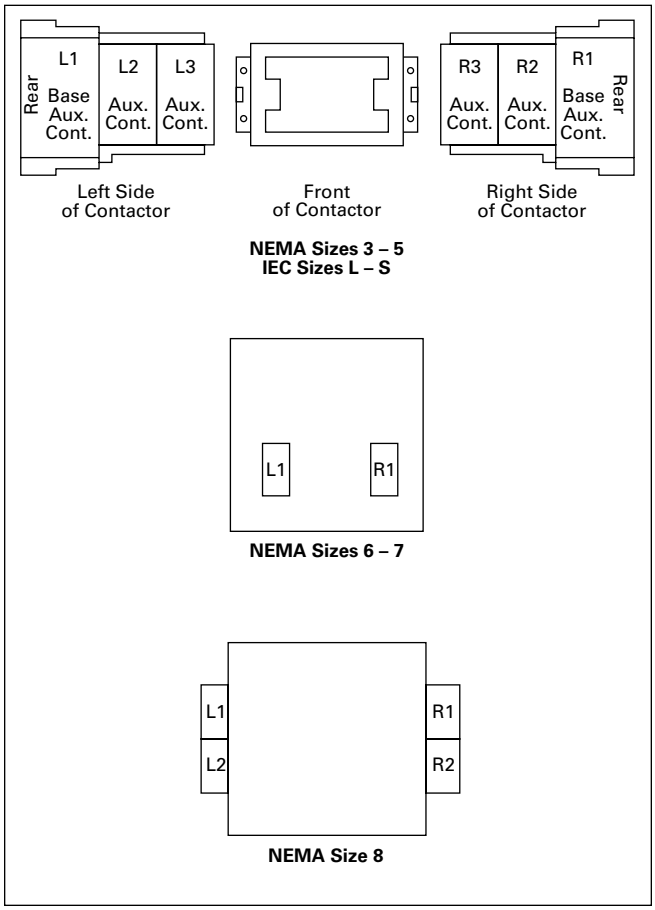


Figure B-159. Auxiliary Contact Location

DC Magnet Coils

When Ordering Specify

Conversion Kit for Field Assembly

- Catalogue Number

Factory Installed DC Coil

- For factory installed DC magnet coil on AC contactors or non-combination starters (open type only), substitute the Code Suffix from table below for the magnet coil identifier in the device Catalogue Number.

  EXAMPLE: For Size 0 AC contactor with a 24V DC coil, change CN15BN3**A**C to CN15BN3**T1**C.

Application

- Connect for separate control
- Not for use with cover control switch operators
- Use twin break, heavy-duty pilot devices
- Designed for +10%, -20% rated voltage, continuous duty operation

Non-reversing Kit Consists of:

- 1 Encapsulated DC magnet coil
- 1 NCI or NO/NCI side mounted auxiliary contact

  Note: These kits are supplied with a NO/NCI side mounted auxiliary contact in place of the NCI contact.
- 2 Blue colored connection wires
- 1 Instruction publication

Operation

These DC coil kits have separate pick-up and seal windings. A **special** (side mounted) early-break NCI auxiliary contact is used to either disconnect the pick-up winding or insert the seal winding in series with the pick-up winding, depending on the frame size of the contactor. DC coil kits come in two styles, a suffix **1** and a suffix **4**. The 1 suffix contains only the **special** (side mounted) early break NCI auxiliary contact. The 4 suffix contains a NO contact in the same package as the **special** (side mounted) early-break NCI auxiliary contact.

Note: For NEMA Sizes 00 and 0 and IEC Sizes A – F, contactors July utilize either suffix 1 or 4 DC coil kits; starters July utilize suffix 4 DC coil kits only. For NEMA Sizes 1 and 2 and IEC Sizes G – K, both contactors and starters July utilize a suffix 4 DC coil kit only.

On the above sizes only, when the **special** auxiliary package is mounted on the side of a contactor or starter, **no** standard auxiliary contact July be mounted on the same side.

Note: For NEMA Sizes 3 – 5 and IEC Sizes L – S, the special coil NCI clearing contact is an add-on auxiliary (**must** mount on a base mount auxiliary contact; normally a 1NO). This arrangement will normally account for two of the three contact positions on the side of each contactor or starter.

Table B-271. Product Selection DC Magnet Coils

Contactor or Starter Size		Conversion Data					Complete Conversion Kit			Factory Installed	
		Volts	Magnet Coil			NCI Interlock Number					
NEMA	IEC		Coil Number	Amps P.U./Seal	Watts P.U./Seal		Catalogue Number	Price	Ship Wt. Lbs. (kg)	Code Suffix	Adder
Non-reversing — Kit includes NCI Side Mounted Auxiliary Contact											
00 and 0 CN35 – A, B, D D15 Relays	A – F	12 24 48 120	9-2988-11 9-2988-12 9-2988-13 9-2988-14	6.4/.28 3.2/.14 1.6/.07 .64/.028	76.8/3.36 76.8/3.36 76.8/3.36 76.8/3.36	C320KGD1 C320KGD1 C320KGD1 C320KGD1	**C335KD3R1** **C335KD3T1** **C335KD3W1** **C335KD3A1**		1.0 (.5)	**R1** **T1** **W1** **A1**	
① 00 and 0 CN35 – A, B, D D15 Relays	A – F	12 24 48 120	9-2988-11 9-2988-12 9-2988-13 9-2988-14	6.4/.28 3.2/.14 1.6/.07 .64/.028	76.8/3.36 76.8/3.36 76.8/3.36 76.8/3.36	C320KGD2 ① C320KGD2 ① C320KGD2 ① C320KGD2 ①	**C335KD3R4** **C335KD3T4** **C335KD3W4** **C335KD3A4**		1.0 (.5)	**R4** **T4** **W4** **A4**	
1 and 2 CN35 – G	G – K	12 24 48 120	9-2990-1 9-2990-2 9-2990-3 9-2990-4	15.4/.42 7.7/.21 3.9/.11 1.5/.041	185/4.98 185/4.96 185/5.04 185/4.87	C320KGD5 C320KGD5 C320KGD5 C320KGD5	**C335KD4R4** **C335KD4T4** **C335KD4W4** **C335KD4A4**		1.0 (.5)	**R4** **T4** **W4** **A4**	
3 CN35 – K	L – N	12 24 48 120	9-3002-1 9-3002-2 9-3002-3 9-3002-4	24/.40 12/.20 6.1/.097 2.5/.038	293/4.84 288/4.75 295/4.67 298/4.57	C320KGD3 C320KGD3 C320KGD3 C320KGD3	**C335KD5R1** **C335KD5T1** **C335KD5W1** **C335KD5A1**		2.0 (.9)	**R1** **T1** **W1** **A1**	
4 and 5 CN35 – N, S	P – S	24 48 120 240	9-2026-4 9-2026-3 9-2026-2 9-2026-1	18/.22 9/.11 3.3/.05 1.7/.02	400/5.3 400/5.2 450/5.4 440/4.9	C320KGD3 C320KGD3 C320KGD3 C320KGD3	**C335KA3T1** **C335KA3W1** **C335KA3A1** **C335KA3B1**		2.5 (1.1)	**T1B** **W1B** **A1B** **B1B**	
Reversing											
00 and 0 CN35 – A, B, D D15 Relays	A – F	12 24 48 120	9-2988-1 ⑤ 9-2988-2 ⑤ 9-2988-3 ⑤ 9-2988-4 ⑤	6.4/.28 3.2/.14 1.6/.07 .64/.028	76.8/3.36 76.8/3.36 76.8/3.36 76.8/3.36	C320KGD1 ⑤ C320KGD1 ⑤ C320KGD1 ⑤ C320KGD1 ⑤	**C335KD3R1** ②⑤ **C335KD3T1** ②⑤ **C335KD3W1** ②⑤ **C335KD3A1** ②⑤		1.0 (0.9)	**R1** ③ **T1** ③ **W1** ③ **A1** ③	
1 and 2 CN35 – G	G – K	12 24 48 120	9-2990-1 ⑤ 9-2990-2 ⑤ 9-2990-3 ⑤ 9-2990-4 ⑤	15.4/.42 7.7/.21 3.9/.11 1.5/.041	185/4.98 185/4.96 185/5.04 185/4.87	C320KGD3 ⑤ C320KGD3 ⑤ C320KGD3 ⑤ C320KGD3 ⑤	④			**R1** ③ **T1** ③ **W1** ③ **A1** ③	

① These kits are supplied with a NO/NCI side mounted auxiliary contact in place of the NCI contact.

② Kit does not include mechanical interlock or crossover wiring. Two NO/NCI top mounted auxiliary contacts are supplied for electrical interlocking.

③ Factory installed DC coils on NEMA contactors and starters include a NO/NC top mounted auxiliary contact on each contactor for electrical interlocking. On IEC contactors and starters, a NC top mounted auxiliary contact is supplied on each contactor for electrical interlocking.

④ Available factory assembled only.

⑤ Two required per reversing assembly.

Discount Symbol **MC7**

Remote Reset Module (32A Overload Relay)

The C316RR remote reset module for the C316F, C316S and C316U overload relays allows remote resetting of tripped (32A) overload relays by means of an electrical solenoid attachment which mounts on the side of the overload relay.

Table B-272. Product Selection

Remote Reset Module Operating Voltage	Catalogue Number	Price
24V 50/60 Hz	**C316RR1U**	
110V 50/60 Hz	**C316RR1A**	

Metal Mounting Plates

Table B-273. For Use on IEC Style Contactors, Starters and Overload Relays

Application	Catalogue Number	Price
Contactors		
IEC Sizes A – F	**C321MP1**	
IEC Sizes G – K	**C321MP2**	
Non-reversing Starters		
IEC Sizes A – F	**C321MP3**	
IEC Sizes G – K	**C321MP4**	
Overload Relays ①		
32A	**C321MP5**	
75A	**C321MP6**	
Reversing Starters		
IEC Sizes A – F	**C321MP7**	
IEC Sizes G – K	**C321MP12**	
IEC Sizes L – N	**C321MP11**	
Reversing Contactors		
IEC Sizes A – F	**C321MP8**	
IEC Sizes G – K	**C321MP9**	
IEC Sizes L – N	**C321MP13**	

① For use with DIN rail and base mounting adapters listed on **Page B-214**.

Table B-274. Metal Mounting Plates — Approximate Dimensions and Shipping Weights

Catalogue Number	Dimensions in Inches (mm)			Ship Wt. Lbs. (kg)
	Wide	High	Mounting	
C321MP1	2.00 (50.8)	3.88 (98.6)	1.50 x 3.38 (38.1 x 85.9)	.2 (.1)
C321MP2	2.56 (65.0)	5.05 (128.3)	2.00 x 4.50 (50.8 x 114.3)	.4 (.2)
C321MP3	1.80 (45.7)	6.60 (167.6)	6.07 (154.2) ②	.7 (.3)
C321MP4	2.56 (65.0)	8.08 (205.2)	2.00 x 7.63 (50.8 x 193.8)	.6 (.3)
C321MP5	1.77 (45.0)	4.63 (117.6)	4.27 (108.5) ②	.3 (.1)
C321MP6	2.52 (64.0)	5.14 (130.6)	2.00 x 4.59 (50.8 x 116.6)	.4 (.2)
C321MP7	4.20 (106.7)	7.38 (187.5)	3.50 x 6.87 (88.9 x 174.5)	.8 (.4)
C321MP8	4.20 (106.7)	4.35 (110.5)	3.50 x 3.86 (88.9 x 98.0)	.5 (.2)
C321MP9	5.66 (143.8)	5.05 (128.3)	5.25 x 3.63 (133.4 x 92.2)	.8 (.4)
C321MP11	8.70 (221.0)	11.35 (288.3)	7.00 x 10.81 (177.8 x 274.6) ③	1.2 (.5)
C321MP12	5.71 (145.0)	8.08 (205.2)	5.25 x 6.75 (133.4 x 171.5) ③	.9 (.4)
C321MP13	8.70 (221.0)	7.17 (182.1)	7.00 x 6.63 (177.8 x 168.4) ③	.9 (.4)

② 2-hole mounting.
③ 3-hole mounting.

3-Pole Top Mounted Fuse Block Kit

IEC Sizes A – K, NEMA Sizes 00 – 2

Field mount to Freedom Series starters and contactors. Designed to save space and reduce installation costs. They provide short circuit protection for branch circuits.

Table B-275. Selection Product

Fuse Type			Catalogue Number	Price
Class H	—	30A 250V	**C350KH21**	
Class R	—	30A 250V	**C350KR21**	
Class G	—	15A 300V	**C350KG37**	
Class G	—	20A 300V	**C350KG38**	
Class G	—	30A 300V	**C350KG31**	
Class G	—	60A 300V	**C350KG32**	
ClassT	—	30A 300V	**C350KT31**	
ClassT	—	60A 300V	**C350KT32**	
Class J	—	30A 600V	**C350KJ61**	
Class J	—	60A 600V	**C350KJ62**	
Type M	—	30A 600V ④	**C350KM61**	
Class CC	—	30A 600V	**C350KC63**	
ClassT	—	30A 600V	**C350KT61**	
ClassT	—	60A 600V	**C350KT62**	

④ Type M fuse block not approved for branch circuit protection.

Discount Symbol **MC7**

B

Mechanical Interlock and Reversing Kits

Mechanical interlocks and reversing kits are designed for field assembly of reversing contactors or starters from Freedom Series components. The Reversing Kits include a Mechanical Interlock, stabilizer bar and a pre-cut, trimmed and formed wire set. Auxiliary contacts, if required, must be ordered separately. See **Page B-218**.

Cat. No. C321KM60B

Part No. 23-7165

Wire Set

Table B-276. Reversing Kits (Horizontal Contactor Mounting Only)

Application		Catalogue Number	Price
NEMA Size	**IEC Size**		
00	A – C	**C321KM60K14B**	
0	D – F	**C321KM60K13B**	
1	—	**C321KM60K15B**	
2	G – K	**C321KM60K16B**	
3	—	**C321KM60K17** ①	
—	L and M	**C321KM60K21** ①	
—	N	**C321KM60K18** ①	
4	—	**C321KM60K19** ①	
5	—	**C321KM60K20** ①	
—	P – S	**C321KM60K44** ①	

① Kit includes (2) NC auxiliary contacts.

Table B-277. Mechanical Interlock Only ②③

Application			Catalogue Number	Price
NEMA Size	**IEC Size**	**Contactor Mounting**		
00 – 2	A – K	Horizontal	**C321KM60B**	
3	L – N	Horizontal	**C321KM30**	
3 to 4	N to P	Horizontal	**C321KM43**	
4	P – S	Horizontal	**C321KM40**	
4 to 5	—	Horizontal	**C321KM45**	
4 to 6	—	Horizontal	**C321KM80**	
5	—	Horizontal	**C321KM50**	
5 to 6	—	Horizontal	**C321KM56**	
6	—	Horizontal	**C321KM70**	
6 to 7	—	Horizontal	**C321KM90**	
7	—	Horizontal	**C321KM34**	
4 or 5 to 5	P – S to 5	Vertical	**C321KM55**	
5 to 6	—	Vertical	**C321KM65**	
6	—	Vertical	**C321KM66**	
6 to 7	—	Vertical	**C321KM67**	

② Without cross-wiring.
③ For use with latest series product.

Solid-State Timers

Solid-State ON DELAY Timer — Side Mounted on Freedom Series NEMA 00 – 2, IEC A – K and C25D, C25E and C25F Frame

This timer is designed to be **wired in SERIES with the load** (typically a coil). When the START button is pushed (power applied to timer), the ON DELAY timing function starts. At the completion of the set timing period, timer and series wired load will both be energized.

Table B-278. Product Selection — Mounted Timer

Timing Range	Catalogue Number ④⑤⑥	Price
.1 – 1.0 Seconds	**C320TDN1_**	
1 – 30 Seconds	**C320TDN30_**	
30 – 300 Seconds	**C320TDN300_**	
5 – 30 Minutes	**C320TDN2000_**	

④ Add operating voltage Suffix to Catalogue Number. **A** = 120V, **B** = 240V, **E** = 208V
⑤ Rated .5 ampere pilot duty – not to be used on larger contactors.
⑥ Terminal connections are quick connects only. Two per side.

Shorting Bar Kits

These kits provide phase-to-phase power connections of contactors for field assembly. The kits include bus connections and mounting hardware. The shorting bars connect all three phases of a single contactor.

Table B-279. Product Selection

Description	Catalogue Number	Price
NEMA Size 3, IEC Sizes L – N	**C321SB18**	
NEMA Size 4, IEC Sizes P – S	**C321SB19**	
NEMA Size 5	**C321SB21**	
NEMA Size 6	**C321SB22**	

Pneumatic Timers — Top Mounted

Attachment mounts on top of any NEMA Size 00 – 2 or IEC Size A – K Freedom Series starter or contactor (top mounted auxiliary contacts can not be installed on device when timer is used). Timer unit has 1NO-1NC isolated timed contacts — circuits in each pole must be the same polarity. Units are convertible from OFF to ON DELAY or vice-versa.

Table B-280. Maximum Ampere Ratings

Description	Volts AC			
	120	**240**	**480**	**600**
Make	30	15	7.5	6
Break	3	1.5	.75	.6

Table B-281. Product Selection

Timing Range	Catalogue Number	Price
.1 to 30 Seconds	**C320TP1**	
10 to 180 Seconds	**C320TP2**	

Discount Symbol **MC7**

Locking Cover for Overload Relay — C306 Only

Snap-on transparent or opaque plastic panel for covering access port to the overload relay trip setting dial — helps prevent accidental or unauthorized changes to trip and reset setting.

Table B-282. Product Selection

	Description	Min. Ordering Qty. (Std. Pkg.)	Catalogue Number	Price
	Clear cover, no accessibility	50	**C320PC3**	
	Gray cover, no accessibility, with Auto only nib	50	**C320PC4**	
	Gray cover, no accessibility, with Manual only nib	50	**C320PC5**	
	Gray cover with FLA dial accessibility, A, B, C, D positions an Auto only nib	50	**C320PC6**	
	Gray cover with FLA dial accessibility, A, B, C, D positions and Manual only nib	50	**C320PC7**	

Control Circuit Fuse Block

These panel mounted fuse holders, designed for control circuit protection or other similar low current requirements, have extractor type fuse caps. The Class CC rejection type fuses (KTK-R) used in these holders are intended for use with equipment designated as being suitable for use on systems having high available fault currents. If branch circuit protective device is 45A or greater, C320FBR fuse kit July be required for control circuit protection per NEC 430-72.

Table B-283. Product Selection

Type	Max. Amperes	Catalogue Number	Price
Fuse Holder Only	15 30	**C320FB** ① **C320FBR** ②	

① A fuse is not supplied, but holder will accept a Bussman Type KTK or KTK-R (13/32" x 1-1/2") fuse, 600V maximum.

② Includes a 5A, 600V KTK-R fuse.

DIN Rail Mounting Channel — 35 mm

Designed for DIN rail mounting of IEC style contactors and starters.

DIN Rail

Table B-284. Product Selection

Description	Catalogue Number	Price
1 Meter Length	**MC382MA1**	

Finger Protection Shields

Snap-on shields for both contactors and starters provide IEC Type IP20 Finger Protection. Prevents accidental contact with line/load terminals.

Table B-285. Product Selection

Application	Catalogue Number	Price
NEMA Size 00, IEC Sizes A – C NEMA Size 0, IEC Sizes D – F	**C320LS1** **C320LS2**	
NEMA Sizes 1 – 2, IEC Sizes G – K Contactors Reversing Contactors	 **C320LS3** **C320LS4**	
NEMA Size 1 Starters Reversing Starters	 **C320LS5** **C320LS6**	
NEMA Size 2, IEC Sizes G – K Starters Reversing Starters	 **C320LS7** **C320LS8**	

Adapter to DIN Rail Mount

NEMA 1 – 2 and IEC G – K Contactors

Designed to allow DIN rail mounting of NEMA 1 – 2 and IEC G – K contactors. Includes all hardware required to convert contactors from panel mounting to 35 mm DIN rail mounting.

Table B-286. Product Selection

Catalogue Number	Price
C320DN65	

Transient Suppressor Kits

NEMA Sizes 00 – 2, IEC Sizes A – K

Cat. No. C320TS2

These kits limit high voltage transients produced in the control circuit when power is removed from the contactor or starter coil. There are three separate suppressors for use on 24 – 120V, 208 – 240V or 277 – 480V coils respectively.

These devices mount directly to the coil terminals of Freedom Series contactors or starters NEMA Sizes 00 – 2, IEC Sizes A – K and lighting contactors 10 – 60A. Reversing devices will require two.

Table B-287. Product Selection

Description	Coil Voltage 50/60 Hz ③	Catalogue Number	Price
Transient Suppressor	24 – 120V 208 – 240V 277 – 480V	**C320TS1** **C320TS2** **C320TS3**	

③ Suppressor is compatible with coil voltages/ranges as shown, 50 and 60 Hz.

NEMA Sizes 3 – 5, IEC Sizes L – S

This device mounts on top of any side mounted auxiliary contact on Freedom Series NEMA Sizes 3 – 5, IEC Sizes L – S and lighting contactors 100 – 300A. It connects across coil terminals on any 120V contactor or starter magnet coil (reversing starters or contactors require 2).

Limits high voltage transients produced in the circuit when power is removed from the coil.

Table B-288. Product Selection

Description	Coil Voltage	Catalogue Number	Price
Transient Suppressor	120V	**C320AS1**	

Discount Symbol **MC7**

B

DC/AC Interface Module

Cat. No. C320DC

The Catalogue Number C320DC Interface Module is an optically isolated solid-state switch which provides a means of operating AC coils with a 5 – 48V DC control signal. It acts as a space saving interposing relay which can switch a specified 50/60 Hz AC source to the contactor or starter coil.

The module July be directly attached to the coil terminals of any Freedom Series contactor or starter — NEMA Sizes 00 – 3, IEC Sizes A – N and lighting contactors 10 – 100A. It also has provisions for DIN rail mounting.

The module will operate coils within the voltage ranges shown below.

Design Characteristics

- DC Input: 5 – 48V DC ±10% at mA nominal
- AC Operating Voltage: 240V AC max. (360 VA) ±10% 50/60 Hz
- DC Operating Voltage: 30V DC max. (5A)
- AC Current Rating:
  - 10A make (inrush)
  - 1A break (sealed)

Table B-289. Controller Coil Voltage Ranges

Controller Catalogue Number Prefix	Controller Size or Rating	Coil Range Volts AC
AE16, AE17, AE56, AE57, CE15, CE55	A – F G – K L – N	24 – 240 48 – 240 110 – 240
AN16, AN56, CN15, CN55	00 – 0 1 – 2 3	24 _ 240 48 – 240 110 – 240
CN35	10 – 30A 60A 100A	24 – 240 48 – 240 110 – 240

Table B-290. Product Selection

Coil Voltage	Catalogue Number	Price
6V DC 9V DC	**C320DC2V6** **C320DC2V9**	
12V DC 24V DC 48V DC	**C320DC2V12** **C320DC2V24** **C320DC2V48**	

Adhesive Dust Cover

NEMA Sizes 00 – 2, IEC Sizes A – K

These adhesive stickers come 25 to a package and provide extra protection from contaminants when applied to the sides of Freedom NEMA Sizes 00 – 2 and IEC Sizes A – K. Adhesive covers are easily applied to side opening where auxiliaries are not installed and provide extra protection from metal filings and other debris.

Table B-291. Product Selection

Catalogue Number	Price
C320DSTCVR (25 to a package)	

Add-On Power Pole Kit

NEMA Sizes 00 – 2, IEC A – K

This device mounts on the side of Freedom NEMA Size 00 – 2 and IEC Size A – K contactors. One unit can be mounted on each side and carries UL, cUL and IEC ratings. The device is rated for resistive, inductive and lighting applications.

Table B-292. Product Selection — Add-On Power Pole Kit

UL Ampere Rating						IEC 947 Ampere Rating			1NO Power Pole Catalogue Number	Price
Inductive 600V	Resistive 600V	hp 1-Phase		Locked Rotor 240V	Lighting Ballast Tungsten 480V	AC-1 600V	AC-3 600V	AC-5a AC-5b 480V		
		115V	230V							
15	20	1/2	2	96	20	20	12	18	**C320PPD10**	

Discount Symbol **MC7**

Table B-293. For Catalogue Numbers AE16, AE17, AE56, AE57, CE15 and CE55 — IEC Frames A – F

Description		IEC Frames A – F	Price	IEC Frames A – C ①		Price	IEC Frames D – F ①		Price
		Series A1		Series B1	Series C1		Series B1	Series C1	
		Part No.		Part No.	Part No.		Part No.	Part No.	
Renewal Parts Publication Number		**None**		**None**	**None**		**None**	**None**	
Contact Kits									
2-Pole		②		②	②		②	②	
3-Pole		②		②	②		②	②	
4-Pole		②		②	②		②	②	
5-Pole		②		②	②		②	②	
Magnet Coils	**Coil Suffix**								
120V 60 Hz or 110V 50 Hz	**A**	②		**9-2875-1**	**9-2875-1**		**9-2876-1**	**9-2876-1**	
240V 60 Hz or 220V 50 Hz	**B**	②		**9-2875-2**	**9-2875-2**		**9-2876-2**	**9-2876-2**	
480V 60 Hz or 440V 50 Hz	**C**	②		**9-2875-3**	**9-2875-3**		**9-2876-3**	**9-2876-3**	
600V 60 Hz or 550V 50 Hz	**D**	②		**9-2875-4**	**9-2875-4**		**9-2876-4**	**9-2876-4**	
208V 60 Hz	**E**	②		**9-2875-5**	**9-2875-5**		**9-2876-5**	**9-2876-5**	
277V 60 Hz	**H**	②		**9-2875-12**	**9-2875-12**		**9-2876-12**	**9-2876-12**	
208/240V 60 Hz	**J**	—		**9-2875-37**	**9-2875-37**		**9-2876-37**	**9-2876-37**	
240V 50 Hz	**K**	②		**9-2875-11**	**9-2875-11**		**9-2876-11**	**9-2876-11**	
380 – 415V 50 Hz	**L**	②		**9-2875-6**	**9-2875-6**		**9-2876-6**	**9-2876-6**	
24V 60 Hz – 24V 50 Hz	**T**	—		**9-2875-36**	**9-2875-36**		**9-2876-36**	**9-2876-36**	
24V 60 Hz	**T**	②		—	—		—	—	
24V 50 Hz	**U**	②		**9-2875-13**	**9-2875-13**		**9-2876-13**	**9-2876-13**	
32V 50 Hz	**V**	②		**9-2875-16**	**9-2875-16**		**9-2876-16**	**9-2876-16**	
48V 60 Hz	**W**	②		**9-2875-8**	**9-2875-8**		**9-2876-8**	**9-2876-8**	
48V 50 Hz	**Y**	②		**9-2875-9**	**9-2875-9**		**9-2876-9**	**9-2876-9**	
Overload Relays									
For replacement on existing starters: 3-Pole — Ambient Compensated Bimetallic		**C306DN3B**		**C306DN3B**	**C306DN3B**		**C306DN3B**	**C306DN3B**	
Current Transformer									
Transformer		—		—	—		—	—	
Magnet Frame Armature									
Lower Magnet Frame		②		②	②		②	②	
Upper Magnet Frame		②		②	②		②	②	

① Non-encapsulated coils.
② Replace with complete contactor.

Discount Symbol **MC17**

Note: For a complete listing of parts, refer to the Renewal Parts Publication Number referenced below.

Table B-294. For Catalogue Numbers AE16, AE17, AE56, AE57, CE15 and CE55 — IEC Frames G and H

Description		IEC Frame G		Price	IEC Frame H		Price
		Series A1	Series B1		Series A1	Series B1	
		Part No.	Part No.		Part No.	Part No.	
Renewal Parts Publication Number		**20862**	**22178**		**20862**	**22178**	
Contact Kits							
2-Pole		**6-65-3**	**6-65-3**		**6-65-5**	**6-65-5**	
3-Pole		**6-65-4**	**6-65-4**		**6-65-6**	**6-65-6**	
4-Pole		**6-65-11**	**6-65-11**		**6-65-13**	**6-65-13**	
5-Pole		**6-65-12**	**6-65-12**		**6-65-14**	**6-65-14**	
Magnet Coils	**Coil Suffix**						
120V 60 Hz or 110V 50 Hz	**A**	**9-2703-1**	**9-2703-1**		**9-2703-1**	**9-2703-1**	
240V 60 Hz or 220V 50 Hz	**B**	**9-2703-2**	**9-2703-2**		**9-2703-2**	**9-2703-2**	
480V 60 Hz or 440V 50 Hz	**C**	**9-2703-3**	**9-2703-3**		**9-2703-3**	**9-2703-3**	
600V 60 Hz or 550V 50 Hz	**D**	**9-2703-4**	**9-2703-4**		**9-2703-4**	**9-2703-4**	
208V 60 Hz	**E**	**9-2703-9**	**9-2703-9**		**9-2703-9**	**9-2703-9**	
277V 60 Hz	**H**	**9-2703-7**	**9-2703-7**		**9-2703-7**	**9-2703-7**	
240V 50 Hz	**K**	**9-2703-14**	**9-2703-14**		**9-2703-14**	**9-2703-14**	
380 – 415V 50 Hz	**L**	**9-2703-8**	**9-2703-8**		**9-2703-8**	**9-2703-8**	
24V 60 Hz – 24V 50 Hz	**T**	—	—		—	—	
24V 60 Hz	**T**	**9-2703-6**	**9-2703-6**		**9-2703-6**	**9-2703-6**	
24V 50 Hz	**U**	**9-2703-12**	**9-2703-12**		**9-2703-12**	**9-2703-12**	
32V 50 Hz	**V**	**9-2703-10**	**9-2703-10**		**9-2703-10**	**9-2703-10**	
48V 60 Hz	**W**	**9-2703-11**	**9-2703-11**		**9-2703-11**	**9-2703-11**	
48V 50 Hz	**Y**	**9-2703-13**	**9-2703-13**		**9-2703-13**	**9-2703-13**	
Overload Relays							
For replacement on existing starters: 3-Pole — Ambient Compensated Bimetallic		**C306GN3B**	**C306GN3B**		**C306GN3B**	**C306GN3B**	
Current Transformer							
Transformer		—	—		—	—	
Magnet Frame Armature							
Lower Magnet Frame		**17-18200**	**17-18200**		**17-18200**	**17-18200**	
Upper Magnet Frame		**48-1936**	**48-1936**		**48-1936**	**48-1936**	

Discount Symbol **MC17**

Note: For a complete listing of parts, refer to the Renewal Parts Publication Number referenced below.

Table B-295. For Catalogue Numbers AE16, AE17, AE56, AE57, AE800, CE15 and CE55 — IEC Frames J and K

Description		IEC Frame J		Price	IEC Frame K		Price
		Series A1	Series B1		Series A1	Series B1	
		Part No.	Part No.		Part No.	Part No.	
Renewal Parts Publication Number		**20862**	**22178**		**20862**	**22178**	
Contact Kits							
2-Pole		**6-65-7**	**6-65-7**		**6-65-18**	**6-65-18**	
3-Pole		**6-65-8**	**6-65-8**		**6-65-19**	**6-65-19**	
4-Pole		**6-65-15**	**6-65-15**		—	—	
5-Pole		**6-65-16**	**6-65-16**		—	—	
Magnet Coils	**Coil Suffix**						
120V 60 Hz or 110V 50 Hz	**A**	**9-2703-1**	**9-2703-1**		**9-2703-1**	**9-2703-1**	
240V 60 Hz or 220V 50 Hz	**B**	**9-2703-2**	**9-2703-2**		**9-2703-2**	**9-2703-2**	
480V 60 Hz or 440V 50 Hz	**C**	**9-2703-3**	**9-2703-3**		**9-2703-3**	**9-2703-3**	
600V 60 Hz or 550V 50 Hz	**D**	**9-2703-4**	**9-2703-4**		**9-2703-4**	**9-2703-4**	
208V 60 Hz	**E**	**9-2703-9**	**9-2703-9**		**9-2703-9**	**9-2703-9**	
277V 60 Hz	**H**	**9-2703-7**	**9-2703-7**		**9-2703-7**	**9-2703-7**	
240V 50 Hz	**K**	**9-2703-14**	**9-2703-14**		**9-2703-14**	**9-2703-14**	
380 – 415V 50 Hz	**L**	**9-2703-8**	**9-2703-8**		**9-2703-8**	**9-2703-8**	
24V 60 Hz – 24V 50 Hz	**T**	—	—		—	—	
24V 60 Hz	**T**	**9-2703-6**	**9-2703-6**		**9-2703-6**	**9-2703-6**	
24V 50 Hz	**U**	**9-2703-12**	**9-2703-12**		**9-2703-12**	**9-2703-12**	
32V 50 Hz	**V**	**9-2703-10**	**9-2703-10**		**9-2703-10**	**9-2703-10**	
48V 60 Hz	**W**	**9-2703-11**	**9-2703-11**		**9-2703-11**	**9-2703-11**	
48V 50 Hz	**Y**	**9-2703-13**	**9-2703-13**		**9-2703-13**	**9-2703-13**	
Overload Relays							
For replacement on existing starters: 3-Pole — Ambient Compensated Bimetallic		**C306GN3B**	**C306GN3B**		**C306GN3B**	**C306GN3B**	
Current Transformer							
Transformer		—	—		—	—	
Magnet Frame Armature							
Lower Magnet Frame		**17-18200**	**17-18200**		**17-18200**	**17-18200**	
Upper Magnet Frame		**48-1936**	**48-1936**		**48-1936**	**48-1936**	

Discount Symbol **MC17**

Note: For a complete listing of parts, refer to the Renewal Parts Publication Number referenced below.

Table B-296. For Catalogue Numbers AE16, AE17, AE56, AE57, AE800, CE15 and CE55 — IEC Frames L – N

Description		IEC Frame L	Price	IEC Frame M	Price	IEC Frame N	Price
		Part No.		Part No.		Part No.	
Renewal Parts Publication Number		**20427**		**20427**		**20427**	
Contact Kits							
2-Pole		**6-43-3**		**6-43**		**6-43-5**	
3-Pole		**6-43-4**		**6-43-2**		**6-43-6**	
4-Pole		—		—		—	
5-Pole		—		—		—	
Magnet Coils	**Coil Suffix**						
120V 60 Hz or 110V 50 Hz	**A**	**9-2756-1**		**9-2756-1**		**9-2756-1**	
240V 60 Hz or 220V 50 Hz	**B**	**9-2756-2**		**9-2756-2**		**9-2756-2**	
480V 60 Hz or 440V 50 Hz	**C**	**9-2756-3**		**9-2756-3**		**9-2756-3**	
600V 60 Hz or 550V 50 Hz	**D**	**9-2756-4**		**9-2756-4**		**9-2756-4**	
208V 60 Hz	**E**	**9-2756-5**		**9-2756-5**		**9-2756-5**	
277V 60 Hz	**H**	**9-2756-9**		**9-2756-9**		**9-2756-9**	
240V 50 Hz	**K**	**9-2756-13**		**9-2756-13**		**9-2756-13**	
380 – 450V 50 Hz	**L**	—		—		—	
340V 60 Hz	**L**	**9-2756-12**		**9-2756-12**		**9-2756-12**	
415V 60 Hz	**M**	**9-2756-8**		**9-2756-8**		**9-2756-8**	
550V 50 Hz	**N**	**9-2756-14**		**9-2756-14**		**9-2756-14**	
24V 60 Hz – 24V 50 Hz	**T**	—		—		—	
24V 60 Hz	**T**	**9-2756-6**		**9-2756-6**		**9-2756-6**	
24V 50 Hz	**U**	**9-2756-11**		**9-2756-11**		**9-2756-11**	
32V 50 Hz	**V**	**9-2756-10**		**9-2756-10**		**9-2756-10**	
48V 60 Hz	**W**	**9-2756-15**		**9-2756-15**		**9-2756-15**	
48V 50 Hz	**Y**	**9-2756-7**		**9-2756-7**		**9-2756-7**	
Overload Relays							
For replacement on existing starters: 3-Pole — Ambient Compensated Bimetallic		**10-6530**		**10-6530-2**		**10-6530-3**	
Current Transformer							
Transformer		—		—		—	
Magnet Frame Armature							
Lower Magnet Frame		**17-8955-2**		**17-8955-2**		**17-8955-2**	
Upper Magnet Frame		**48-1902**		**48-1902**		**48-1902**	

Discount Symbol **MC17**

Note: For a complete listing of parts, refer to the Renewal Parts Publication Number referenced below.

Table B-297. For Catalogue Number CE15 Contactors — IEC Frames P – S

Description		IEC Frame P	Price	IEC Frame R	Price	IEC Frame S	Price
		Part No.		Part No.		Part No.	
Renewal Parts Publication Number		22278		22278		22278	
Contact Kits	**Size**	6-294		6-288		6-286	
Magnet Coils	**Coil Suffix**						
120V 60 Hz or 110V 50 Hz	A	9-1891-1		9-1891-1		9-1891-1	
200V 50 Hz or 118V 60 Hz	E	—		—		—	
240V 60 Hz or 220V 50 Hz	B	9-1891-2		9-1891-2		9-1891-2	
254V 50 Hz or 277V 60 Hz	H	—		—		—	
380V 50 Hz or 415V 60 Hz	L	—		—		—	
480V 60 Hz or 440V 50 Hz	C	9-1891-3		9-1891-3		9-1891-3	
600V 60 Hz or 550V 50 Hz	D	9-1891-4		9-1891-4		9-1891-4	
208V 60 Hz	E	9-1891-13		9-1891-13		9-1891-13	
277V 60 Hz	H	9-1891-26		9-1891-26		9-1891-26	
240V 50 Hz	K	9-1891-20		9-1891-20		9-1891-20	
380V 50 Hz	L	9-1891-14		9-1891-14		9-1891-14	
415V 50 Hz	M	9-1891-21		9-1891-21		9-1891-21	
24V 60 Hz	T	9-1891-15		9-1891-15		9-1891-15	
Overload Relays — Reference C316 Overload Relays							
Magnet Frame Armature							
Lower Magnet Frame		48-1030		48-1030		48-1030	
Upper Magnet Frame		48-1029-2		48-1029-2		48-1029-2	

Discount Symbol **MC17**

D15 Series — Freedom 600V Multipole

B

4-Pole Relay

4-Pole Relay with Front Contact Pole Deck Assembled

Product Description

Contact poles on the D15 relay are of the fixed design and are not convertible. The basic 4-pole relay will accept a front-mounted contact pole deck and/or side-mounted contact blocks (one per side). In addition, a side-mounted solid-state timer or a front-mounted pneumatic timer can be added to the relay. Only one front-mounted attachment can be added to the basic relay.

Application Description

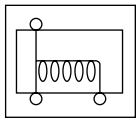
Side-mounted contact blocks can be used to provide additional poles in applications where a pneumatic timer is installed on the front of the relay. They can also be used where panel depth is restricted.

The maximum number of contacts recommended per relay is 8, 6 of which can be NC. When a pneumatic timer is used, the maximum recommended number of NC contacts is 3.

Relays with DC coils are supplied with a coil clearing NC contact mounted on the side of the relay.

Features

- 600V, 10A continuous thermal current
- State indicator visually shows relay ON or OFF status
- Relay base has mounting holes on 35 x 60 mm centers, permitting direct replacement of competitive relays
- Relay also mounts on 35 mm DIN rail as standard
- Magnet coil has three terminals, permitting either top or diagonal wiring — easy to replace European or U.S. relays without changing wiring layout



- Contact pole terminals have captive, backed-out, self-lifting pressure plates with ± screws — reduced wiring time
- All terminals are shrouded or "finger-proofed" to reduce possibility of electrical shock
- Designed to meet or exceed UL, NEMA, IEC, CSA, VDE, BS and other international standards

Standards and Certifications

UL CSA CE

Terminal Marking

Relay terminals are identified by a two digit number in accordance with International Standards approved by CENELEC (European Committee for Electrotechnical Standardization). The number is marked on the relay and is used to identify location and status of the contacts.

The first digit indicates the location of the contact on the relay. The numbering begins with 1 and continues without a break from left to right.

The second digit indicates the status of the contacts (NO or NC). Terminal marking 1 and 2 mean NC and 3 and 4 mean NO.

Example of marking with 2NO and 2NC contacts:

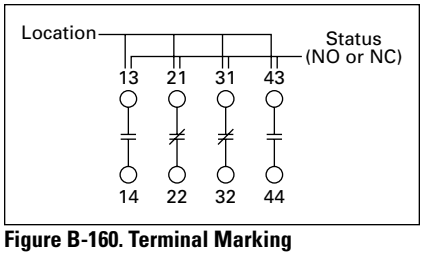


Figure B-160. Terminal Marking

Technical Data

Table B-298. Contact Ratings

NEMA A600		
Continuous Thermal Rating: 10A		
AC Volts	**Make**	**Break**
120	60	6.0
240	30	3.0
480	15	1.5
600	12	1.2

NEMA P300	
Continuous Thermal Rating: 5A	
DC Volts	**Make/Break Amperes**
125	1.1
250	0.55

Table B-299. Magnet Coil Data

AC Voltage	Pick-Up		Sealed	
	VA	Watts	VA	Watts
12 – 600V	80	49	7.5	2.4

DC Voltage	Pick-Up		Sealed	
	Amps	Watts	VA	Watts
12	6.4	76.8	0.28	3.36
24	3.2	76.8	0.14	3.36
48	1.6	76.8	0.07	3.36
120	0.64	76.8	0.028	3.36

Accessories

Pneumatic Timer Attachment

Attachment mounts on top of any Freedom Series relay (top-mounted auxiliary contacts can not be installed on device when timer is used). Timer unit has DPST timed contacts — circuits in each pole must be the same polarity. Units are convertible from OFF to ON Delay or vice-versa.

C320 Pneumatic Timer Attachment

Table B-300. Pneumatic Timer Attachment

Timing Range	catalogue Number	Price
0.1 to 30 Seconds	**C320TP1**	
10 to 180 Seconds	**C320TP2**	

Table B-301. Maximum Ampere Ratings

Description	Volts AC			
	120	240	480	600
Make	30	15	7.5	6
Break	3	1.5	0.75	0.6

Discount Symbol **MC7**

Finger Protection Shields

Snap-on shields for both contactors and starters provide IEC Type IP20 Finger Protection. Prevents accidental contact with line/load terminals.

Table B-302. Finger Protection Shields

Application	Catalogue Number	Price
D15	**C320LS1**	

Adhesive Dust Cover

These adhesive stickers come 25 to a package and provide extra protection from contaminants when applied to the sides of Freedom D15. Adhesive covers are easily applied to side opening where auxiliaries are not installed and provide extra protection from metal filings and other debris.

Table B-303. Adhesive Dust Cover

Catalogue Number	Price
C320DSTCVR (25 to a package)	

Solid-State ON DELAY Timer — Side Mounted on Freedom Series NEMA 00 – 2, D15, IEC A – K and C25D, C25E and C25F Frame

This timer is designed to be **wired in series with the load** (typically a coil). When the START button is pushed (power applied to timer), the ON Delay timing function starts. At the completion of the set timing period, timer and series wired load will both be energized.

Solid-State Timer

Table B-304. Mounted Timer

Timing Range	Catalogue Number ①②	Price
0.1 – 1.0 Seconds	**C320TDN1_**	
1 – 30 Seconds	**C320TDN30_**	
30 – 300 Seconds	**C320TDN300_**	
5 – 30 Minutes	**C320TDN3000_**	

① Add operating voltage Suffix to catalogue Number. **A** = 120V, **B** = 240V, **E** = 208V

② Rated 0.5 ampere pilot duty — not to be used on larger contactors.

Terminal connections are quick connects only. Two per side.

Metal Mounting Plate

Fits all D15 Multipole Relays.

Table B-305. Mounting Plate

Description	Catalogue Number	Price
Metal Mounting Plate	**C321MP1**	

Mounting Channel (DIN Rail)

Designed for DIN rail mounting of Freedom Series relays.

DIN Rail

Table B-306. Mounting Channel (DIN Rail)

Description	Catalogue Number	Price
1 Meter Length	**MC382MA1**	

Transient Suppressor Kits

These kits limit high voltage transients produced in the control circuit when power is removed from the contactor or starter coil. There are three separate suppressors for use on 24 – 120V, 208 – 240V or 277 – 480V coils respectively.

Cat. No. C320TS2

These devices mount directly to the coil terminals.

Table B-307. Transient Suppressor Kits

Description	Coil Voltage 50/60 Hz ③	Catalogue Number	Price
Transient Suppressor	24/120V 208/240V 277/480V	**C320TS1** **C320TS2** **C320TS3**	

③ Suppressor is compatible with coil voltages/ ranges as shown, both 50 and 60 Hz.

Identification Markers

Identification Marker

Designed to snap-on the face of contactor for easy, personalized identification of individual devices. Includes holder and labels.

Table B-308. Identification Markers

Description	Catalogue Number	Price
Identification Marker (Pack of 100)	**C320DL2**	

Discount Symbol **MC7**

B

Dimensions

Table B-309. Approximate Dimensions in Inches (mm) and Shipping Weights.

Description	Dimension C in Inches (mm)	Shipping Weights Lbs. (kg)
Relay Only	3.30 (83.8)	1.3 (0.6)
Relay with Timer Attachment	5.55 (141.0)	1.5 (0.7)
Relay with Front Contact Pole Deck	4.66 (118.4)	1.7 (0.8)

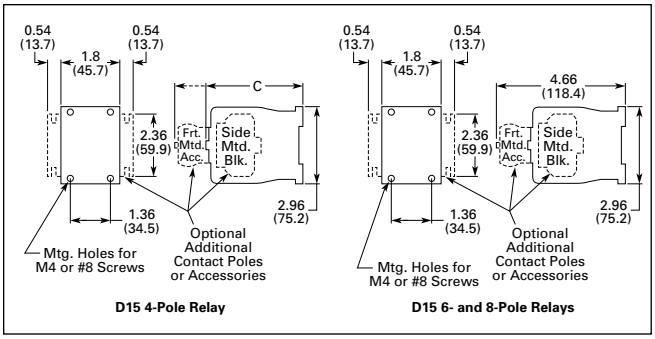


Figure B-161. Approximate Dimensions in Inches (mm)

Front-Mounted 4-Pole Deck

Side-Mounted Contact Block

4-Pole Relay with Side-Mounted Contact Block

Product Selection

When Ordering Specify

- Catalogue Number and Magnet Coil Code Letter. Example For a 4-pole relay having 4NO contacts with a 120V 60 Hz coil, order Catalogue Number D15CR40**A**B.

Table B-310. Factory Assembled Multipole Relays

Number of Poles	Type of Contacts		Open Type	
	NO	NC	Catalogue Number①	Price
4	4	0	**D15CR40_B**	
	3	1	**D15CR31_B**	
	2	2	**D15CR22_B**	
	1	3	**D15CR13_B**	
	0	4	**D15CR04_B**	
6 (4-Pole Relay with 2-Pole Front-Mounted Deck)	6	0	**D15CR60_B**	
	5	1	**D15CR51_B**	
	4	2	**D15CR42_B**	
	3	3	**D15CR33_B**	
	2	4	**D15CR24_B**	
	1	5	**D15CR15_B** ②	
	0	6	**D15CR06_B** ②	
8 (4-Pole Relay with 4-Pole Front-Mounted Deck)	8	0	**D15CR80_B**	
	7	1	**D15CR71_B**	
	6	2	**D15CR62_B**	
	5	3	**D15CT53_B**	
	4	4	**D15CR44_B**	
	3	5	**D15CR35_B** ②	
	2	6	**D15CR26_B** ②	

① Underscore indicates missing code suffix for magnet coil — see Selection Table below.

② Not all Suffix Codes available: consult Customer Support Centre.

Table B-311. Additional Contact Poles

Description	Catalogue Number	Price
Front Contact Pole Deck		
1NO-1NC	**C320KGT3**	
2NO	**C320KGT4**	
2NC	**C320KGT5**	
1NO (E.C.) – 1NC (L.O.)	**C320KGT7**	
4NO	**C320KGT13**	
3NO-1NC	**C320KGT14**	
2NO-2NC	**C320KGT15**	
1NO-3NC	**C320KGT16**	
4NC	**C320KGT17**	
Side-Mounted Contact Blocks		
1NO-1NC	**C320KGS3**	
2NO	**C320KGS4**	
2NC	**C320KGS5**	
1NO (E.C.) – 1NC (L.O.)	**C320KGS7**	

E.C. = Early Closing L.O. = Late Opening

Table B-312. Magnet Coil Selection Table

AC Coils Volts and Hertz	Code Suffix	AC Coils Volts and Hertz	Code Suffix	DC Coils Volts	Code Suffix
120/60 or 110/50	**A**	208/60	**E**	12	**R1**
240/60 or 220/50	**B**	277/60	**H**	24	**T1**
480/60 or 440/50	**C**	208 – 240/60	**J**	48	**W1**
600/60 or 550/50	**D**	24/60	**T**	120	**A1**

Discount Symbol **MC7**