



*GE Electrical Distribution
& Control*

Electrical Distribution Components for International Voltages





Contents and Introduction

Introduction

In the USA two of the 3-phase, 4-wire, low-voltage electrical systems used are 480Y/277 and 208Y/120 Vac. Much of the world outside the USA uses electrical systems with voltages in-between these USA voltages, such as 415Y/240, 400Y/230 and 380Y/220 Vac.

This brochure contains products for these in-between voltages up to and including 415Y/240 Vac. The products in this brochure do not appear in GE's USA domestic literature.

The scope of Underwriters Laboratories does not include approving products for these in-between voltages. Therefore none of the products in this brochure are UL Listed. These products are labelled by GE, however, for use on voltages up to and including 415Y/240 Vac.

GE markets many other electrical distribution components that are suitable for both 415Y/240 and for higher voltages used in the USA. To avoid repetition, those products are not included in this brochure. See GE's domestic USA literature for these other products that are suitable for use at both 415Y/240 Vac and higher voltages.

Hazardous Business

The products listed in this catalog were designed and manufactured for use in standard commercial, industrial and residential applications. If these products are to be applied in any location which might be of a hazardous nature, such as nuclear installations, commercial or military aircraft, missile installations, space explorations or other critical applications where failure of a single component could cause substantial harm to persons or property, the GE Company disclaims all responsibility unless it has received a complete description of the application and has concurred that the product in question is suitable for the proposed application. Such concurrence must be signed by the responsible GE Company representative. Any questions should be referred to the factory through the purchaser's local GE Company office.

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Publications

Buy Log Catalog	GEP-1100
Molded Case Circuit Breakers – Application and Selection	GET-2779
Mag-Break* Motor Circuit Protectors	GEA-7498
Current Limiting Circuit Breakers	GET-6972
PowerMark Plus* Circuit Breaker Load Centers ...	GEA-11317
Replacement Parts for Load Centers	GEF-4453

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GE Company

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Features and Data

Features

Scope

Miniature circuit breakers or MCBs are available in 3 types:
 - Plug-in (TQL and TQP families)
 - Wire-in (TQC family)
 - Strap-in (TQB family)

Plug-in style

Installation ease plus security, and time-proven performance.

Protection

Conventional thermal and magnetic trip mechanism which protects against both overloads and short circuits.

Trip free

Breaker will trip even if handle is locked in the ON position.

Trip indicating

Handle moves to a center position to indicate breaker has tripped.

Internal common trip

An internal linkage between poles of a multipole breaker ensures that a fault detected by one pole trips all of the poles, without relying on the handle tie to accomplish this.

Quick make, quick break

Allows fast, safe contact closure and separation.

Size

Breakers are manufactured in standard one inch (25mm) modules.

Ambient compensating

If breakers are ambient compensating, they are designed and calibrated to carry rated current in open-air ambients throughout the range from 10 to 50 degrees C. Above 50 degrees C the breakers derate themselves to protect conductors (and the breaker) against dangerously high temperatures, as well as overloads.

Copper stabs

Copper plug-in stabs provide copper-to-copper connection.

Ampere labeling

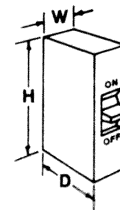
Visible ampere rating on the handle makes breaker identification easy.

Load lugs

Box-type load lugs save installation time and provide reliable connections. Lugs accept 60/75 degree C cu/al wire, to meet virtually all applications.

Ampacity

Available in 1-, 2- and 3-pole versions from 10 through 100 amperes.



Interrupting Capacities, Dimensions, Weights and Drawings

Frame Size (Amps)	Breaker Type (# = 415Y /240 VAC Catalog Numbers)	Ampere Rating Range	Poles	Maximum Voltage ac	Interrupting Rating (Thousands of Amps RMS Symm) to NEMA Test Standards and ac Voltages				Major Dimensions (mm)			Ship Wt. Each (kg)	Shipping Cube Each (cu mt)	Time Current Curve	Outline Drawing	Country of Origin B = Brazil S = S'pore U = USA
					220Y /127	240Y /138	380Y /220	415Y /240	H	W	D					
50	TQP #	10-50	1	240	10	---	3*	3*	83	25	60	0.1	0.0003	K215-144A	456C383	S
					*40 & 50 AMP 2 KA											
	TQP A #	15-30	1	240	10	---	6	6	83	25	60	0.1	0.0003	K215-144A	456C383	U
				*25 & 30 AMP 4 KA												
100	TQL X #	10-30 10-30	1 2	240 415	10 10	---	5 5	5 5	83 83	25 51	60 60	0.2 0.3	0.0003 0.0006	K215-80D ---	456C872 ---	S S
	TQL B #	8-100 8-100 8-100	1 2 3	240 415 415	10 10 10	---	5 5 5	5 5 5	83 83 83	25 51 76	60 60 60	0.2 0.3 0.5	0.0003 0.0006 0.0008	K215-69E, K215-67E, &K215-68F	456C872	B B B
	TQL A #	15-30	1	240	10	---	6	6	83	25	60	0.2	0.0003	K215-67E	456C872	U
					*25 & 30 AMP 4 KA											
	TQB X #	10-30 10-30	1 2	240 415	10 10	---	5 5	5 5	83 83	25 51	60 60	0.2 0.3	0.0003 0.0006	K215-80D ---	456C873 ---	S S
	TQB B #	8-100 8-100 8-100	1 2 3	240 415 415	10 10 10	---	5 5 5	5 5 5	83 83 83	25 51 76	60 60 60	0.2 0.3 0.5	0.0003 0.0006 0.0008	K215-69E, K215-67E, &K215-68F	456C873	B B B
	TQB A #	15-30	1	240	10	---	6	6	83	25	60	0.2	0.0003	K215-67E	456C873	U
					*25 & 30 AMP 4 KA											
	TQC B #	8-100 8-100 8-100 25-40	1 2 3 4	240 415 415 415	10 10 10 10	---	5 5 5 5	5 5 5 5	99 99 99 99	25 51 76 102	60 60 60 60	0.2 0.3 0.5 0.7	0.0003 0.0006 0.0008 0.0011	K215-69E, K215-67E, &K215-68F	456C874	B B B B
	THQL #	15-100 15-100 15-100	1 2 3	240 415 415	22 22 22	---	9 9 9	9 9 9	83 83 83	25 51 76	60 60 60	0.2 0.4 0.6	0.0003 0.0006 0.0008	GES-6202A, &GES-6203A	456C872	B, U B, U B, U
	THQB #	15-100 15-100 15-100	1 2 3	240 415 415	22 22 22	---	9 9 9	9 9 9	83 83 83	25 51 76	60 60 60	0.2 0.4 0.6	0.0003 0.0006 0.0008	GES-6202A, &GES-6203A	456C873	B, U B, U B, U
	THQC #	15-100 15-100 15-100	1 2 3	240 415 415	22 22 22	---	9 9 9	9 9 9	99 99 99	25 51 76	60 60 60	0.2 0.4 0.6	0.0003 0.0006 0.0008	GES-6202A, &GES-6203A	456C874	B, U B, U B, U
TQL GF #	15-30	1	240	---	---	3	3	83	25	60	0.2	0.0003	GES-6200	139K4005	U	
TQB GF #	15-30	1	240	---	---	3	3	83	25	60	0.2	0.0003	GES-6200	139K4005	U	



GE Miniature Circuit Breakers

TQP, TQL and Ground Fault Breakers

**Type TQP Plug-In Circuit Breaker
240 Vac, 3 kA, Lug on Load End**

Amp Rating	1-pole 240 Vac 3kA
15	TQP1215
20	TQP1220
25	TQP1225
30	TQP1230
35	TQP1235
40	TQP1240
45	TQP1245①
50	TQP1250①



TQP1215

① 2 kA.

**Type TQP Plug-In Circuit Breaker
240 Vac, 6 kA, Lug on Load End**

Amp Rating	1-pole 240 Vac 6 kA
15	TQP1215A
20	TQP1220A
25	TQP1225A②
30	TQP1230A②



TQP1215A

② 4 kA.

**Type TQL Plug-In Circuit Breaker
415Y/240 Vac, 5 kA, Lug on Load End**

Amp Rating	1-pole 240 Vac 5 kA	2-pole 415 Vac 5 kA
8	TQL1208X	TQL2408X
10	TQL1210X	TQL2410X
15	TQL1215X	TQL2415X
20	TQL1220X	TQL2420X
25	TQL1225X	TQL2425X
30	TQL1230X	TQL2430X



TQL1210X

**Type TQL Plug-In Circuit Breaker
240 Vac, 6 kA, Lug on Load End**

Amp Rating	1-pole 240 Vac 6 kA
15	TQL1215A
20	TQL1220A
25	TQL1225A③
30	TQL1230A③

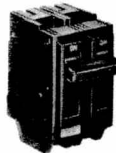


TQL1215A

③ 4 kA.

**Type TQL Plug-In Circuit Breaker
415Y/240 Vac, 5 kA, Lug on Load End**

Amp Rating	1-pole 240 Vac 5 kA	2-pole 415 Vac 5 kA	3-pole 415 Vac 5 kA
8	TQL1208B	TQL2408B	TQL3408B
10	TQL1210B	TQL2410B	TQL3410B
15	TQL1215B	TQL2415B	TQL3415B
20	TQL1220B	TQL2420B	TQL3420B
25	TQL1225B	TQL2425B	TQL3425B
30	TQL1230B	TQL2430B	TQL3430B
35	TQL1235B	TQL2435B	TQL3435B
40	TQL1240B	TQL2440B	TQL3440B
45	TQL1245B	TQL2445B	TQL3445B
50	TQL1250B	TQL2450B	TQL3450B
60	TQL1260B	TQL2460B	TQL3460B
70	TQL1270B	TQL2470B	TQL3470B
90	TQL1290B	TQL2490B	TQL3490B
100	TQL12100B	TQL24100B	TQL34100B
60	TQL12Y60B④	TQL24Y60B④	TQL34Y60B④
100	TQL12Y100B④	TQL24Y100B④	TQL34Y100B④



TQL2415B

**Type TQL Plug-In Circuit Breaker
415Y/240 Vac, 9 kA, Lug on Load End**

Amp Rating	1-pole 240 Vac 9 kA	2-pole 415 Vac 9 kA	3-pole 415 Vac 9 kA
10	TQL1210⑤	TQL2410⑤	TQL3410⑤
15	THQL1215	THQL2415	THQL3415
20	THQL1220	THQL2420	THQL3420
25	THQL1225	THQL2425	THQL3425
30	THQL1230	THQL2430	THQL3430
35	THQL1235	THQL2435	THQL3435
40	THQL1240	THQL2440	THQL3440
45	THQL1245	THQL2445	THQL3445
50	THQL1250	THQL2450	THQL3450
60	THQL1260	THQL2460	THQL3460
70	THQL1270	THQL2470	THQL3470
90	THQL1290	THQL2490	THQL3490
100	THQL12100	THQL24100	THQL34100
60	TQL12Y60④	TQL24Y60④	TQL34Y60④
100	TQL12Y100④	TQL24Y100④	TQL34Y100④



THQL34100

⑤ 6 kA.

**Types TQL and TQB Ground
Fault Circuit Breaker
240 Vac, 3 kA, Lug on Load End**

Incorporates overload, short circuit, and ground fault circuit interruption. 220/240 Vac nominal. Operable between 200 Vac minimum, and 250 Vac maximum. 3000 amps RMS symmetrical interrupting capacity.



TQL1215GF

Type TQL

Amp Rating	1-pole 240 Vac 3 kA
15	TQL1215GF⑥
20	TQL1220GF⑥
25	TQL1225GF⑥
30	TQL1230GF⑥
15	TQL1215GF10⑦
20	TQL1220GF10⑦
25	TQL1225GF10⑦
30	TQL1230GF10⑦

⑥ 5 mA trip level.
⑦ 10 mA trip level.

Type TQB

Amp Rating	1-pole 240 Vac 3 kA
15	TQB1215GF⑥
20	TQB1220GF⑥
25	TQB1225GF⑥
30	TQB1230GF⑥
15	TQB1215GF10⑦
20	TQB1220GF10⑦
25	TQB1225GF10⑦
30	TQB1230GF10⑦

TQB, TQC and Accessories

Type TQB Strap-In Circuit Breaker 415Y/240 Vac, 5 kA, Lug on Load End

Amp Rating	1-pole 240 Vac 5 kA	2-pole 415 Vac 5 kA
8	TQB1208X	TQB2408X
10	TQB1210X	TQB2410X
15	TQB1215X	TQB2415X
20	TQB1220X	TQB2420X
25	TQB1225X	TQB2425X
30	TQB1230X	TQB2430X

Type TQB Strap-In Circuit Breaker 415Y/240 Vac, 5 kA, Lug on Load End

Amp Rating	1-pole 240 Vac 5 kA	2-pole 415 Vac 5 kA	3-pole 415 Vac 5 kA
8	TQB1208B	TQB2408B	TQB3408B
10	TQB1210B	TQB2410B	TQB3410B
15	TQB1215B	TQB2415B	TQB3415B
20	TQB1220B	TQB2420B	TQB3420B
25	TQB1225B	TQB2425B	TQB3425B
30	TQB1230B	TQB2430B	TQB3430B
35	TQB1235B	TQB2435B	TQB3435B
40	TQB1240B	TQB2440B	TQB3440B
45	TQB1245B	TQB2445B	TQB3445B
50	TQB1250B	TQB2450B	TQB3450B
60	TQB1260B	TQB2460B	TQB3460B
70	TQB1270B	TQB2470B	TQB3470B
90	TQB1290B	TQB2490B	TQB3490B
100	TQB12100B	TQB24100B	TQB34100B
60	TQB12Y60B ^②	TQB24Y60B ^②	TQB34Y60B ^②
100	TQB12Y100B ^②	TQB24Y100B ^②	TQB34Y100B ^②

② Molded case isolating switch. No IC rating.

Type TQC Wire-In Circuit Breaker 415Y/240 Vac, 5 kA, Lugs on Line and Load Ends

Amp Rating	1-pole 240 Vac 5 kA	2-pole 415 Vac 5 kA	3-pole 415 Vac 5 kA	4-pole 415 Vac 5 kA
8	TQC1208WLB	TQC2408WLB	TQC3408WLB	TQC4425WLB
10	TQC1210WLB	TQC2410WLB	TQC3410WLB	
15	TQC1215WLB	TQC2415WLB	TQC3415WLB	
20	TQC1220WLB	TQC2420WLB	TQC3420WLB	
25	TQC1225WLB	TQC2425WLB	TQC3425WLB	
30	TQC1230WLB	TQC2430WLB	TQC3430WLB	
35	TQC1235WLB	TQC2435WLB	TQC3435WLB	
40	TQC1240WLB	TQC2440WLB	TQC3440WLB	
45	TQC1245WLB	TQC2445WLB	TQC3445WLB	
50	TQC1250WLB	TQC2450WLB	TQC3450WLB	
60	TQC1260WLB	TQC2460WLB	TQC3460WLB	TQC4440WLB
70	TQC1270WLB	TQC2470WLB	TQC3470WLB	
90	TQC1290WLB	TQC2490WLB	TQC3490WLB	
100	TQC12100WLB	TQC24100WLB	TQC34100WLB	
60	TQC12Y60B ^④	TQC24Y60B ^④	TQC34Y60B ^④	
100	TQC12Y100B ^④	TQC24Y100B ^④	TQC34Y100B ^④	

④ Molded case isolating switch. No IC rating.

Q Line Mounting Plates and Bases

Description	Breaker Type	Catalog Number
Back Mounting Plates Screw Type (TQC/THQC Breaker held to Mounting Plate by screw clip)	1-pole TQC/THQC	TQCBMPA1
	2-pole TQC/THQC	TQCBMPA2
	3-pole TQC/THQC	TQCBMPA3
	10-pole TQC/THQC	TQCBMPA10
Snap In (TQC/THQC, TQC-GF snaps in to spring retaining clip)	1-pole TQC/THQC	TQCGFBMPA1
	2-pole TQC/THQC	TQCGFBMPA2
	3-pole TQC/THQC	TQCGFBMPA3
	10-pole TQC/THQC	TQCGFBMPA10
Front-mounting Plates	1-pole TQC/THQC	TQCFMP1
	2-pole TQC/THQC	TQCFMP2
	3-pole TQC/THQC	TQCFMP3
	4-pole TQC/THQC	TQCFMP4
3-pole Plug-in Mounting Base (70 Amp)	3-pole TQL/THQL	571B595DDG2
2-pole Plug-in Mounting Base (70 Amp)	2-pole TQL/THQL	571B595DDG1
3-pole Plug-in Mounting Base (100 Amp)	3-pole TQL/THQL	565B837G1
2-pole Plug-in Mounting Base (100 Amp)	2-pole TQL/THQL	565B837G2

Other circuit breaker accessories – see pages 21 through 31.

Information subject to change without notice

Type TQB Strap-In Circuit Breaker 240 Vac, 6 kA, Lug on Load End

Amp Rating	1-pole 240 Vac 6 kA
15	TQB1215A
20	TQB1220A
25	TQB1225A ^①
30	TQB1230A ^①

① 4 kA.



TQB2415B



THQC2460WL

Type TQB Strap-In Circuit Breaker 415Y/240 Vac, 9 kA, Lug on Load End

Amp Rating	1-pole 240 Vac 9 kA	2-pole 415 Vac 9 kA	3-pole 415 Vac 9 kA
10	TQB1210 ^③	TQB2410 ^③	TQB3410 ^③
15	THQB1215	THQB2415	THQB3415
20	THQB1220	THQB2420	THQB3420
25	THQB1225	THQB2425	THQB3425
30	THQB1230	THQB2430	THQB3430
35	THQB1235	THQB2435	THQB3435
40	THQB1240	THQB2440	THQB3440
45	THQB1245	THQB2445	THQB3445
50	THQB1250	THQB2450	THQB3450
60	THQB1260	THQB2460	THQB3460
70	THQB1270	THQB2470	THQB3470
90	THQB1290	THQB2490	THQB3490
100	THQB12100	THQB24100	THQB34100
60	TQB12Y60 ^②	TQB24Y60 ^②	TQB34Y60 ^②
100	TQB12Y100 ^②	TQB24Y100 ^②	TQB34Y100 ^②

③ 6 kA.

Type TQC Wire-In Circuit Breaker 415Y/240 Vac, 9 kA, Lugs on Line and Load Ends

Amp Rating	1-pole 240 Vac 9 kA	2-pole 415 Vac 9 kA	3-pole 415 Vac 9 kA
15	THQC1215WL	THQC2415WL	THQC3415WL
20	THQC1220WL	THQC2420WL	THQC3420WL
25	THQC1225WL	THQC2425WL	THQC3425WL
30	THQC1230WL	THQC2430WL	THQC3430WL
35	THQC1235WL	THQC2435WL	THQC3435WL
40	THQC1240WL	THQC2440WL	THQC3440WL
45	THQC1245WL	THQC2445WL	THQC3445WL
50	THQC1250WL	THQC2450WL	THQC3450WL
60	THQC1260WL	THQC2460WL	THQC3460WL
70	THQC1270WL	THQC2470WL	THQC3470WL
90	THQC1290WL	THQC2490WL	THQC3490WL
100	THQC12100WL	THQC24100WL	THQC34100WL
60	TQC12Y60 ^④	TQC24Y60 ^④	TQC34Y60 ^④
100	TQC12Y100 ^④	TQC24Y100 ^④	TQC34Y100 ^④

Copper-Aluminum Lugs

Wire Size	For Use With	Catalog Number
# 14-6 Cu, # 12-2 Al	TQC/THQC (15-60A)	TQAL3
# 4-1/0 Cu-Al	TQC/THQC (70-100A)	TQAL4

Breaker Mounting-screw Kits

Application	Breaker Type	Catalog Number
Mounting screws for connecting low tab to panel board	TQB/THQB (packaged 24/kit)	TQBS1

Padlocking Devices

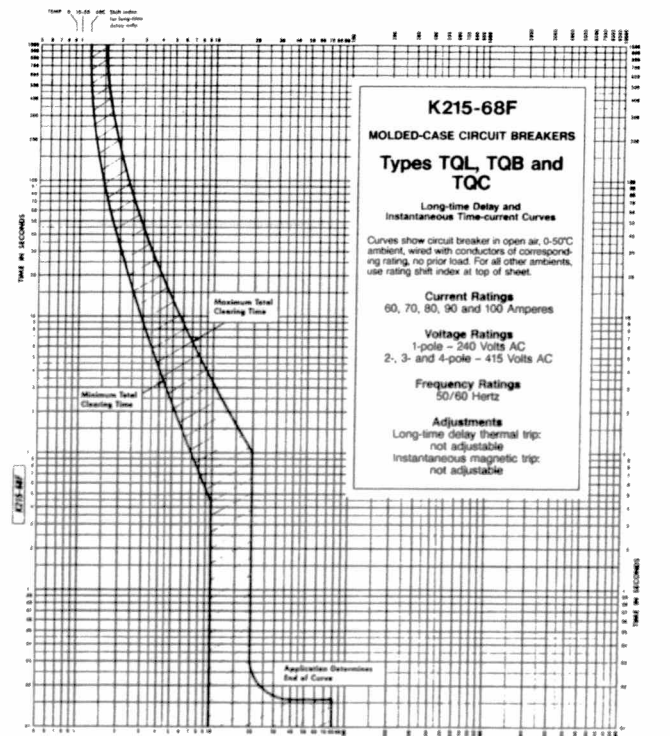
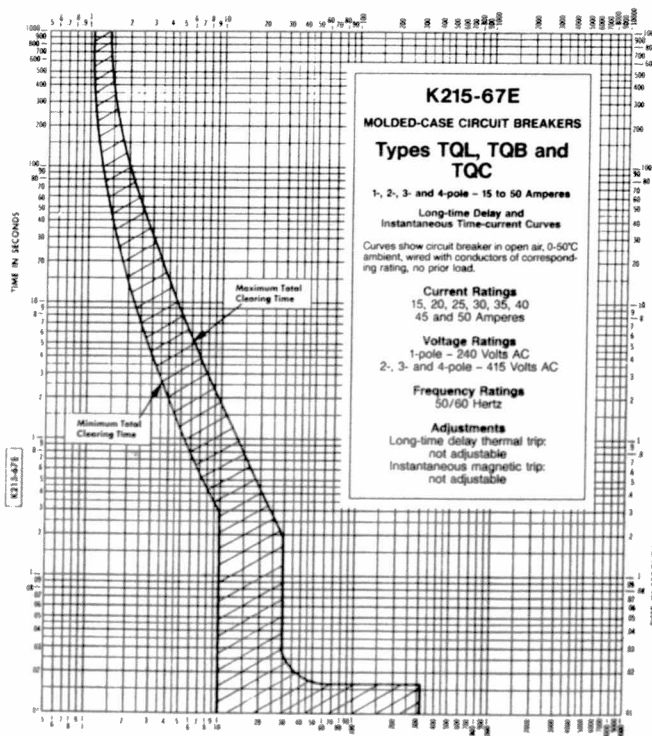
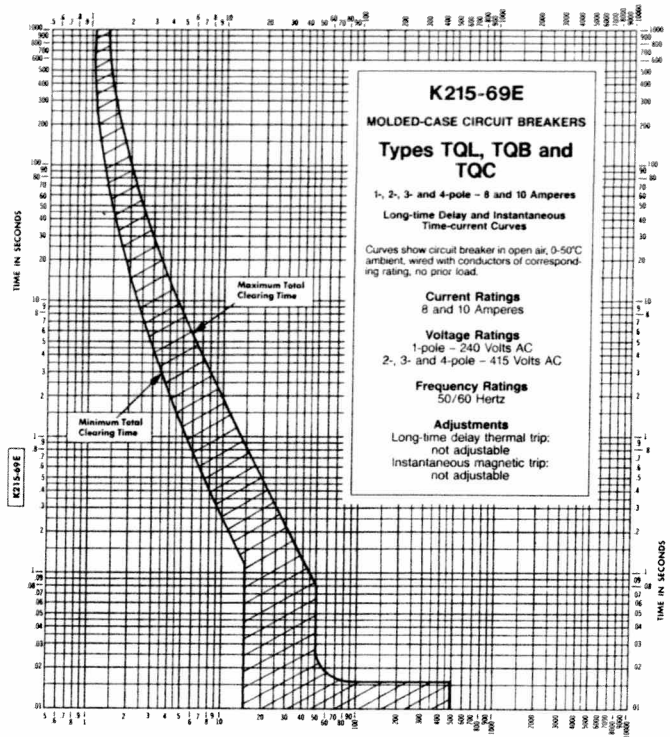
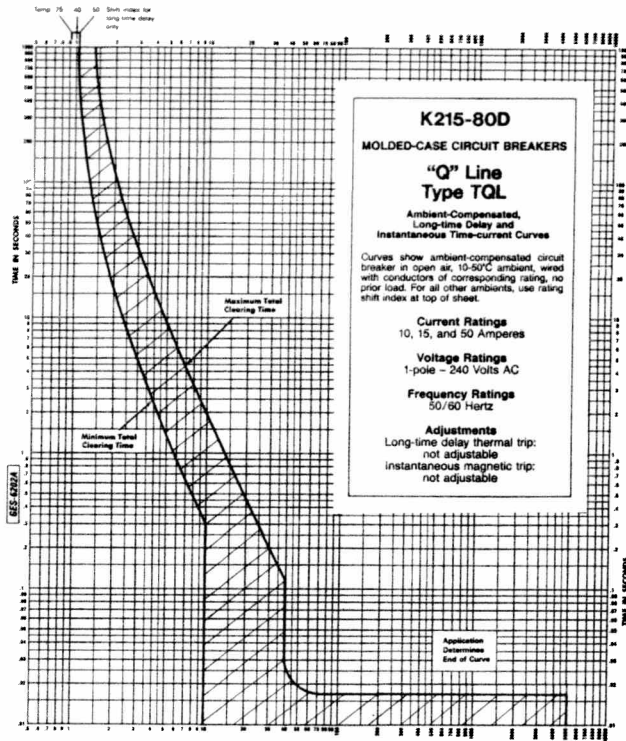
Breaker Type	Device Catalog Number
TQC/THQC	TQPLD1

Suitable for use with circuit breakers used in group mounted panelboard construction only.

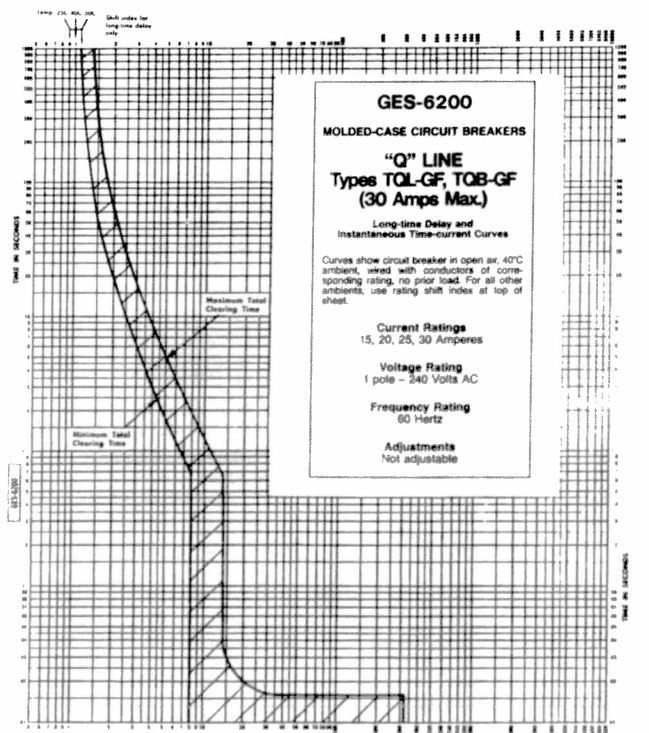
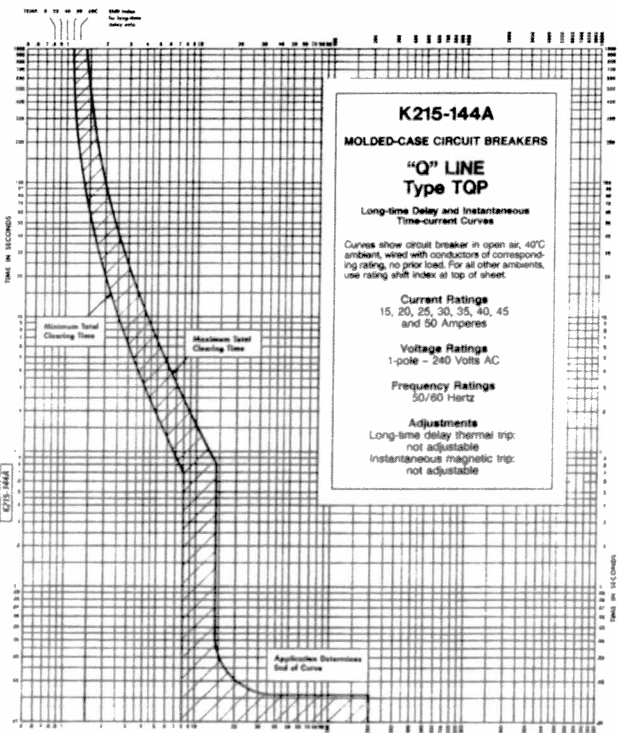
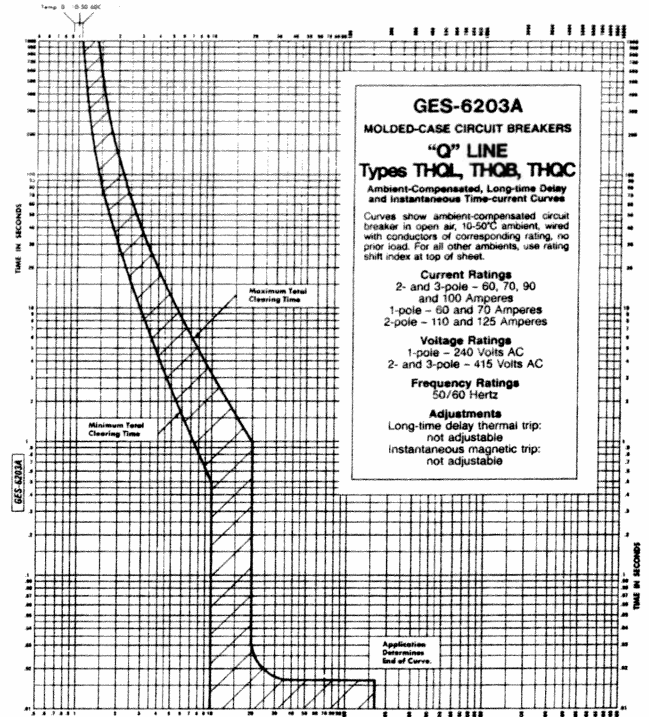
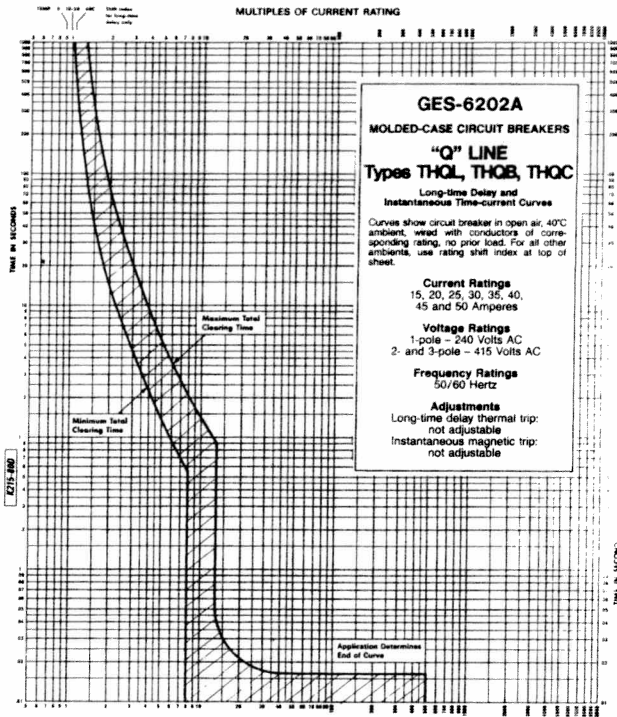


GE Miniature Circuit Breakers

Time-Current Curves



GE Miniature Circuit Breakers Time-Current Curves



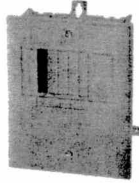


GE Load Centers

Single Phase, for Plug-in MCBs



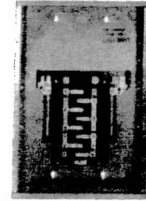
TPL412CX2



TT405FNMX2



TLM3020CX2



TLM1612CX2

Single-phase, 240 Volt ac Maximum, Non-metallic, Indoor Panels with Main Lugs Only

Main Ampere Rating	Maximum Spaces			Indoor Type 1 Enclosure ^①		Main Wire Size AWG/MCM Use 90°C	Equipment Ground Kit Factory Installed Catalog Number
	13 mm THQP	25 mm THQL-GF	Total 1-pole Spaces	Catalog Number	Box No. See Page 16		
40	3 5	— —	3 5	TT403FNMX2,SNMX2 TT405FNMX2,SNMX2	1 1	14-8 Cu	TGL2 TGL2

Main Ampere Rating	Maximum Spaces				Total 1-pole Spaces	Indoor Type 1 Enclosure		Main Wire Size AWG/MCM Cu	Equipment Ground Kit Order Separately See Page 10 Catalog Number
	25 mm THQL		13 mm THQP			Catalog Number	Box No. See Page 16		
	1-pole	2-pole	1-pole	2-pole					
40	2	1	4	1	4	TPL240CX2	2	14-6 Cu	TGL1
70	2	1	4	1	4	TPL270CX2	2	6-2/0	TGL1
125	2 4	1 2	4 8	1 3	4 8	TPL212CX2 TPL412CX2	2 2	6-2/0	TGL1 TGL1

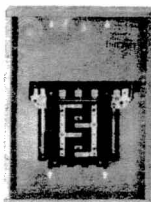
Single-phase, 240 Volt ac Maximum, Steel, Indoor Panels with Main Lugs Only, Top Feed^②

Main Ampere Rating	Maximum Spaces				Total 1-pole Spaces	Indoor Type 1 Enclosure		Main Wire Size AWG/MCM Cu-AL	Equipment Ground Kit Order Separately See Page 10 Catalog Number
	25 mm THQL		13 mm THQP			Catalog Number	Box No. See Page 16		
	1-pole	2-pole	1-pole	2-pole					
40	2	1	4	1	4	TL240CX2	2A	14-6 Cu	TGL1
70	2	1	4	1	4	TL270CX2	2A	6-2/0	TGL1
125	4 6 8 12 16 20 24	2 3 4 6 8 10 12	8 12 16 24 18 8 —	3 3 6 10 6 2 —	8 12 16 24 24 24 24	TL412CX2 TLM612F1X2,S1X2 TLM812F1X2,S1X2 TLM1212CX2 TLM1612CX2 TLM2012CX2 TLM2412CX2	2A 3 3 4 5 6 8	6-2/0 6-2/0	TGL1 TGL2 TGL2 TGL2 TGL2 + TGL3 TGL2 + TGL3 TGL2 + TGL3
150	12 16 20	6 8 10	24 28 20	10 12 8	24 30 30	TL1215CX2 TL1615CX2 TL2015CX2	4 5 6	1-4/0 Cu 1-3/0 Cu	TGL2 TGL2 + TGL3 TGL2 + TGL3
200	8 12 20 30 40	4 6 10 14 20	16 24 40 20 —	6 10 18 8 —	16 24 40 40 40	TL820CX2 TL1220CX2 TL2020CX2 TL3020CX2 TL4020CX2	6 7 7 10 13	1-250 Cu	TGL2 TGL2 TGL2 + TGL3 (2)TGL2 (2)TGL2
225	24 42	12 20	32 —	14 —	40 42	TL2422CX2 TL4222CX2	10 13	1-300 Cu	(2)TGL2
400	24 42	12 20	— —	— —	24 42	TL2440FX2,SX2 TL4240FX2,SX2	16 16	(2)2/0-250	(2)TGL2
600	24 42	12 20	— —	— —	24 42	TL2460FX2,SX2 TL4260FX2,SX2	17 18	(2)250-350 Cu	(2)TGL2

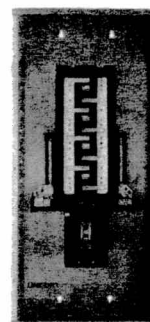
① Front Suffix:
C = Combination flush or surface; F = Flush; S = Surface.

② All single-phase devices in this grouping are designed for use with single-phase, 3-wire systems. Instructions are attached to each device to show how a jumper cable can be field-installed for use with single-phase, 2-wire systems. All one-pole, separately purchased breakers (up through 100 amps) can be field installed and backed to convert load center into a main breaker panel. For Load Center Accessories see pages 10 through 12.

Three Phase, for Plug-in MCBs



TL12412CX2



TM24420CX2

Three-phase, Four-wire, 415Y/240 Volt ac Maximum, Steel, Indoor Panels with Main Lugs Only, Top Feed

Main Ampere Rating	Maximum Spaces			Total 1-pole Spaces	Indoor Type 1 Enclosure ^①		Main Wire Size AWG/MCM Cu-Al	Equipment Ground Kit Order Separately See Page 10 Catalog Number
	25 mm THQL				Catalog Number	Box No. See Page 16		
	1-pole	2-pole	3-pole					
125	12	6	4	12	TL12412CX2	4	6-2/0	TGL2
150	18	8	6	18	TL18415CX2	6	1-3/0 Cu	TGL2 + TGL3 (2)TGL2
	24	12	8	24	TL24415CX2	7		
200	18	8	6	18	TL18420CX2	7	1-250 Cu	TGL2 + TGL3 (2)TGL2 (2)TGL2
	30	14	10	30	TL30420CX2	10		
	42	20	14	42	TL42420CX2	13		
225	30	14	10	30	TL30422CX2	15	1-300 Cu or 2/0-300 Al	(2)TGL2 (2)TGL2
	42	20	14	42	TL42422CX2	15		
400	24	12	8	24	TL24440FX2,SX2	16	(2)2/0-250	(2)TGL2 (2)TGL2
	42	20	14	42	TL42440FX2,SX2	16		
600	24	12	8	24	TL24460FX2,SX2	17	(2)250-350 Cu or (2)350-500 Al	(2)TGL2 (2)TGL2
	42	20	14	42	TL42460FX2,SX2	18		

Three-phase, Four-wire, 415Y/240 Volt ac Maximum, Steel, Indoor Panels with Main Breaker Installed, Top Feed

Main Ampere Rating	Maximum Spaces			Total 1-pole Spaces	Indoor Type 1 Enclosure ^①		Main Wire Size AWG/MCM Cu-Al	Equipment Ground Kit Order Separately See Page 10 Catalog Number
	25 mm THQL				Catalog Number	Box No. See Page 16		
	1-pole	2-pole	3-pole					
100	12	6	4	12	TM12410CX2	6	6-1/0 or 4-1/0 Al	TGL2 TGL2 + TGL3
	18	8	6	18	TM18410CX2	6		
125	30	14	10	30	TM30412CX2	11	1-3/0 Cu or 2/0-3/0 Al	(2)TGL2
150	24	12	8	24	TM24415CX2	10	1-3/0 Cu or 2/0-3/0 Al	(2)TGL2 (2)TGL2 (2)TGL2
	30	14	10	30	TM30415CX2	11		
	42	20	14	42	TM42415CX2	13		
200	24	12	8	24	TM24420CX2	11	1-250 Cu or 2/0-250 Al	(2)TGL2 (2)TGL2 (2)TGL2
	30	14	10	30	TM30420CX2	12		
	42	20	14	42	TM42420CX2	14		
225	42	20	14	42	TM42422CX2	15	1-300 Cu or 2/0-300 Al	(2)TGL2
400	24	12	8	24	TM24440FX2,SX2	17	(1)6-600 or (2)2/0-250	(2)TGL2 (2)TGL2
	42	20	14	42	TM42440FX2,SX2	18		

- ① Front Suffix
 C = Combination flush or surface
 F = Flush
 S = Surface

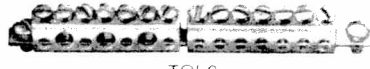
For Load Center Accessories see pages 10 through 12.



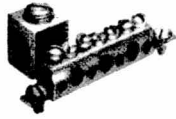
GE Load Centers

Accessories and Modifications

Equipment Ground Kits



TGL2



TGL20 combined with TGL1

Number of Terminals			Catalog Number	Std. Pkg
Small 14-8 Cu 12-8 Al	Large 14-4 Cu 12-4 Al	Other AWG/MCM Cu/Al		
4 7	3 —	— —	TGL1① TGL3①	20
11 14 10	3 — 2	— — (1) 14-2	TGL2② TGL4② TGL8②	
—	—	(1) 6-2/0	TGL20③	
—	—	(3) 10-1/0	TNG3④	1
—	—	(6) 10-1/0	TNG6④	

Neutral Kits



TNLK1



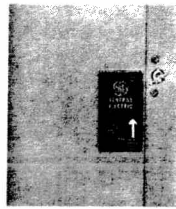
286A8894G1



192A7663G13

Wire Size AWG/MCM Cu/Al	Catalog Number	Std. Pkg.
(5) 14-1/0	TNLK1④	1
(3) 1-300	TNLK2④	
(1) 6-2/0 Cu/Al	286A8894G1⑤	
(1) 1-300 Cu or 2/0-300 Al	192A7663G13⑤	

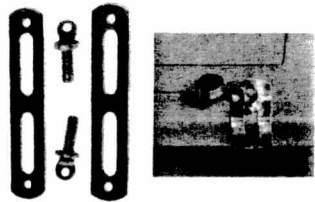
Door Lock



TDL106

Description	Catalog Number	Std. Pkg.
For all indoor load centers except TPL240, TPL270, TPL212, TPL412	TDL106	10

Front Sealing Kit



TFS1

Description	Catalog Number	Std. Pkg.
For all indoor load centers except TPL240, TPL270, TPL212, TPL412	TFS1	5

Circuit Directory



TD42

Description	Catalog Number	Std. Pkg.
Card and holder with pressure-sensitive backing Mounts inside door	TD42	1

- ① TGI 1 and TGI 3 mount interchangeably
- ② TGI 2, TGI 4 and TGI 8 mount interchangeably

- ③ Add-on equipment ground lug (for use on any TGI kit)
- ④ Suitable only for 400- and 600-amp devices

- ⑤ Add-on neutral lug for 100-200-amp load centers

Accessories and Modifications

Touch-up Paint



TSP61

Description	Catalog Number	Std. Pkg.
0.3 kg spray can of light gray enamel	TSP61	1

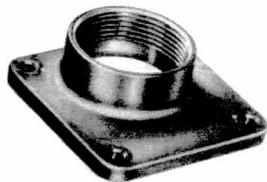
Front Filler Plates Covers Rectangular Breaker Knockouts



TFH

Knockout Width	Catalog Number	Std. Pkg.
13 mm	TFH	100
25 mm	TQLFP1	50

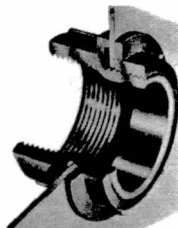
Universal Raintight Hubs For Outdoor Enclosures that have Removable Closing Caps



TC150

Nominal Conduit Diameter in Millimeters	Aluminum Hub Catalog Number	Std. Pkg.
19 mm	TC75	10
25 mm	TC100	
32 mm	TC125	
38 mm	TC150	
51 mm	TC200	
64 mm	TC250	
Closing Cap	TCCP	

Myers Scru-Tite Hubs For Outdoor Enclosures that Require Field Cut Openings



343L647G21

Nominal Conduit Diameter in Millimeters	Zinc Hub Catalog Number	Chrome Plated Zinc Hub Catalog Number	Std. Pkg.
13 mm	343L647G3	343L647G17	1
19 mm	343L647G4	343L647G18	
25 mm	343L647G5	343L647G19	
32 mm	343L647G6	343L647G20	
38 mm	343L647G7	343L647G21	
51 mm	343L647G8	343L647G22	
64 mm	343L647G9	343L647G23	
76 mm	343L647G10	343L647G24	
89 mm	343L647G11	343L647G25	
102 mm	343L647G12	343L647G26	

Door Handles



TRL22



TRL22B

Location of Main Lugs or Main Breaker	Catalog Number	Std. Pkg.
Top	TRL22	1
Bottom	TRL22B	



GE Load Centers

Accessories and Modifications

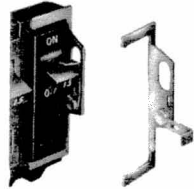
Main Breaker Retainers
For Main Lug Load Centers Utilizing
a Back Fed Branch Breaker as a Main



THQLRK

Load Center	Breaker	Catalog Number	Std. Pkg.
Travel Trailer	THQP	THQPSBK	1
TL (225A max)	THQL	THQLRK	
	TQDL	TQDLRK	

Handle Locks—Padlocking
ON or OFF
Snap-On
Padlock Not Included



THP100

Breaker	Catalog Number	Std. Pkg.
THQP	TQPPL	10
THQL	THP100	
TQDL	TQDLPLD1	
TQD	TQDPLD1	

Handle Locks—Non Padlocking
ON or OFF
Snap-On



THL103

Breaker	Catalog Number	Std. Pkg.
THQP	TQPL	10
THQL	THL103	

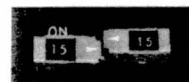
Handle Ties^①
For Two Single-pole
Breakers.
All Multi-pole Breakers
have Internal Common Trip.



THT2



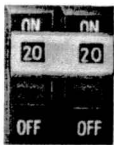
THT104



TQHT1



THT1



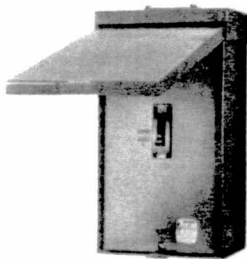
Breaker	Description	Catalog Number	Std. Pkg.
THQP	Solid Snap-on Trip Indicating	THT1	100
	For 2 THQP's separated by 2 side-by-side THQP's	THT2	20
THQL	Solid Snap-on	THT104	50
	Trip Indicating	TQHT1	20

① No charge if ordered with appropriate device.

Circuit Breaker Enclosures



Type 1, indoor surface or flush mounting



Type 3R outdoor, raintight

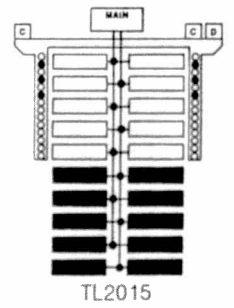
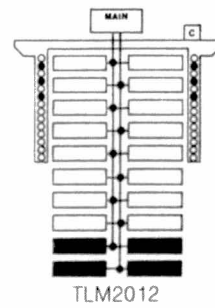
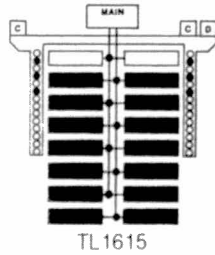
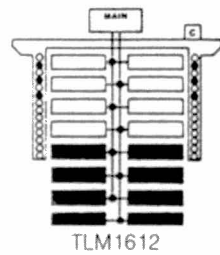
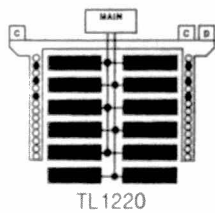
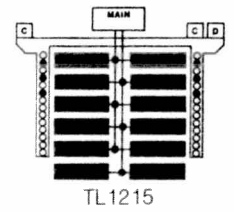
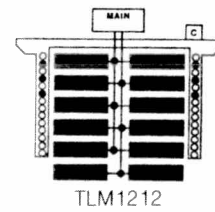
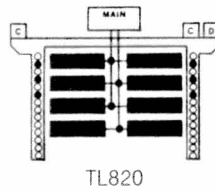
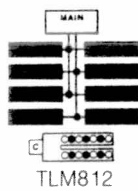
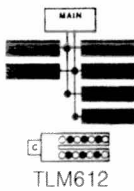
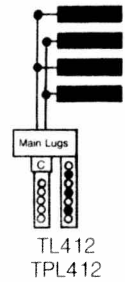
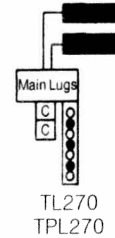
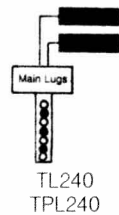
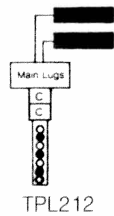
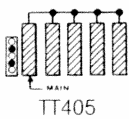
See page 44 for available products.

Wiring Diagrams

Breaker Symbol	Breaker Fill	
	25 mm TQL	13 mm TQP
	1	—
	1	2
	1	1
	—	1

Terminal Symbol	Wire Range (AWG/MCM) ①	
	Cu	Al
○	14-8	12-8
●	14-4	12-4
A	6-2	6-2
B	14-1/0	12-1/0
C	6-2/0	6-2/0
D	1-300	2/0-300
E	1-300	1-300

① See page 51 for conversion to metric wire sizes.

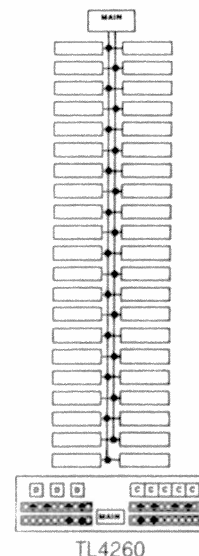
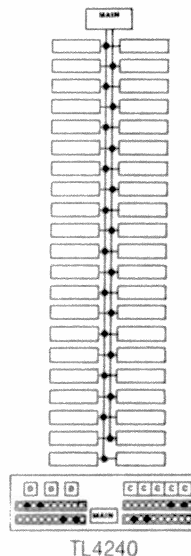
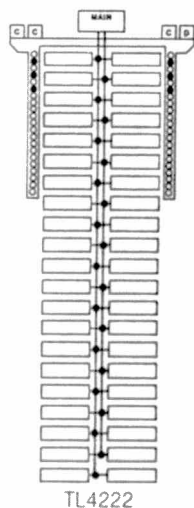
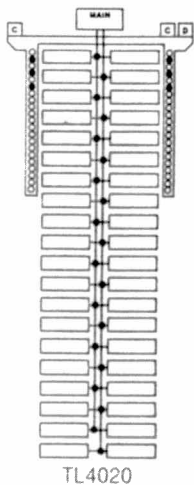
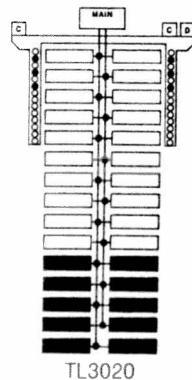
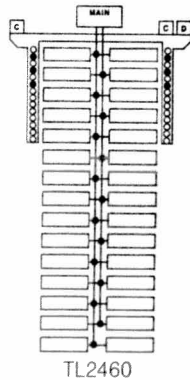
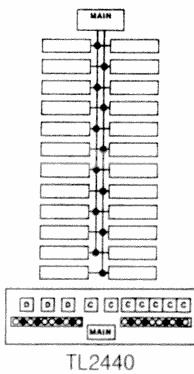
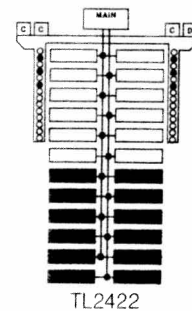
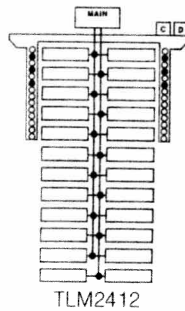
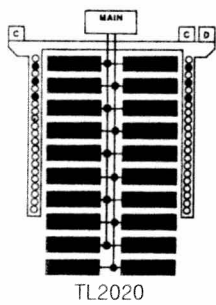




Wiring Diagrams

Breaker Symbol	Breaker Fill		Terminal Symbol	Wire Range (AWG/MCM)①	
	25 mm TQL	13 mm TQP		Cu	Al
	1	—	○	14-8	12-8
	1	2	●	14-4	12-4
	1	1	A	6-2	6-2
	1	1	B	14-1/0	12-1/0
	—	1	C	6-2/0	6-2/0
			D	1-300	2/0-300
			E	1-300	1-300

① See page 51 for conversion to metric wire sizes.

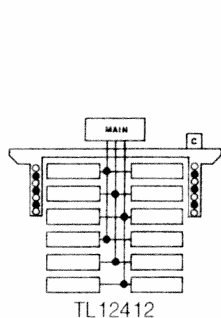


Wiring Diagrams

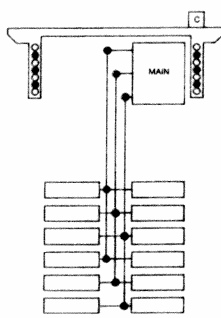
Breaker Symbol	Breaker Fill	
	25 mm TQL	13 mm TQP
	1	—
	1	2
	1	1
	—	1

Terminal Symbol	Wire Range (AWG/MCM) ①	
	Cu	Al
○	14-8	12-8
●	14-4	12-4
A	6-2	6-2
B	14-1/0	12-1/0
C	6-2/0	6-2/0
D	1-300	2/0-300
E	1-300	1-300

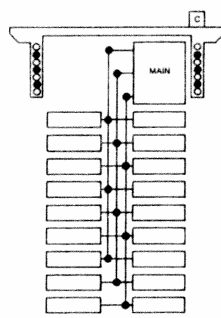
① See page 51 for conversion to metric wire sizes.



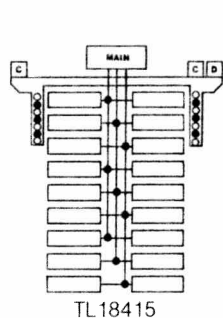
TL12412



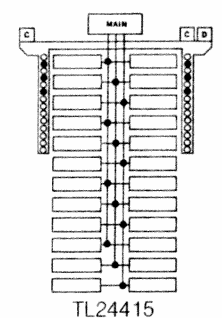
TM12410



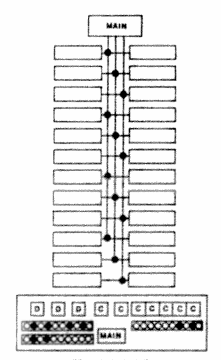
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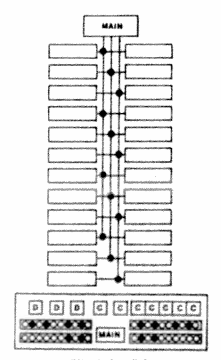
TL18415
TL18420



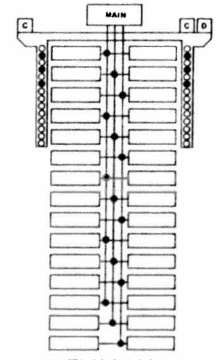
TL24415
TM24415, TM24420



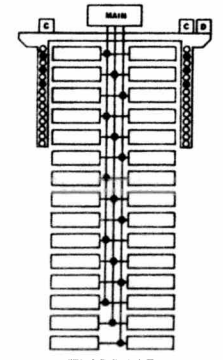
TL24440
TM24440



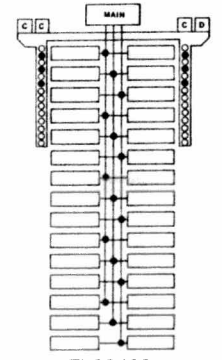
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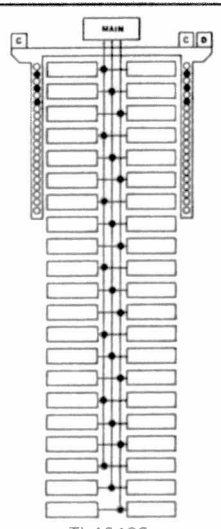
TM30412



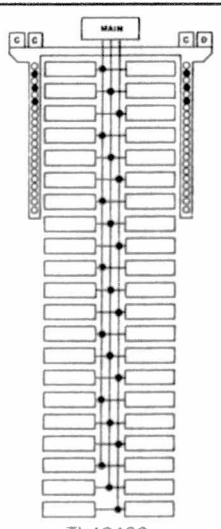
TM30415
TL30420, TM30420



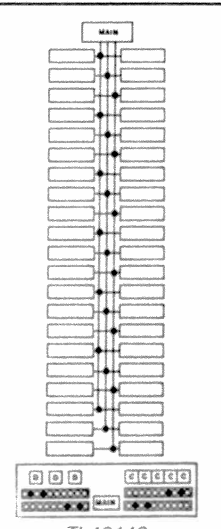
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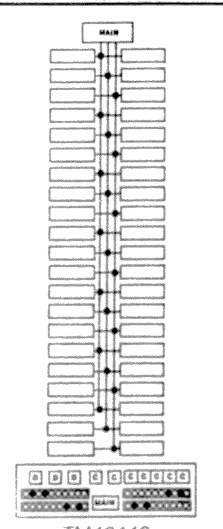
TL42420
TM42415, TM42420



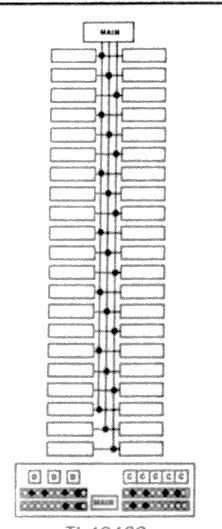
TL42422
TM42422



TL42440



TM42440



TL42460



Dimensions and Knockouts

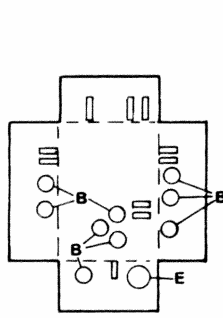
Indoor Enclosures

Dimensions

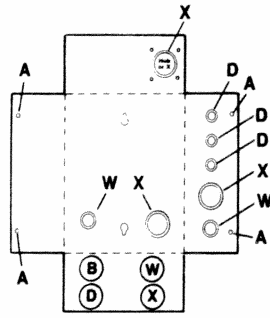
(In Millimeters)			
Box No.	Width	Height	Depth
1	138	188	64
2	191	234	84
2A	184	229	76
3	259	470	92
4	356	483	95
5	356	533	95
6	356	584	95
7	356	627	95
8	356	672	95
9	356	722	95
10	356	773	95
11	356	843	95
12	356	900	95
13	356	995	95
14	356	1103	95
15	356	1103	117
16	406	1146	148
17	508	1241	155
18	508	1521	155

Knockouts

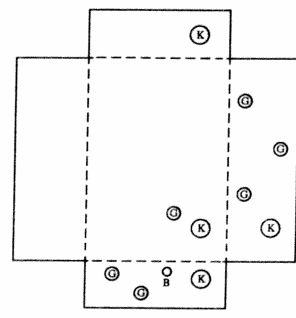
Symbol	A			B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	U	V	W	X	
Conduit Size in mm	7	8 x 14	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	—	—	10	—	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	—	—	13	13	13	13	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	—	—	—	—	19	19	19	19	19	19	19	—	—	—	—	—	19	—	—	—	19	—	—	19	—
	—	—	—	—	—	—	—	—	25	25	25	25	25	25	—	25	25	—	—	25	—	—	25	—	
	—	—	—	—	—	—	—	—	—	—	32	32	32	32	32	32	32	—	—	32	32	—	—	32	—
	—	—	—	—	—	—	—	—	—	—	—	—	38	38	38	38	—	—	38	38	38	—	—	—	38
	—	—	—	—	—	—	—	—	—	—	—	—	—	—	51	51	51	51	51	51	—	—	51	51	—
	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	64	64	64	64	—	—	64	64	—	—
	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	76	—	76	76	—	—	—
	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	89	89	89	—	—	—
	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	102	—	—



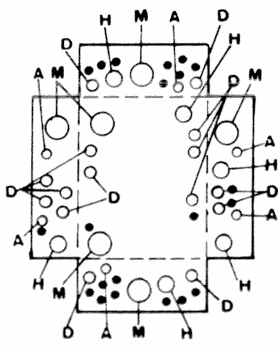
Box 1



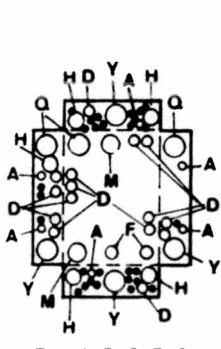
Box 2



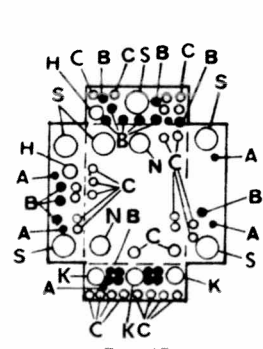
Box 2A



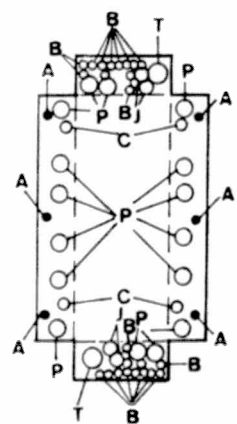
Box 3



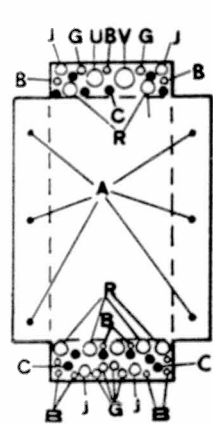
Box 4, 5, 6, 7, 8, 10, 11, 12, 13, 14



Box 15



Box 16



Box 17, 18

Features and Data

Features

- Broad product line to meet virtually any application need.
- Reduce downtime. A tripped breaker is easily spotted and can be immediately reset after the fault has been corrected.
- Eliminate single phasing. A common trip bar disconnects all poles simultaneously on both overloads and short circuits.
- Offer application flexibility through the use of a wide variety of accessory devices and special attachments.
- Repetitive operation—no fuses to replace.
- Breakers can be repetitively tested. Fuses must be destroyed to confirm calibration accuracy.

How to Order

TEB, TQD and TJD Lines

- Thermal Magnetic Circuit Breakers
- Molded Case Switches

The catalog numbers as shown in the following pages include the complete breaker or switch. All devices listed come with Cu/Al line and load lugs. If line lugs are not required on a breaker, eliminate "WL" from catalog number; for molded case switches see below.

TEI, TFI, TJI and TKI Lines

- Thermal Magnetic Circuit Breakers
- Tested and rated to I.E.C. Standard 157-1 P1 and to British Standard BS 4752.
- Suitable for operation at 50°C ambient.

The catalog numbers as shown in the following pages include the complete breaker. All breakers have non-interchangeable trips. All devices listed come with Cu/Al line and load lugs as standard. Accessories, dimensions, enclosures, and lug terminations are identical to the USA-voltage E, F, J and K frame products.

Molded Case Circuit Breaker and Switch Terminal Configuration Code

Order standard Cu/Al lugs by using suffix codes presented. Order lugs separately if special lugs are required. For optional lugs, see page 30.

Breaker/Switch Type	Suffix				
	Blank	W	XL	X2	LL
TEB	Load Lugs Only	Line and Load Lugs	①	Line Lugs Only	No Lugs①
TQD/TJD	Load Lugs Only	Line and Load Lugs	—	Line Lugs Only	No Lugs
Molded Case Switch	Line and Load Lugs	—	No Lugs	Line Lugs Only	Load Lugs Only

① For E150 circuit breakers suffix XL is used to specify "no lugs".

TEB Molded Case Switches Short Circuit Withstand Rating②

Molded Case Switch Catalog Number	Maximum Rating Protective Device③		Short Circuit Withstand Rating
	Voltage	Amps	
TEB112Y100	415	100	10,000
TEB124Y100	415	100	10,000
TEB134Y100	415	100	10,000

② TEB molded case switches have a 10,000 amp symmetrical short circuit withstand rating when protected by a fuse or circuit breaker rated 10,000 amps IC or greater and whose ampere rating does not exceed the ampere rating of the switch.

③ Protective device must be on line side of molded case switch.

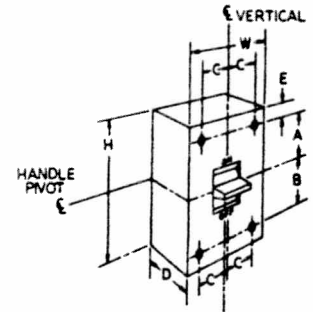
TQD, TJD Molded Case Switches Short Circuit Withstand Rating

Molded Case Switch		Protective Device		Short Circuit Withstand Ratings	
Ampere Rating	Catalog Number	Type	Max. Amp Rating	Amps rms Sym.	Max. Voltage
225	TQD34Y225	TQD	225	14,000	415
400	TJD434Y400	TJD	400	22,000	415



GE Molded Case Circuit Breakers

Features and Data



Interrupting Capacities, Dimensions, Weights and Drawings

Frame Size (Amps)	Breaker Type (# = 415Y /240 Vac Catalog Numbers Only)	Ampere Rating Range	Poles	Maximum Voltage		Interrupting Rating (Thousands of Amps RMS Symm) and Test Standard										Major Dimensions (mm)			Minor Dimensions (mm)				Ship Wt. Each (kg)	Shipping Cube Each (cu mt)	Time-Current Curve	Outline Drawing	Country of Origin B = Brazil U = USA		
						ac Voltage					dc Voltage																		
						NEMA		IEC			NEMA		H	W	D													A	B
				ac	dc	220Y /127	240Y /138	380Y /220	415Y /240	220Y /127	240Y /138	380Y /220				415Y /240	125	250											
150	TEB #	10-100	1	240	125	10	10	10	10	—	—	—	—	5	—	160	35	86	67	57	0	18	18	0.5	0.002	K215-96A, K215-97A, &K215-98A	139C3643 SH 1, 2, 4, 7, & 8	B, U B, U B, U	
		10-100	2	415	250	10	10	10	10	—	—	—	—	—	5	—	160	70	86	67	57	18	18	18	0.9				0.004
		10-100	3	415	—	10	10	10	10	—	—	—	—	—	—	—	160	105	86	67	57	18	18	18	1.6				0.006
	TEI #	10-100	1	240	125	65	14	14	14	65	14	14	14	10	—	160	35	86	67	57	18	18	18	0.7	0.002	K215-156, K215-157, &K215-158	139C3643 SH 1, 2, 4, 7, & 8	U U U	
		15-100	2	415	250	65	65	30	25	65	65	30	25	—	10	160	70	86	67	57	18	18	18	1.7	0.004				
		15-150	3	415	250	65	65	30	25	65	65	30	25	—	—	160	105	86	67	57	18	18	18	2.0	0.006				
225	TQD #	100-225	2	415	—	10	10	10	10	10	10	10	10	—	—	167	70	67	62	62	0	21	21	1.3	0.005	K215-99A	455C765	B, U B, U	
	100-225	3	415	—	10	10	10	10	10	10	10	10	—	—	167	105	67	62	62	18	21	21	1.8	0.005					
400	TJD #	250-400	2	415	250	22	22	22	22	—	—	—	—	—	—	257	210	97	100	97	35	30	30	7	0.028	K215-107A	139C3602	U U	
		250-400	3	415	—	22	22	22	22	—	—	—	—	—	—	257	210	97	100	97	35	30	30	8	0.028				
600	TJI #	125-600	3	415	250	65	65	45	45	65	65	45	45	—	10	257	210	97	100	97	35	30	30	9	0.028	K215-164	139C3602	U	
800	TKI #	700-800	3	415	250	65	65	50	50	65	65	50	50	—	10	394	210	140	217	145	35	16	16	18	0.045	K215-164	455C840 SH 1	U	
1200	TKI #	1000-1200	3	415	—	65	65	50	50	65	65	50	50	—	—	394	210	140	217	145	35	16	16	19	0.045	K215-164	455C840 SH 1	U	

TEB, TQD and TJD

**415Y/240 Volts ac Line
Tested to U.S.A. NEMA Test Procedures**



TEB112015WL TEB124060WL TEB134100WL

**TYPE TEB Circuit Breaker
415Y/240 Vac, 10 kA, Lugs on Line and Load Ends**

Amp Rating	1-pole 240 Vac 10 kA	2-pole 415 Vac 10 kA	3-pole 415 Vac 10 kA
10	TEB112010WL	TEB124010WL	TEB134010WL
15	TEB112015WL	TEB124015WL	TEB134015WL
20	TEB112020WL	TEB124020WL	TEB134020WL
25	TEB112025WL	TEB124025WL	TEB134025WL
30	TEB112030WL	TEB124030WL	TEB134030WL
35	TEB112035WL	TEB124035WL	TEB134035WL
40	TEB112040WL	TEB124040WL	TEB134040WL
50	TEB112050WL	TEB124050WL	TEB134050WL
60	TEB112060WL	TEB124060WL	TEB134060WL
70	TEB112070WL	TEB124070WL	TEB134070WL
80	TEB112080WL	TEB124080WL	TEB134080WL
90	TEB112090WL	TEB124090WL	TEB134090WL
100	TEB112100WL	TEB124100WL	TEB134100WL
100	TEB112Y100①	TEB124Y100①	TEB134Y100①

① Molded case isolating switch. No IC rating.

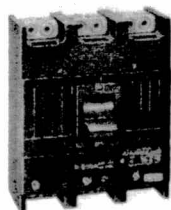


TQD24225WL

**Type TQD Circuit Breaker
415Y/240 Vac, 10 kA, Lugs on Line and Load Ends**

Amp Rating	2-pole 415 Vac 10 kA	3-pole 415 Vac 10 kA
125	TQD24125WL	TQD34125WL
150	TQD24150WL	TQD34150WL
175	TQD24175WL	TQD34175WL
200	TQD24200WL	TQD34200WL
225	TQD24225WL	TQD34225WL
225	TQD24Y225②	TQD34Y225②

② Molded case isolating switch. No IC rating.



TJD434400WL

**Type TJD Circuit Breaker
415Y/240 Vac, 22 kA, Lugs on Line and Load Ends**

Amp Rating	2-pole 415 Vac 22 kA	3-pole 415 Vac 22 kA
250	TJD424250WL	TJD434250WL
300	TJD424300WL	TJD434300WL
350	TJD424350WL	TJD434350WL
400	TJD424400WL	TJD434400WL
400	TJD424Y400③	TJD434Y400③

③ Molded case isolating switch. No IC rating.

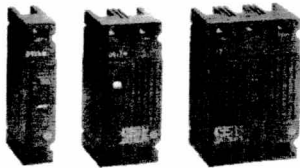


GE Molded Case Circuit Breakers

TEI, TFI, TJI and TKI

415Y/240 Volts ac Line Tested to IEC Test Procedures

- Interrupting capacities are in thousands of amperes symmetrical to IEC Standard 157-1 P1 and to British Standard BS 4752.
- 220/240 Vac ratings are at 50-60 Hz.
- 380 and 415 Vac ratings are at 50 Hz.
- All breakers are of the non-interchangeable trip design.
- Catalog numbers shown include line and load lugs as standard.
- Accessories, dimensions, enclosures, and lug terminations are identical to the current U.S.A. voltage line of E, F, J and K frame products.
- All breakers are suitable for operation at 50°C ambients and are so labelled.



TEI Circuit Breakers



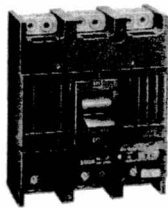
TFI345C225

Type TEI Circuit Breaker 415Y/240 Vac, 14 to 25 kA, Lugs on Line and Load Ends

Amp Rating	1-pole	2-pole	3-pole
	14 kA @ 240 Vac 14 kA @ 220 Vac 10 kA @ 120 Vdc	25 kA @ 415 Vac 30 kA @ 380 Vac 65 kA @ 240 Vac 65 kA @ 220 Vac 10 kA @ 250 Vdc	25 kA @ 415 Vac 30 kA @ 380 Vac 65 kA @ 240 Vac 65 kA @ 220 Vac 10 kA @ 250 Vdc
10	TEI125C010		
15	TEI125C015	TEI245C015	TEI345C015
20	TEI125C020	TEI245C020	TEI345C020
25	TEI125C025	TEI245C025	TEI345C025
30	TEI125C030	TEI245C030	TEI345C030
35	TEI125C035	TEI245C035	TEI345C035
40	TEI125C040	TEI245C040	TEI345C040
45	TEI125C045	TEI245C045	TEI345C045
50	TEI125C050	TEI245C050	TEI345C050
60	TEI125C060	TEI245C060	TEI345C060
70	TEI125C070	TEI245C070	TEI345C070
80	TEI125C080	TEI245C080	TEI345C080
90	TEI125C090	TEI245C090	TEI345C090
100	TEI125C100	TEI245C100	TEI345C100
110			TEI345C110
125			TEI345C125
150			TEI345C150

Type TFI Circuit Breaker 415Y/240 Vac, 30 kA, Lugs on Line and Load Ends

Amp Rating	3-pole
	30 kA @ 415 Vac 40 kA @ 380 Vac 65 kA @ 240 Vac 65 kA @ 220 Vac 10 kA @ 250 Vdc
70	TFI345C070
80	TFI345C080
90	TFI345C090
100	TFI345C100
125	TFI345C125
150	TFI345C150
175	TFI345C175
200	TFI345C200
225	TFI345C225



TJI345C600



TKI345C1200

Type TJI Circuit Breaker 415Y/240 Vac, 45 kA, Lugs on Line and Load Ends

Ampere Rating	Adjustable Instantaneous Trip Range Amp		3-pole 45 kA @ 415 Vac 45 kA @ 380 Vac 65 kA @ 240 Vac 65 kA @ 220 Vac 10 kA @ 250 Vdc	Copper/ Aluminum Lugs	Wire Size
	Lo	Hi			
125	375	1250	TJI345C125	TCAL 43 Included in price of breaker	(1) 6-600 MCM or (2) 2/0-250 MCM
150	450	1500	TJI345C150		
175	525	1750	TJI345C175		
200	600	2000	TJI345C200		
225	675	2250	TJI345C225		
250	750	2500	TJI345C250		
300	900	3000	TJI345C300		
350	1050	3500	TJI345C350		
400	1200	4000	TJI345C400		
450	1350	4500	TJI345C450		
500	1500	5000	TJI345C500		
600	1800	6000	TJI345C600		

Type TKI Circuit Breaker 415Y/240 Vac, 50 kA Lugs on Line and Load Ends

Ampere Rating	Adjustable Instantaneous Trip Range Amp		3-pole 50 kA @ 415 Vac 50 kA @ 380 Vac 65 kA @ 240 Vac 65 kA @ 220 Vac 10 kA @ 250 Vdc	Terminal Lugs for Front Connection (Copper/Aluminum)	
	Lo	Hi		Catalog Number	Wire Size
700	2100	6400	TKI345C700	TCAL81 ①	(3) 3/0-500 MCM ①
800	2400	6400	TKI345C800		
1000	3000	10000	TKI345C1000②	TCAL 121	(4) 250-350 MCM-Cu (4) 350-500 MCM-Al
1200	3600	10000	TKI345C1200②		

① Not suitable for 1000-amp aluminum conductor.

② Not suitable for use on dc systems.

Accessories and Modifications

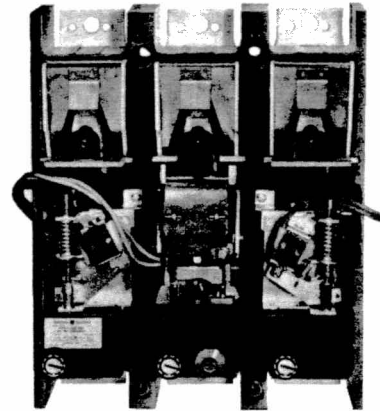
Accessory Devices and Ratings

Internally mounted accessories can be either factory or field installed in all interchangeable trip breakers, but should be factory installed in all noninterchangeable trip (sealed) breakers.

For accessory installation combinations refer to table below. "Mounting Pole" refers to left, center or right hand pole as

seen when facing the front of the breaker. Control leads may exit the breaker from its side (S) or back (B).

Nonautomatic circuit breakers (molded case switches) require dummy trip units if internal accessories are to be field installed (refer to page 24).



Pole Positions

- L—Left
- C—Center
- R—Right

Lead Wire Exit

- S—Side
- B—Back

J Frame circuit breaker with internal accessories mounted in each pole

Breaker Type	Bell Alarm Switch				Auxiliary Switch or Shunt Trip			Undervoltage Release			Three Coil Shunt Trip			Total Number of Accessories Within any One Circuit Breaker
	Mounting Pole			Inst. Sheet GEH-	Mounting Pole		Inst. Sheet GEH-	Mounting Pole		Inst. Sheet GEH-	Mounting Pole		Inst. Sheet GEH-	
	L	C	R		L	R		L	R		L	R		
TEB, TEI ^①	① Yes	—	Yes	4576	① Yes	Yes	3418 Aux 3416 S.T.	—	Yes	3417	—	③ Yes	3434	2-pole circuit breaker—any one 3-pole circuit breaker—any two except UVR and 3-coil shunt trip
TFI	—	—	Yes	4620	② Yes	② Yes	4653	Yes	Yes	4653	③ Yes	Yes	4622	Any two
TJD, TJI	—	④ Yes	—	3320	Yes	Yes	3321 Aux 3435 S.T.	—	Yes	5407	④ Yes	—	3346	Any two plus bell alarm
TKI	—	③ Yes	—	4305	Yes	Yes	3331 Aux 3344 S.T.	—	Yes	5408	③ Yes	—	3346	Any two plus bell alarm
Accessory-Lead Color Coding ^⑤	<p>Bell Alarm Switch</p>				<p>Auxiliary Switch Shunt Trip</p>			<p>Undervoltage Release</p>			<p>Three-coil Shunt Trip</p>			All accessory contacts shown with the circuit breaker in tripped position.

① Left pole mounting not available for two-pole TEB.

② Four-circuit auxiliary switch available for left pole mounting only with side exit leads. Must be factory installed.

③ Not available with lead exit from the back of breaker.

④ Interrupting capacity with accessories: 10K AIC at 600 volts ac, 22K AIC at 480 volts ac, 22K AIC at 240 volts ac.

⑤ Leads are # 18 125 °C Vulkane* insulated.

⑥ Accessories not available for single-pole TEB. Use two-pole circuit breaker.



GE Molded Case Circuit Breakers

Accessories and Modifications

Internally Mounted Signalling and Controlling Functions

How to Order

For factory installation, specify breaker catalog number, accessory base number, and appropriate suffix. (Example: Catalog Number TJI345C600, TJUV1RS, TJKASA2AB2LS specifies a type TJI breaker with factory-installed undervoltage release in the right hand pole and an auxiliary switch in the left-hand pole.

For field replacement, order the accessory by the base number only. Where this number ends in "R" or "L" right-hand and left-hand devices are physically different. Specify only one suffix letter per accessory catalog number when option is available.

Non-automatic circuit breakers require dummy trip units if internal accessories are to be mounted.

Auxiliary Switches

Unless otherwise noted switch is SPDT rated 6 amps at rated ac voltage, 1/2 amp at 125 volts dc, 1/4 amp at 250 volts dc.

Breaker Type	No. of SPDT Switch Elements	Control Voltage 240V ac, 250V dc Max. Catalog Number		Control Voltage 600V ac, 250V dc Max. Catalog Number	
		Base Number	Suffix ⁽²⁾	Base Number	Suffix ⁽²⁾
TQB, THQB TQL, THQL	1 ⁽³⁾	TQAS2A1 ⁽⁴⁾	⑦	—	—
TQC, THQC	1 ⁽³⁾	TQCAS2A1 ⁽⁴⁾	⑦	—	—
TQD	1	TQDAS2AB1RS	N/A	—	—
TEB, TEI	1	TEDAS2AB1R,L ^{(1) ⑤}	S	TEDAS6AB1R,L ^{(1) ⑤}	S
	2	TEDAS2AB2 ^{(1) ⑤}	RS or LS	TEDAS6AB2 ^{(1) ⑤}	RS or LS
TFI	1	TFKASA2AB1	RS ⁽⁶⁾	TFKASA6AB1	RS ⁽⁶⁾
	2	TFKASA2AB2	or	TFKASA6AB2	or
TJD, TJI	1	TJKASA2AB1R,L	S	TJKASA6AB1R,L	S
	2	TJKASA2AB2R,L		TJKASA6AB2R,L	
	3	TJKASA2AB3R,L		TJKASA6AB3R,L	
	4	TJKASA2AB4R,L		TJKASA6AB4R,L	
TKI	1	TKMAAS2AB1	RS or LS	TKMAAS6AB1	RS or LS
	2	TKMAAS2AB2		TKMAAS6AB2	
	3	TKMAAS2AB3		TKMAAS6AB3	
	4	TKMAAS2AB4		TKMAAS6AB4	

- ① Auxiliary switch volts mounts in right pole only on two-pole TEB, TED breakers. (Factory installed only).
- ② "S" suffix for wires out side of breaker. For lead exit from back of breaker, replace suffix "S" with "B".

- ③ Switch is SPST. Operates like "A" side of an "AB" contact and is rated six amps at 120 volts ac and three amps at 24 volts ac.
- ④ Accessories mounted in a one-inch frame and increases overall breaker size by one pole added to left side. May be applied to 1, 2 or 3-pole

- breakers. Must be factory installed. Maximum total breaker width is four-poles.
- ⑤ Field mounting kit available for left pole only.
- ⑥ Back lead exit device limited to one or two element TFKASA2AB1RB or LB.

- ⑦ To order, specify both the accessory and breaker catalog number, e.g. THQL2430, TQAS2A1 identifies a 30 amp, 2-pole plug-in breaker with a factory installed SPST auxiliary switch.

Accessories and Modifications

Internally Mounted Signalling and Controlling Functions

How to Order

For field replacement, order base number only. For factory installation, order base number plus appropriate suffix.

For a non-automatic breaker (molded case switch) a dummy trip is required when installing either a shunt trip or UVR.

Shunt Trip

Remote Tripping—Trips breaker by remote control. Trip coil de-energized when breaker opens.

Undervoltage Release

UVR automatically trips breaker when applied coil voltage drops to 30 to 70 percent of rated value.

Time delay unit prevents nuisance tripping due to momentary loss of voltage. Separate externally mounted unit has 120 volts ac input and 125 volts dc output. Used in conjunction with 125 volt dc undervoltage release which must be ordered separately. Catalog number TD110A530 for adjustable delay .1 to .5 seconds or TD1000 for adjustable delay .1 to 1.0 seconds.

Shunt Trip

Undervoltage Release

Breaker Type	Accessory Voltage		Catalog Number		Catalog Number ^⑤	
	ac	dc	Base No. for field replacement	Suffix No. ① Add to base Catalog Number for factory installation	Base No. for field replacement	Suffix No. ① Add to base Catalog Number for factory installation
TQB, THQB,	120-240		TQST1 ^③	⑥		
TQL, THQL		12 24-48	TQST7 ^③ TQST8 ^③			
TQC, THQC,	120-240		TQCST1 ^③	⑥		
		12 24	TQCST7 ^③ TQCST8 ^③			
TQD	120 240		TQDST1 ^② TQDST2 ^②	⑥		
		12 24	TQDST7 ^② TQDST8 ^②			
TEB, TEI	120 240		TEDST12	RS ^④ or LS ^④	TEDUV1 TEDUV2	RS
	480 600		TEDST13		TEDUV4 TEDUV6	
		12 24 48 125 250	TEDST7 TEDST8 TEDST9 TEDST12 TEDST11		TEDUV7 TEDUV8 TEDUV9 TEDUV10 TEDUV11	
TFI	120 240		TFKSTA12	RS or LS	TFKUYA1 TFKUYA2	RS or LS
	480 600		TFKSTA13		TFKUYA4 TFKUYA6	
		12 24 48 125 250	TFKSTA7 TFKSTA8 TFKSTA9 TFKSTA12 TFKSTA11		TFKUYA7 TFKUYA8 TFKUYA9 TFKUYA10 TFKUYA11	
TJD, TJI	120 240		TJKSTA12R,L	S	TJUV1R TJUV2R	S
	480 600		TJKSTA13R,L		TJUV4R TJUV6R	
		12 24 48 125 250	TJKSTA7R,L TJKSTA8R,L TJKSTA9R,L TJKSTA12R,L TJKSTA11R,L		TJUV7R TJUV8R TJUV9R TJUV10R TJUV11R	
TKI	120 240		TKMASTA12R,L	S	TKUV1R TKUV2R	S
	480 600		TKMASTA13R,L		TKUV4R TKUV6R	
		12 24 48 125 250	TKMASTA7R,L TKMASTA8R,L TKMASTA9R,L TKMASTA12R,L TKMASTA11R,L		TKUV7R TKUV8R TKUV9R TKUV10R TKUV11R	

- ① "S" suffix for wires out the side of breaker. For lead exit from back of breaker, replace suffix "S" with "B".
- ② Must be factory installed, right pole only.
- ③ Mounts in a one-inch (25 mm) frame and increases overall breaker size by one pole added to left side. May be applied to 1, 2, or 3-pole breakers. Maximum total breaker width is four-pole. Must be factory installed.

- ④ Mounts in right pole only on two-pole TEB breakers.
- ⑤ For replacement voltage suppressor on 120-volt ac UVR's for F225 line, order Catalog Number 286A8062G1. For 120-volt ac UVR's on all other breaker lines, order Catalog Number 192A8300G1.

- ⑥ To order, specify both the accessory and breaker catalog number, e.g. THQL2430, TQST1 identifies a 30 amp, 2-pole plug-in breaker with a factory installed 120 volt ac shunt trip.



Accessories and Modifications

Internally Mounted Signalling and Controlling Functions

Heavy-duty Undervoltage Release

Automatically trips breaker when an undervoltage or power outage condition occurs. Special PUSH-TO-TRIP/PUSH-TO-RESET button is used to manually trip the breaker (E-frame only). On J and K frames, the UVR is handle resettable with a cover-mounted button to provide local mechanical tripping.

The Heavy-duty Undervoltage Release is designed for applications where repeated UVR trips are anticipated. The manual reset feature prevents breaker reset or possible contact kiss until power is available and reset button is depressed.

Mounts in right pole of breaker only. Must be factory installed to incorporate special breaker frame modifications. Motor-operated mechanism cannot be provided when heavy-duty UVR is installed.

How to Order

For factory installation, order base number plus appropriate suffix.

Breaker Type	Voltage		Catalog Number ①
	ac	dc	
TEB, TEI	24	—	TEDXUVARS
	120	—	TEDXUVBRS
	240	—	TEDXUVCRS
	—	12	TEDXUVDRS
	—	24	TEDXUVERS
	—	60	TEDXUVFRS
	—	125	TEDXUVGRS
	—	250	TEDXUVHRS
TJD, TJI	24	—	TJMDVAS
	120	—	TJMDVBS
	240	—	TJMDVCS
	—	12	TJMDVDS
	—	24	TJMDVES
	—	60	TJMDVFS
TKI	24	—	TKMDVAS
	120	—	TKMDVBS
	240	—	TKMDVCS
	—	12	TKMDVDS
	—	24	TKMDVES
	—	60	TKMDVFS

Dummy Trip

Breaker Type	Dummy Trip Catalog Number
E150 FJ225 JJ400	Internal accessories for these non-interchangeable breakers require factory installed dummy trips. Automatically supplied when accessories are ordered.
FK225 FK225 JK400 JK600 KM800 KM1200	TFKYT2 (two-pole) TFKYT3 (three-pole) TJKYT3 (two-pole, three-pole) TJKYT36 (two-pole, three-pole) TKMAYT3 (two-pole, three-pole) TKMA3YT12 (two-pole, three-pole)

Bell Alarm Switches

Breaker Type	Catalog Number	
	Base No.	Suffix
TEB, TEI	TEDBAR or TEDBAL ②	S
TFI	TFKBAAR ③	S
TJD, TJI	TJKBAAL ④	S
TKI	TKMABAAL ④	S

Blown Fuse Detector—Three-coil Shunt Trip

Breaker Type	Catalog Number UL Listed When Factory Installed	
	Base No.	Suffix
TEB, TEI	TEDST316	RS
TFI	TFKBF316	LS or RS
TJD, TJI	TJKST316	LS
TKI	TKMAST316	LS

- ① Add "B" suffix for leads exit from back of breaker.
- ② Not available for two-pole TEB. Order TEDBAR.
- ③ Changes circuit breaker interrupting capacity to: 10KA @ 600V ac, 22KA @ 480V ac, 22KA @ 240V ac.

- ④ Mounts in center pole with leads out left side.

Accessories and Modifications

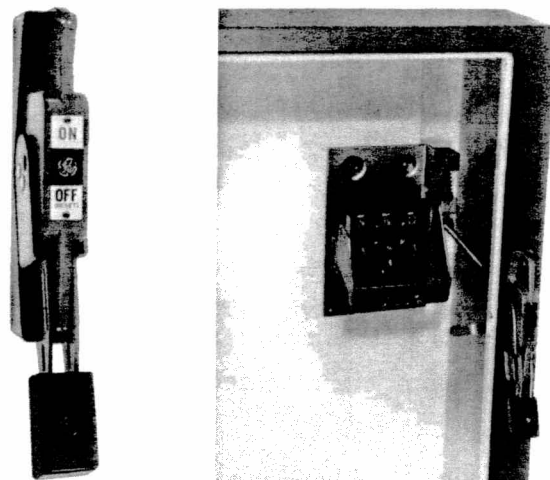
Handle Operators

Type TDA Flange Handles and Variable Depth Operating Mechanisms

- Designed to meet automotive duty specifications.
- NEMA 12 and 13 components.
- For right or left hand flange mounting—field convertible.
- Mounting dimensions to fit standard flange enclosures 203 to 610 mm deep.
- Drilling templates and detailed installation instructions.

Flange Handle Selection

Catalog Number TDA1 (152 mm) and TDA2 (254 mm) flange handles are interchangeable. While all operating mechanisms can be easily operated with the 152 mm TDA1 handle, the 254 mm TDA2 may be used to obtain lower operating force and/or to provide a proportionally larger handle on large enclosures.



Flange Handle, Catalog Number TDA1

Flange Handle Cat. No.	Nominal Length (Millimeters)	Installation Instruction Number	Drilling Template No.
TDA1	152	GEH-5314	GEH-5314
TDA2	254		

Operating Mechanism Selection

Circuit Breaker Type	Flange Handle Cat. No.	Operating Mechanism	Operating Mechanism Installation	Drilling Template No.
		Cat. No.	Instruction No.	
TEB, TEI	TDA1 (152 mm) or TDA2 (254 mm)	TDOM1A	GEH-5315	GEZ-7484
TFI		TDOM3	GEH-5317	GEZ-7490
TJD, TJI		TDOM4	GEH-5318	GEZ-7491
TKI		TDOM6	GEH-5319	GEZ-7492

Construction Details

Flange Handles

- Rugged die cast housing with provision for locking in off position with up to three 5 to 8 mm diameter padlocks. Optional provision for locking on by drilling hole in die casting.
- O-ring seals for dusttight/oiltight duty.
- Gusseted, 2 mm thick double-sided steel handle with large, red-black self-extinguishing grade plastic grip.

Variable Depth Operating Mechanisms

- Plated steel yokes and integral mounting plates are 3 mm thick minimum.
- Operating yokes have toggle spring assist for positive on/off operation.
- Mounting plates include positive yoke stops to prevent undue wear on disconnect and circuit breaker toggle handles.
- Threaded 10 mm dia. drive rod (406 mm length—standard, 559 mm length—optional) provides simple variable depth connection between flange-mounted handle and operating mechanism.



GE Molded Case Circuit Breakers

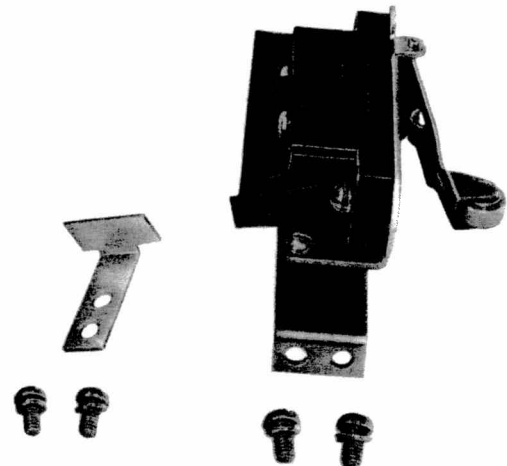
Accessories and Modifications

Type TDA Flange Handles and Operating Mechanisms

Auxiliary Contact Kit

Available SPDT and DPDT and actuated by operating mechanism yoke.

Used With Operating Mechanism Catalog Number	When TDA handle is on		Auxiliary Contact Kit	
	Right Flange	Left Flange	SPDT	DPDT
			Catalog Number	Catalog Number
TDOM1A	X		TDAS1L1	TDAS1L2
TDOM3		X	TDAS1R1	TDAS1R2
TDOM4	X		TDAS2L1	TDAS2L2
TDOM6		X	TDAS1R1	TDAS1R2



Auxiliary Contact Kit, Catalog Number TDAS1L1

Flange Stiffener Kit or Extended Length Drive Rod, Catalog Number TDSR

Provides rigid 10 mm diameter rod between TDA handle mounting surface (flange or center mullion) and operating mechanism when TDA handle would otherwise not be rigidly supported.

Rod length is 559 mm and may be cut to appropriate length. Also used as extended length drive rod when standard 406 mm rod is not long enough.

Operating Mechanism Catalog Number	Flange Stiffener Kit Catalog Number	Extended Drive Rod Catalog Number
TDOM1A through TDOM3	TDSR	TDSR
TDOM4 through TDOM6	406 mm supplied with operating mechanism	TDSR1

Extended Drive Stud, Catalog Number TDS1, TDS2

This optional drive stud permits locating the operating mechanism 33 mm further to the left (when flange handle is on right side) or to the right (when handle is on left side) to accommodate specific mounting restrictions.

Operating Mechanism Catalog Number	Extended Drive Stud Catalog Number
TDOM1A, TDOM3	TDS1
TDOM6	TDS2

Note: Not suitable for use with TDOM4 and TDOM5 operating mechanisms.

Door Hardware (NEMA 12)

Type TDV door hardware provides sealing and interlocking of 19 mm nominal door depth hinged on left. Interlocking design requires use of screwdriver to release. When used with TDA flange handle and operating mechanisms disconnect or circuit breaker cannot be turned on unless door and door hardware have been closed. For non-interlocking type, one bracket in kit is not used. Use of third point latch recommended for doors 1016 mm or longer.

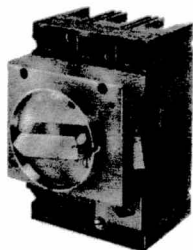
Description	Catalog Number for Door hinged on left
Two-point interlocking door hardware kit	TDV1
Auxiliary roller third point latch	TDV3

Instructions:

Door Hardware	GEH-5322
Auxiliary Contact Kit	GEH-5323
Flange Stiffener Kit or Extended Length Drive Rod	GEH-5324
Extended Drive Stud	GEH-5325

Accessories and Modifications

Handle Operators

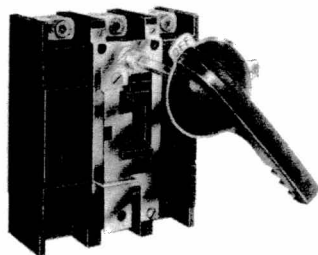


TDR handle on TEI

TDR Integral Handle Mechanism^①

Breaker Type	Handle			Door Ring— Interlock Catch Kit	Gasket Kit
	Vertical Mounting Cat. No.	Horizontal Mounting Cat. No.	Ship Wt.	Cat. No.	Cat. No.
TEB, TEI	TEFR1B	TEFR1HB	17 ^②	343L483G1	792A489G1
TFI	TFKR1B	TFKR1HB	22 ^②	343L483G5	792A489G1
TJD, TJI	TJR1B	TJR1HB	5	343L483G2	792A489G2
TKI	TKMR1B	TKMR1HB	5	343L483G3	792A489G3

① Not suitable for use with heavy duty UVR breakers. ② Shipped 12 per pack.



TDM operating handle,
fixed or adjustable shaft

TDM Handle Operating Mechanisms, Door-mounted

Breaker Type	Box Depth in Millimeters	Complete Mechanism ^③ with NEMA 1, 3R, 12 Handle	Operating Mechanism Only	Handle Only	
				NEMA 1, 3R, 12	NEMA 4 and 5
		Catalog Number	Catalog Number	Catalog Number	Catalog Number
TEB, TEI	Shallow Mount 106	TEFHM1	TEFOM1	TH1	THCH45 ④
	Extended Shaft 130-133 130-148 130-381	TEFHM3 TEFHM4 TEFHM2	TEFOM3 TEFOM4 TEFOM2		
TFI	Shallow Mount 149	TFKHM1	TFKOM1	TH2	
	Extended Shaft 175-394	TFKHM2	TFKOM2		
TJD, TJI	Shallow Mount 149	TJKHM1	TJKOM1	TH2	
	Extended Shaft 143-397	TJKHM2	TJKOM2		
TKI	Shallow Mount 189	TKMHM1	TKMOM1	TH2	
	Extended Shaft 179-440	TKMHM2	TKMOM2		

Handle Accessories for TDM Operating Mechanisms

Device	Catalog Number
Replacement neo- prene gaskets for NEMA 3R, 12 and 12K enclosures Use with TH1	788A742P3
..... Use with TH2	788A742P4

- ③ Handle assembly and operating mechanism separately packaged.
- ④ Provides interlocking for J600 and K1200 breakers when used with extended shaft operating mechanism. For interlocking with E150 and F225, order special shaft Catalog Number 788A832G1.



GE Molded Case Circuit Breakers

Accessories and Modifications

Plug-in Hardware

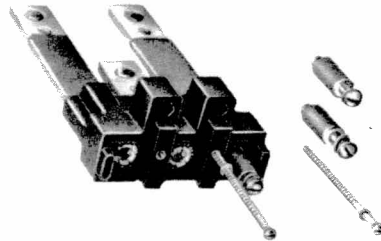
Each plug-in mounting base assembly includes all mounting hardware, studs, and male or female connectors for attachment to one end of breaker.

Studs are of different length so by using proper combinations of PD1 and PD2 units, adequate electrical spacing will be assured between adjacent breakers, i.e., a short-long-short (SLS) unit must be used adjacent to a long-short-long (LSL) unit.

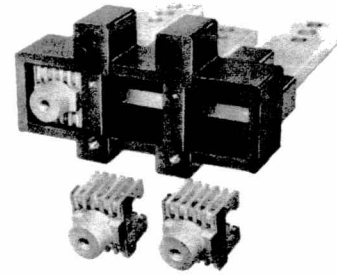
Two-pole breakers of the E 150 line require an open-long-short (OLS) unit on one end of the breaker and a short-long-open (SLO) on the other since these breakers are built with the normal left pole missing while the mounting bases are built from standard three-pole molded supports.

All other two-pole breakers are basically three-pole devices with the center pole missing. When these breakers are to be mounted side by side, a short-open-short (SOS) unit must be used on one end and a long-open-long (LOL) on the other. Horizontal studs are normally supplied with the flat surface of studs at right angles to the long axis of the breaker. If vertical studs are desired, substitute "C" for "D" in the catalog number, e.g., TE13PC1 (vertical) for TE13PD1 (horizontal).

The optional mounting plate (TMP1, etc.), supplied at no cost when ordered with a pair of plug-in mounting bases. It accurately locates and supports the line and load plug-in mounting-base assemblies, provides convenient means to attach the entire unit to a metal structure, and serves as a deadfront barrier.



Plug-in mounting base with hardware
Catalog Number TF23PD2 shown



Plug-in mounting base
Catalog Number TK123PD2A shown

Plug-in Mounting Base Assembly

Plug-in Mounting Bases—2 Required per Breaker						Optional Mounting Plate
Ampere Rating	Breaker Type	No. Poles	Stud Configuration		Catalog Number	Catalog Number
			PD1	PD2		
150	E 150Ⓢ	2	OLS	SLO	TE12PD1,2	TMP1
		3	SLS	LSL	TE13PD1,2	
225	F 225	2	SOS	LOL	TF22PD1,2	TMP2
		3	SLS	LSL	TF23PD1,2	
400	J 400	2	SOS	LOL	TJ42PD1A,2A	TMP3
		3	SLS	LSL	TJ43PD1A,2A	
600	J 600	2	SOS	LOL	TJ62PD1A,2A	TMP3
		3	SLS	LSL	TJ63PD1A,2A	
800	K 1200	2	SOS	LOL	TK62PD1A,2A	TMP4
		3	SLS	LSL	TK63PD1A,2A	
1000	K 1200	2	SOS	LOL	TK82PD1A,2A	TMP4
		3	SLS	LSL	TK83PD1A,2A	
1200	K 1200	2	SOS	LOL	TK102PD1A,2A	TMP4
		3	SLS	LSL	TK103PD1A,2A	
1200	K 1200	2	SOS	LOL	TK122PD1A,2A	TMP4
		3	SLS	LSL	TK123PD1A,2A	

Ⓢ Order three-pole base for use with two-pole Hi-Break* and 600 volt ac breakers.

Required with plug-in mounting base assembly when used with motor-operating mechanisms and TDR integral-handle kits. Furnished no charge when ordered with base.

Mounting Screw Kit for Motor-operated Mechanism

Breaker Type	Mounting Screw Kit Catalog Number
TEB, TEI	343L564G7
TFI	343L564G1
TJD, TJI	343L564G2
TKI	343L564G3

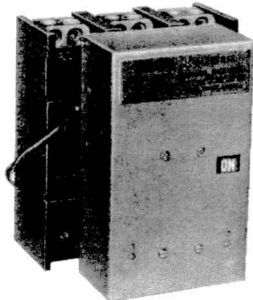
Mounting Screw Kit for TDR Integral Handle

Breaker Type	Mounting Screw Kit Catalog Number
TFI	343L564G4
TEB, TEI, TJD, TJI, TKI	No Special Mounting Screws Required

* Trademark of General Electric Company U.S.A.

Accessories and Modifications

Motor-operated Mechanisms

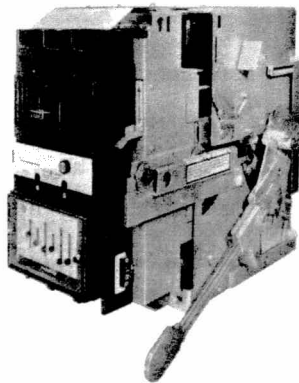


Motor-operated mechanism

- ① For use on three-pole breaker only.
- ② Suitable for use at 208 volts ac.
- ③ TEDMOMA1 not rated at 50 hertz.

Breaker Net	Voltage		Cat. No.
	ac 50/60 Hz	dc	
TEB ^① , TEI ^①	— 120 ^③ 240 ^②	24 — —	TEDMOMA8 TEDMOMA1 TEDMOMA2
TFI	— — 120 240 ^②	24 48 125 250	TFKMOMA8 TFKMOMA9 TFKMOMA1 TFKMOMA2
TJD, TJI	— — 120 240 ^②	24 48 125 250	TJKMOMA8 TJKMOMA9 TJKMOMA1 TJKMOMA2
TKI	— — 120 240 ^②	24 48 125 250	TKMMOMA8 TKMMOMA9 TKMMOMA1 TKMMOMA2

Draw-Outs and Mounting Hardware



Complete draw-out assembly

Draw-Out Assembly

Breaker Type	Complete Draw-Out ^④	Stationary Mounting Frame Only	Carriage Only ^④
	Catalog Number ^⑤	Catalog Number	Catalog Number ^⑤
TKI	TKMD03	TKMFD03	TKMCD03

④ Must be factory assembled to breaker. Replacement or spare breakers should include carriage assembly.

⑤ Add suffix letter "E" for electrically operated units.

Bypass Switch

This switch is used to provide control circuit continuity or downstream signalling when draw out is disengaged. It consists of a switch assembly which mounts to the stationary frame and an actuator which mounts on the carriage. Each switch assembly consists of four SPDT (AB type) elements wired and preassembled on a mounting bracket. Switch is rated 5 amperes at 240 volts ac, 1/2 ampere at 125 volts dc and 1/4 ampere at 250 volts dc. Specify catalog number TKBP1 for the K-Frame.

Secondary Disconnects

Available in blocks of eight circuits each, these disconnects are used for control and accessory wiring. A maximum of two blocks (16 circuits) may be used on drawout Type TKMD03. All other draw outs will accept up to three blocks (24 circuits). To determine the necessary secondary disconnects, see the following table. Each secondary disconnect kit includes the stationary as well as moveable contact blocks. Order catalog number TSDLD.

Number of Secondary Disconnects

Device	Number ^⑥
Motor Operated Mechanism	6
Auxiliary Switch	3
Undervoltage Release (UVR)	2
Bell Alarm	3
Shunt Trip	2

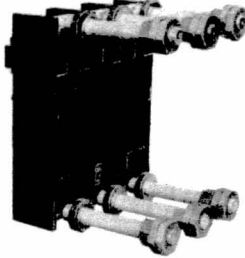
⑥ Required secondary disconnect circuits for each device or function.



GE Molded Case Circuit Breakers

Accessories and Modifications

Studs, Lugs and Associated Hardware



Breaker with line and load studs

Back-Connected Line and Load Studs

Breaker Type	Amps	Length, Back of Breaker in Millimeters	Catalog Number	Std Pkg
TEB ^① , TEI ^①	50	71 (short) 112 (long)	TEF1 TEF2	1
	150	87 (short) 147 (long)	TEF3 TEF4	
TFI ^①	225	69 (short) 152 (long)	TFK1 TFK2	1
TJD, TJI	400	140	TJK1	1
	600	140	TJK2	
TKI	1200	140	TKM11	2
		203	TKM12	

Lugs, Line Shields, Covers and Bus Connectors

Accessory	Wire Size	For Use With	Catalog Number
Copper-Aluminum Lugs	# 14-6 Cu, # 12-2 Al # 4-1/0 Cu-Al # 1-300 MCM	TQC (15-60A) TQC (70-100A) TQD	TQAL3 TQAL4 TCAL25
	# 14-8 # 14-3 Cu, # 12-1 Al # 6-2/0 Cu, # 4-2/0 Al # 2-3/0 Cu, # 1-3/0 Al	E150 (15-30A) E150 (15-60A) E150 (70-110A) E150 (110-150A)	TCAL14 TCAL12 TCAL12A TCAL15
	# 4-300 MCM	TFI { Load end Line end	TCAL24 TCAL26
	(1) 6-600 MCM or (2) 2/0-250 MCM (2) 4/0-350 MCM Cu or (2) 300-500 MCM Al (1) 750 MCM Cu-Al	TJI (thru 400A), TJD TJI (450-600A) TJI, TJD	TCAL43 TCAL63 TCAL47
	(2) 1/0-250 MCM or (1) # 4-600 MCM (2) 2/0-500 MCM (3) 3/0-500 MCM (4) 250-350 MCM Cu or (4) 250-500 MCM Al	TKI (300-450A) TKI (500-600A) TKI (700-1000A) TKI (1000-1200A)	TCAL41 TCAL61 TCAL81 ^② TCAL121
	Copper Only Lugs With Follower and Extra Plating	# 14-2/0	TEB, TEI (thru 150A)
# 1-300 MCM		TQD (100-225A)	TCT25
# 14-300 MCM		TFI { Load end Line end	TC024 TC026
(1) 6-600 MCM or (2) 2/0-250 MCM (2) 250-350 MCM		TJI (thru 400A) TJI (450-600A)	TC043 TC063
(1) 1/0-600 MCM or (2) 1/0-250 MCM (2) 2/0-500 MCM (3) 250-500 MCM (4) 250-400 MCM		TKI (300-400A) TKI (500-600A) TKI (700-1000A) TKI (1200A)	TC041 TC061 TC081A TC0121
Line Shield	TEB, TEI TFI TJI	TEDLS TFKLS TJKLS	
Lug Cover, TKI Breaker (two per breaker)		TCO41, TCAL41 Lugs	789A448G3 ^③
		TCO61, TCAL61, TCAL81 Lugs, TCO81A	789A448G1
		TCO121; TCAL121 Lugs	789A448G2
Connector (back strap)		TKI	TKMC1

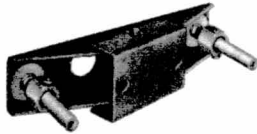
① For proper clearance between poles, a short and long stud must be assembled adjacent to each other.

② Not suitable for 1000-amp aluminum conductor.

③ End cover supplied with 800A frame is used as lug cover.

Accessories and Modifications

Plates, Bases and Interlocks



Mechanical Interlock for J600 and K1200 frames

Special Calibration

Q Line and 600 volts, Types E150, F225, J600, K1200 are ambient compensating as a standard feature. They are calibrated to carry full load at 50° C and meet UL tripout requirements at 25° C and 40° C.

Type Breaker	Price Addition
Fixed trip unit	10%—(Add to price of complete breaker)

Fungus and Moisture Proofing

Poles	Q Lines	E 150	F 225	J 600	K 1200	TB-1	TB-4	TB-6, -8
1, 2 and 3	Available for 1, 2 and 3 poles							

Handle-locking, Handle-extension Devices

Breaker Type	Device	Catalog Number
TEB	Handle locking	TLD3
TFI	Handle locking	TFKLD1
TKI	Handle extension	455C307G1

Mechanical Interlocks

Walking Beam Type Externally Mounted

Breaker Type	Panel Thickness in Millimeters	Requires Breaker with Special Factory Drilling. Order 2 Breakers per Interlock, Specifying "Drilled for Mech. Interlock Catalog Number"
TEB, TEI	6 to 25	TEDMI
TFI	6 to 25	TFKMI
TJD, TJI	10 25	TJKMIB TJKMIE
TKI	19 to 25	TKMMI

Padlocking Devices

Breaker Type	Device Catalog Number
TQD	TQDPLD1
TEB, TEI	TEFPLD1
TFI	TFKPLD1
TJD, TJI	TJKPLD1
TKI	TKMPLD1

Suitable for use with circuit breakers used in group mounted panelboard construction only.

Breaker Mounting-screw Kits

Application	Breaker Type	Catalog Number
For use on mounting plates with clearance holes	1-pole TEI 2- and 3-pole TEI and 3-pole TEB TFI TJD and TJI TKI	343L162G1 343L162G2 343L162G21 343L162G20 343L162G19
For use on mounting plates with tapped holes	1-pole TEI 2- and 3-pole TEI and 3-pole TEB 2- and 3-pole TQD TFI TJD and TJI TKI	343L162G7 343L162G8 343L184G18 343L162G16 343L162G11 343L162G13
Cup washer (for mounting single pole breakers)	TEI (2 req'd per breaker)	254V644P1



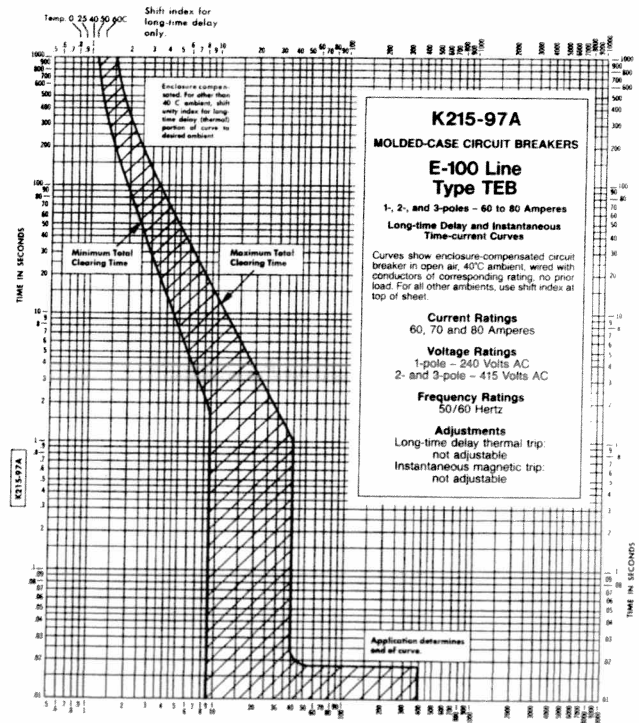
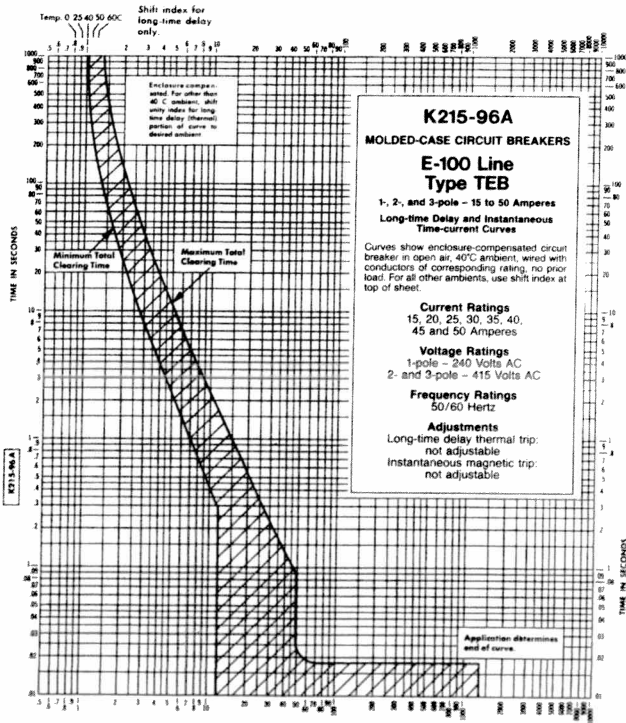
GE Molded Case Circuit Breakers

Time-Current Curves

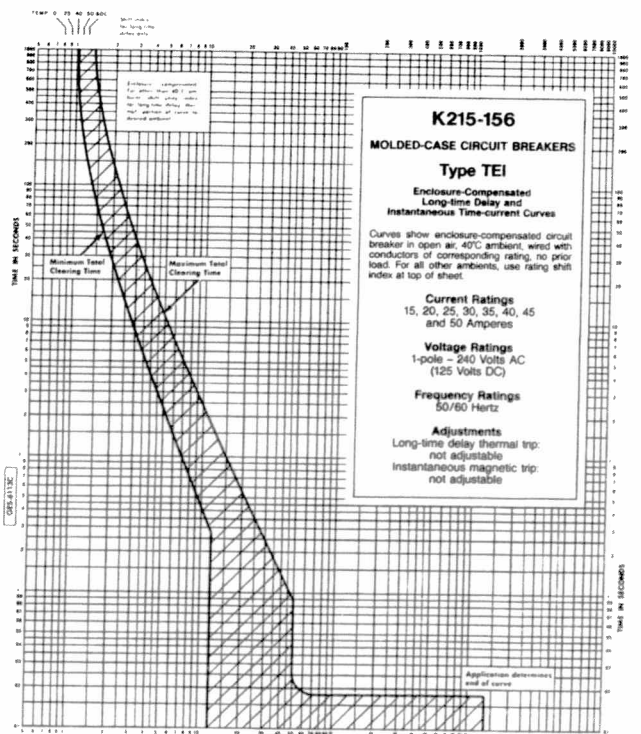
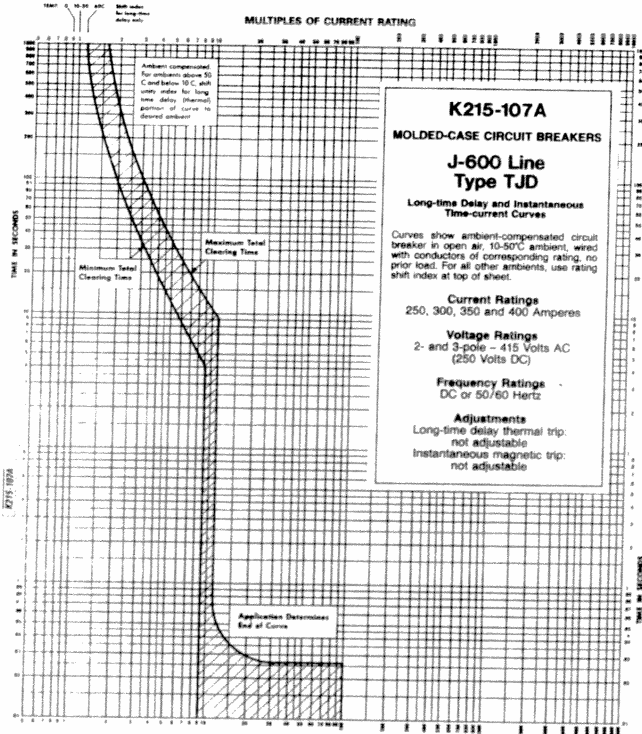
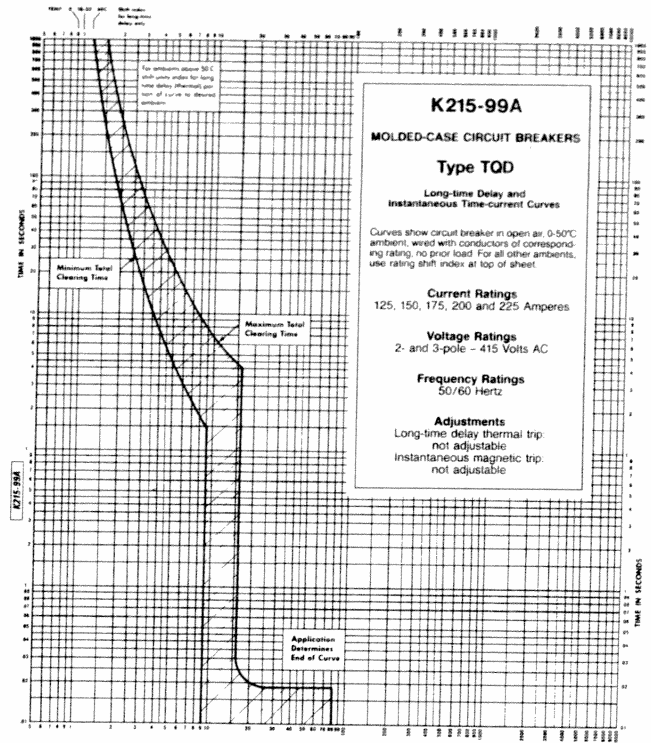
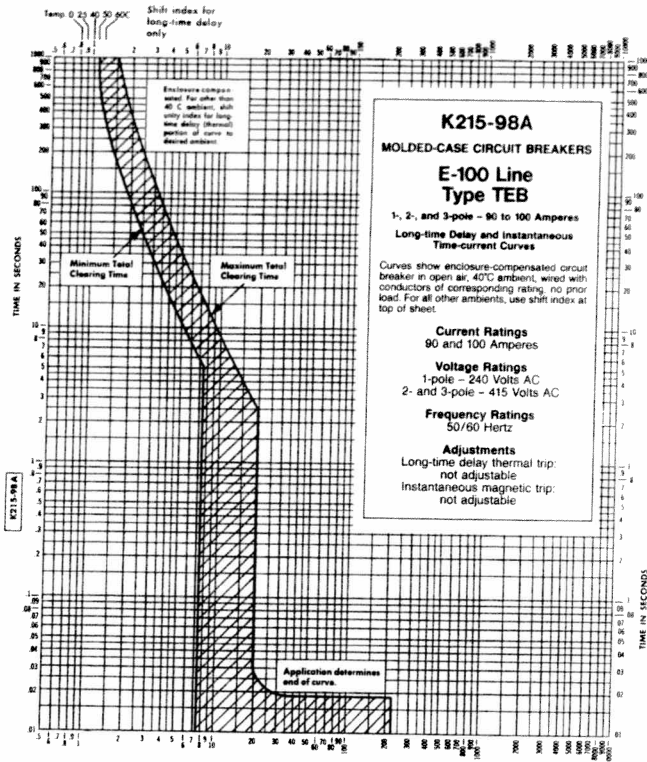
415Y/240 Volts ac MCCBs

TEB	K215-96, 97 and 98
TQD	K215-99
TJD	K215-107
TEI	K215-156, 157, 158, 159, 160 and 161
TFI	K215-162
TJI	K215-163
TKI	K215-164

Order from your local sales office or:
GE Company
Distribution Services
P.O. Box 2913
Bloomington, IL 61702-2913, U.S.A.
Fax: (309) 662-9660



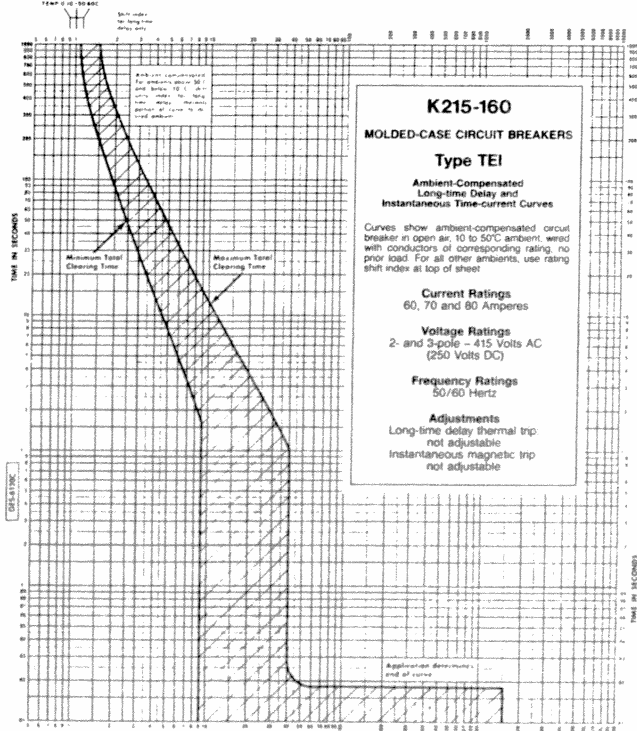
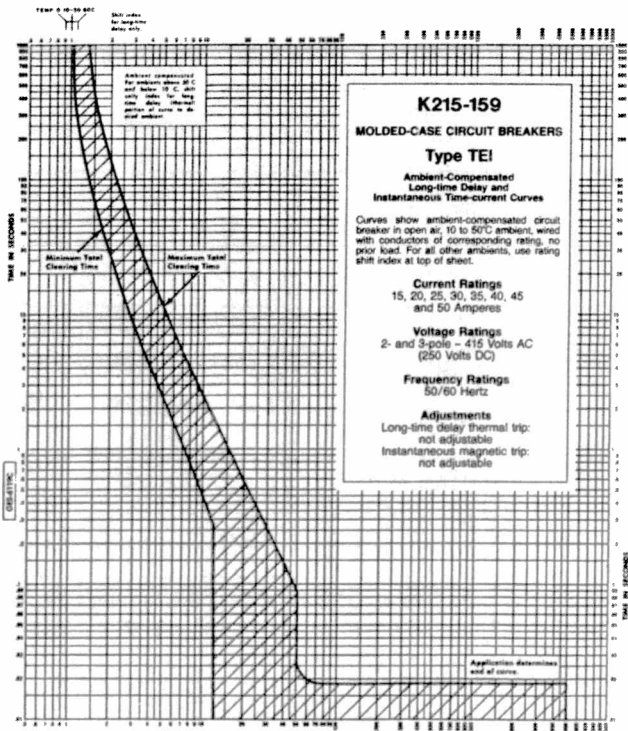
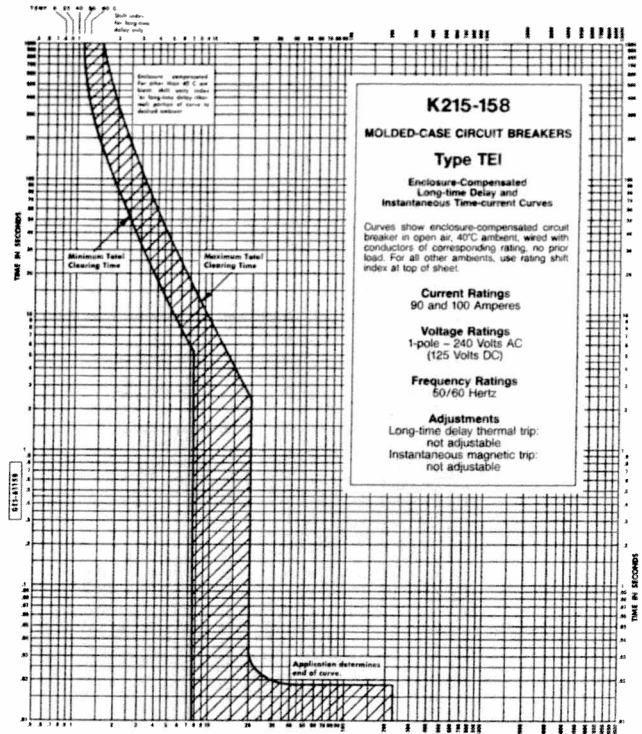
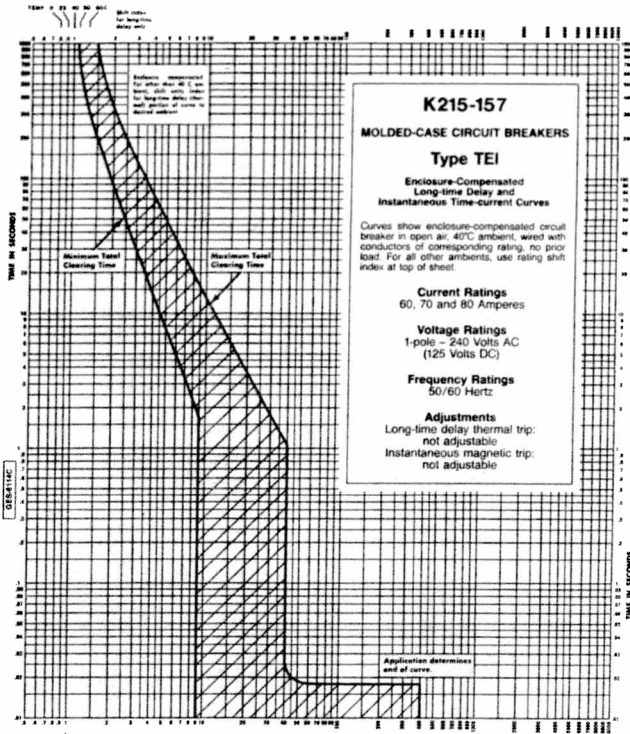
Time-Current Curves



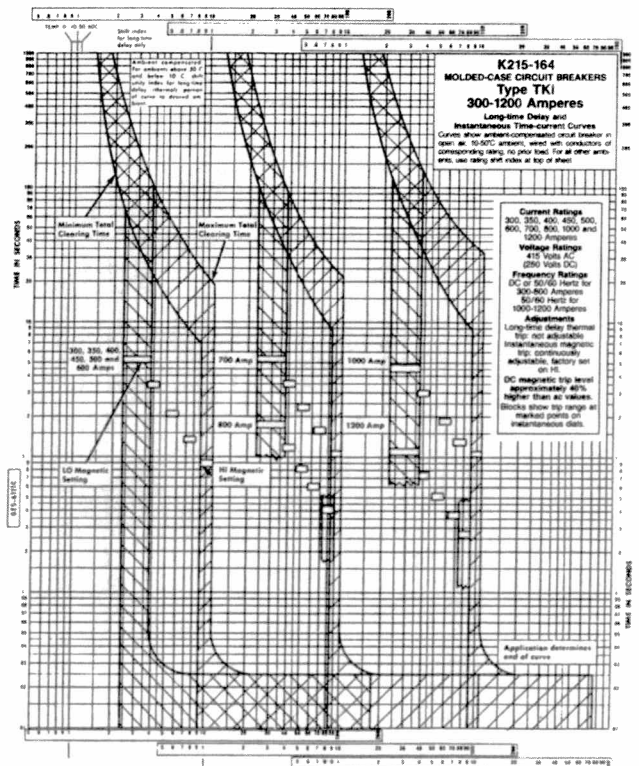
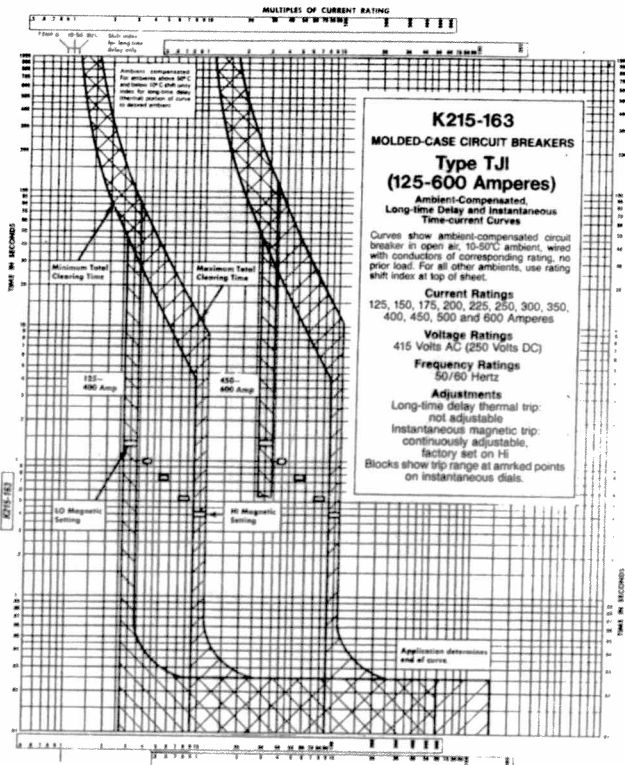
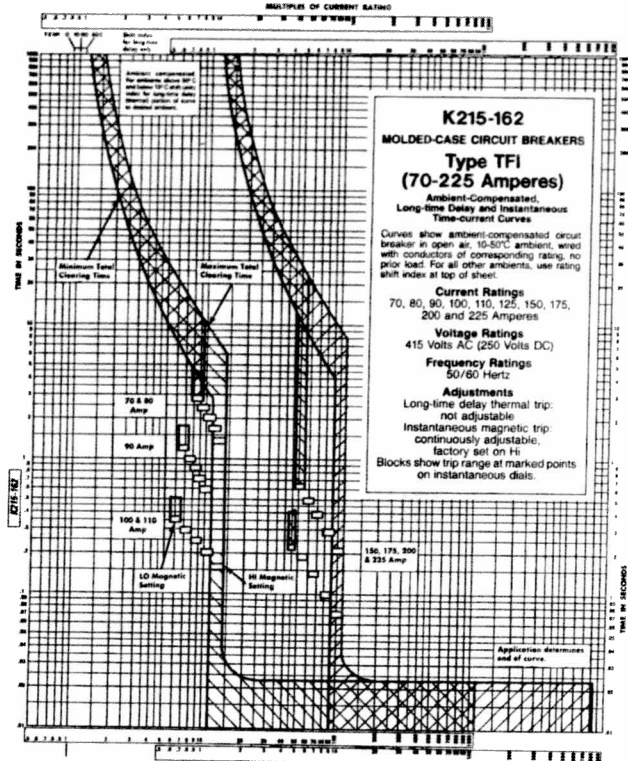
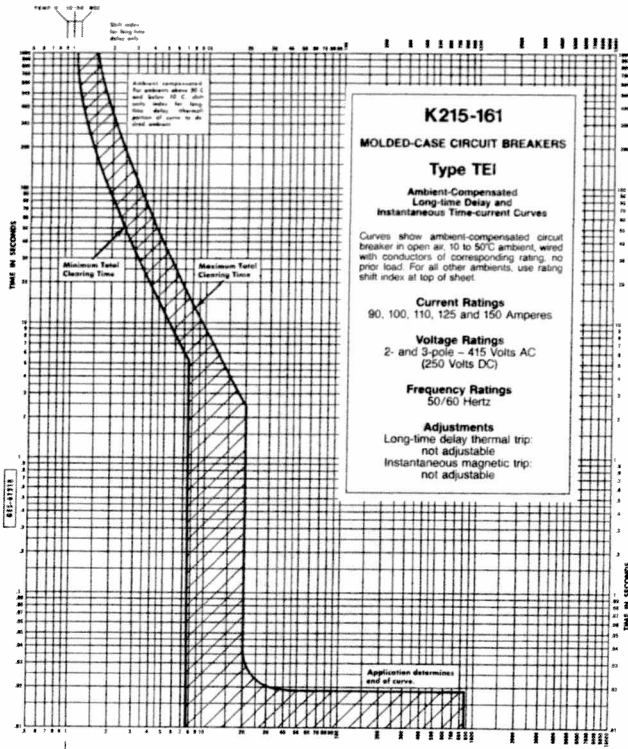


GE Molded Case Circuit Breakers

Time-Current Curves



GE Molded Case Circuit Breakers Time-Current Curves





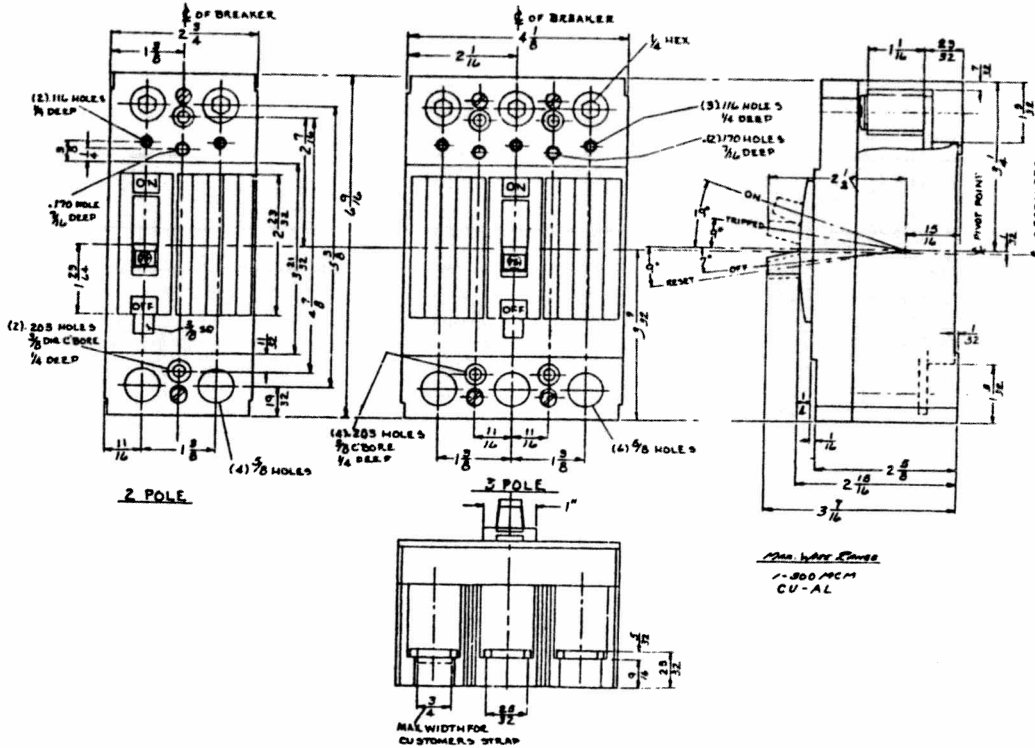
GE Molded Case Circuit Breakers

Outline Drawings

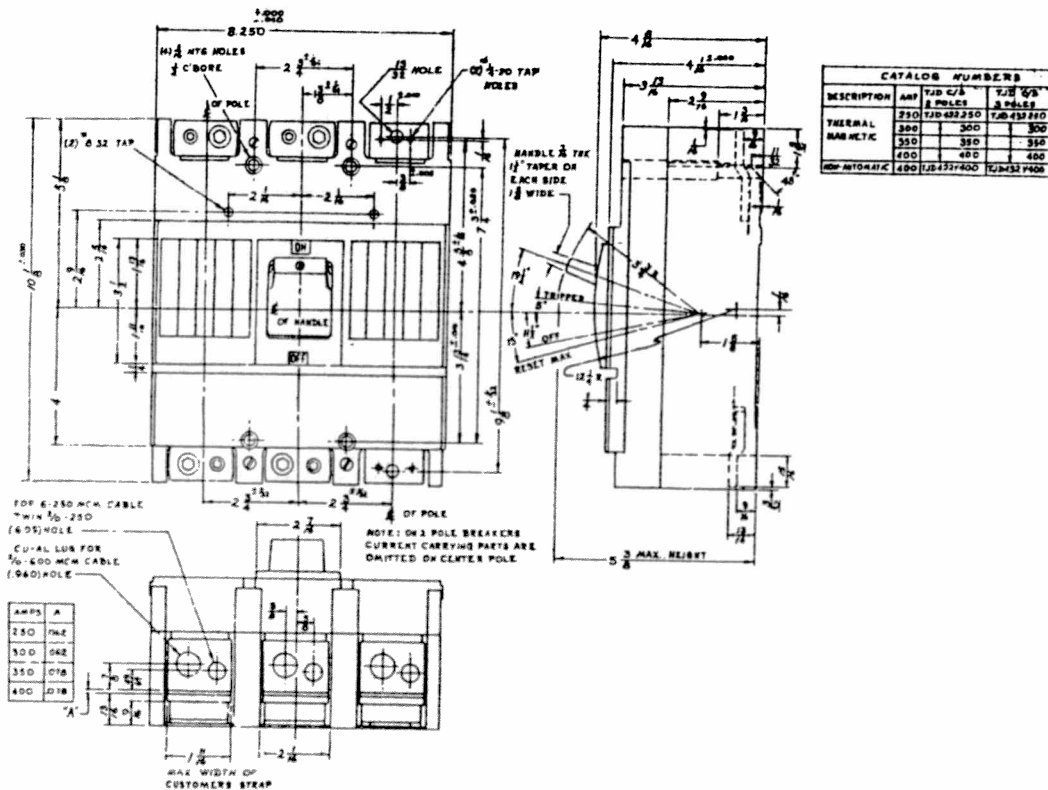
Molded Case Circuit Breakers (Dimensions in inches)

TQD	455C765	TFI	455C561-sh.6
TJD	139C3602	TJI	455C564-sh.1
TEB, TEI	139C3643-sh.1, 2, 4	TKI	455C840-sh.1

TQD Line



TJD Line

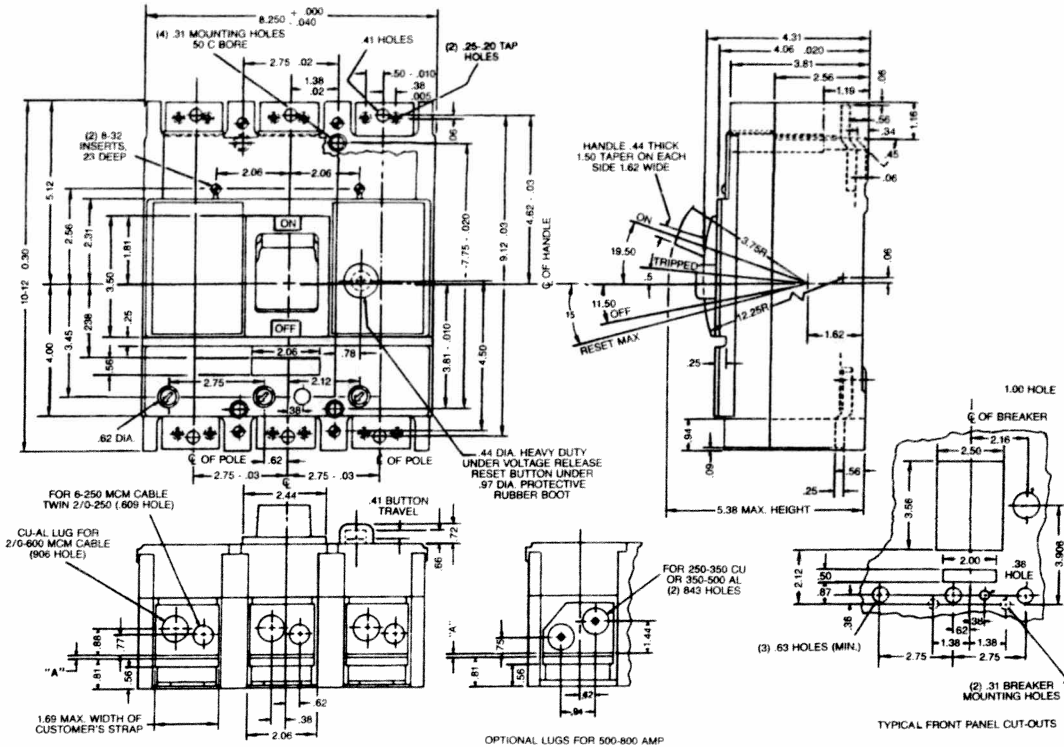




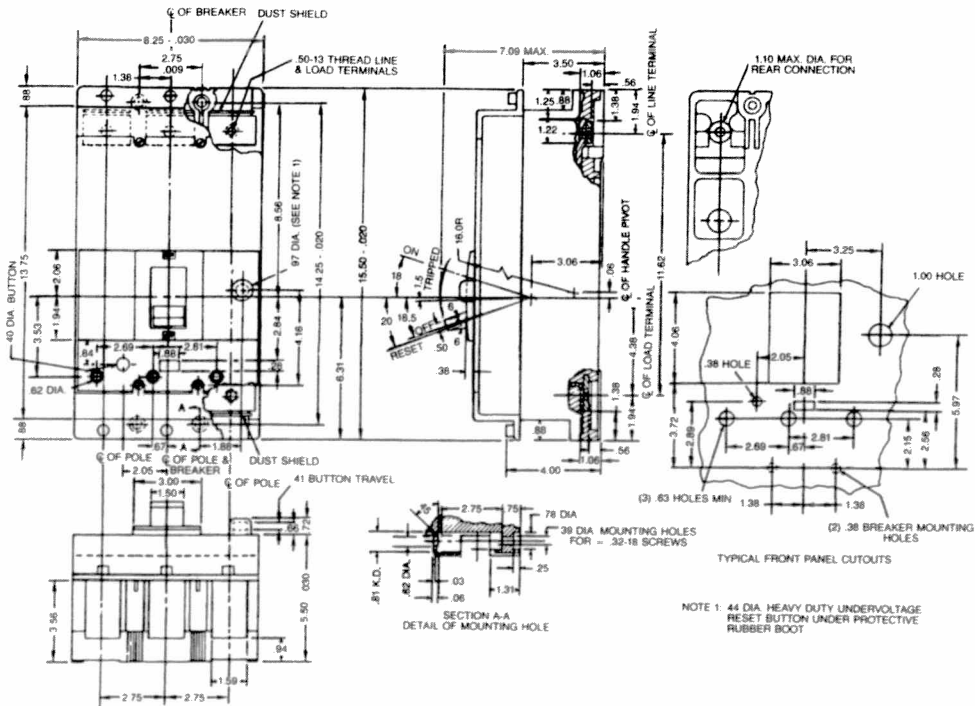
GE Molded Case Circuit Breakers

Outline Drawings

TJI Line



TKI Line



Application Data

Molded case circuit breakers are circuit protective devices that primarily perform two functions: (1) manual-switching operation to open and close a circuit by means of a toggle handle and (2) automatic opening of the circuit under sustained overload and/or short circuit conditions. Circuit breakers inherently provide the automatic protective function of opening the circuit under abnormal sustained overload, or short circuit conditions, without the use of fuses. (See Figure 1.) When a circuit breaker opens to clear a fault, the toggle handle goes to a TRIPPED position mid-way between the ON and OFF positions, thus clearly indicating that the breaker has opened. When the cause of the fault has been removed, the circuit breaker can again be closed simply by moving the toggle handle to the RESET position, and then moving the handle to the ON position.

The quick-make, quick-break, trip-free mechanism minimizes arcing during breaker operation. Contacts cannot be "teased" into position. The trip-free mechanism is independent of manual handle control. The breaker trips under short circuit or overload, even though the operating handle is held in the ON position.

Circuit breakers have several advantages over fuses:

- A fault on one pole of a multi-pole breaker actuates a common trip bar that opens all poles simultaneously, thus avoiding single phasing a motor circuit, as could occur in a fusible device when one fuse opens.
- Circuits may be "repowered" after a circuit breaker trips without obtaining and replacing a "blown" fuse.
- Adjustable characteristics of circuit breakers provide the opportunity for better protection of conductors and loads.

Molded case circuit breakers are available with thermal magnetic trip units.

Thermal Magnetic Trip Units

Molded case circuit breakers with thermal magnetic trip units are available with ampere ratings from 10 to 1200 amperes.

The thermal action of the bimetal provides a time-delay which prevents service interruptions on normal inrush currents or temporary overloads. Continuous overloads will cause the bimetal to deflect sufficiently to release the trip latch and open the contacts.

An electro-magnet which partially surrounds the bimetal is used to provide instantaneous trip in the event of a short circuit. The high current creates a strong magnetic field, attracting the armature and releasing the trip latch in the same manner as the bimetal does on overload.

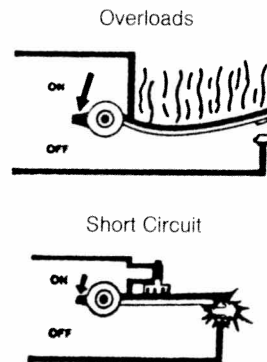


Fig. 1

The basis of the ratings for molded case circuit breakers is as follows:

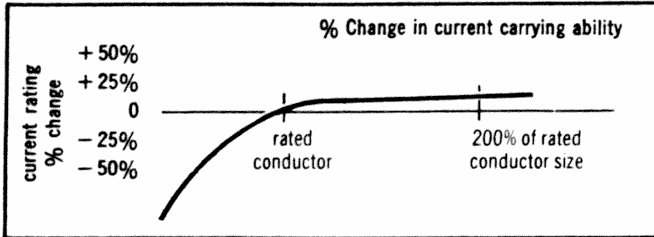
1. Circuit breakers are rated to carry 100 percent of their nameplate current continuously in free air at 25°C when cabled per Table on page 41.
2. Enclosed circuit breakers are rated to carry 100 percent of their nameplate current intermittently (up to 3 hours maximum) and 80 percent continuously, with the enclosure in a 25°C ambient, and cabled per Table on page 41.
3. Group mounted circuit breakers may require derating of the circuit breaker and cable in room ambient temperatures other than 25°C and with cable other than specified in Table on page 41.

Molded case circuit breakers are designed to protect insulated cable, therefore the characteristics of breakers are closely tied to the Underwriters' Laboratories specified size and type of wire for each rating as well as the load characteristics. The following items should be considered when applying and using molded case circuit breakers:

- A. Cable size must be equal to, or greater than that specified by Underwriters' Laboratories Inc. Standard for Safety 489. Thermal current measuring systems (bimetals) incorporate a resistance element which generates heat at a rate proportional to the square of the current. The cable is used as a heat sink to control the temperature of the bimetal; reducing the size of the conductor raises the temperature and the breaker will carry less current. In general the effect of cable size on breaker thermal calibration looks like Fig. 2 (page 40).
- B. Ambient temperatures have an even wider effect on the rating of the breaker-cable system. High ambient temperatures not only affect the calibration of the breaker but may cause internal temperatures to exceed the temperature limits of the insulating materials. Cable may be adapted through the use of higher rated materials such as glass or mineral, but this is not possible with switching devices due to mechanical requirements and fabrication techniques. Low temperatures, on the other hand, substantially increase the current carrying ability of the system until other limiting factors occur, such as lubricant failure or binding due to differential contraction of parts. In general the effect of ambient temperature on an ambient compensating breaker calibration looks like Fig. 3 (page 40).

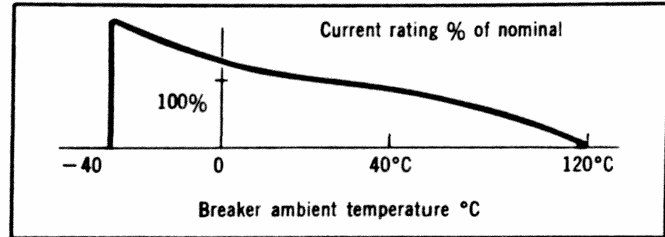


Application Data



Breaker current rating and conductor size are a matched pair; any insulation type may be used but the cross section must remain constant.

Fig. 2



The effect of ambient temperature on the continuous current carrying ability of the breaker and cable system is shown on page 42, "FACTOR B - AMBIENT TEMPERATURE".

Fig. 3

Notice that the curve specifies the ambient temperature of the air surrounding the breaker *not room temperature*. To convert this information to room ambient it is necessary to know the temperature rise of the equipment housing the circuit breaker. This must include factors for group mounting of devices, ventilation, solar insulation or other radiant heat sources, etc. The curve also applies *only* to devices connected with the UL sized conductor.

the instantaneous element, which is a solenoid constructed of copper and steel, becomes hot. This raises the temperature of the breaker, thereby reducing the continuous current rating of the device. The instantaneous trip solenoid becomes hot because of the nature of its construction and materials. In addition to adding heat to the breaker, the instantaneous trip does not respond to current correctly and the higher the frequency, the less accurate the response.

devices require additional derating due to the lack of free air circulation around the devices. With loads such as resistance welders, the breaker continuous current rating must be no less than 125 percent of the welder 100 percent duty-cycle rating.

In general, where load protection in addition to cable protection is desired, the load characteristics and protection requirements must be fully evaluated.

C. System operating frequency also has a major effect on the rating and performance of molded case circuit breakers. Most circuit breakers may be directly applied at their published ratings on 50 or 60 Hertz systems, but molded case circuit breakers should not be applied at other frequencies without the concurrence of the manufacturer except as described on page 42, "FACTOR C - FREQUENCY RATING".

D. Another factor to be considered is the altitude at which the breaker will be applied. The design altitude for molded case circuit breakers is 0 to 1830 meters. At altitudes above 1830 meters the thin atmosphere affects the heat transfer of the breaker as well as its ability to interrupt short circuits. An additional derating of 4 percent is applied at altitudes from 1830 to 3050 meters.

F. The final factor which needs to be considered is a safety factor. If the circuit breaker is run at the current level derived from factors A-E continuously, it will be within its rating and the conductor ratings, but it will be on the verge of tripping, and any perturbation from nominal could cause the circuit breaker to trip. A safety factor of at least 10 percent should be applied to prevent possible nuisance tripping. Other conditions such as excessive load break operations, overload tripping or severe load cycling can effect breaker life and should be factored into the rating.

Two separate effects occur at frequencies above 60 Hertz depending on the method of current sensing. In thermal magnetic devices, the bimetal, which provides overload protection, responds accurately to the applied current. However,

E. Load type and duty cycle must also be considered in the application of molded case circuit breakers. Loads such as capacitors and electromagnets require a substantial, continuous current derating factor if the breaker is normally used to switch the load. Group mounted

The above information is summarized and tabulated in the following pages for your convenience.

Application Data

Properties of Conductors Rated for Use with Molded Case Circuit Breakers

Size AWG, MCM	Area Cir. Mils	Concentric Lay Stranded Conductors		Bare Conductors		DC Resistance Ohms/M Ft. At 25°C, 77°F		
		No Wires	Diameter Each Wire (Millimeters)	Diameter (Millimeters)	ⓐ Area (Square Millimeters)	Copper		Aluminum
						Bare Conductor	Tin'd. Conductor	
18	1620	Solid	1.02	1.02	0.82	6.51	6.79	10.7
16	2580	Solid	1.29	1.29	1.31	4.10	4.26	6.72
14	4110	Solid	1.63	1.63	2.09	2.57	2.68	4.22
12	6530	Solid	2.05	2.05	3.30	1.62	1.68	2.66
10	10380	Solid	2.59	2.59	5.95	1.018	1.06	1.67
8	16510	Solid	3.26	3.26	8.35	.6404	.659	1.05
6	26240	7	1.55	4.67	17.13	.410	.427	.674
4	41740	7	1.96	5.89	27.25	.259	.269	.424
3	52620	7	2.20	6.60	34.21	.205	.213	.336
2	66360	7	2.47	7.42	43.24	.162	.169	.266
1	83690	19	1.69	8.43	55.81	.129	.134	.211
0	105600	19	1.89	9.44	69.99	.102	.106	.168
00	133100	19	2.13	10.62	88.58	.081	.0843	.133
000	167800	19	2.39	11.94	112.0	.0642	.0668	.105
0000	211600	19	2.68	13.41	141.2	.0509	.0525	.0836
250	250000	37	2.09	14.61	167.6	.0431	.0449	.0708
300	300000	37	2.29	16.00	201.1	.0360	.0374	.0590
350	350000	37	2.47	17.30	235.1	.0308	.0320	.0505
400	400000	37	2.64	18.49	268.5	.0270	.0278	.0442
500	500000	37	2.95	25.65	334.9	.0216	.0222	.0354
600	600000	61	2.52	22.68	404.0	.0180	.0187	.0295
700	700000	61	2.72	24.49	471.1	.0154	.0159	.0253
750	750000	61	2.82	25.35	504.7	.0144	.0148	.0236
800	800000	61	2.91	26.16	537.5	.0135	.0139	.0221
900	900000	61	3.09	27.69	602.2	.0120	.0123	.0197
1000	1000000	61	3.25	29.21	670.1	.0110	.0111	.0177
1250	1250000	91	2.98	32.77	843.4	.00863	.00888	.0142
1500	1500000	91	3.26	35.81	1007	.00719	.00740	.0118
1750	1750000	127	2.98	38.76	1180	.00616	.00634	.0101
2000	2000000	127	3.19	41.40	1346	.00539	.00555	.00885

ⓐ Area given is that of a circle having a diameter equal to the overall diameter of a stranded conductor. The values given in the table are those given in Handbook 100 of the National Bureau of Standards except that those shown in the 8th column are those given in Specification B33 of the American Society for Testing and Materials, and those shown in the 9th column are those given in Standard No. S-19-81 of the Insulated Power Cable Engineers Association and Standard No. WC3-1969 of the National Electrical Manufacturers Association.

Current Rating Selection

$$\text{Circuit breaker ampere rating } (I_p) = I_a \times A \times B \times C \times D \times E \times F \times G$$

- where I_a = Actual full-load current or RMS current
A = Wire size factor
B = Ambient temperature rating factor
C = Frequency rating factor
D = Altitude rating factor
E = Load class rating factor
F = Safety factor
G = 1.0 for intermittent load or 1.25 for continuous load

Cable Size by Ampere Rating

Circuit breakers are calibrated and rated for use with the following wire sizes by Ampere rating.

Circuit Breaker Ampere Rating	Copper Conductor		Aluminum or Copper-clad Aluminum Conductor		Circuit Breaker Ampere Rating	Copper Conductor		Aluminum or Copper-clad Aluminum Conductor	
	Paralleled	Sizeⓐ	Paralleled	Sizeⓐ		Paralleled	Sizeⓐ	Paralleled	Sizeⓐ
15 or less	—	14 AWG	—	12 AWG	400	two	3/0 AWG	two	250 MCM
20	—	12 AWG	—	10 AWG	450	two	4/0 AWG	two	300 MCM
25	—	10 AWG	—	10 AWG	500	two	250 MCM	two	350 MCM
30	—	10 AWG	—	8 AWG	550	two	300 MCM	two	500 MCM
35	—	8 AWG	—	6 AWG	600	two	350 MCM	two	500 MCM
40	—	8 AWG	—	6 AWG	700	two	500 MCM	three	350 MCM
45	—	6 AWG	—	4 AWG	800	three	300 MCM	three	400 MCM
50	—	6 AWG	—	4 AWG	1000	three	400 MCM	four or three	350 or 600 MCM
60	—	4 AWG	—	3 AWG	1200	four	350 or 600 MCM	three or four	600 MCM
70	—	4 AWG	—	2 AWG	1400	four	500 MCM	four	500 MCM
80	—	3 AWG	—	1 AWG	1600	five	400 or 600 MCM	five	500 MCM
90	—	2 AWG	—	1/0 AWG ⓑ	2000	four	500 MCM	six	600 MCM
100	—	1 AWG	—	1/0 AWG ⓑ	2500	five	400 or 600 MCM	six	600 MCM
110	—	1 AWG	—	1/0 AWG ⓑ	3000	four	600 MCM	—	—
125	—	1/0 AWG ⓑ	—	2/0 AWG	4000	six	400, or 600 MCM	—	—
150	—	1/0 AWG	—	3/0 AWG	—	five	600 MCM	—	—
175	—	2/0 AWG	—	4/0 AWG	—	eight	400, or 500, or 600 MCM	—	—
200	—	3/0 AWG	—	250 MCM	—	seven	500, or 600 MCM	—	—
225	—	4/0 AWG	—	300 MCM	—	six	600 MCM	—	—
250	—	250 MCM	—	350 MCM	—	nine	400, or 500, or 600 MCM	—	—
275	—	300 MCM	—	500 MCM	—	eight	500, or 600 MCM	—	—
300	—	350 MCM	—	500 MCM	—	seven	600 MCM	—	—
325	—	400 MCM	two	4/0 AWG	—	twelve	400, or 500, or 600 MCM	—	—
350	—	500 MCM	two	4/0 AWG	—	eleven	500, or 600 MCM	—	—
						ten	600 MCM	—	—

ⓑ No. 1 Type RH, RHW, RUH, THW, THWN, or XHHW copper conductor may be used if the circuit breaker is so marked.
 ⓑ No. 1 RH, RHH, RHW, THW, THWN, or XHHW aluminum conductor may be used if the circuit breaker is so marked.

ⓐ See table (page 51) for conversion to equivalent metric wire sizes.



GE Molded Case Circuit Breakers

Application Data

Factor A—Cable Size

Applied Wire Cross Sectional Area as a Percent of Rated Cross Sectional Area	Percent								
	50	60	70	80	90	100 ^①	125	150	200
Factor A	1.4	1.25	1.15	1.07	1.03	1.0	0.99	0.97	0.97

① The correct size wire should be used with every circuit breaker. The values shown above can be useful in understanding the response of the breaker in some misapplications or in applications where cable ampacity is not required to match breaker ampacity.

Factor B—Circuit Breaker Ambient Temperature^②

Circuit Breaker Type	Circuit Breaker Ambient Temperature											
	25°C		40°C		50°C		60°C		70°C		80°C	
	B =	MWIR	B =	MWIR	B =	MWIR	B =	MWIR	B =	MWIR	B =	MWIR
TQL, TQB, TQC	1.0	60/75	1.0	90	1.16	105	1.19	105	1.27	125	1.38	125
TQD	1.0	75	1.0	90	1.08	105	1.17	105	1.26	125	1.38	125
TEB	1.0	60/75	1.0	90	1.0	105	1.05	105	1.14	125	1.25	125
TEI	1.0	75	1.0	90	1.0	105	1.1	105	1.21	105	1.38	105
TFI	1.0	75	1.0	90	1.0	105	1.08	105	1.14	125	1.38	125
TJD, TJI4	1.0	75	1.0	90	1.0	105	1.05	105	1.14	105	1.25	125
TJI6	1.0	75	1.0	90	1.0	105	1.08	105	1.21	105	1.33	105
TKI8	1.0	75	1.0	90	1.0	105	1.05	105	1.18	105	1.25	125
TKI12	1.0	75	1.0	105	1.0	105	1.1	105	1.15	125	1.25	125

MWIR = Minimum Wire Insulation Rating

② Air temperature around the outside of the breaker molded case, but inside the enclosure.

Note: All temperatures are °C

Factor C – Frequency Ratings

Circuit Breaker Type	C (Frequency) Rating Factor At						
	DC	50/60 Hertz	100/120 Hertz	150/180 Hertz	200/240 Hertz	300/360 Hertz	400/480 Hertz
TQL, TQB, TQC	1.0	1.0	1.01	1.02	1.03	1.04	1.05
TEB, TEI	1.0	1.0	1.00	1.00	1.00	1.00	1.00
TFI	1.0	1.0	1.02	1.05	1.09	1.18	1.18
TJI	1.0	1.0	1.02	1.04	1.06	1.15	1.15
TKI8	1.0	1.0	1.02	1.04	1.15	1.35	1.35
TKI12		1.0	1.02				

Factor D – Altitude Rating

1.00 for 30 to 1830 meters

1.04 for 1831 to 3050 meters

1.08 for 3051 to 4570 meters

Factor E – Load Class Rating Total^③

Group Mounted (12 or more breakers)	Switching Capacitors	Switching Electro-magnets	Single Motor Branch Circuit Protection (Normal Duty)	Single Motor Branch Circuit Protection (Heavy Duty) ^④	All other (Normal) Load Types	Transformers with Secondary Protection	Transformers without Secondary Protection
1.1	1.5	1.5	1.5	1.75	1.0	Primary Protection 2.50 Secondary Protection 1.25	Primary Protection 1.25 —

③ E equals the product of the load class rating factors which apply to the circuit in question.

④ Use this factor for plugging duty or cycling loads with over 25 starts per hour where the RMS current cannot be reliably calculated.

Factor F – Safety Factor ≥ 1.1

Factor G – Duty Factor

Continuous duty (operation at essentially constant load for three hours or more)	Intermittent or short-time duty (constant load for less than three hours or intermittent load)
1.25	1.00

Selection of Circuit Breaker Current Rating

Circuit breakers are primarily used to provide overload and short circuit protection for insulated conductors. In this regard, the USA National Electrical Code Article 240-5 requires that conductors be protected in accordance with their ampacities, as given in NEC Tables 310-12 through 310-15. Exceptions are listed in the article for certain specific applications or conditions including protection for conductors in motor circuits.

The size and type of conductors required for a given circuit are usually calculated by the consulting engineer or other specifying authority, and specified on the job plans. It is in these instances, relatively simple to select a standard circuit breaker rating that matches the ampacity of the conductor. Where standard circuit breaker ratings do not correspond to the ampacity of the conductor, the NEC allows the next higher rating to be used where rating is 800 amperes or less.

For applications where only load currents are known, and motor circuits, ambient temperature, special duty cycles, frequency and altitude are involved, the following formula for selection of standard circuit breaker ratings is used:

$$\text{Circuit Breaker Ampere Rating} = \text{Actual Load Current} \times A \times B \times C \times D \times E \times F \times G$$

The procedure for using this formula is explained in the following steps.

Step 1. Determine the ACTUAL CURRENT of the circuit by adding the continuous load amperes for each load on the circuit. If the load is intermittent, the actual load current is equal to the RMS current over a time period equal to one-tenth of the frame ampere rating in minutes – 100 ampere frame = 10 minutes, 225 ampere frame – 23 minutes, etc.

Example:

An air-conditioning compressor cycles on and off at a maximum rate of four per hour and has the following characteristics:

- 62 full load amperes
- 248 locked rotor amperes
- 6 second starting time
- 5 minute off-time between starts

If you use an E frame breaker (150 ampere maximum) you must calculate the RMS current during the worst 10 minute period, which is START and RUN in this example.

$$I_{RMS} = \sqrt{\frac{(I \text{ start})^2 (T \text{ start}) + (I \text{ run})^2 (T \text{ run})}{T \text{ total}}}$$

$$= \sqrt{\frac{(248)^2 (0.1 \text{ minute}) + (62)^2 (9.9 \text{ minutes})}{10 \text{ minutes}}}$$

$$I_{RMS} = 66.5 \text{ amperes}$$

If you use an F frame (225 amperes) we must calculate the RMS current during the worst 22.5 minute period which is 0.1 minute START, 9.9 minute RUN, 5 minute OFF, 0.1 minute START, 7.4 minute RUN.

$$I_{RMS} = \sqrt{\frac{(248)^2 (.1) + (62)^2 (9.9) + (248)^2 (.1) + (62)^2 (7.4)}{22.5}} = 121.99 \text{ amps}$$

Step 2. Using the ACTUAL CURRENT, or RMS current determined in STEP 1, estimate the breaker frame size required by your application. Retain this "estimated" frame size to complete STEP 3.

Step 3. Select the appropriate multiplying factors A to F for the application conditions involved, and substitute in the formula. For applications under the jurisdiction of the National Electrical Code the product of B through F must be equal to or greater than 1.25 for continuous loads on standard rated devices and equal to or greater than 1.0 for 100 percent rated devices.

Step 4. Now compute the proper ampere rating and the proper circuit breaker for the application by multiplying the ACTUAL CURRENT by each of the four factors determined under STEP 3.

$$\text{Ampere Rating} = \text{Actual Current} \times A \times B \times C \times D \times E \times F \times G = \text{amperes}$$

Select a breaker having a rating equal to or next above your answer.

Example:

To illustrate: Assume a 415 volt three-phase circuit of 50 amperes continuous such as a computer power supply. The available short circuit current is less than 10kA. The protective device is to be group mounted in a panelboard with a total of thirty circuits.

The conductor supplying the load will be selected to be equal to the protective device rating.

Ambient temperature inside the box will not exceed 40°C.

There are no appreciable harmonics associated with the load.

The mounting location will be at 2190 meters.

$$\text{Circuit Breaker Ampere Rating} = I \text{ continuous} \times A \times B \times C \times D \times E \times F \times G$$

$$\text{Rating} = 50 \times 1.0 \times 1.0 \times 1.0 \times 1.04 \times 1.1 \times 1.1 \times 1.25 = 78.65 \text{ amperes.}$$

The next standard rating would be 80 amperes. Therefore select a TEB134080 and # 3 AWG copper conductor.



GE Enclosures

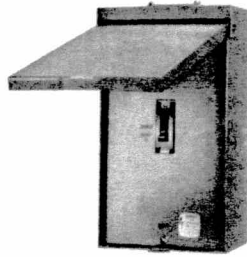
Products

Suitable for use as service equipment.
60°C/75°C conductor ratings.
Short circuit ratings are equal to the rating of the installed breaker.

70-1200 Amperes
240-600 Volts ac,
125-250 Volts dc



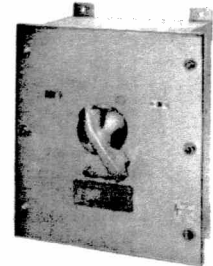
Type 1,
indoor surface or
flush mounting



Type 3R
outdoor, raintight



Types 12K and 12
rotary handle inte-
gral with breaker



Types 4/4X
stainless steel,
watertight, dust tight

Breaker Type	Max. Amp Rating	Poles	Type 1 ^① Indoor	Type 3R ^② Outdoor	Type 12 ^③ Oil-tight/ Dust-tight	Type 4/4X Stainless Steel	Neutral Catalog Number
TQL, THQL, TQL-GF,	70	1,2,3	TQL70FX2 ^① TQL70SX2 ^①	TQL70R	—	—	included
	100	1,2,3	TQL100FX2 ^① TQL100SX2 ^①	TQL100R			
	125	1,2	TPL212CX2	TPL212R			
TQC THQC	100	1,2,3	TQC100FX2 ^① TQC100SX2	TQC100R	—	—	included
TEB	100	2,3	TE100F TE100S	TE100R	TE100D TE100J ^⑦	TE100CS ^⑥	included
TQD	225	2	—	TQD225NR ^④	—	—	included
		2,3	TQD225FX2 ^① TQD225SX2	TQD225R			
TFI	225	2,3	TF225F TF225S	TF225R	TF225D TF225J	TF225CS	TNIA225
TJD	400 ^⑦	2,3	TJ400F	TJ400R TJ400S	TJ400D	TJ400CS TJ400J	TNIA400
TJI	600	2,3	TJ600F TJ600S	TJ600R	TJ600J	TJ600CS	TNIA400 TNIA600
TKI	1200	2,3	TK4V1200F TK4V1200S	TK4V1200R	TK1200J	—	TNIA400 TNIA600 TNIA800 TNIA1200 TNIA1200

① F-flush; S-surface.

② 70-250 amp devices have removable closing cap. Larger ampere devices require field cut openings. Order hubs separately, see page 45.

③ D = Type 12K with KO's.

J = Type 12 without KO's.

④ Suitable only for 2-pole breaker.

⑤ For three-pole breaker only.

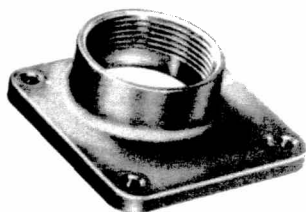
⑥ Neutral not included; if required, order Catalog Number TNI100.

⑦ Suitable for parallel 250 MCM maximum. If larger cable is applied, use 600-amp enclosure.

Hubs and Accessories

Universal Raintight Hubs

For outdoor enclosures that have removable closing caps.



TC150

Nominal Conduit Diameter in Millimeters	Aluminum Hub	Standard Pkg.
	Catalog Number	
19	TC75	10
25	TC100	
32	TC125	
38	TC150	
51	TC200	
64	TC250	
Closing Cap	TCCP	

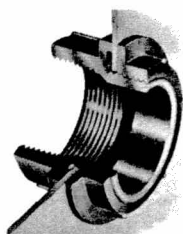
Stainless Steel Cover Only

For flush mounted Type 1 circuit breaker enclosures, field installed only.

Enclosure Catalog Number	Stainless Steel Cover
	Catalog Number
TE100F	TE100FSS
TF225F TJ400F TJ600F	Order by Description

Myers Scru-Tite Hubs

For outdoor enclosures that require field cut openings.



343L647G21

Nominal Conduit Diameter in Millimeters	Zinc Hub	Chrome Plated Zinc Hub	Std. Pkg.
	Catalog Number	Catalog Number	
13	343L647G3	343L647G17	1
19	343L647G4	343L647G18	
25	343L647G5	343L647G19	
32	343L647G6	343L647G20	
38	343L647G7	343L647G21	
51	343L647G8	343L647G22	
64	343L647G9	343L647G23	
76	343L647G10	343L647G24	
89	343L647G11	343L647G25	
102	343L647G12	343L647G26	

Special Phenolic Nameplates

For circuit breaker enclosures, 15 letters maximum.

Quantity (same words)
1-5
6-10

Insulated Groundable Neutrals Only

Neutral Catalog Number	Max. Ampere Rating	Lug Wire Size (CU-AL) AWG/MCM	Std. Pkg.
TNI100	100	14-1/0 CU 12-1/0 AL	1
TNIA225	225	1-300	
TNIA400 TNIA400VG	400	(2) 1/0-250 or (1) 4-600	
TNIA600 TNIA600VG	600	(2) 2/0-500	
TNIA800	800	(3) 250-500	
TNIA800G	800	(3) 250-350 CU or (3) 250-500 AL	
TNIA1200 TNIA1200G	1200	(4) 250-350 CU or (4) 250-500 AL	
TNIAC1200	1200	(4) 250-400 CU Only	

Ground Kits

For Enclosure	Catalog Number
70-125 Amp	Included
225-400 Amp	(1) TGL1 plus (1) TGL20
600-1200 Amp	TGL6

Key Interlocks

Available for circuit breaker enclosures on special factory order on Type 1, only. Order by description. Locks supplied. Complete coordination (lock scheme) required with order.



Outline Drawings and Dimensions

Outline Drawings

TE100F,S	139C5651-sh.1
TE150F,S	139C5497-sh.1
TF225F,S	139C5497-sh.2
TJ400F,S	139C5497-sh.3
TJ600F,S	139C5497-sh.4
TQC100F,S	139C5651-sh.1
TQD225F,S	139C5497-sh.1
TQL70F,S	139C5651-sh.1
TQL100F,S	139C5651-sh.1
TE100R	139C5652-sh.1
TE150R	139C5498-sh.1
TF225R	139C5498-sh.2
TJ400R	139C5498-sh.4
TJ600R	139C5519-sh.1
TQC100R	139C5652-sh.1
TQD225NR	139C5498-sh.3
TQD225R	139C5498-sh.1
TQL70R	139C5652-sh.1
TQL100R	139C5652-sh.1
TE100CS	139C5654-sh.1

TE225CS	139C5496-sh.1
TJ400CS	139C5496-sh.2
TJ600CS	139C5496-sh.3
TE100D	139C5653-sh.1
TE100J	139C5653-sh.1
TF225D	139C5682-sh.1
TF225J	139C5682-sh.2
TJ400D	139C5682-sh.3
TJ400J	139C5682-sh.4
TJ600J	139C5682-sh.5
TK1200J	139C5682-sh.6

Order From Your Local Sales Office or:
GE Company
Distribution Services
P.O. Box 2913
Bloomington, IL 61702-2913, U.S.A.
Fax: (309) 662-9660

Dimensions

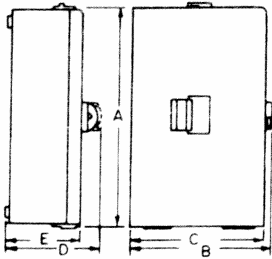


Fig. 1 Suffix F (flush)
Suffix S (surface)

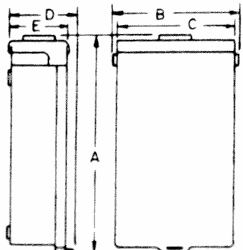


Fig. 2. Outdoor Enclosure

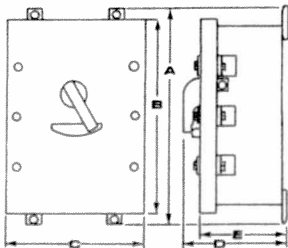


Fig. 3. Stainless Steel

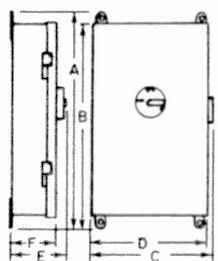


Fig. 4. Suffix D (with KO's)
Suffix J (without KO's)

Type 1

See Fig. 1

Catalog Number	Dimensions in Millimeters					Outline Drawing Number
	A ^①	B ^①	C ^①	D	E	
TE100F,S	432		200	140	121	139C5651 Sh 1
TE150F,S	672	225	225	157	140	139C5497 Sh 1
TF225F,S	759	225	225	157	140	139C5497 Sh 2
TJ400F,S ^②	697	392	392	181	164	139C5497 Sh 3
TJ600F,S	1184	437	437	230	213	139C5497 Sh 4
TPL212C	234	191	191	84	84	—
TQC100F,S	387	—	175	121	102	139C5651 Sh 1
TQD225F,S	672	225	225	157	140	139C5497 Sh 1
TQL70F,S	283	—	149	102	83	139C5651 Sh 1
TQL100F,S	387	—	175	121	102	139C5651 Sh 1

Type 3R

See Fig. 2

Catalog Number	Dimensions in Millimeters					Outline Drawing Number
	A ^①	B ^①	C ^①	D	E	
TE100R	445	200	191	144	137	139C5652 Sh 1
TE150R	670	260	254	159	140	139C5498 Sh 1
TF225R	767	260	254	178	159	139C5498 Sh 2
TJ400R ^②	694	403	398	221	203	139C5498 Sh 4
TJ600R	1173	459	459	219	194	139C5519 Sh 1
TPL212R	234	191	191	84	84	—
TQC100R	400	200	191	144	137	139C5652 Sh 1
TQD225NR	681	198	194	130	113	139C5498 Sh 3
TQD225R	670	260	254	159	140	139C5498 Sh 1
TQL70R	292	184	175	124	114	139C5652 Sh 1
TQL100R	400	200	191	144	124	139C5652 Sh 1

Type 4/4X

See Fig. 3

Catalog Number	Dimensions in Millimeters					Outline Drawing Number
	A ^①	B ^①	C ^①	D	E	
TE100CS	489	438	216	178	127	139C5654 Sh 1
TE225CS	806	762	265	230	181	139C5496 Sh 1
TJ400CS ^②	743	699	413	230	181	139C5496 Sh 2
TJ600CS	1175	1156	486	230	181	139C5496 Sh 3

Type 12 and 12K

See Fig. 4

Catalog Number	Dimensions in Millimeters						Outline Drawing Number
	A	B	C	D	E	F	
TE100D	489	440	229	203	146	124	139C5653 Sh 1
TE100J	489	440	229	203	146	124	139C5653 Sh 1
TF225D	806	768	241	229	192	164	139C5682 Sh 1
TF225J	806	768	241	229	192	164	139C5682 Sh 2
TJ400D ^②	745	706	362	335	200	164	139C5682 Sh 3
TJ400J ^②	745	706	362	335	200	164	139C5682 Sh 4
TJ600J	1230	1192	451	437	248	213	139C5682 Sh 5
TK1200J	1430	1392	576	559	265	221	139C5682 Sh 6

① Flush front extends approximately 16 mm beyond each side.

② Suitable for parallel 250MCM maximum. If larger cable is applied, use 600-amp enclosure

GE Enclosures Knockouts

Symbol	A	⊕	B	C	D	E	F	G	H	I	J	K	L	M	N	P	Q	R	S	T	U	V	W	X	Y	Z	
Conduit Size (Millimeters)	7	—	10	—	—	—	—	—	—	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	—	13	13	13	—	13	—	13	—	13	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	—	—	19	19	19	19	19	19	19	19	19	—	—	—	—	19	—	—	—	—	—	—	19	—	—	—	
	—	—	—	—	—	25	25	25	25	25	25	25	—	25	—	25	25	—	—	—	—	—	25	—	—	—	
	—	—	—	—	—	—	—	—	—	32	32	32	32	32	32	32	—	—	—	32	—	—	—	—	—	—	
	—	—	—	—	—	—	—	—	—	38	38	38	38	38	38	38	38	38	38	38	38	—	—	—	—	—	
	—	—	—	—	—	—	—	—	—	—	—	—	—	—	51	51	51	51	51	51	51	51	—	51	51	51	
	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	64	64	64	64	64	64	64	64	64	64	64	64
	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	76	76	76	76	76	76	76	76	76	76
	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	89	89	89	89	89
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	102	

Circuit Breaker Enclosures	
Catalog Number	KO Fig. No. (also see pg. 48)
TE100D	2
TE100F,S	3
TE100R	16
TE150F,S	7
TE150R	12
TF225D	1
TF225F,S	7
TF225R	12
TJ400D	10
TJ400F,S	9
TJ400R	11
TJ600F,S	6
TJ600R	15
TPL212C	5
TPL212R	14
TQC100F,S	4
TQC100R	16
TQD225F,S	7
TQD225NR	13
TQD225R	12
TQL70F,S	8
TQL70R	17
TQL100F,S	4
TQL100R	16

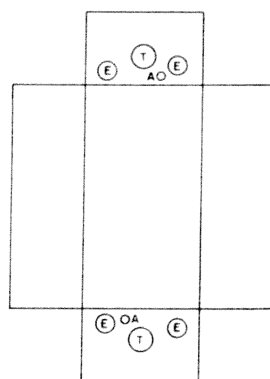


Fig. 1. TF225D

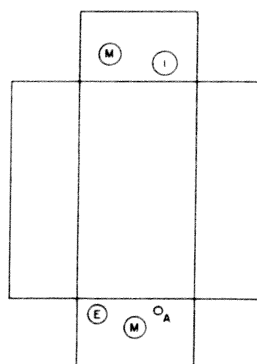


Fig. 2. TE100D

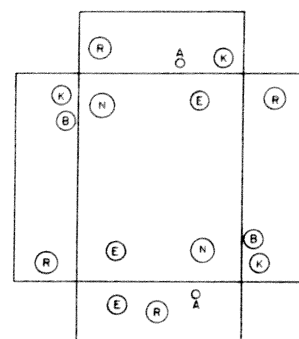


Fig. 3. TE100F,S

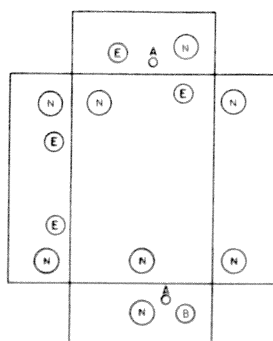


Fig. 4. TQC100F,S
TQL100F,S

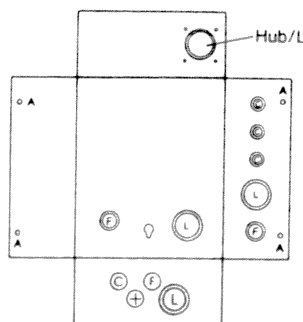


Fig. 5. TPL212C

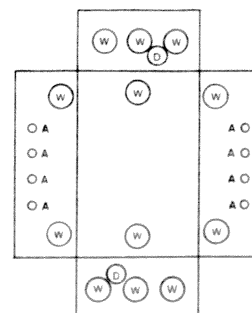


Fig. 6. TJ600F,S

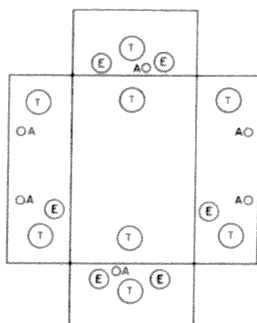


Fig. 7. TE150F,S
TF225F,S TQD225F,S

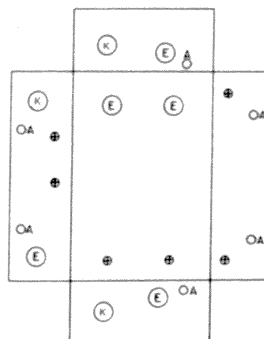


Fig. 8. TQL70F,S

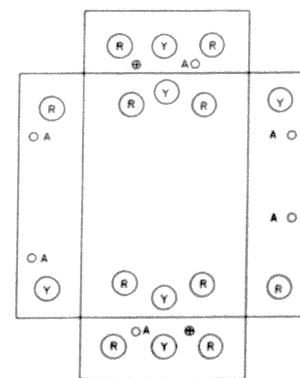


Fig. 9. TJ400F,S



Knockouts

Symbol	A	⊕	B	C	D	E	F	G	H	I	J	K	L	M	N	P	Q	R	S	T	U	V	W	X	Y	Z
Conduit Size (Millimeters)	7	—	10	—	—	—	—	—	—	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	—	13	13	13	—	13	—	13	—	13	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	—	—	19	19	19	19	19	19	19	19	19	—	—	—	—	19	—	—	—	—	—	19	—	—	—	—
	—	—	—	—	—	25	25	25	25	25	25	25	—	25	—	25	25	—	—	—	—	25	—	—	—	—
	—	—	—	—	—	—	—	—	32	32	32	32	32	32	32	32	32	—	—	32	—	—	32	—	—	—
	—	—	—	—	—	—	—	—	—	—	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38
	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	51	51	51	51	51	51	51	51	51	51	51
	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	64	64	64	64	64	64	64	64	64	64
	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	76	76	76	76	76	76	76
	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	89	89	89	89	89
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	102	

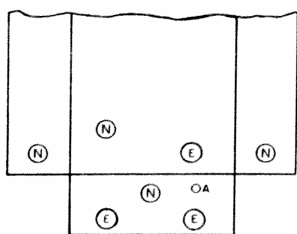


Fig. 10. TJ400D

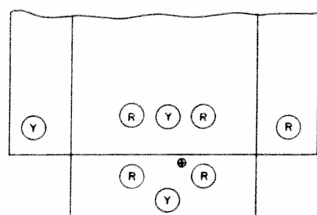


Fig. 11. TJ400R

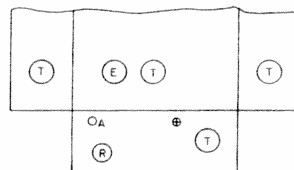


Fig. 12. TE150R
TF225R TQD225R

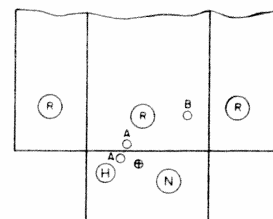


Fig. 13. TQD225NR

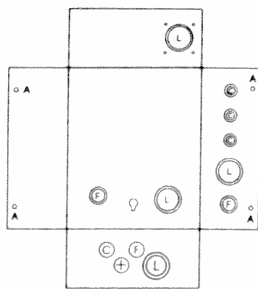


Fig. 14. TPL212R

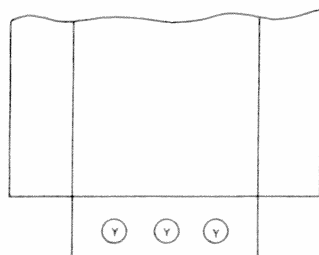


Fig. 15. TJ600R

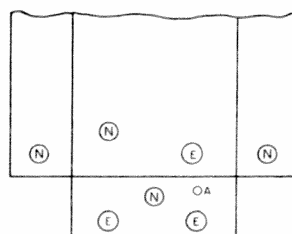


Fig. 16. TE100R
TQC100R TQL100R

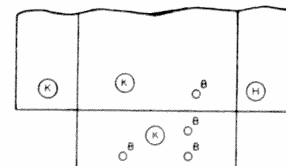
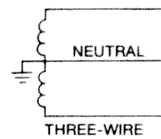
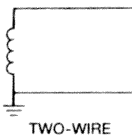


Fig. 17. TQL70R

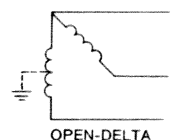
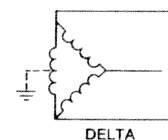
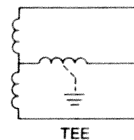
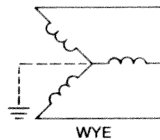
Voltage

Equipments are applied in systems whose voltage does not exceed the equipment rating. Principal transformer secondary connections to supply the system voltages are:

Single-phase Systems

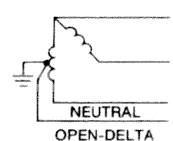
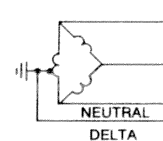
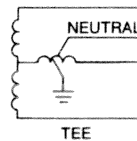
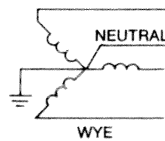


Three-phase Three-wire Systems



Note in delta connections the ground may be connected as shown if midpoint available, or to one-phase conductor (corner grounded) or omitted entirely (ungrounded)

Three-phase Four-wire Systems



Electrical Formula—For Obtaining kW, kVA, Hp, and Amps

Wanted	Single-phase	Three-phase
Kilowatts (kW)	$\frac{I \times E \times PF}{1000}$	$\frac{I \times E \times 1.73 \times PF}{1000}$
kVA	$\frac{I \times E}{1000}$	$\frac{I \times E \times 1.73}{1000}$
Horsepower (Hp)	$\frac{I \times E \times \% \text{ Eff.} \times PF}{746}$	$\frac{I \times E \times 1.73 \times \% \text{ Eff.} \times PF}{746}$
Amps from kVA	$\frac{kVA \times 1000}{E}$	$\frac{kVA \times 1000}{1.73 \times E}$
Amps from kW	$\frac{kW \times 1000}{E \times PF}$	$\frac{kW \times 1000}{1.73 \times E \times PF}$
Amps from Horsepower	$\frac{Hp \times 746}{E \times \% \text{ Eff.} \times PF}$	$\frac{Hp \times 746}{1.73 \times E \times \% \text{ Eff.} \times PF}$

E = Volts I = Amps % Eff. = Percent Efficiency PF = Power Factor



Reference Information

Inch - Millimeter Equivalents of Decimal and Common Fractions, from 1/64 to 1 inch^①

Inch	1/2s	1/4s	8ths	16ths	32ds	64ths	Decimals of an inch ^②	Millimeters
						1	0.015625	0.397
					1	2	0.03125	0.794
						3	0.046875	1.191
				1	2	4	0.0625	1.588
						5	0.078125	1.984
						6	0.09375	2.381
						7	0.109375	2.778
			1	2	4	8	0.1250	3.175
						9	0.140625	3.572
						10	0.15625	3.969
						11	0.171875	4.366
				3	6	12	0.1875	4.762
						13	0.203125	5.159
						14	0.21875	5.556
						15	0.234375	5.953
		1	2	4	8	16	0.2500	6.350
						17	0.265625	6.747
						18	0.28125	7.144
						19	0.296875	7.541
						20	0.3125	7.938
						21	0.328125	8.334
						22	0.34375	8.731
						23	0.359375	9.128
			3	6	12	24	0.3750	9.525
						25	0.390625	9.922
						26	0.40625	10.319
						27	0.421875	10.716
						28	0.4375	11.112
						29	0.453125	11.509
						30	0.46875	11.906
						31	0.484375	12.303
	1	2	4	8	16	32	0.5000	12.700
						33	0.515625	13.097
						34	0.53125	13.494
						35	0.546875	13.891
						36	0.5625	14.288
						37	0.578125	14.684
						38	0.59375	15.081
						39	0.609375	15.478
			5	10	20	40	0.6250	15.875
						41	0.640625	16.272
						42	0.65625	16.669
						43	0.671875	17.066
						44	0.6875	17.462
						45	0.703125	17.859
						46	0.71875	18.256
						47	0.734375	18.653
		3	6	12	24	48	0.7500	19.050
						49	0.765625	19.447
						50	0.78125	19.844
						51	0.796875	20.241
						52	0.8125	20.638
						53	0.828125	21.034
						54	0.84375	21.431
						55	0.859375	21.828
						56	0.8750	22.225
						57	0.890625	22.622
						58	0.90625	23.019
						59	0.921875	23.416
				15	30	60	0.9375	23.812
						61	0.953125	24.209
						62	0.96875	24.606
						63	0.984375	25.003
1	2	4	8	16	32	64	1.0000	25.400

- ① Convert only to the number of decimal places consistent with the stated or implied accuracy.
- ② Exact.

Celsius and Fahrenheit Thermometer Scales^③

Deg C	Deg F	Deg C	Deg F	Deg C	Deg F	Deg C	Deg F	Deg C	Deg F
0	32	21	69.8	41	105.8	61	141.8	81	177.8
1	33.8	22	71.6	42	107.6	62	143.6	82	179.6
2	35.6	23	73.4	43	109.4	63	145.4	83	181.4
3	37.4	24	75.2	44	111.2	64	147.2	84	183.2
4	39.2	25	77	45	113	65	149	85	185
5	41	26	78.8	46	114.8	66	150.8	86	186.8
6	42.8	27	80.6	47	116.6	67	152.6	87	188.6
7	44.6	28	82.4	48	118.4	68	154.4	88	190.4
8	46.4	29	84.2	49	120.2	69	156.2	89	192.2
9	48.2	30	86	50	122	70	158	90	194
10	50	31	87.8	51	123.8	71	159.8	91	195.8
11	51.8	32	89.6	52	125.6	72	161.6	92	197.6
12	53.6	33	91.4	53	127.4	73	163.4	93	199.4
13	55.4	34	93.2	54	129.2	74	165.2	94	201.2
14	57.2	35	95	55	131	75	167	95	203
15	59	36	96.8	56	132.8	76	168.8	96	204.8
16	60.8	37	98.6	57	134.6	77	170.6	97	206.6
17	62.6	38	100.4	58	136.4	78	172.4	98	208.4
18	64.4	39	102.2	59	138.2	79	174.2	99	210.2
19	66.2	40	104	60	140	80	176	100	212
20	68								

- ③ For values not shown use the following formulas:
 $^{\circ}\text{C} = 5/9 \times (^{\circ}\text{F} - 32)$
 $^{\circ}\text{F} = (9/5 \times ^{\circ}\text{C}) + 32$

Comparing AWG/MCM to MM² Wire Sizes

ISO cross-section (MM ²)	AWG/MCM ^{① ②}	
	Size	Equivalent cross-section (MM ²)
0.2	24	0.205
—	22	0.324
0.5	20	0.519
0.75	18	0.82
1	—	—
1.5	16	1.3
2.5	14	2.1
4	12	3.3
6	10	5.3
10	8	8.4
16	6	13.3
25	4	21.2
35	2	33.6
50	0	53.5
70	00	67.4
95	000	85
—	0000	107.2
120	250 MCM	127
150	300 MCM	152
185	350 MCM	177
240	500 MCM	253
300	600 MCM	304

① MCM means "Thousand Circular Mills."

② The dash, when it appears, counts as a size.

Full-load Currents, Single-phase ac Motors (Amperes)

Hp	115 Volts	230 Volts
1/6	4.4	2.2
1/4	5.8	2.9
1/3	7.2	3.6
1/2	9.8	4.9
3/4	13.8	6.9
1	16	8
1 1/2	20	10
2	24	12
3	34	17
5	56	28
7 1/2	80	40
10	100	50

Full-load Currents, Three-phase ac Motors (Amperes)

Hp	Induction Type Squirrel-cage and Wound-rotor Amps					Synchronous Type Unity Power Factor Amps			
	115V	230V	460V	575V	2300V	230V	460V	575V	2300V
1/2	4	2	1	.8					
3/4	5.6	2.8	1.4	1.1					
1	7.2	3.6	1.8	1.4					
1 1/2	10.4	5.2	2.6	2.1					
2	13.6	6.8	3.4	2.7					
3		9.6	4.8	3.9					
5		15.2	7.6	6.1					
7 1/2		22	11	9					
10		28	14	11					
15		42	21	17					
20		54	27	22					
25		68	34	27		53	26	21	
30		80	40	32		63	32	26	
40		104	52	41		83	41	33	
50		130	65	52		104	52	42	
60		154	77	62	16	123	61	49	12
75		192	96	77	20	155	78	62	15
100		248	124	99	26	202	101	81	20
125		312	156	125	31	253	126	101	25
150		360	180	144	37	302	151	121	30
200		480	240	192	49	400	201	161	40



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