



Molded Case Circuit Breakers

Application and Selection





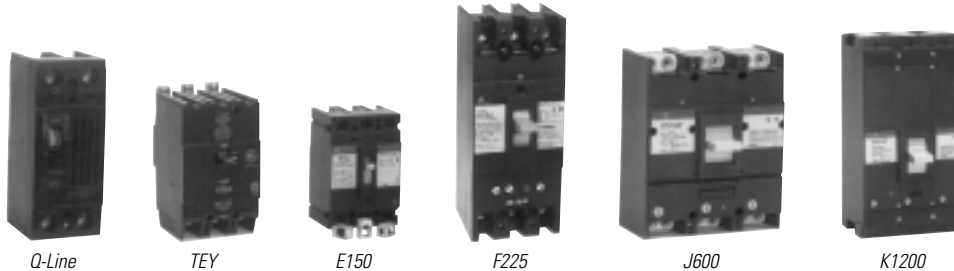
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The GE Family of Molded Case Circuit Breakers

From 10-1200 Amperes



Application Flexibility

In switchboards, motor control centers and lighting, power and customized control panelboards, General Electric molded case circuit breakers are used to provide reliable circuit protection. Molded case circuit breakers in individual enclosures are also used in numerous applications.

Minimum Downtime

Downtime is reduced and fuse replacement is eliminated with circuit breakers. In case of overload or short circuit, the breaker trips, opening the circuit and protecting the conductors. When normal conditions are restored, the breaker can be closed (“ON”) again.

Trip-Free Mechanism

The breaker’s trip-free mechanism opens the breaker contacts under overload or short circuit conditions, even with the breaker handle held in the ON position.

Eliminates Single-Phasing

Circuit breakers eliminate single-phasing. When an overload or short circuit occurs on any one conductor, a common trip bar simultaneously disconnects all three conductors of a three-phase circuit.

Easy System Upgrading

With General Electric circuit breakers, the circuit can be updated, even after the breaker has been installed. Interchangeable trips provide a wide range of ratings within the same frame size.

Accessory Functions

Application flexibility of molded case circuit breakers is enhanced by a breaker accessory line. Remote closing or opening, undervoltage protection, indication of “tripped” condition at a remote location, electrical or mechanical interlocking, automatic reclosing, and primary or sequential operation are some of the functions practical with accessories.

Space Savings

Space savings can be an important factor in selecting General Electric molded case circuit breakers as equipment components. Higher rated breakers in particular, offer major space economies over fused switches.

Interrupting Ability

Interrupting ratings of General Electric molded case circuit breakers are based on actual short circuit tests. Breakers are rated for RMS symmetrical ac amperes and for maximum dc amperes.

Standards and Specifications

General Electric molded case circuit breakers meet standards established by Underwriters’ Laboratories, National Electric Manufacturers Association, Federal Specifications, Institute of Electronic Engineers, National Electric Code and General Electric Company’s own high quality standards.



Rugged, Dependable Construction

Circuit Breaker Frame

- **Molded case** is molded from high-mechanical and high-dielectric strength engineered plastic.
- **Trip indication** is shown by handle position midway between ON and OFF. To reset the trip mechanism, move the handle to extreme OFF, then to ON position.
- **Quick-make, quick-break, trip-free mechanism** minimizes arcing during breaker operation. Contacts cannot be “teased” into position. 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 ON position.
- **Verifier “Twist-to-Trip” and “Push-to-Trip”** mechanically simulates over-current tripping through actuation of linkages not operated by the ON-OFF handle. Experience has shown that thermal magnetic circuit breakers in industrial applications better maintain their original protective characteristics when regularly exercised.
- **Common-trip bar** assures instant disconnect of all conductors when an overload or short circuit occurs on any one conductor in the circuit, or an accessory trip device operates.
- **Silver alloy contacts** combine the conductive properties of silver with other elements for clean, positive electrical contacting. Pitting and burning are minimized for longer contact life.
- **Arc chutes** of heat-absorbing, insulating material and metal grid plates quickly “extinguish” arcs.
- **UL listed lugs** for copper or aluminum cable, at full frame rating. Easy access and simple, straight-in wiring.

Thermal Magnetic Trip System

- **Front-adjustable magnetic trip** provides instantaneous trip in event of short circuit. Any current surge above the trip setting produces a magnetic field which instantly actuates the trip mechanism and opens the circuit.
- **Thermal trip** provides protection against sustained overloads. A bi-metallic element reacts time-wise in inverse proportion to the current. If a circuit is overloaded, heat resulting from excessive current flow causes the bi-metal to bend, actuating the trip mechanism to open the circuit.
- **Interchangeable trip units** (for frames over 150 ampere rating) simplify stocking and reduce inventory requirements. Field interchangeability assures maximum flexibility.

Electronic Trip System

- **Front adjustable programming functions (Power+ 4, MicroVersaTrip Plus)** provide a high degree of flexibility and convenience in making and checking settings.
- **Long-time pick up indication** is illuminated whenever the breaker is experiencing an overload condition. The light is extinguished by removing the overload or tripping the breaker.
- **Glass epoxy printed circuit boards with epoxy conformal coating** over all assembled components provide long life with error free operation.
- **Switch contacts and board interconnectors** provide corrosion resistance and long product life.
- **Neutral current sensor connections** located between the breaker lugs allow panelboard mounting of breakers without special fillers or increased panel space.
- **Fault trip indicators** for overload, short circuit, and ground fault are available for local indication.



Thermal Magnetic and Solid State Trip Types

Spectra RMS™ circuit breakers with digital rms-sensing electronic trip units provide many features and benefits not offered by thermal magnetic breakers (refer to GET-7002).

Thermal magnetic trip units are available in all GE molded case circuit breakers from Q Line through K frame. Solid state trip units may be alternatively selected for J and K frame circuit breakers. Additionally, non-automatic circuit interrupters, or molded case switches, are available. These interrupters have no automatic overload or short circuit trip elements. They are used for manual switching and isolation.

Enclosure Compensated Thermal Trip: 40°C

An enclosure compensated thermal trip is constructed to permit an enclosed circuit breaker in a 25°C room ambient to carry 100% of its nameplate current *intermittently* and 80% of its nameplate current *continuously* when cabled with conductor sized per the UL 489 standard (see Figure 29.1).

The thermal trip action is accomplished by a bimetallic strip. The movement of the bimetal and thus tripping is proportional to the current — high current fast response, low current slow response. This action provides a time delay which prevents service interruptions from normal inrush currents or temporary overloads. Continuous overloads will cause the bimetal to deflect sufficiently to release the latch and open the breaker contacts. However, the bimetal is also sensitive to ambient temperatures. If the room ambient is above or below 25°C, or the enclosure is warmer than normal, the breaker rating will vary inversely to the temperature: higher ambient-lower current, lower ambient-higher current. Enclosure compensation is furnished on Q-Line, TEB, TEY, TB-1, TED 277 volt and TED 480 volt circuit breakers.

Ambient Temperature Compensated Thermal Trip: 10° TO 50°C

An ambient compensating or “Ambient Compensated” thermal trip is the same as an enclosure compensated trip with one notable exception. It has a reduced sensitivity to changes in ambient temperature. In an ambient compensating thermal trip an additional bimetal is added to the circuit breaker. This bimetal responds to breaker ambient and modifies the characteristics of the current sensing bimetal to compensate for ambient temperature changes.

Ambient compensating thermal trips are provided as standard in all 600 volt thermal-magnetic molded case circuit breakers.

Adjustable Magnetic Trip — F225, J600, K1200 and TEC, TEMPL, TFC, TJC, TKC, TFL, THLC-2, THLC-4, TLB4

An electromagnet 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 instantaneously releasing the trip latch in the same manner as the bimetal does on overload.

For short circuit protection, the adjustable magnetic trip provides high, low and intermediate trip settings.

Solid State Trip: -20° TO +55°C

Solid state MicroVersaTrip® Plus trip units meet the same standards as thermal trip units. Complete circuit breakers equipped with MicroVersaTrip Plus trip units are rated to carry 100% of their current sensor rating intermittently and 80% continuously in a 40°C breaker ambient. Some MicroVersaTrip Plus equipped breakers are rated to carry 100% continuously and are so marked.

In addition to the protection of conductors as required by codes and standards, MicroVersaTrip Plus can be set to provide protection for equipment such as motors, generators, or transformers and provide improved distribution system selectivity.

Figure 4.1
Operation of Thermal-Mag Trip Units

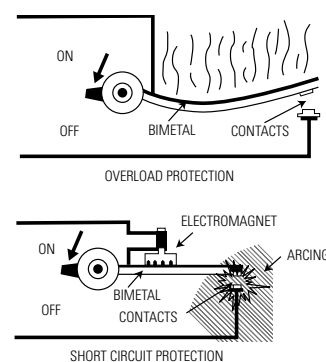




Table 5.1
Breaker Trip Types

	Breaker Type	Trip Type
Q-Line	All	Non-Interchangeable
TEY-100	TEY	Non-Interchangeable
E150	TEB TED THED Hi-Break	Non-Interchangeable Non-Interchangeable Non-Interchangeable
F225	TFJ TFK THFK Hi-Break	Non-Interchangeable Interchangeable Interchangeable
J600	TJJ TJK THJK Hi-Break TJ4V TJH4V Hi-Break TJH Hi-Break MVT Plus	Non-Interchangeable Interchangeable Interchangeable Non-Interchangeable Non-Interchangeable Interchangeable (Rating Plug ①)
K1200	TKM-800 TKM-1200 THKM Hi-Break TK4V TKH Hi-Break MVT Plus	Interchangeable Interchangeable Interchangeable Non-Interchangeable Interchangeable (Rating Plug ①)
Hi-I.C.	TEL, TEML② TFL② TJL4V Hi-I.C. TJL Hi-I.C. MVT Plus TKL4V Hi-I.C. TKL Hi-I.C. MVT Plus TLB-2② TLB-4②	Non-Interchangeable Non-Interchangeable Non-Interchangeable Interchangeable (Rating Plug ①) Non-Interchangeable Interchangeable (Rating Plug ①) Non-Interchangeable Non-Interchangeable
Current Limiting	THLC-1② THLC-2② THLC-4②	Non-Interchangeable Non-Interchangeable Non-Interchangeable
Tri-Break (fused)	TB-1 TB-4 TB-6 TB-8	Non-Interchangeable Non-Interchangeable Non-Interchangeable Non-Interchangeable

① MicroVersaTrip® Plus incorporates trip units with field replaceable rating plugs providing ease of changing ratings within frame size and sensor rating, with minimum downtime. See Table 5.2 for rating plug selection.

② Obsolete type.

Table 5.2
J/K Rating Plug Selection

Frame Type	Sensor Rating (Amps)	Current Rating (Amps)
J400	150	60, 80, 100, 125, 150
J400	400	150, 200, 225, 250, 300, 400
J600	600	300, 400, 450, 500, 600
K800	800	300, 400, 500, 600, 700, 800
K1200	1200	600, 800, 1000, 1200



Trip Unit Ratings Molded Case Circuit Breakers

Table 6.1
Trip Unit Ratings

Type	Reverse Feed		Trip Unit Type	Trip Unit Ratings (Amperes)	Instantaneous Type
Q-Line (THOB, L, C)	Yes		Non-interchangeable	10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100, 110 ^① , 125 ^①	Fixed
TEY	Yes		Non-interchangeable	15, 20, 30, 40, 50, 60, 70, 80, 90, 100	Fixed
E150	Yes		Non-interchangeable	10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 110, 125, 150	Fixed
TEL ^②	Yes		Non-interchangeable	15, 20, 25, 30, 35, 40, 50, 50, 60, 70, 80, 90, 100, 125, 150	Fixed
THLC-1 ^②	Yes		Non-interchangeable	15, 20, 30, 40, 50, 60, 70, 80, 90, 100, 125, 150	Fixed
TB-1	No		Non-interchangeable	15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100	Fixed
TQD	Yes		Non-interchangeable	100, 125, 150, 175, 200, 225	Fixed
F225	TFJ	Yes	Non-interchangeable	70, 80, 90, 100, 110, 125, 150, 175, 200, 225	Adjustable
	TFK	No	Interchangeable		
TFL ^②	Yes		Non-interchangeable	70, 80, 90, 100, 125, 150, 175, 200, 225	Adjustable
THLC-2 ^②	Yes		Non-interchangeable	125, 150, 175, 200, 225	Adjustable
TJD	Yes		Non-interchangeable	250, 300, 350, 400	Fixed
J400	TJJ	Yes	Non-interchangeable	125, 150, 175, 200, 225, 250, 300, 350, 400	Adjustable
	TJK	No	Interchangeable		
J600	No		Interchangeable	250, 300, 350, 400, 450, 500, 600	Adjustable
TLB-4 ^②	Yes		Non-interchangeable	250, 300, 350, 400	Adjustable
THLC-4 ^②	Yes		Non-interchangeable	250, 300, 350, 400	Adjustable
TB-4	No		Non-interchangeable	125, 150, 175, 200, 225, 250, 300, 350, 400	Adjustable
TB-6	No		Non-interchangeable	300, 350, 400, 500, 600	Adjustable
K800	No		Interchangeable	300, 350, 400, 450, 500, 600, 700, 800	Adjustable
K1200	No		Interchangeable	600, 700, 800, 1000, 1200	Adjustable
TB-8	No		Non-interchangeable	600, 700, 800	Adjustable

① THQL only (2 pole).

② Obsolete type.



MicroVersaTrip Plus™ Tripping Functions

MicroVersaTrip Plus is a trip unit for J and K frame circuit breakers incorporating the newest technological advances in over-current protection for improved reliability, long-life, and flexibility. Operation is fully automatic and normally no external logic or control power inputs are required. It uses digital rms sensing to accurately measure the waveshape and has an LCD display including overload, short circuit, and ground fault indicators.



Programmable Microelectronic Processor

This forms the basis of the MicroVersaTrip Plus protection programmer. This miniaturization of circuitry provides the increased flexibility required to incorporate nine adjustable time-current functions, three mechanical fault indicators (local), a long-time pickup indicator (local), and zone selective interlocking. All adjustable programmer functions are automatic and self-contained. This compilation of functions provides the basis for the most flexible and useful breaker design presently available anywhere.

Specially Treated Printed Circuit Boards

Each printed circuit board has a protective conformal epoxy coating to prevent moisture absorption, fungus growth, and signal leakage. All electronics are housed within a metallic enclosure designed to protect against hi-fault interruption arcs, magnetic interference, dust, and other contaminants.

Flux-Shift Trip Device

A low energy, positive action tripping device which is self-powered by and controlled by the trip unit.

Current Sensor Package

Three-phase current sensors are incorporated into a single package providing greater flexibility and reliability.



Table 8.1
MicroVersaTrip Plus Trip Unit Functions

		LI	LIG	LIGZ1	LIGZ2	LSI	LSIG	LSIGZ1	LSIGZ2
Long-Time	Adjustable Current Setting	X	X	X	X	X	X	X	X
	Adjustable Long Time Delay	X	X	X	X	X	X	X	X
Short-Time	Adjustable Pick-Up					X	X	X	X
	Adjustable Delay					X	X	X	X
	I ² t Switch					X	X	X	X
Adjustable Instantaneous Pick-Up		X	X	X	X	X	X	X	X
Ground Fault	Adjustable Pick-Up		X	X	X		X	X	X
	Adjustable Delay		X	X	X		X	X	X
	I ² t Switch		X	X	X		X	X	X
Zone Interlock	GF			X				X	
	GF-ST				X				X

Table 8.2
MicroVersaTrip Plus Trip Unit Function Characteristics

Frame Type	Sensor Rating (Amps)	Current Setting (Multiple of Rating Plug Amp) (X)	Long-Time ^③	Short-Time		Adjustable Instantaneous Pick-Up (Multiple of Rating Plug Amp) (X)	Ground Fault	
			Delay (Seconds)	Pick-Up (Multiple of Current Setting) (C)	Delay (Seconds)		Pick-Up (Multiple of Sensor Amp Rating) (S)	Delay (Seconds)
J400	150, 400	.50 to 1.00 in steps of .05	2.4, 4.9, 9.8, 20 at 600% of current setting at lower limit of each band	1.5 to 9.0 in steps of .05	I ² T in .40 ^④	1.5 to 10.0 without short-time in steps of 0.5	0.2 to 0.6 in steps of 0.01	I ² T in .40 ^⑤
J600	600				I ² T out ^① .10, .21, .35			
K800	800							
K1200	1200							

① Time delay shown at lower limit of each band. Pick-up tolerances ±10%. Ground fault pick-up not to exceed 1200 amps.

② J600 frame with 600-amp sensor for high IC 65kA rating (TJL) limited to 10X.

③ Pick-up fixed at 1.05C.

④ Time delay at 600% of current setting at lower limit of band.

⑤ Time delay at 200% of pick-up setting at lower limit of band.

X = rating plug amps

S = sensor amp rating

C = current setting

Setup Mode

Set points for all trip unit functions can be entered into the trip system via the 5-function key pad and LCD display. When working in Setup Mode, the trip unit must be provided with control power from the internal battery, or the MicroVersaTrip Portable Power Pack or by loading the breaker to at least 20% of its sensor value. While still in Setup Mode, settings can be automatically scanned by depressing the VALUE key for 5 seconds.



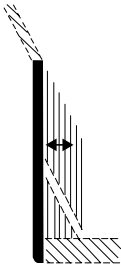
Current Setting (Standard)

The adjustable current setting determines the nominal long time current setting with a $\pm 10\%$ bandwidth. With a 1.0 setting the breaker will carry indefinitely without tripping the rating plug rating. Changing the setting changes the nominal current rating for the breaker.



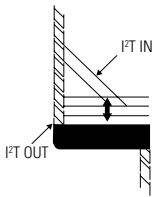
Long-Time Delay (Standard)

This long-time delay adjustment varies the time it will take the breaker to trip under sustained overload conditions. It provides the function of withstanding momentary overloads such as motor starting, welding, or other overcurrent conditions without interrupting the service.



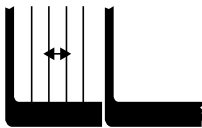
Short-Time Pickup (Optional)

This short-time pickup adjustment controls the level of high current the breaker can carry for short periods of time without tripping. Permits downstream breakers to clear short circuit faults without tripping out the upstream protective device.



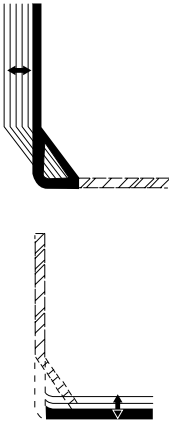
Short-Time Delay (Optional)

The short-time delay adjustment is used in conjunction with the short-time pickup setting to provide a further refinement of coordination between circuit breakers. It establishes the time interval the breaker will wait before responding to the short-circuit current level selected on the short-time trip point adjustment.



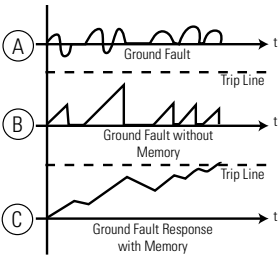
Adjustable Instantaneous Pickup (Standard)

The instantaneous trip point determines the level at which the breaker will trip without intentional time delay (0.025 seconds or less). This immediate interruption occurs only as a result of a severe overcurrent condition, thereby minimizing damage to the electrical system and equipment.



Ground Fault Pickup and Ground Fault Delay (Optional)

The ground fault pickup adjustment controls the level of ground fault current at which circuit interruption will occur. To comply with the National Electrical Code (NEC 230-95), no trip point exceeds 1200 amperes. The common square knee of the curve can be replaced with an I²t function to facilitate coordination with downstream devices such as thermal-magnetic breakers and fuses. The ground fault delay adjustment is used to add a pre-determined delay in time to the trip point once the ground fault pickup level has been reached. This provides tripping selectivity between main and feeder or other downstream breakers. The ground fault unit also includes as standard an inverse I²t ramp to substantially improve coordination with downstream protective devices such as fuses and thermal magnetic circuit breakers.



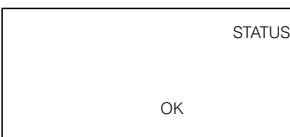
Memory Circuit

Because of the highly intermittent and erratic nature of arcing ground faults, a memory circuit has been incorporated in all MicroVersaTrip Plus ground fault-sensing circuits as standard. The memory circuit integrates arcing fault current with time, essentially summing the intermittent ground current spikes. In the diagrams, it can be seen how the memory function works.

Diagram A shows a typical ground fault with half-cycles, whole cycles and multiple cycles missing, as normally occurs.

Diagram B shows trip response of a typical ground fault function, which does not include memory. The breaker never trips because the time delay circuits are reset with every missing cycle.

Diagram C shows response of MicroVersaTrip Plus ground fault circuits to the same ground fault; the circuit’s memory carries through the missing cycles and generates a trip signal after the preset time delay.



Status Indication

The LCD display provides continuous information on the operating status of the circuit breaker. Under normal conditions the status screen simply displays the OK message. After a fault event occurs, the LCD display indicates the event type, the magnitude, and overcurrent target when appropriate.

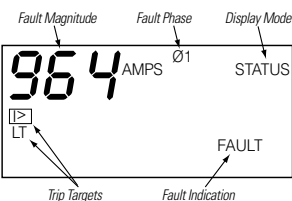
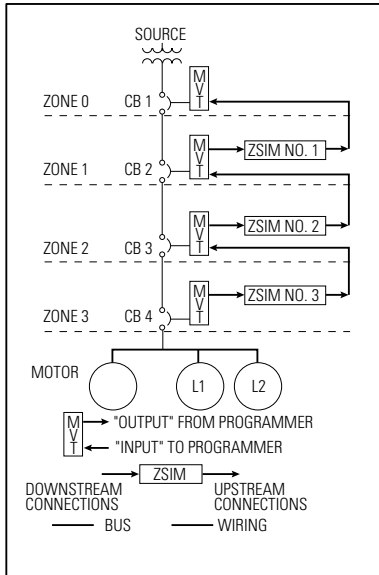




Figure 11.1
Multi-Zone Interlocking



Zone Selective Interlocking

The standard means of obtaining selectivity between main and feeder breakers is by incorporating programmers with time-coordinated trip characteristics. This consists of setting the farthest downstream breaker with a small time delay, and progressively increasing the time delay as you get closer to the main protective device. The disadvantage of this method is that the system must now endure the stress of a high current fault between the main and feeder until time-out occurs.

The Zone Selective Interlock module, Figure 11.1, receives a signal from a downstream MicroVersaTrip Plus programmer (Logic 0) which causes the module to transmit a low-level interlock signal to a MicroVersaTrip Plus programmer upstream. The interlock signal activates the LED portion of an LED-Transistor Opto-isolator in the upstream programmer causing the fixed delay band to shift from “MIN” to the programmer delay band setting. Both the Short-Time and Ground Fault functions are capable of being interlocked.

Zone Selective Interlocking is available for both the short-time function and the ground fault function, or the ground fault function only.

Test Jack

The Test Jack located on the front of the rating plug accepts a test cable supplied with a portable, battery operated (or 120Vac) test kit separately available. The test kit will test the circuit breaker while the circuit breaker is carrying load, and provides either a trip or no trip test. The test kit will simulate a time-over current condition for the long-time, short-time and ground fault functions. It will also read trip unit switch settings and provide a report on the trip unit self-test feature.



Rating Plugs (Standard)

Various rating plugs are available to fix the ampere rating equal to or lower than the sensor ampere rating as in Table 5.2.

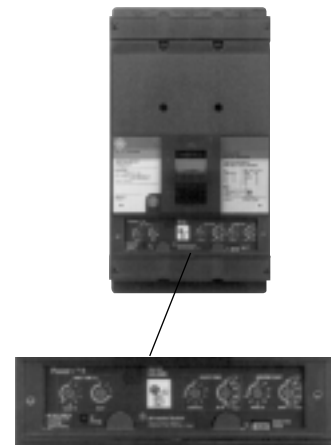


Power+™ 4 Tripping Functions

Power+ 4 is the standard electronic trip device for GE J and K frame circuit breakers. This trip unit is integral to the breaker and is not available separately. Operation is fully automatic and, normally, no external logic or control power inputs are required.

Protection Trip Unit

The current sensor-powered solid-state logic unit incorporates rotary adjustment knobs for up to four functions. The functions available are Current Setting (standard), Instantaneous Pickup (standard) or Short-time Pickup with Fixed Instantaneous (optional), Ground Fault Delay (optional), and Ground Fault Pick Up (optional). The Long-time Delay features four user selectable bands, and there are three short time constant delay bands with I²t in or I²t out.



Flux Shift Trip Device

A low energy, positive action tripping device is automatically powered and controlled by the protection programmer.

Current Sensor Package

Three phase current sensors are incorporated into a single package for maximum flexibility and reliability.

Table 12.1
Power+ 4 Protection Functions and Setting Values

Protective Function	Pickup Settings	Nominal Midpoint Delay Settings	Delay Curve
Long-Time (C)	.5, .6, .7, .8, .9, .95, 1.0 multiple of Sensor Rating (X)	3, 6, 8, 12, 25 seconds (Bands 1, 2, 3, 4) at 600% C	Fixed
Short-Time	1.5, 2, 2.5, 3, 4, 5, 7, 9 multiple of Long-Time Setting (C)	.13, .26, .42 second (Min, Int, Max) I ² t Out	I ² t In, I ² t Out
Adjustable Instantaneous ①	1.5, 2, 3, 5, 7, 9, 10 multiple of Sensor Rating (X)	No Delay	N/A
Ground-Fault	.2, .25, .3, .35, .4, .45, .5, .6 multiple of Sensor Rating (X)	.13, .26, .42 second (Min, Int, Max) I ² t Out	I ² t In, I ² t Out

① When short-time protection is provided, instantaneous is fixed at 15X.

Table 12.2
Power+ 4 Trip Unit Selection

Trip Unit Functions		Suffix			
		None	N	G	NG
Long-Time	Adjustable Current Setting	X	X	X	X
	Fixed Long-Time Pickup	X	X	X	X
	Fixed Long-Time Delay	X	X	X	X
	Long-Time Timing Light	X	X	X	X
Short-Time	Adjustable Short-Time Pickup		X		X
	Fixed Short-Time Delay I ² t Ramp		X		X
Instantaneous	Adjustable Instantaneous Pickup	X		X	
	Fixed Instantaneous Pickup②		X		X
Ground Fault①	Adjustable Group Fault Pickup - Zero Sequence			X	X
	Adjustable Ground Fault Delay			X	X

① For single-phase, 3-wire or 3-phase, 4-wire applications, select appropriate neutral current sensor.

② T.JL4V with 500A and 600A sensors available with adjustable instantaneous only.



Current-Limiting Circuit Breakers

Note: OBSOLETE — for reference use only.

To meet increased demands for electrical service by residential, commercial, and industrial users, and to reduce system power losses and cost, larger low-impedance transformers are being installed by power companies. The result is systems with higher available short circuit currents. Traditional branch circuit equipment cannot handle the fault currents available in these systems which can reach 150,000 rms symmetrical amperes or more.

THLC current-limiting circuit breakers (CLB) react far more quickly to high-level short circuits than conventional breakers. In fact, the *higher the short circuit current, the faster the THLC operates*, because of its magnetic repulsion design.

Example: if a 150,000 RMS symmetrical ampere short circuit at 480 volts ac were to threaten your system, the THLC1 would interrupt it in *just 3 milliseconds*. At the same time, the THLC1 would limit peak let-through current to less than 42,000 amperes – only 13% of the destructive energy that would flow through without THLC1 protection, and a small enough current to be controlled by standard series-connected circuit breakers.

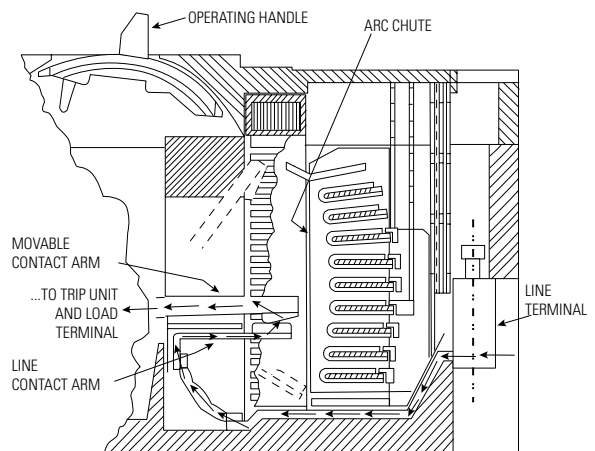
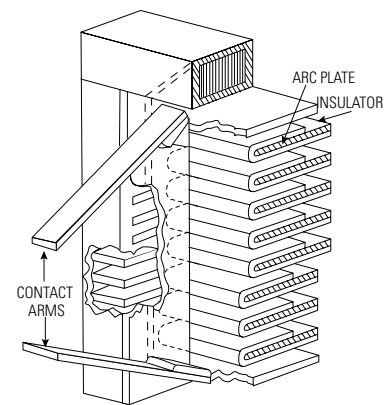
But a fast break isn't enough; a CLB must control arc voltage quickly and efficiently, too.

GE THLC current limiting breakers force the arc into patented, U-shaped arc plates where sufficient voltage is developed to “dominate” the short circuit *fast*. During a 480 volt interruption, for example, the THLC1 quickly counters the driving voltage with a peak arc-voltage in the range of 800 volts – sufficient voltage to quench the short circuit without causing unwanted dielectric breakdown elsewhere down the line.

And for long, reliable life, the THLC is also equipped with special baffles to vent hot gases out of the breaker during the arc-quenching process.

The THLC current-limiting circuit breaker is designed to protect standard circuit breakers with ratings as low as 10,000 AIC on systems with available currents up to 200,000 RMS symmetrical amps at 240 Vac or at 480 Vac. It's available in amp ratings ranging from 15 to 400 amps.

- *UL-listed and CSA certified IC ratings of 200kAIC at 240 and 480 volts and 50kAIC at 600 volts*
- *Patented arc plates provide fast, efficient control of short-circuit conditions*
- *Resettable, fuse-free construction minimizes downtime*
- *Magnetic repulsion contact design interrupts short-circuit currents of up to 200,000 amperes at 480 volts in less than 3 milliseconds – the higher the current, the faster the breaker operates*
- *Standard circuit breaker protection with ratings as low as 10,000 AIC on systems with available currents up to 200,000 symmetrical rms amperes*
- *150-ampere frame size with ampere ratings ranging from 15-150 amperes*
- *225-ampere frame size with ampere ratings ranging from 125-225 amperes*
- *400-ampere frame size with ampere ratings ranging from 250-400 amperes*





Adjustable Magnetic Ratings — Molded Case Circuit Breakers

Table 14.1
Adjustable Magnetic Ranges^① (In RMS Symmetrical Amperes, Nominal)

F225, TFL ^②			J400			J600			K800			K1200		
Trip Unit	Lo	Hi	Trip Unit	Lo	Hi	Trip Unit	Lo	Hi	Trip Unit	Lo	Hi	Trip Unit	Lo	Hi
70	600	900	125	375	1250	250	750	2500	300	900	3000	600	1800	6000
80	600	900	150	450	1500	300	900	3000	350	1050	3500	700	2100	6400
90	600	900	175	525	1750	350	1050	3500	400	1200	4000	800	2400	6400
100	600	1250	200	600	2000	400	1200	4000	450	1350	4500	1000	3000	10,000
110	600	1250	225	675	2250	450	1350	4500	500	1500	5000	1200	3600	10,000
125	600	1250	250	750	2500	500	1500	5000	600	1800	6000			
150	700	1500	300	900	3000	600	1800	6000	700	2100	6400			
175	800	1750	350	1050	3500				800	2400	6400			
200	900	2000	400	1200	4000									
225	1000	2250												

THLC-2 ^②			THLC-4 ^② , TLB-4 ^②			TB-4, TB-6			TB-8		
Trip Unit	Lo	Hi	Trip Unit	Lo	Hi	Trip Unit	Lo	Hi	Trip Unit	Lo	Hi
125	600	1250	250	1100	2500	125	375	1250	600	1800	3000
150	700	1500	300	1400	3000	150	450	1500	700	2100	4000
175	800	1750	350	1600	3500	175	525	1750	800	2400	4000
200	900	2000	400	1800	4000	200	600	2000			
225	1000	2250				225	675	2250			
						250	750	2500			
						300	900	3000			
						350	1050	3500			
						400	1200	3500			
						500	1500	3000 TB-6			
						600	1800	3000 TB-6			

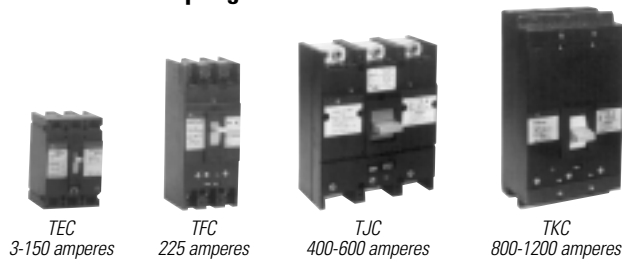
① Consult published trip-time curves for tolerances.

② Obsolete type.

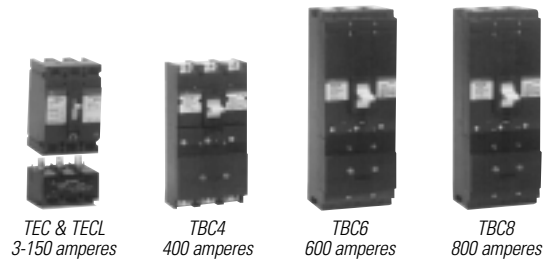


Mag-Break® Motor Circuit Protectors

Standard Interrupting Devices



Limiter Assisted Devices



Mag-Break motor circuit protector provides accurate and fast clearing of faults on motor circuits — including low level faults — the type most prevalent in motor installations. Mag-Break serves to minimize damage to motors and motor control apparatus in addition to protecting motor branch circuit conductors. Continuous current ratings and adjustable instantaneous trip ranges have been designed to meet NEC requirements concerning motor full load and locked rotor current. The Mag-Break instantaneous trip point can be set low and precisely (just above asym. motor inrush) assuring fault protection and eliminating nuisance tripping.

Each pole of the Mag-Break motor circuit protector contains a current sensing element to trip the breaker instantaneously when the preselected current setting is exceeded. Mag-Break's unique magnetic system permits independent factory calibration of both the Hi and Lo ends of the trip range. This provides field adjustability with accuracy and repeatability at all Mag-Break trip scale positions.



In addition to the two independent factory calibrations, Mag-Break is field adjustable by screwdriver adjustments on the front of each breaker. The field adjustable setting is continuous over the entire range from Hi to Lo, and each breaker rating label contains a table converting setting position to amperes. An over-current on any pole will cause all three poles to trip simultaneously, thus preventing costly single phasing problems.

Table 15.1
Trip Set Positions to Trip Amperes

Catalog Number 3-Pole	Cont. Amperes	Trip Setting Positions ^②						
		Lo	2	4	6	8	10	Hi
TEC36003	3	8	13	18	23	28	33	38
TEC36007	7	18	30	42	54	66	78	90
TEC36015	15	42	68	94	120	146	172	198
TEC36030	30	90	140	190	240	290	340	390
TEC36050	50	180	260	340	420	500	580	660
TEC36100	100	300	468	636	804	972	1140	1300
TEC36150	150	600	950	1300	1650	2000	2350	2700
TFC36225	225	600	780	1020	1200	—	—	1400
TFC36225A	225	1000	1200	1630	1920	—	—	2250
TJC36400B	400	1200	1400	1850	3250	—	—	4000
TJC36400E	400	330	435	600	860	—	—	1100
TJC36400F	400	550	720	945	1280	—	—	1670
TJC36400G	400	1000	1280	1780	2360	—	—	3300
TJC36600G	600	1000	1280	1780	2360	—	—	3300
TJC36600H	600	1800	2100	2600	3600	—	—	6000
TKC36800L ^①	800	3000	3600	4300	5100	—	—	6000
TKC36800M ^①	800	5000	6000	7000	8400	—	—	10000
TKC361200L ^①	1200	3000	3600	4300	5100	—	—	6000
TKC361200M ^①	1200	5000	6000	7000	8400	—	—	10000
Limiter Assisted Devices								
TBC43225F14F	225	550	720	945	1280	—	—	1670
TBC43400F14G	400	1000	1280	1780	2360	—	—	3300
TBC63600J14L	600	3000	3600	4300	5100	—	—	6000
TBC83800K18	800	2400	—	—	—	—	—	6000

^① For motors above 350 Hp use Power+ 4 or MicroVersaTrip Plus equipped breakers.
^② Tolerance ±20% of nominal value.



Accessories

Undervoltage Protection



The Undervoltage Release instantaneously trips the breaker when voltage drops to 35-70% of normal rating. The device retrips the breaker if it is closed before normal voltage is restored.

Standard duty and heavy-duty types are available.



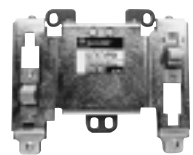
Time Delay Unit — for use with UVR. This unit prevents nuisance tripping due to momentary loss of voltage.

A separate, externally mounted unit has 120 volt ac input and 125 volt dc output with delay adjustable from .1 to .5 seconds. It is used in conjunction with 125-volt dc undervoltage release, which must be ordered separately.

Mechanical Interlocking



Mechanical interlocks permit only one of two interconnected circuit breakers in a switchboard to be on at a time. Both circuit breakers can be OFF at the same time.



The walking beam interlock interconnects two circuit breakers from the rear, making it ideal for use in applications where a dead front would make it impossible to mount a mechanism on the face of the breaker.



The face mounted interlock interconnects the handles of two circuit breakers. This makes it possible to use the interlock with a motor operator.

Auxiliary Switch



An auxiliary switch can be used to operate other accessories, indicating lights, relays, automatic reset, etc. It is available with one to four SPDT (form C) elements for flexibility. Switches open and close as the breaker is either manually or remotely tripped or turned OFF.

Bell Alarm



A bell alarm actuates a warning signal or other circuitry when the breaker is tripped under overload, short circuit, shunt trip, undervoltage trip, and 3 coil shunt trip conditions. Not actuated during normal ON-OFF operation.

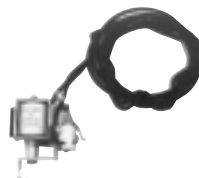
Motor Operator for Remote "On-Off"



A motor-operated mechanism can open, close, or reset a breaker remotely. This convenient attachment mounts integrally with the breaker, without modification to the breaker or its handle. Just lift the cover of the accessory mechanism to operate the breaker manually. Breaker ON-OFF is indicated in the operating mechanism cover.

Shunt Trip for Remote Tripping

Standard



A Shunt Trip Device can be used to trip and open a breaker by remote control. When the breaker opens, the shunt trip coil circuit is de-energized by means of an auxiliary switch. They meet UL requirements for operation at 55% of rated voltage for use on ground fault systems.

Three-coil (Blown Fuse Detector)

(not illustrated)

This provides single-phase protection for fused circuit breaker combinations, factory installed only.

It mounts in right pole for TEB, TED, and in left pole for TFK, TJK, TKM. Installed internally similar to standard shunt trip with leads connected across the fuses, it trips the breaker when a fuse blows or if the breaker is closed under load with a fuse open and fits all breaker types including molded case switches. Suitable for system voltages 208 to 600 volts ac.



Molded Case Circuit Breakers

Accessory Data

Breaker Type	Bell Alarm Switch			Auxiliary Switch ^③ or Shunt Trip			Undervoltage Release			Blown Fuse Trip Device			Combination Accessories			Total Number of Accessories Within Any One Circuit Breaker	
	Mounting Pole			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	GEH-	L	R	GEH-	L	R	GEH-	L	R	GEH-		
Q-Line					UL ^⑧			N/A								One only	
TQD, THQD						UL										One only	
E150, TEB, TEC, TED, THED, TEL, TEML, TB1 ^② , THLC-1	UL ^①	—	UL	4576 5402	UL ^①	UL	3418 Aux. 3416 S.T. 5403 Aux. 5401 S.T.	—	UL	3417 5400	—	UL ^⑤	3434	—	—	—	2-pole circuit breaker – any one 3-pole circuit breaker – any two except UVR and 3-coil shunt trip
F225 ^⑥ , TFC, TFJ, TFK, THFK, TFL, TLB-2, TLB-4 THLC-4	—	—	UL ^⑤ ⑥	4620 5406	UL	UL	4653 5406	UL	UL	4653 5406	UL ^⑤	—	4622	—	—	Any two	
J600 TJC, TJD, TJJ, TJK, THJK, TB4 ^② , TBC4 ^②	—	UL ^⑤	—	3320	UL	UL	3321 Aux. 3435 S.T.	—	UL	5407	UL ^⑤	—	3346	—	—	Any two plus bell alarm	
K1200 TKC, TKM, THKM, TB6 ^② , TBC6 ^② , TB8, TBC8	—	UL ^⑤	—	4305	UL	UL	3321 Aux. 3344 S.T.	—	UL	5408	UL ^⑤	—	3346	—	—	Any two plus bell alarm	
MicroVersaTrip™ 4 and RMS-9, TJ4V, THJ4V, TJL4V, TK4V, TKL4V, TJH, TJL, TKH, TKL	—	UL	—	4626 4663	—	UL	4623 Aux. 4623 S.T.	—	UL	4623	—	UL	4624 ^⑦	—	UL	4323	Any one plus bell alarm. UL Listed for field installation except bell alarm
Accessory Lead ^⑨ Color Coding													Same as individual accessories			All accessory contacts shown with the circuit breaker in tripped position. ^⑩	

① Left pole mounting not available for 2 pole TEB, TED.

② UL listed at 200,000 AIC without internal accessories. 100,000 AIC with internally mounted accessories.

③ 600 volts AC auxiliary switches are not UL listed.

④ Formerly green.

⑤ Not available with lead exit from the back of breaker.

⑥ UL listed interrupting capacity with accessories: 10K AIC at 600 volts, AC, 22K AIC at 480 volts AC, 22K AIC at 240 volts AC.

⑦ Maximum available short circuit application is 85,000 sym rms A.

⑧ Accessory mounts in a one-inch frame and increases overall breaker size by one pole added to left side.

⑨ Leads are #18 AWG 125°C Vulkene[®] insulated.

⑩ Auxiliary switch is activated in both OFF and tripped positions.



Accessories Electrical Data

Q-Line

THQL, THQB, THQC, TQD, THQD

Auxiliary Switch

Circuit Breaker	Catalog Number	Number of Switches	Switch Rating
TQB, THQB, TQL, THQL	TQAS2A1	1-SPST (A)	6 amperes-120 Vac 3 amperes-24 Vac
TQC, THQC	TQCAS2A1	1-SPST (A)	6 amperes-120 Vac 3 amperes-24 Vac
TQD, THQD	TQDAS2AB1RS	1-SPDT (AB)	6 amperes-240 Vac 1/2 ampere-125 Vdc 1/4 ampere-250 Vdc

Shunt Trip

Circuit Breaker	Catalog Number	Volts		Amperes (Inrush)	
		ac 50-60 Hz	dc	ac	dc
TQB, THQB, TQL, THQL	TQST 1	120-240		2.0	
	TQST 7		12		4.0
	TQST 8		24-48		2.4
TQC, THQC	TQCST 1	120-240		2.0	
	TQCST 7		12		4.0
	TQCST 8		24		2.4
TQD, THQD	TQDST 1	120		.9	
	TQDST 2	240		.8	
	TQDST 7		12		7.5
	TQDST 8		24		4.8
	TQDST 9		48		2.4



E150
TED, THED, TEB, TEC, THLC-1, TB1, TEL, TEML

Auxiliary Switch (Installation Instructions GEH-3418 or GEH-5403)

Catalog Number ^①	Number of Switches	Switch Rating
TEDAS2AB1R	1	6 amperes, 1/2 horsepower, 120, 240 volts ac 5 amperes, 120 volts ac "Lamp Load"
TEDAS2AB2	2	1/2 ampere, 125 volts dc 1/4 ampere, 250 volts dc

① For TEL, TEML breakers substitute TEL for TED in Catalog Number (second installation instruction noted applies.)

Shunt Trip (Installation Instructions GEH-3416 or GEH-5401)

Catalog Number ^①	Volts		Amperes (Inrush)	
	ac 50-60 Hz	dc	ac	dc
TEDST12	120/240	125	1.0/1.9	1.0
TEDST13	480/600	—	1.5/1.9	—
TEDST7	—	12	—	7.5
TEDST8	—	24	—	4.6
TEDST9	—	48	—	2.4
TEDST11	—	250	—	.4

① For TEL, TEML breakers substitute TEL for TED in Catalog Number (second installation instruction noted applies.)

Undervoltage Release (Installation Instructions GEH-5400 or GEH-3417)

Catalog Number ^{①②} Heavy Duty/Std. Duty	Current mA	Volts		Dropping (25 watt) Resistor
		ac 50-60 Hz	dc	
TEDXUVAR/—	100	24	—	—
TEDXUVBR/UV 1	18	120	—	—
TEDXUVCR/UV2	18	240	—	7,500
—/UV 4	18	480	—	20,000
—/UV 6	18	600	—	30,000
TEDXUVDR/UV 7	200	—	12	—
TEDXUVER/UV 8	100	—	24	—
—/UV 9	50	—	48	—
TEDXUVER/—	33	—	60	—
TEDXUVGR/UV 10	18	—	125	—
TEDXUVHR/UV 11	18	—	250	7,500

① For TEL, TEML breakers substitute TEL for TED in Catalog Number (second installation instruction noted applies.)

② For TEL, TEML breakers standard duty only.

Bell Alarm (Installation Instructions GEH-4576 or GEH-5402)

Catalog Number ^①	Mounting	Switch Rating
TEDBAR	Right Pole	5 amperes, 240 volts ac
TEDBAL	Left Pole	5 amperes resistive, 2 1/2 amperes inductive at 28 volts dc

① For TEL, TEML breakers substitute TEL for TED in Catalog Number (second installation instruction noted applies.)

Motor Operators (Installation Instructions GEH-5007)

Catalog Number	Control			Timing (Seconds)		Recommended Fuse
	Volts 50-60 Hz	Amperes		Closing	Opening Reset	
		Inrush	Running			
TEDMOMA1	120 Vac	10.5	5.0	1.5	1.75	.5 Ampere (Time Delay)
TEDMOMA2	240 Vac	2.2	.57	1.5	1.75	
TEDMOMA8	24 volts	2.0	1.0	1.5	1.75	



F225
TFJ, TFC, TFK, THFK, THLC-2, THLC-4, TFL, TLB-4

Auxiliary Switch (Installation Instructions GEH-4653 or GEH-5406)

Catalog Number ^①	Number of Switches	Switch Rating
TFKASA2AB2	2	6 amperes, 1/2 horsepower, 120, 240 volts ac 5 amperes, 120 volts ac "Lamp Load"
TFKASA2AB4	4	1/2 ampere, 125 volts dc 1/4 ampere, 250 volts dc

① For TFL breakers substitute TFL for TFK in Catalog Number (second installation instruction noted applies.)

Shunt Trip (Installation Instructions GEH-4653 or GEH-5406)

Catalog Number ^①	Volts		Amperes (Inrush)	
	ac 50-60 Hz	dc	ac	dc
TFKSTA12	120/240	125	2.6/5.2	2.7
TFKSTA13	480/600	—	1.5/1.9	—
TFKSTA 7	—	12	—	4.2
TFKSTA 8	—	24	—	4.2
TFKSTA 9	—	48	—	1.0
TFKSTA11	—	250	—	.2

① For TFL breakers substitute TFL for TFK in Catalog Number (second installation instruction noted applies.)

Undervoltage Release (Installation Instructions GEH-4653 or GEH-5406)

Catalog Number ^①	Current mA	Volts		Dropping (25 watt) Resistor
		ac 50-60 Hz	dc	
TFKUVA 1	18	120	—	—
TFKUVA 2	18	240	—	7,500
TFKUVA 4	18	480	—	20,000
TFKUVA 6	18	600	—	30,000
TFKUVA 7	200	—	12	—
TFKUVA 8	100	—	24	—
TFKUVA 9	50	—	48	—
TFKUVA10	18	—	125	—
TFKUVA11	18	—	250	7,500

① For TFL breakers substitute TFL for TFK in Catalog Number (second installation instruction noted applies.)

Bell Alarm (Installation Instructions GEH-4620 or GEH-5406)

Catalog Number ^①	Switch Rating
TFKBAAR ^{②③}	5 amperes, 240 volts ac
	5 amperes resistive,
	2 1/2 amperes inductive at 28 volts dc

① For TFL breakers substitute TFL for TFK in Catalog Number (second installation instruction noted applies.)

② Changes circuit breaker interrupting capacity to:
10KA @ 600 Vac, 22KA @ 480 Vac, 22KA @ 240 Vac.

③ UL listed for field installation with model 4 frames and trips.

Motor Operators^① (Installation Instructions GEH-3313)

Catalog Number	Control			Timing (Seconds)		Recommended Fuse
	Volts 50-60 Hz	Amperes		Closing	Opening Reset	
		Inrush	Running			
TFKMOMA1	120 Vac	9.5	5.5	.25	.25	1 Ampere (Time Delay)
	125 Vdc	7.0	4.5			
TFKMOMA2	240 Vac	5.0	2.5	.45	.50	
	250 Vdc	6.0	4.0			
TFKMOMA8	24 Vdc	24.0	16.0	.25	.25	2 Ampere (Time Delay)
TFKMOMA9	48 Vdc	14.0	9.0			

① Not available for THLC-2, THLC-4.



J600
TJC, TJJ, TJK, THJK, TJD, TB4, TBC4

Auxiliary Switch (Installation Instructions GEH-3321)

Catalog Number	Number of Switches	Switch Rating
TJKASA2AB1	1	6 amperes, 1/2 horsepower, 120, 240 volts ac
TJKASA2AB2	2	5 amperes, 120 volts ac "Lamp Load"
TJKASA2AB3	3	1/2 ampere, 125 volts dc
TJKASA2AB4	4	1/4 ampere, 250 volts dc

Shunt Trip (Installation Instructions GEH-3435)

Catalog Number	Volts		Amperes (Inrush)	
	ac 50-60 Hz	dc	ac	dc
TJKSTA12	120-240	125	.9-1.9	1.0
TJKSTA13	480-600	—	1.5-1.9	—
TJKSTA7	—	12	—	7.5
TJKSTA8	—	24	—	4.6
TJKSTA9	—	48	—	2.4
TJKSTA11	—	250	—	.4

Undervoltage Release (Installation Instructions GEH-5408)

Catalog Number	Current mA	Volts		Dropping (25 watt) Resistor
		ac 50-60 Hz	dc	
TJUV1R	18	120	—	—
TJUV2R	18	240	—	7,500
TJUV4R	18	480	—	20,000
TJUV6R	18	600	—	30,000
TJUV7R	200	—	12	—
TJUV8R	100	—	24	—
TJUV9R	50	—	48	—
TJUV10R	18	—	125	—
TJUV11R	18	—	250	7,500

Bell Alarm (Installation Instructions GEH-3320)

Catalog Number	Mounting	Switch Rating
TJKBAAL	Center Pole	5 amperes, 240 volts ac, 5 amperes resistive, 2 1/2 amperes inductive at 28 volts dc

Heavy Duty Undervoltage Release (Installation Instructions GEH-5409)

Catalog Number	Current mA	Volts		Dropping (25 watt) Resistor
		ac 50-60 Hz	dc	
TJMDVAS	100	24	—	—
TJMDVBS	18	120	—	—
TJMDVCS	18	240	—	7,500
TJMDVDS	200	—	12	—
TJMDVES	100	—	24	—
TJMDVFS	33	—	60	—

Motor Operators (Installation Instructions GEH-4676)

Catalog Number ^①	Control			Timing (Seconds)		Recommended Fuse
	Volts ac 50-60 Hz	Amperes		Closing	Opening Reset	
		Inrush	Running			
TJKMOMA1	120 Vac	9.5	5.5	.30	.30	1 Ampere (Time Delay)
	125 Vdc	10.0	3.5			
TJKMOMA2	240 Vac	5.0	3.0	.35	.35	
	250 Vdc	5.5	2.5			
TJKMOMA8	24 Vdc	22.0	15.0	.60	.50	2 Ampere (Time Delay)
TJKMOMA9	48 Vdc	14.0	10.0	.35	.35	

① TJV, TJH-S breaker requires mounting plate Catalog Number 286A7558G8.



K1200

TKC, TKMA, THKMA, TB6, TBC6, TB8, TBC8

Auxiliary Switch (Installation Instructions GEH-3321)

Catalog Number	Number of Switches	Switch Rating
TKMAAS2AB1	1	6 amperes, 1/2 horsepower, 120, 240 volts ac
TKMAAS2AB2	2	5 amperes, 120 volts ac "Lamp Load"
TKMAAS2AB3	3	1/4 ampere, 250 volts dc
TKMAAS2AB4	4	1/2 ampere, 125 volts dc

Shunt Trip (Installation Instructions GEH-3344)

Catalog Number	Pole Mounting Suffix	Volts		Amperes (Inrush)	
		ac 50-60 Hz	dc	ac	dc
TKMASTA12	R L	120-240	125	.9-1.9	1.0
TKMASTA13		480-600	—	1.5-1.9	—
TKMASTA7		—	12	—	7.5
TKMASTA8		—	24	—	4.3
TKMASTA9		—	48	—	2.4
TKMASTA11		—	250	—	.4

Undervoltage Release (Installation Instructions GEH-5408)

Catalog Number	Pole Mounting Suffix	Current mA	Volts		Dropping (25 watt) Resistor
			ac 50-60 Hz	dc	
TKUV1	R	18	120	—	—
TKUV2		18	240	—	7,500
TKUV4		18	480	—	20,000
TKUV6		18	600	—	30,000
TKUV7		200	—	12	—
TKUV8		100	—	24	—
TKUV9		50	—	48	—
TKUV10		18	—	125	—
TKUV11		18	—	250	7,500

Bell Alarm

Catalog Number	Mounting	Switch Rating
TKMABAAL	Center Pole	5 amperes, 240 volts ac, 5 amperes resistive, 2 1/2 amperes inductive at 28 volts dc

Heavy Duty Undervoltage Release (Installation Instructions GEH-5410)

Catalog Number	Current mA	Volts		Dropping (25 watt) Resistor
		ac 50-60 Hz	dc	
TKMDVAS	100	24	—	—
TKMDVBS	18	120	—	—
TKMDVCS	18	240	—	7,500
TKMDVDS	200	—	12	—
TKMDVES	100	—	24	—
TKMDVFS	33	—	60	—

Motor Operators (Installation Instructions GEH-4675)

Catalog Number	Control			Timing (Seconds)		Recommended Fuse
	Volts ac 50-60 Hz	Amperes		Closing	Opening Reset	
All K1200 ^①		Inrush	Running			
TKMMOMA1	120 Vac	9.0	6.0	.30	.30	1 Ampere (Time Delay)
	125 Vdc	10.5	4.5			
TKMMOMA2	240 Vac	5.0	3.0	.40	.30	
	250 Vdc	4.5	3.0			
TKMMOMA8	24 Vdc	22.0	15.0	.60	.35	2 Ampere (Time Delay)
TKMMOMA9	48 Vdc	14.0	10.0	.40	.30	

^① TK4V, TKH-S breaker requires mounting plate Catalog Number 286A7558G7.



J600 & K1200 MicroVersaTrip Accessories Right Pole Mounting

Auxiliary Switch (Installation Instructions GEH-4623)

Catalog Number	Number of Switches	Switch Rating
TVAS2AB2R	2	6 amperes – 240 volts ac, 1/2 ampere – 125 volts dc, 1/4 ampere – 250 volts dc
TVAS2AB4R	4	
TVAS6AB2R①	2	6 amperes – 600 volts ac, 1/2 ampere – 125 volts dc, 1/4 ampere – 250 volts dc
TVAS6AB4R①	4	

① Not UL listed.

Shunt Trip (Installation Instructions GEH-4623)

Catalog Number	Volts		Amperes (Inrush)		Coil Resistance
	ac 50-60 Hz	dc	ac	dc	
TVST7R		12		2.5	1.6
TVST8R		24		4.6	5.2
TVST9R		48		2.4	46.0
TVST11R		250		0.4	1250.0
TVST12R	120	125	1.0	1.0	130.0
	240		1.9		
TVST13R	480		1.5		313.0
	600		1.9		

Undervoltage (Installation Instructions GEH-4623)

Catalog Number	Volts		Current mA		Coil Resistance	Bridge Rectifier	External Resistor	
	ac 50-60 Hz	dc	ac	dc			Ohms	Watts
TVUV1R	120		18		7100	Yes	None	
TVUV2R	240		18		7100		7,100	12W
TVUV3R	380		18		7100		15,000	25W
TVUV4R	480		18		7100		20,000	25W
TVUV6R	600		18		7100		30,000	25W
TVUV7R		12		200	60	No	None	
TVUV8R		24		100	240			
TVUV9R		48		50	960			
TVUV10R		125		18	7100			
TVUV11R		250		18	7100			

Combination Shunt Trip/Two Auxiliary Switches (Installation Instructions GEH-4623)

Catalog Number 600 Volt Auxiliary Switch	Catalog Number 250 Volt Auxiliary Switch	Shunt Trip Volts		Coils	Switch Rating
		ac 50-60 Hz	dc		
TV6AB2ST7R	TV2AB2ST7R		12	Same as Shunt Trips	Same as Auxiliary Switches
TV6AB2ST8R	TV2AB2ST8R		24		
TV6AB2ST9R	TV2AB2ST9R		48		
TV6AB2ST11R	TV2AB2ST11R		250		
TV6AB2ST12R	TV2AB2ST12R	120	125		
		240			
TV6AB2ST12R	TV2AB2ST12R	480			
		600			



Molded Case Circuit Breakers

Combination Undervoltage/Two Auxiliary Switches (Installation Instructions GEH-4623)

Catalog Number 600 Volt Auxiliary Switch	Catalog Number 250 Volt Auxiliary Switch	Volts		Coils	Switch Rating
		ac 50-60 Hz	dc		
TV6AB2UV1R	TV2AB2UV1R	120		Same as Undervoltage Release	Same as Auxiliary Switches
TV6AB2UV2R	TV2AB2UV2R	240			
TV6AB2UV3R	TV2AB2UV3R	380			
TV6AB2UV4R	TV2AB2UV4R	480			
TV6AB2UV6R	TV2AB2UV6R	600			
TV6AB2UV7R	TV2AB2UV7R		12		
TV6AB2UV8R	TV2AB2UV8R		24		
TV6AB2UV9R	TV2AB2UV9R		48		
TV6AB2UV10R	TV2AB2UV10R		125		
TV6AB2UV11R	TV2AB2UV11R		250		

Motor Operators (Installation Instructions GEH-4676)

Catalog Number ^①	Control			Timing (Seconds)		Recommended Fuse
	Volts ^②	Amperes		Closing	Opening Reset	
		Inrush	Running			
TJKMOMA1	120 Vac	9.5	5.5	.30	.30	1 Ampere (Time Delay)
	125 Vdc	10.0	3.5			
TJKMOMA2	240 Vac	5.0	3.0	.60	.35	
	250 Vdc	5.5	2.5			
TJKMOMA8	24 Vdc	22.0	15.0	.35	.30	2 Ampere (Time Delay)
TJKMOMA9	48 Vdc	14.0	10.0	.35	.30	

① Requires mounting plate Catalog Number 286A7758G8.

② AC voltages are 50-60 Hz.

Motor Operators

Catalog Number	Control			Timing (Seconds)		Recommended Fuse
	Volts ^②	Amperes		Closing	Opening Reset	
		Inrush	Running			
TKMMOMA1	120 Vac	9.0	6.0	.30	.30	1 Ampere (Time Delay)
	125 Vdc	10.5	4.5			
TKMMOMA2	240 Vac	5.0	3.0	.60	.35	
	250 Vdc	4.5	3.0			
TKMMOMA8	24 Vdc	22.0	15.0	.40	.30	2 Ampere (Time Delay)
TKMMOMA9	48 Vdc	14.0	10.0	.40	.30	

① Requires mounting plate Catalog Number 286A7558G7.

② AC voltages are 50-60 Hz.

Center Pole Mounting Only

Bell Alarm

Catalog Number	Single-Pole Double-Throw Switch Rating	Installation Instructions
TFKBAAR	5 amperes, 240 volts ac	GEH-4626
TFKBAAR	2½ amperes, 28 volts ac	GEA-4663



Accessories — Mechanical Data

Mounting Hardware



Front Connections

Front-connected Cu-Al lugs allow easy cable feed. The lug mounts directly to the mounting surface with screws and lockwashers.



Power Distribution Lugs

Multi-termination lugs enable wiring to multiple devices in UL 508 applications. The lugs are for use on the load side of the breaker only and mount directly to the mounting surface.



Back Connections

Back-connected studs need to be supported by a sub-base, but make positive contact with each line and load terminal. Studs stay in place while the breaker can be removed or installed.



Plug-In Mounting

A plug-in base assembly provides for quick changeout of breakers. The assembly backplate mounts to angle-iron cross-pieces. Breaker plug-in terminals align with one-piece backplate assembly.



STDA Flange Handle and Variable Depth Operating Mechanism

The STDA Flange Handle is for use with 150-1200 ampere frame circuit breakers. It is designed to meet automotive duty specifications, and NEMA 12 and NEMA 4/4X. UL recognized components are used. The mechanism is of Quick-Make, Quick-Break type with an integral mounting plate and low operating force. Mounting dimensions fit standard flange enclosures 8"-24" deep. Detailed installation instructions are provided.



SCH Cable Operators

Cable operators make it simple to switch circuit breakers mounted in a wide variety of applications. The handle mechanism is combined with one of eight operating cables, ranging in length from 3 to 10 feet, to cover a broad range of possible breaker mounting locations. The breaker operating mechanism mounts directly to the face of the breaker using hardware included with the mechanism. Flange mounted handles are available for NEMA Type 1, 3R, 12, 13, and 4/4X applications.

Handles and Operating Mechanisms



TDR Rotary Operating Handle

The Rotary-Operating Integral Handle mounts directly to the breaker, and operates through the door of the enclosure. A mechanical interlock prevents unauthorized opening of the enclosure when the handle is in the ON position. The locking hasp accommodates up to three padlocks. Suitable for horizontally or vertically mounted breakers. Suitable for NEMA 12K and NEMA 12 enclosures when used with gasket kit.



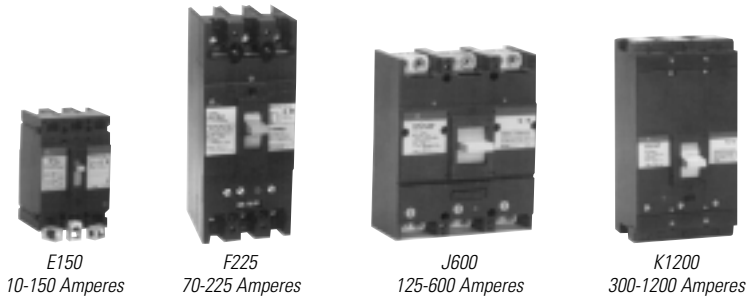
TDM Adjustable Depth Handles

TDM Door-Mounting Handles are available in shallow mounting types and extended shaft type for vertical or horizontal breaker mounting. The mechanism provides interlocking. The door-mounted handle accommodates up to three padlocks. Suitable for NEMA 12K and NEMA 12 enclosures.

NOTE: A pendulum-type handle designated Catalog Number THCH45 is also available for NEMA 4, NEMA 4X, and NEMA 5 enclosures.



Application Data – Molded Case Circuit Breakers



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. When a circuit breaker opens to clear a fault, the toggle handle goes to a TRIPPED position midway between the ON and OFF positions, thus clearly indicating that a circuit 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.

Circuit breakers have an advantage over fusible elements. 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. Molded case circuit breakers are “trip free” in construction. This means that the circuit breaker contacts cannot be held closed against a fault condition. Molded case circuit breakers are designed to protect insulated conductors against unsafe overheating that would ultimately damage the insulation and conductor.

Thermal-magnetic molded case circuit breakers are not designed to provide motor running overload protection. This function is normally performed by overload relays supplied in manual or magnetic motor starters. However, for infrequently started motors, MicroVersaTrip Plus equipped molded case circuit breakers can be used to provide motor overload, overcurrent, and ground fault protection.

Molded case circuit breakers meet UL Standard 489 covering “Molded Case Circuit Breakers, Molded Case Switches, and Circuit Breaker Enclosures.”

UL Standard 489 makes provision for two classes of products — UL Standard rated and UL 100 percent rated. The basis of these ratings for molded case and insulated case circuit breakers is as follows:

A. Standard rated under UL 489

1. Circuit breakers are rated to carry 100 percent of their nameplate current continuously in free air at 25°C when cabled per Table 31.1.
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 32.1.
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 32.1.



B. 100-percent rated under UL489

1. Circuit breakers are rated to carry 100 percent of their nameplate current continuously in an enclosure with ventilation and volume as specified on the device in a room ambient of 25°C when cabled as specified in Table 31.1 using 90°C insulation, sized to 75°C ampacity.
2. Room ambient temperatures other than 25°C, cable other than specified in Table 31.1, or enclosure volume and/or ventilation other than specified on the devices may require derating of the system.

100% Rated Circuit Breakers

Frame Type	Catalog Number	
	100% 65kAIC	100% Hi-Break®
J600	TJL1SS	TJH1SS
	TJL3SS	TJH3SS
	TJL4SS	TJH4SS
	TJL6SS	TJH6SS
K1200	TKL8SS	TKH8SS
	TKL12SS	TKH12SS

Standards and References

Underwriters Laboratories

UL 489 Branch Circuit and Service Circuit Breakers

Order from UL Publications Stock, 333 Pfingsten Road, Northbrook, Illinois 60062.

Federal Specifications

WC-375 Circuit Breaker, Molded Case; Branch Circuit and Service

National Electrical Code (NEC) (NFPA 70)

Latest Issue

Order from National Fire Protection Association, One Batterymarch Park, Quincy, Ma. 02269.



Federal Specifications

WC375a

Federal Class	Circuit Breaker Type	Poles	Volts (ac)
1a	THQL, THQAL, THQB, THQC	1	120/240
1b	THQL, THQAL, THQB, THQC	2 and 3	240
2a	TED, TEY	1	277
2b	THQL, THQAL, THQB, THQC	1	120
2c	THQL, THQAL, THQB, THQC	2 and 3	240
2d	TED	2 and 3	600 maximum
2e	TB1		
2f	THED		
3a	TFJ, TFK		
3b	THFK		
3c	TB4		
3d	TJJ, TJK		
4a	TB4		
4b	TJJ, TJK		
4c	THJK		
5a	TJK6, TKM8		
5b	THJK6, THKM8		
6	TB6		

WC375b

Federal Class	Circuit Breaker Type	Poles	Volts		
10a①, 10b, 11a, 11b, 12a	THQB, THQL, THQC, THHQB, THHQL, THHQC, THQBGF, THQLGF, THQCGF, THHQLGF, THHQBGF TEB, TED, TEY	1 or 2 2 or 3	120/240 240		
12b①	TQD, THQD, THQL, THQG, THQC, TEY, TED4	2 and 3	240		
12c	TEY, TED4	1	277		
13a	TEY, TED4	1	277		
13b	TED4, 15-30 amps	1	480④		
	TEY, TED-4, 15—100 amps	1, 2, and 3	277/480		
14a①	THHQL, THHQB, THHOC, TEY	1 and 2	120/240		
14b	THQP, TID, TEY	2 and 3	240		
15a①	TXQL, TXQB, TXQC, TEY	1 and 2	120/240		
15b	TEY, THFK	2 and 3	240		
16a②	TB1, TB4	2 and 3	480		
16b②	TB1, TB4, TB6	2 and 3	600		
17a②	TB4, TB6, TB8	2 and 3	600		
18a	TED6 15—100 amps	2 and 3	600 maximum		
19a	TFJ③, TFK③				
20a	TFJ③, TFK③				
21a	TJJ, TJK, TKM, TJ4V, TK4V				
22a	THED 15-100 amps				
23a	THJK, THKM, THJ4V, TJH				
24a	TJL, TKL, TJH, TKH				
26a	TB-1, TB-4, TB-6, TB-8				
Not defined	TED 4, TED 6, 110-150 amps			3	
	THED 4, THED 6 110-150 amps			3	
	TEL, TFL, TLB, THLC				

① Single unit or duplex construction must be specified.

② This class may incorporate a current limiting device within the breaker case.

③ 2-pole rated 480Vac maximum.

④ UL/CSA 347Vac maximum.



Current Ratings

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. All GE molded case circuit breakers described in this manual are to be used with 75°C ampacity conductors. The use of 90°C conductors is acceptable providing they are sized to the 75°C ampacities. Using a lug marked “Cu9A1” does NOT make the breaker suitable for use with 90°C conductors at 90°C ampacity. Thermal current measuring systems (bimetals and fuses) 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 is illustrated in Figure 29.1.
- 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 Figure 30.1.

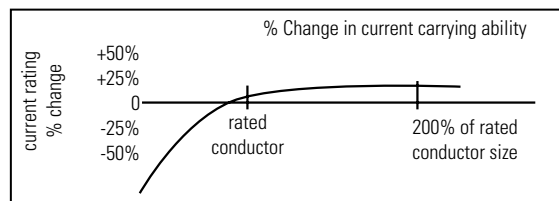
Notice that the curve in Figure 30.1 specifies the ambient temperature of the air surrounding the breaker not room temperature. To convert this information to room ambient it is necessary to know the temperature rise of the equipment housing the circuit breaker. This must include factors for group mounting of devices, ventilation, solar insulation, other radiant heat sources, etc. The curve in Figure 30.1 also applies only to devices connected with the UL sized conductor.

- 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 General Electric Company except as described on page 36, “Factor C — Frequency 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, 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; the higher the frequency, the less accurate the response.

At nominal system frequencies less than 50 hertz but above direct current, solid-state trip devices become inoperative due to sensor saturation. Thermal trip devices remain accurate while instantaneous trip solenoids lose accuracy. On direct current systems, solid-state trip units are completely inoperative, thermal trip units calibrate accurately, and instantaneous trip solenoids may or may not be accurate depending on the specific construction technique used.

Figure 29.1
Breaker current rating and conductor size are a matched pair; any insulation type may be used but the cross section must remain constant.





- 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 6000 feet. At altitudes above 6000 feet 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 6000 to 10,000 feet.
- 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 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.

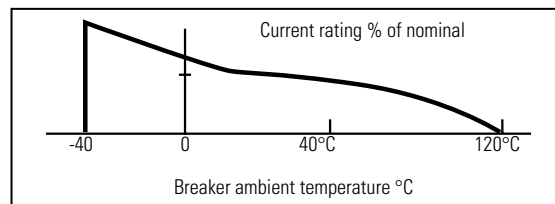
- F. An additional factor which needs to be considered is a safety factor. If the circuit breaker is run at the current level derived from factors A-E continuously, it will be within its rating and the conductor ratings, but it will be on the verge of tripping, and any perturbation from nominal could 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 affect breaker life and should be factored into the rating.

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

The trip time characteristics of GE solid state trip systems which use rating plugs, like MicroVersaTrip® Plus, do not change over ambient temperature variations which are inside the operating temperature range of the trip unit. The operating temperature range for MVT Plus molded case circuit breakers is -20°C to +55°C. The operating range for the trip unit is -20°C to +85°C. Accordingly, for breakers with MVT Plus, the items above should be used only for the purposes of determining if a larger frame is required. Rating plugs should be selected based solely on the load current in order to provide the tightest overload protection.

Selecting the rating plug based solely on the actual RMS current also permits use of smaller conductors. Referring to Example #2 on page 35, it can be seen that if a non-interchangeable trip thermal magnetic breaker had been selected, it would have been rated 400 amperes and (2) 3/0 AWG conductors per phase would have been required (see Table 32.1). Using the solid state trip breaker with interchangeable rating plug, a 300 ampere rating plug would be appropriate for the load and the conductor size is reduced to (1) 350 kcmil.

Figure 30.1
The effect of ambient temperature on the continuous current carrying ability of the breaker and cable system is shown on page 35, "Factor B – Ambient Temperature."



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



Table 31.1
Wire and Cable Size by Ampere Rating

Circuit breakers are calibrated and rated for use with the following wire sizes by ampere rating (based on 75°C insulation conductor ampacity).

Circuit Breaker Ampere Rating	Copper Conductor		Aluminum or Copper clad Aluminum Conductor	
	Paralleled	Size	Paralleled	Size
15 or less	—	14 AWG	—	12 AWG
20	—	12 AWG	—	10 AWG
25	—	10 AWG	—	10 AWG
30	—	10 AWG	—	8 AWG
35	—	8 AWG	—	8 AWG
40	—	8 AWG	—	8 AWG
45	—	8 AWG	—	6 AWG
50	—	8 AWG	—	6 AWG
60	—	6 AWG	—	4 AWG
70	—	4 AWG	—	3 AWG
80	—	4 AWG	—	2 AWG
90	—	3 AWG	—	2 AWG ^②
100	—	3 AWG	—	1 AWG ^②
110	—	2 AWG	—	1/0 AWG
125	—	1 AWG ^①	—	2/0 AWG
150	—	1/0 AWG	—	3/0 AWG
175	—	2/0 AWG	—	40 AWG
200	—	3/0 AWG	—	250 kcmil
225	—	4/0 AWG	—	300 kcmil
250	—	250 kcmil	—	350 kcmil
275	—	300 kcmil	—	500 kcmil
300	—	350 kcmil	—	500 kcmil
325	—	400 kcmil	2	4/0 AWG
350	—	500 kcmil	2	4/0 AWG
400	2	3/0 AWG	2	250 kcmil
450	2	4/0 AWG	2	300 kcmil
500	2	250 kcmil	2	350 kcmil
550	2	300 kcmil	2	500 kcmil
600	2	350 kcmil	2	500 kcmil
700	2	500 kcmil	3	350 kcmil
800	3	300 kcmil	3	400 kcmil
1000	3	400 kcmil	4	350 kcmil
			3	600 kcmil
1200	4	350 kcmil	4	500 kcmil
	3	600 kcmil		
1400	4	500 kcmil	5	500 kcmil
1600	5	400 kcmil	6	600 kcmil
	4	600 kcmil		
2000	6	400 kcmil	6	600 kcmil
	5	600 kcmil		
2500	8	400 kcmil	9	500 kcmil
	7	500 kcmil	8	600 kcmil
	6	600 kcmil	7	750 kcmil
3000	9	400 kcmil	10	500 kcmil
	8	500 kcmil	9	600 kcmil
	7	600 kcmil	8	750 kcmil
4000	12	400 kcmil	13	500 kcmil
	11	500 kcmil	12	600 kcmil
	10	600 kcmil	11	750 kcmil

① Number 1 Type RH, RHW, RUH, THW, THWN, or XHHW copper conductor may be used if the circuit breaker is so marked.

② Number 1 RH, RHH, RHW, THW, THWN, or XHHW aluminum conductor may be used if the circuit breaker is so marked.



Molded Case Circuit Breakers

Table 32.1
Properties of Conductors Rated for Use With Molded Case Circuit Breakers

Size AWG, KCM	Area Cir. Mils	Concentric Lay Stranded Conductors		Bare Conductors		Dc Resistance Ohms/M Ft. at 25°C, 77°F		
		No. Wires	Diam. Each Wire Inches	Diam. Inches	Area Square Inches ^①	Copper		Aluminum
						Bare Conductor	Tin'd. Conductor	
18	1620	Solid	.0403	.0403	.0013	6.51	6.79	10.7
16	2580	Solid	.0508	.0508	.0020	4.10	4.26	6.72
14	4110	Solid	.0641	.0641	.0032	2.57	2.68	4.22
12	6530	Solid	.0808	.0808	.0051	1.62	1.68	2.66
10	10380	Solid	.1019	.1019	.0081	1.018	1.06	1.67
8	16510	Solid	.1285	.1285	.0130	.6404	.659	1.05
6	26240	7	.0612	.184	.027	.410	.427	.674
4	41740	7	.0772	.232	.042	.259	.269	.424
3	52620	7	.0867	.260	.053	.205	.213	.336
2	66360	7	.0974	.292	.067	.162	.169	.266
1	83690	19	.0664	.332	.087	.129	.134	.211
0	105600	19	.0745	.372	.109	.102	.106	.168
00	133100	19	.0837	.418	.137	.0811	.0843	.133
000	167800	19	.0940	.470	.173	.0642	.0668	.105
0000	211600	19	.1055	.528	.219	.0509	.0525	.0836
250	250000	37	.0822	.575	.260	.0431	.0449	.0708
300	300000	37	.0900	.630	.312	.0360	.0374	.0590
350	350000	37	.0973	.681	.364	.0308	.0320	.0505
400	400000	37	.1040	.728	.416	.0270	.0278	.0442
500	500000	37	.1162	.813	.519	.0216	.0222	.0354
600	600000	61	.0992	.893	.626	.0180	.0187	.0295
700	700000	61	.1071	.964	.730	.0154	.0159	.0253
750	750000	61	.1109	.998	.782	.0144	.0148	.0236
800	800000	61	.1145	1.030	.833	.0135	.0139	.0221
900	900000	61	.1215	1.090	.933	.0120	.0123	.0197
1000	1000000	61	.1280	1.150	1.039	.0108	.0111	.0177
1250	1250000	91	.1172	1.289	1.305	.00863	.00888	.0142
1500	1500000	91	.1284	1.410	1.561	.00719	.00740	.0118
1750	1750000	127	.1174	1.526	1.829	.00616	.00634	.0101
2000	2000000	127	.1255	1.630	2.087	.00539	.00555	.00885

① Area given is that of a circle having a diameter equal to the over-all 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 of the National Electrical Manufacturers Association.

Table 32.2
Factor A — Wire 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	.99	.97	.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.



Molded Case Circuit Breakers

Table 33.1
Factor B — Circuit Breaker Ambient Temperature^①

Circuit Breaker Type	Circuit Breaker Ambient Temperature											
	25°C		40°C		50°C		60°C		70°C		80°C	
	B=	Minimum Wire Insulation Rating	B=	Minimum Wire Insulation Rating ^②	B=	Minimum Wire Insulation Rating ^②	B=	Minimum Wire Insulation Rating ^②	B=	Minimum Wire Insulation Rating ^②	B=	Minimum Wire Insulation Rating ^②
Q-Line	1.0	60/75	1.0	90	1.16	105	1.19	105	1.27	125	1.38	125
TQD, TJQD	1.0	75	1.0	90	1.08	105	1.17	105	1.26	125	1.38	125
TEB, TED, TEY, TB-1 100A	1.0	60/75	1.0	90	1.05	105	1.05	105	1.14	125	1.25	125
TED 600V, THED, TEL-150A THLC-1	1.0	75	1.0	90	1.0	105	1.1	105	1.21	125	1.38	125
TFJ, TFK, THFK, TFL, TLB-2, THLC-2	1.0	75	1.0	90	1.0	105	1.08	105	1.14	125	1.38	125
TJJ, TJK-4, THJK4, TB4, TLB-4, THLC-4	1.0	75	1.0	90	1.0	105	1.05	105	1.14	125	1.25	125
TJK6, THJK6	1.0	75	1.0	90	1.0	105	1.08	105	1.21	125	1.33	125
TKMA8, THKMA8, TB-8, TB-6	1.0	75	1.0	90	1.0	105	1.05	105	1.18	125	1.25	125
TKMA12, THKMA12	1.0	75	1.0	105	1.0	105	1.1	105	1.15	125	1.25	125
TJ4V, THJ4V, TJL4V, TJH, TJL	1.0	75	1.0	90	1.0	105	—	—	—	—	—	—
TK4V, TKL4V, TKH, TKL	1.0	75	1.0	105	1.0	105	—	—	—	—	—	—

^① This is the air temperature around the outside of the breaker molded case, but inside the enclosure.

^② Wire size, however, must be based on 75°C ampacity.

Table 33.2
Factor C — Frequency Rating

Circuit Breaker Type	C (Frequency) Rating Factor							
	Dc	25 Hz	50/60 Hz	100/120 Hz	150/180 Hz	200/240 Hz	300/360 Hz	400/415 Hz
Q-Line	1.0 ^①		1.0	1.01	1.02	1.03	1.04	1.05
TEB, TED, THED, TEY, TEL, THLC-1	1.0		1.0	1.00	1.00	1.00	1.00	1.00
TFJ, TFK, THFK, TFL, TLB-2, THLC-2	1.0		1.0	1.02	1.05	1.09	1.18	1.18
TFC	1.0		1.0	1.02	—	—	—	—
TJJ, TJK, THJK, TLB-4, THLC-4	1.0		1.0	1.02	1.04	1.06	1.15	1.15
TJC	1.0		1.0	1.02	—	—	—	—
TKM8, THKMA8	1.0		1.0	1.02	1.04	1.15	1.35	1.35
TKMA12, THKMA12	—		1.0	1.02	—	—	—	—
TKC	1.0		1.0	1.02	—	—	—	—
TJ4V, THJ4V, TJL4V, TJH, TJL	—		1.0	1.02	1.04	1.06	1.15	1.15
TK4V, TKL4V, TKH, TKL	—		1.0	1.02	1.04	1.15	1.35	1.35

^① Q-Line rated 48 Vdc, 5KA, not UL listed.

Factor D — Altitude Rating

1.00 for -100 to +6000 feet 1.04 for 6001 to 10000 feet 1.08 for 10001 to 15000 feet

Table 33.3
Factor E — Load Class Rating Total^①

Group Mounted (12 or more breakers)	Switching Capacitors	Switching Electromagnets	Single Motor Branch Circuit Protection (Normal Duty)	Single Motor Branch Circuit Protection (Heavy Duty)	All other (Normal) Load Types	Transformer Primary Protection with Secondary Protection ≤600V		Transformer Primary Protection Only – No Secondary Protection ≤600V
						Primary Breaker	Secondary Breaker	
1.1	1.35	1.5	1.25	②	1.0	2.5	1.25	1.25

^① Equals the product of the load class rating factors which apply to the circuit in question.

^② Refer to the NEC Article 430, Part B, for conductor and circuit breaker sizing.

Factor F — Safety Factor ≥ 1.1

Table 33.4
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 National Electrical Code Article 240-3 (1999 NEC) requires that conductors be protected in accordance with their ampacities, as given in NEC Tables 310-16 or 310-17. 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 is 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 – 22.5 minutes, etc.

Example #1:

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

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

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

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

If we 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.

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

$$= 59.2 \text{ amps}$$

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 G 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 General Electric 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 #2:

To illustrate: Assume a 480 v three phase load of 260 amperes continuous such as an air-handling fan motor. The available short circuit current is 57 kA. The protective device is individually mounted in a switchboard.

The conductors supplying the load will be selected to be equal to 1.25 times the load current.

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

A solid state breaker with a rating plug and long time, short time, ground fault and instantaneous protection is required.

There are no appreciable harmonics associated with the load and the instantaneous inrush is 7.8 times motor full load amperes.

The mounting location will be at 7200 ft.

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

$$\text{Rating} = 260 \times 1.0 \times 1.0 \times 1.0 \times 1.04 \times 1.0 \times 1.1 \times 1.25 = 371.8 \text{ amperes.}$$

Select a 400A frame MicroVersaTrip® Plus, TJL4S with a C204LSIG programmer. Since the rating plug is not affected by load characteristics other than the actual RMS current value, select a 300A rating plug rather than a 400A plug.



Interrupting Ratings

Circuit breakers must not only carry the circuit current at all times under normal conditions and trip open under overload conditions, but must have sufficient interrupting capacity to successfully interrupt short circuit current that will flow under the worst fault conditions that can occur.

Basis of Interrupting Ratings

Short-Circuit Current

Interrupting ratings depend upon knowing the magnitude of the short-circuit current that may flow through the circuit breaker or molded case switch. Devices rated in accordance with UL Standard 489 list their interrupting rating in terms of rms symmetrical amps.

The procedures for calculating short-circuit current and the X/R ratios are described in detail in GE Publication GET-3550.

Generally, electrical power system engineers calculate the X/R ratios rather than the power factors of protected circuits during their short-circuit studies. The magnitude of the momentary peak current to be interrupted — or withstood — is a function of the maximum peak current displacement from the zero current axis. That displacement is a function of the X/R ratio (or power factor) of the faulted circuit. The higher the X/R ratio, the lower the power factor, and the greater the magnitude of peak current displacement.

Listed interrupting ratings (Table 38.1) are subject to derating where circuit power factors are below listed values. Table 39.2 lists rating factors versus X/R ratios and power factors to allow the user to compensate the interrupting rating of a circuit breaker for circuit power factor, where necessary.

Frequency

Frequency has an effect upon the interrupting capability of a molded case circuit breaker. Exhaustive testing has been conducted at the two worldwide standard frequencies, 50 Hz and 60 Hz. Less testing has been conducted on industrial circuit breakers at 25 Hz and 400 Hz. Table 40.1 lists suggested application guidelines for circuit breakers in 400 Hz circuits.

The data shown takes into account the lack of world test facilities to verify 400 Hz performance, but does represent the existing best engineering judgment of General Electric.

Power Factor or X/R Ratio

Interrupting ratings of molded case circuit breakers are based upon a specific ratio of reactance-to-resistance, or a specific power factor. Since practical ac circuits contain some reactance, there is some displacement between current and voltage waveforms. Because a short-circuit can literally occur during any point of the voltage wave, an actual trace of short-circuit current may display considerable initial displacement from zero axis.

Figure 36.1
Symmetrical Ac Waveform

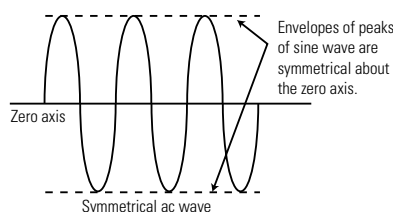
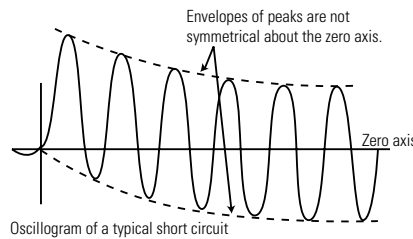




Figure 36.1 shows a symmetrical ac current waveform that would occur if a purely resistive circuit was short-circuited (or even a circuit containing reactance if the short circuit occurred at precisely the right point in the voltage waveform — which is unlikely).

Figure 37.1 shows the current trace of a short circuited ac circuit where displacement about the zero axis exists as a consequence of when the short circuit is applied and the amount of reactance in the short-circuited circuit, compared to its resistance.

Figure 37.1
Asymmetrical Ac Waveform



Interrupting Ratings

There is a simple relationship between the power factor of a short-circuited circuit and its X/R ratio. It is:

$$\text{Power Factor (in Percent)} = \frac{R}{Z} \times 100$$

$$\text{and: } Z = \sqrt{R^2 + X^2}$$

$$\text{therefore PF} = \frac{R}{\sqrt{R^2 + X^2}} \times 100$$

R = Circuit Resistance

X = Circuit Reactance

Z = Circuit Impedance

Interrupting ratings not UL listed are based on tests per NEMA Standard AB-1 “Molded Case Circuit Breakers.” The basic rating is given in RMS symmetrical amperes, the preferred basis for selection and application.

In dc applications, values of UL listed interrupting ratings are maximum amperes.



Molded Case Circuit Breakers

Table 38.1
AC Interrupting Ratings — UL Listed Except as Noted

Circuit Breaker Type	Max. Ampere Rating	Max. ac Voltage	Voltage									
			120/240		240		277		480		600	
			Multi-Pole (2P)	1 Pole	Multi-Pole (3P)	1 Pole	277/480 Multi-Pole	1 Pole	Multi-Pole	1 Pole	Multi-Pole	1 Pole
THQB, C, L	100 ^⑦ , 70 ^⑤	120/240	10000	5000	10000	8660						
THHQB, C, L	100, 70 ^⑤	120/240	22000	5000	22000	8660						
TXQB, C, L	30		65000	5000	65000	8600						
TQD	225		10000	5000	10000	8660						
TQDL	200		10000	5000								
THQD	225		22000	5000	22000	8660						
THQDL	200	120/240	22000	5000								
TEB	100	120		10000								
TEB	100	240			10000	8660						
TEY	100	277/480	65000	65000	65000	8660 ^②	14000	14000				
TED	100	480								10000		
TED	100	277						14000				
TED	100	480			18000	8660			18000	8660		
TB-1	100	600			200000	8660			200000	8660	200000	8660
TEC	150	600			10000	8660			10000	8660	10000	8660
TEC and TECL	150	600			100000	8660			100000	8660	100000	8660
TED	150	600			18000	8660			18000	8660	14000	8660
THED	30	277						65000				
THED	150	600			42000	8660			25000	8660	18000	8660
TEL	150	600			100000	8660			65000	8660	25000	8660
TEML	150	600			100000	8660			65000	8660	25000	8660
THLC-1 ^⑥	150	480			200000	8660			150000	8660	50000	8660
TFJ, TFK ^④ , TFC	225	600			25000	8660			22000	8660	18000	8660
THFK ^④	225	600			65000	8660			25000	8660	18000	8660
TFL	225				100000	8660			65000	8660	25000	8660
TLB-2	225	480			85000	8660			50000	8660		
THLC-2 ^⑥	225	480			200000	8660			150000	8660	50000	8660
TJD	400	240	22000	10000	22000	8660						
TJ ^{①④}	600	600			42000	8660			30000	8660	22000	8660
THJ ^{①④}	600	600			65000	8660			35000	8660	25000	8660
TLB-4	400	480			85000	8660			50000	8660		
TJH	600	600			65000	8660			35000	8660	25000	8660
TJL	600	600			100000	8660			65000	8660	30000	8660
THLC-4 ^⑥	400	480			200000	8660			150000	8660	50000	8660
TB-4	400	600			200000	8660			200000	8660	200000	8660
TB-6	600	600			200000	8660			200000	8660	200000	8660
TK ^④	1200	600			42000	12120			30000	12120	22000	12120
THKMA ^④	1200	600			65000	12120			35000	12120	25000	12120
TKH	1200	600			65000	12120			50000	12120	25000	12120
TKL ^③	1200	600			100000	12120			65000	12120	42000	12120
TB-8	800	600			200000	8660			200000	8660	200000	8660

① Includes J, K, C, and 4V suffixes.

② Includes C, MA and 4V suffixes.

③ Includes 4V suffixes.

④ Interchangeable thermal-magnetic trip circuit breakers are not UL listed for reverse feed.

⑤ Single pole limit.

⑥ If model is rated for 600 volts.

⑦ 110A for THQC.

Note: The single pole interrupting ratings shown are the UL listed values for three pole devices and are not necessarily the maximum capability of the device.

Single pole interrupting capability must be considered when molded case circuit breakers are used on ungrounded or resistance grounded distribution systems.

Note: For series-connected ratings with main circuit breakers or fuses, refer to publication DET-008.



Molded Case Circuit Breakers

Table 39.1
DC Interrupting Ratings — UL Listed Except as Noted by (*)

Circuit Breaker Type	125 Volts	250 Volts		300 Volts		400 Volts		500 Volts			600 Volts	
	1 Pole	1 Pole	2 Pole	1 Pole	2 Pole	1 Pole	2 Pole	1 Pole	2 Pole	3 Pole ^①	1 Pole	2 Pole
TEB	5000	—	5000									
TED4, TEC, TED6	10000	—	14000*							10000		
THED	20000*	—	20000*		20000*		20000*					
TFJ, TFK, TFC	10000	—	10000							10000		
THFK	20000*	—	20000*		20000*		20000*					
TJJ, TJK4, TJC, TJD	10000	10000	10000		20000*					20000		
THJK4, THJK6	20000*	10000	40000		20000*		20000*		20000*			
TKMA8, TKC800	10000	10000	10000	10000*						22000		
TKC361200L	22000*	22000*	23000*	10000*	23000*	10000*	23000*		23000*			23000*
THKMA8	20000*	20000*	20000*	10000*	20000*	10000*	20000*	10000*	20000*			

* Not UL listed.

① UL listed for 500 volts 3 poles in series ungrounded battery applications.

Notes:

1. Direct current interrupting ratings are based on a system fault time constant of 8 ms (milliseconds) or less.
2. Multi-pole ratings (2 or 3) are based on midpoint grounded systems with one pole in positive leg and one pole in negative leg, or end grounded systems with two or three poles wired in series in the ungrounded leg.
3. Single-pole ratings are for application in ungrounded systems.

Table 39.2
Interrupting Rating Multiplying Factors for Power Factors Lower Than (or X/R Ratios Higher Than) Test Values

Power Factor (Percent)	X/R Ratio	Rated Maximum Interrupting Rating		
		1 to 10 kA ^① Multiplier	11 to 20 kA Multiplier	21 kA and Higher Multiplier
4	24.980	.61	.72	.81
5	19.974	.62	.74	.82
6	16.637	.63	.75	.83
7	14.251	.64	.76	.84
8	12.460	.65	.77	.85
9	11.066	.66	.78	.87
10	9.950	.67	.79	.88
11	9.036	.68	.80	.89
12	8.273	.69	.81	.90
13	7.627	.69	.82	.91
14	7.072	.70	.83	.93
15	6.591	.71	.84	.94
16	6.169	.72	.85	.95
17	5.797	.73	.86	.96
18	5.465	.74	.87	.97
19	5.167	.75	.88	.98
20	4.899	.76	.89	1.000
21	4.656	.77	.90	1.000
22	4.434	.77	.91	1.000
23	4.231	.78	.92	1.000
24	4.045	.79	.94	1.000
25	3.873	.80	.95	1.000
26	3.714	.81	.96	1.000
27	3.566	.82	.97	1.000

Power Factor (Percent)	X/R Ratio	Rated Maximum Interrupting Rating		
		1 to 10 kA ^① Multiplier	11 to 20 kA Multiplier	21 kA and Higher Multiplier
28	3.429	.83	.98	1.000
29	3.300	.83	.99	1.000
30	3.180	.84	1.000	1.000
31	3.067	.85	1.000	1.000
32	2.961	.86	1.000	1.000
33	2.861	.87	1.000	1.000
34	2.766	.88	1.000	1.000
35	2.676	.88	1.000	1.000
36	2.592	.89	1.000	1.000
37	2.511	.90	1.000	1.000
38	2.434	.91	1.000	1.000
39	2.361	.91	1.000	1.000
40	2.291	.92	1.000	1.000
41	2.225	.93	1.000	1.000
42	2.161	.94	1.000	1.000
43	2.100	.95	1.000	1.000
44	2.041	.95	1.000	1.000
45	1.984	.96	1.000	1.000
46	1.930	.97	1.000	1.000
47	1.878	.97	1.000	1.000
48	1.828	0.98	1.000	1.000
49	1.779	0.99	1.000	1.000
50	1.732	1.000	1.000	1.000

① kA = Kiloamps (1 kA is 1,000 amps) rms, symmetrical.



Table 40.1
Estimated 400-415 Hz Interrupting Ratings in Amperes — Not UL Listed

Circuit Breaker Type	Volts			
	120	120/208 and 120/240	277/480	346/600
THQL, B, C		1000		
THHQL, B, C		2200		
TXQL, B, C		6500		
TQD, TQDL		1000		
THQD, THQDL		2200		
TEY	6500	6500	1400	
TEB	1000	1000	—	—
TED 4	1800	1800	1400	—
TED 6	1800	1800	1400	1400
THED	6500	6500	2500	1800
TFL, TEL	10000	10000	6500	2500
TFJ, TFK	2500	2500	2200	2200
THFK	6500	6500	2500	2200
THLC-1	20000	20000	15000	5000
TJD		2200	2200	
TJJ, TJK	4200	4200	3000	2200
TJ①	4200	4200	3000	2200
THJ①	6500	6500	3500	2500
TJH	6500	6500	3500	2500
TJL	10000	10000	6500	3000
TK①	4200	4200	3000	2200
THK①	6500	6500	5000	2500
TKH	6500	6500	5000	2500
TKL	10000	10000	6500	4200

① Includes solid state trips.

Note: 400-Hertz interrupting ratings are based on engineering judgement, taking into consideration the operating characteristics of molded case circuit breakers and the worldwide lack of test facilities to verify performance.

Table 40.2
Q-Line and TEB Molded Case Switch Short Circuit Withstand Rating①

Molded Case Switch Catalog Number	Maximum Rating Protective Device②		Short Circuit Withstand Rating Amps rms Sym
	Voltage	Amps	
TQL, TQB, TQC21Y690	120/240	60	10,000
TQL, TQB, TQC21Y100	120/240	100	10,000
TQL, TQB, TQC22Y60	240	60	10,000
TQL, TQB, TQC22Y100	240	100	10,000
TQL, TQB, TQC32Y60	240	60	10,000
TQL, TQB, TQC32Y100	240	100	10,000
TEB111Y100	240	100	10,000
TEB122Y100	240	100	10,000
TEB132Y100	240	100	10,000

① Q-Line and 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.

② Protective device must be on line side of molded case switch.

Note: Circuit breakers, Mag-Break® instantaneous only breakers and molded case switches are inherently horsepower rated by the testing performance requirements in UL489. They are therefore not marked with horsepower ratings. See NEC Article 430-109.



Table 41.1
Molded Case Switch Short Circuit Withstand Rating

Molded Case Switch		Protective Device ^①		Short Circuit Withstand Ratings	
Ampere Rating	Catalog Number	Type	Max. Amp Rating	Amps rms Sym.	Max. Voltage
100	TED113Y100	Any fuse or circuit breaker rated 10,000A 240V	100	10,000	240
100	TED134Y100	TED134100	100	14,000	480
150	TED136Y150	TED126150	150	14,000	600
		TED134150	150	14,000	480
225	TFJ236Y225	TED, THED	150	14,000	600
		TFJ, TFK, THFK	225	14,000	600
		Class J Fuse	400	14,000	600
		TQD32Y225	TQD	225	14,000
400	TJD432Y400	TJD	400	22,000	240
		Class T Fuse	400	50,000	240
400	TJJ436Y400	TFJ, TFK, THFK	225	18,000	600
				22,000	480
		TJJ, THJK, TJ4V, THJ4V, TJJL4S, TJJL4SS, TJH4S, TJH4SS	400	30,000	480
600	TJK636Y600	Class J Fuse	400	50,000	600
		TJJ, THJK,	400	22,000	600
		TJ4V, THJ4V,		30,000	480
		TJJL4S, TJJL4SS, TJH4S, TJH4SS	600	50,000	600
		Class J Fuse		22,000	600
		TJK, THJK,		30,000	480
		800	TKMA836Y800	TJ4V, THJ4V,	600
TJJL6S, TJJL6SS, TJH6S, TJH6SS	30,000			480	
TKM, THKM,	22,000			600	
TK4V, THK4V,	800			30,000	480
TKL8S, TKL8SS, TKH8S, TKH8SS				50,000	600
Class L Fuse				22,000	600
1200	TKMA3Y1200	TJK, THJK,	600	22,000	600
		TJ4V, THJ4V,		30,000	480
		TJJL6S, TJJL6SS, TJH6S, TJH6SS		22,000	600
		TKM, THKM,	1200	30,000	480
		TK4V, THK4V		50,000	600
		TKL12S, TKL12SS, TKH12S, TKH12SS		22,000	600
		Class L Fuse		30,000	480
		50,000	600		

① Three-pole, 600 volt switches cover 2-pole, 600 volt and 2- and 3-pole, 480 volt switches.

Table 41.2
Electrical Formula — For Obtaining kW, kVA, Horsepower and Amperes

Wanted	Single-phase	Alternating Current Two-phase, Four-wire	Three-phase	Direct Current
Kilowatts	$\frac{I \times E \times PF}{1000}$	$\frac{I \times E \times 2 \times PF}{1000}$	$\frac{I \times E \times 1.73 \times PF}{1000}$	$\frac{I \times E}{1000}$
kVA	$\frac{I \times E}{1000}$	$\frac{I \times E \times 2}{1000}$	$\frac{I \times E \times 1.73}{1000}$	$\frac{I \times E}{1000}$
Horsepower	$\frac{I \times E \times \% \text{ Eff.} \times PF}{746}$	$\frac{I \times E \times 2 \times \% \text{ Eff.} \times PF}{746}$	$\frac{I \times E \times 1.73 \times \% \text{ Eff.} \times PF}{746}$	$\frac{I \times E \times \% \text{ Eff.}}{746}$
Amperes from kVA	$\frac{kVA \times 1000}{E}$	$\frac{kVA \times 1000}{2 \times E}$	$\frac{kVA \times 1000}{1.73 \times E}$	$\frac{kVA \times 1000}{E}$
Amperes from kW	$\frac{kW \times 1000}{E \times PF}$	$\frac{kW \times 1000}{2 \times E \times PF}$	$\frac{kW \times 1000}{1.73 \times E \times PF}$	$\frac{kW \times 1000}{E}$
Amperes from Hp	$\frac{Hp \times 746}{E \times \% \text{ Eff.} \times PF}$	$\frac{Hp \times 746}{2 \times E \times \% \text{ Eff.} \times PF}$	$\frac{Hp \times 746}{1.73 \times E \times \% \text{ Eff.} \times PF}$	$\frac{Hp \times 746}{E \times \% \text{ Eff.}}$

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

A.C. Short Circuit Determination —

For methods of calculating short-circuit currents for industrial and commercial power systems, request a copy of GET-3550.



Application Data

Table 42.1
Molded Case Switch Horsepower Ratings

Catalog Number	No. of Poles	Amperes	Volts	Horsepower Ratings					
				240 Volt		480 Volt		600 Volt	
				Single-phase	Three-phase	Single-phase	Three-phase	Single-phase	Three-phase
TEB122Y100	2	100	240 Vac	20	—	—	—	—	—
TEB132Y100	3	100	240 Vac	20	30	—	—	—	—
TED124Y100	2	100	480 Vac	20	—	40	—	—	—
TED134YT100	3	100	480 Vac	20	30	40	75	—	—
TED126Y100	2	100	600 Vac	20	—	40	—	50	—
TED136YT100	3	100	600 Vac	20	30	40	75	50	100
TED136YT150	3	150	600 Vac	30	50	50	100	50	150
TFJ226Y225	2	225	600	50	—	50	—	50	—
TFK226Y225	2	225	600	50	—	50	—	50	—
TFJ236Y225	3	225	600	50	75	50	150	50	200
TFK236Y225	3	225	600	50	75	50	150	50	200
TJJ426Y225	2	225	600	50	—	50	—	50	—
TJJ426Y400	2	400	600	50	—	50	—	50	—
TJK426Y400	2	400	600	50	—	50	—	50	—
TJJ436Y225	3	225	600	50	75	50	150	50	200
TJJ436Y400	3	400	600	50	150	50	300	50	400
TJK436Y400	3	400	600	50	150	50	300	50	400
TJD522Y400	2	400	240	—	—	—	—	—	—
TJD432Y400	3	400	240	—	—	—	—	—	—
TJK626Y600	2	600	600 Vac	50	—	50	—	50	—
TJK636Y600	3	600	600 Vac	50	200	50	500	50	500
TKMA2Y1000	2	1000	600	50	—	50	—	50	—
TKMA3Y1000	3	1000	600	50	250	50	500	50	500
TKMA2Y1200	2	1200	600	50	—	50	—	50	—
TKMA3Y1200	3	1200	600	50	250	50	500	50	500



Time Current Curves — Index

Breaker Type	Time Current Curve Number	Page
Q-Line 15-50	GES-6202A	45
Q-Line 60-100	GES-6203A	45
THQL, THQP, THHQL 15①	GES-9886	46
THQL, THQP, THHQL 20①	GES-9887	46
THQL, THQP, THHQL 25-50①	GES-9888	47
THQB, THQC, THHQB, THHQC 15-20①	GES-9885	47
THQB, THQC, THHQB, THHQC 25-50①	GES-9888	48
THQL...GF, THHQL...GF 15②	GES-9881	48
THQL...GF, THHQL...GF 20②	GES-9882	49
THQL...GF, THHQL...GF 25-30②	GES-9883	49
THQB...GF, THQC...GF, THHQB...GF, THHQC...GF 15-20②	GES-9920	50
THQB...GF, THQC...GF, THHQB...GF, THHQC...GF 25-30②	GES-9883	50
TQD, THQD	GES-6108C	51
TJD	GES-6112A	51
TEB 15-50	GES-6122B	52
TEB 60-80	GES-6123B	52
TEB 90-100	GES-6124A	53
TED 15-50	GES-6113C	53
TED 60-80	GES-6114C	54
TED 90-100	GES-6115B	54
TED6 & THED6 15-50	GES-6119C	55
TED6 & THED6 60-80	GES-6120C	55
TED6 & THED6 90-150	GES-6121B	56
TEY 15-50	GES-6237	56
TEY 60	GES-6238	57
TEY 100	GES-6239	57
TEL (15-40 Amps) TCC	GES-6229A	58
I ² t	GES-9620	58
I _p	GES-9621	59
TEL (50-80 Amps) TCC	GES-6230A	59
(90-150 Amps) TCC	GES-6231A	60
(50-150 Amps) I ² t	GES-9622	60
I _p	GES-9623	61
TFJ, TFK, THFK	GES-6103E	61
TFL (70-225 Amps) TCC	GES-6236	62
I ² t	GES-9628	62
I _p	GES-9629	63
TJJ, TJK, THJK	GES-6104C	63

Breaker Type	Time Current Curve Number	Page
TLB-4	GES-6225B	64
TKMA, THKMA	GES-6111C	64
TJ4V, THJ4V, TJL4V, TK4V, TKL4V-Power+ 4	GES-6198C	65
TJ4V, THJ4V, THL4V, TK4V, TKL4V-Power+ 4 GF	GES-6195B	65
TJH, TJJ, TKH, TKL-RMS-9	GES-6235A	66
TJH, TJJ, TKH, TKL-RMS-9 Ground	GES-6228C	66
THLC-1 15-40	GES-6219A	67
THLC-1 50-80	GES-6220B	67
THLC-1 90-150	GES-6218B	68
THLC-1 (15-150) I _p	GES-9603B	68
I ² t	GES-9604B	69
THLC-2 (125-225A) TCC	GES-6221B	69
I _p	GES-9608A	70
I ² t	GES-9609A	70
THLC-4 (250-400A) TCC	GES-6226B	71
I _p	GES-9610A	71
I ² t	GES-9611A	72
TB-1 15-30	K215-71C	72
TB-1 40-100	K215-72C	73
TB-4	K215-73D	73
TB-6	K215-74D	74
TB-8	K215-75D	74
TEC with TECL	K215-100A	75
TEC with TECL I _p	GES-9600	75
I ² t	GES-9601	76
TEML (3-30 Ampere) TCC	GES-6232	76
I _p	GES-9625	77
I ² t	GES-9624	77
TEML 50-150 Ampere TCC	GES-6233	78
I _p	GES-9627	78
I ² t	GES-9626	79
TFC	K215-101	79
TJC 400	GES-6141	80
TJC 600	GES-6142	80
TKC 800	GES-6146	81
TKC 1200	GES-6147	81
TBC 225	GES-6136A	82
TBC 400	GES-6137	82
TBC 600	GES-6138	83
TBC 800	GES-6139	83

① For THQL, THHQL, THQB, THHQB, THQC, THHQC, THQP Model A or Model B, request GES-9884 and GES-9888.

② For GFCL manufactured before 5/2/94, request GES-6200A.



Time Current Tripping Characteristics

Molded case circuit breaker time-current curves are the engineering documents which define technical performance characteristics of the devices. The test parameters for the generation of these curves are as follows:

- A. Circuit breaker connected with a minimum of four feet of rated conductor per terminal.
- B. Circuit breaker in open air at ambient temperature indicated.
- C. All tests initiated from the no current condition (cold start).

Information provided on the time current curve includes the following:

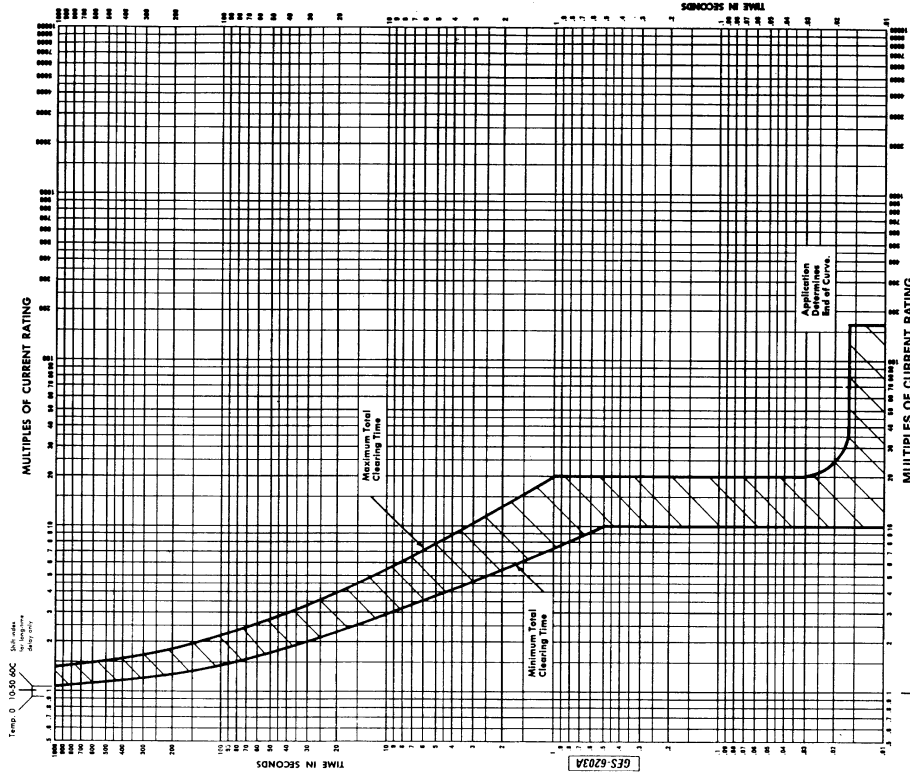
- 1. Product family type
- 2. Specific device type
- 3. Ampere ratings covered on curve
- 4. Overcurrent characteristics — long-time, short-time, instantaneous, etc.
- 5. Maximum total clearing time
- 6. Maximum and minimum temperature limits
- 7. Frequency ratings
- 8. Voltage ratings
- 9. Specific trip unit ratings
- 10. Trip unit adjustment ranges
- 11. Tolerances

Multiples of circuit breaker trip rating are shown on the top and bottom horizontal axis, with time in seconds on the vertical axis. Approximate minimum and maximum clearing time is readily determined from the characteristics curves. For example, a TED134100WL 100 ampere, 3 phase, 480 volt breaker, (reference curve GES-6115B, page 49), under a sustained overload of 200 amperes (2 times trip rating) reading up to curve from the horizontal axis, will clear within 80 to 350 seconds. Curve also shows that this breaker may trip instantaneously at current values within a band ranging from 7.5 to 20 times breaker trip rating but may take up to 14 seconds to trip. Beyond 20 times breaker rating it will always clear instantaneously. This instantaneous clearing time with no intentionally introduced time delay, ranges up to 0.018 seconds as shown on curve.

Tripping characteristics meet National Electrical Manufacturers Association and Underwriters' Laboratories, Inc. standards for rating and calibration.

Time Current Curves

Q-LINE—60-100



GE Electrical Distribution & Control
General Electric Company
Rensselaer, CT 06652

Current Ratings
1 pole—60 and 75 Amperes
2 pole—110 and 125 Amperes (200/240 Volt AC)
3 pole—110 and 125 Amperes (200/240 Volt AC)

Voltage Ratings
1- and 2-pole—240 Volt AC
3-pole—240 Volt AC
Frequency—50/60 Hertz

Molded Case Circuit Breakers "Q" Line
Types THQL, THQB, THQC, THHQL, THHQB, THHQC, THHOC, THHQB, THHQC

Adjustments
Long-time delay thermal trip, not adjustable
Instantaneous magnetic trip, not adjustable

Applications
Determines Top of Curve

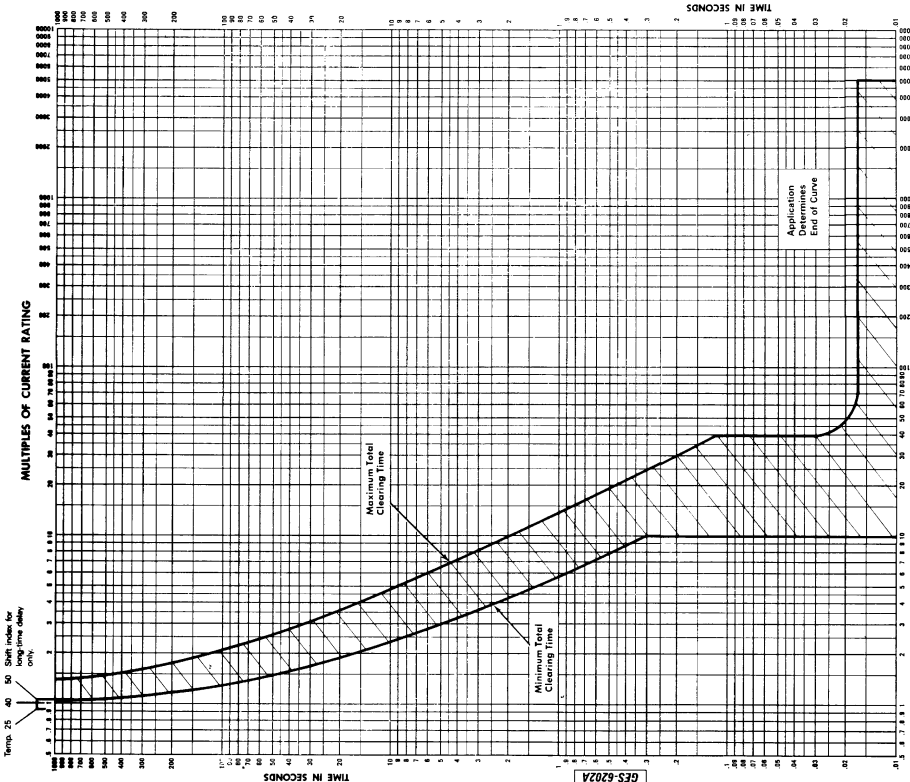
Applications
Determines Top of Curve

GES-6203A

4188 (M)

KC15-640

Q-LINE—15-50



GE Electrical Distribution & Control
General Electric Company
Rensselaer, CT 06652

Current Ratings
15, 20, 25, 30, 35, 40, 45 and 50 Amperes

Voltage Ratings
1- and 2-pole—240 Volt AC
3-pole—240 Volt AC
Frequency—50/60 Hertz

Molded Case Circuit Breakers "Q" Line
Types THQL, THQB, THQC, THHQL, THHQB, THHQC, TXQL, TXQB, TXQC (30 Amps Max.)

Adjustments
Long-time delay thermal trip, not adjustable
Instantaneous magnetic trip, not adjustable

Applications
Determines Top of Curve

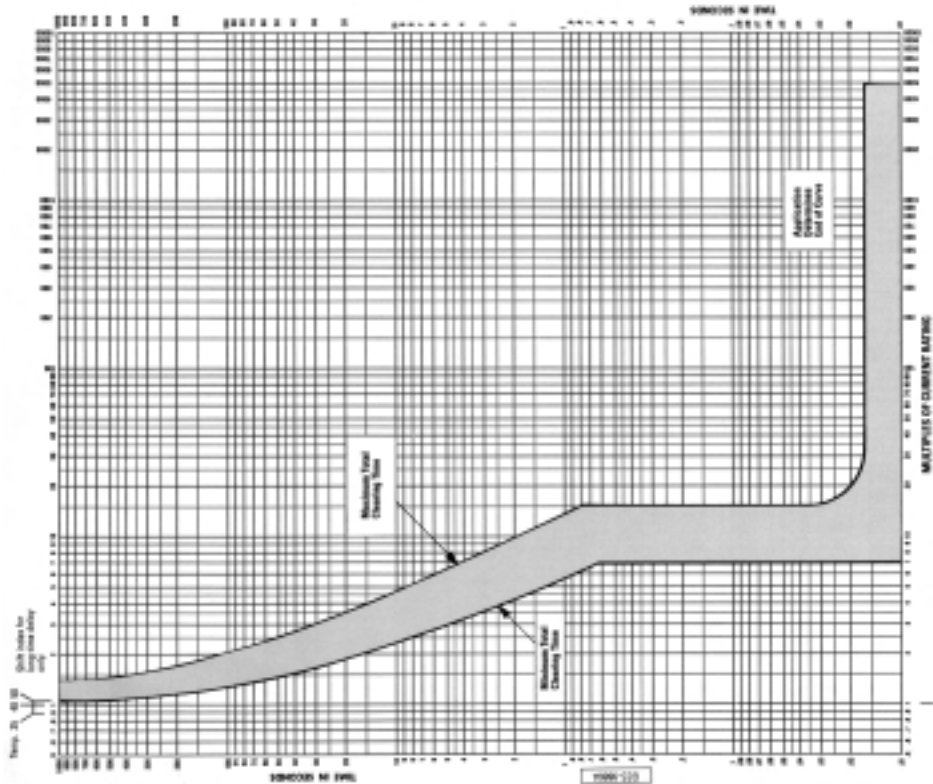
Applications
Determines Top of Curve

GES-6202A

4188 (M)

KC15-620

THQL, THQP, THHQ, THHL 15



EF Electrical Distribution & Control

Model Data Circuit Breaker
 0 Line
 Types: THQL, THQP, THHQ, THHL 15/15M
 Long-time delay and instantaneous
 Time-Current Curves
 Curve data for coordination with other circuit breakers and fuses is available upon request.

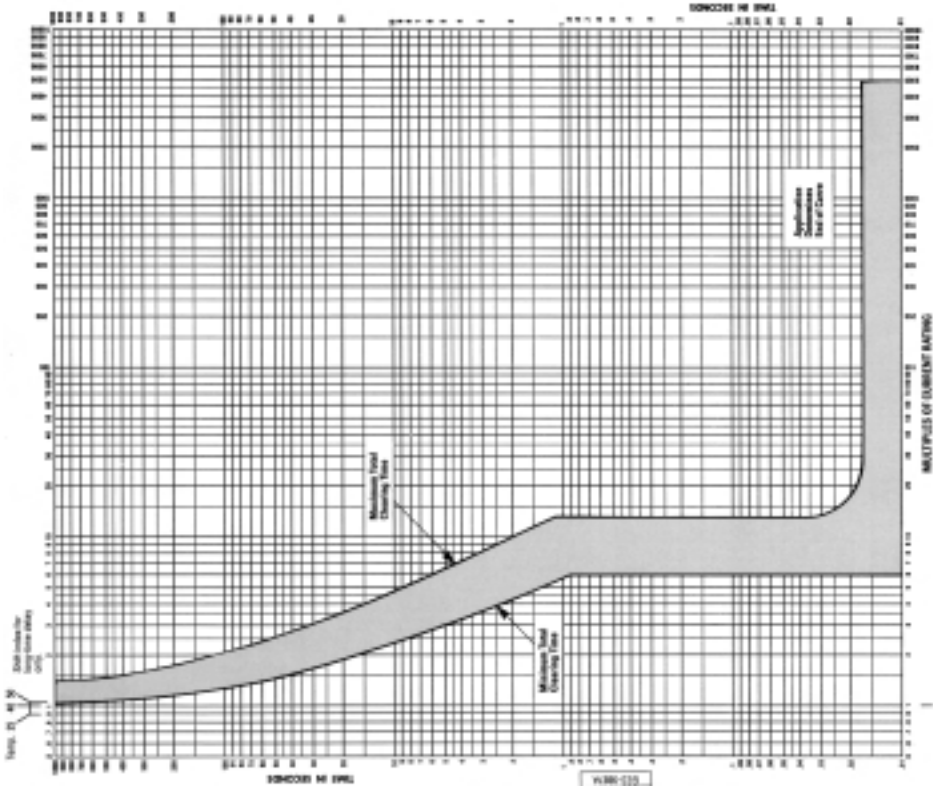
Adjustments
 Long-time delay (adjustable) not adjustable
 Instantaneous magnitude (not adjustable)

General Ratings
 15 kV, 1500 A, 1500 A, 1500 A, 1500 A
 1500 A, 1500 A, 1500 A, 1500 A

Application Limit of Curve

027 0000

THQL, THQP, THHQ, THHL 20



EF Electrical Distribution & Control

Model Data Circuit Breaker
 0 Line
 Types: THQL, THQP, THHQ, THHL 20/20M
 Long-time delay and instantaneous
 Time-Current Curves
 Curve data for coordination with other circuit breakers and fuses is available upon request.

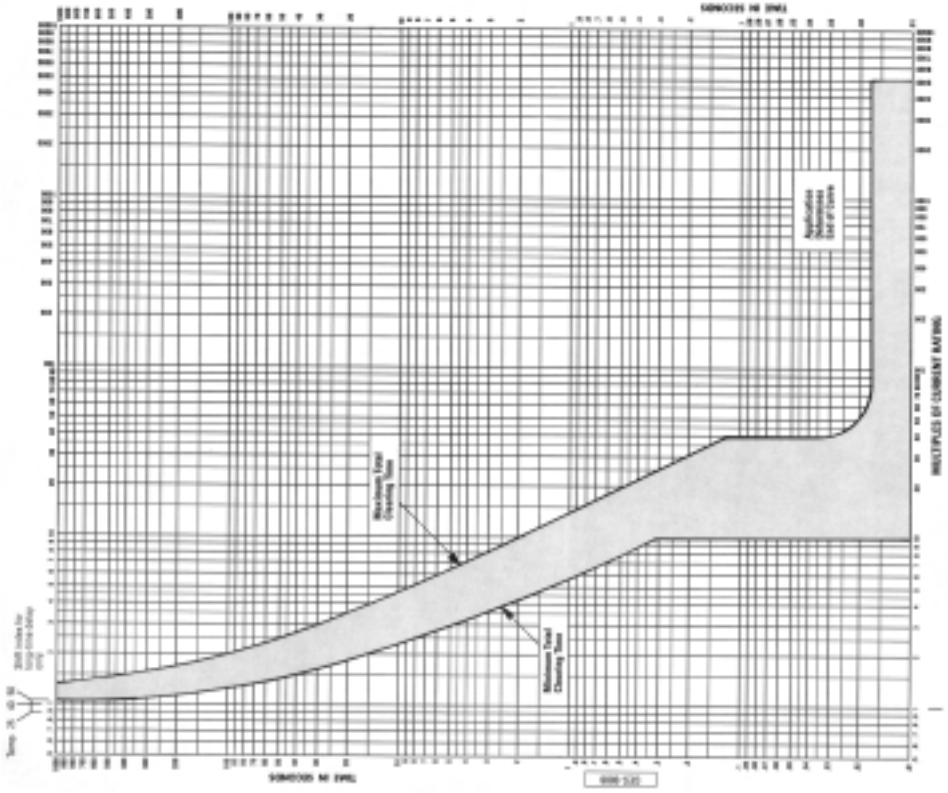
Adjustments
 Long-time delay (adjustable) not adjustable
 Instantaneous magnitude (not adjustable)

General Ratings
 20 kV, 2000 A, 2000 A, 2000 A, 2000 A
 2000 A, 2000 A, 2000 A, 2000 A

Application Limit of Curve

027 0000

THQB, THQC, THQB, THQC 25-50



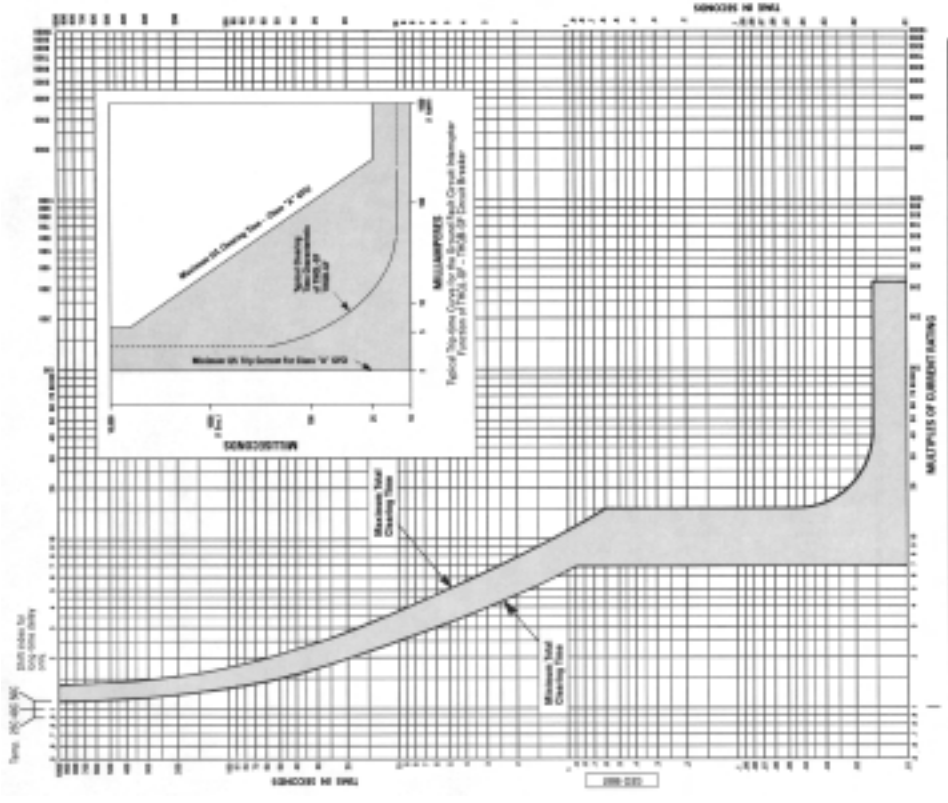
ET Electrical Distribution & Control

Company Name: ET Electrical Distribution & Control
 1, Lane and 2, Lane
 30000, P.O. Box 100
 06037, CT

ET Electrical Distribution & Control

Model: ET Electrical Distribution & Control
 Type: ET Electrical Distribution & Control
 Application: Long time delay for overcurrent and undervoltage
 Features: Long time delay for overcurrent and undervoltage
 Features: Long time delay for overcurrent and undervoltage
 Features: Long time delay for overcurrent and undervoltage

THQL...GF, THQL...GF 15



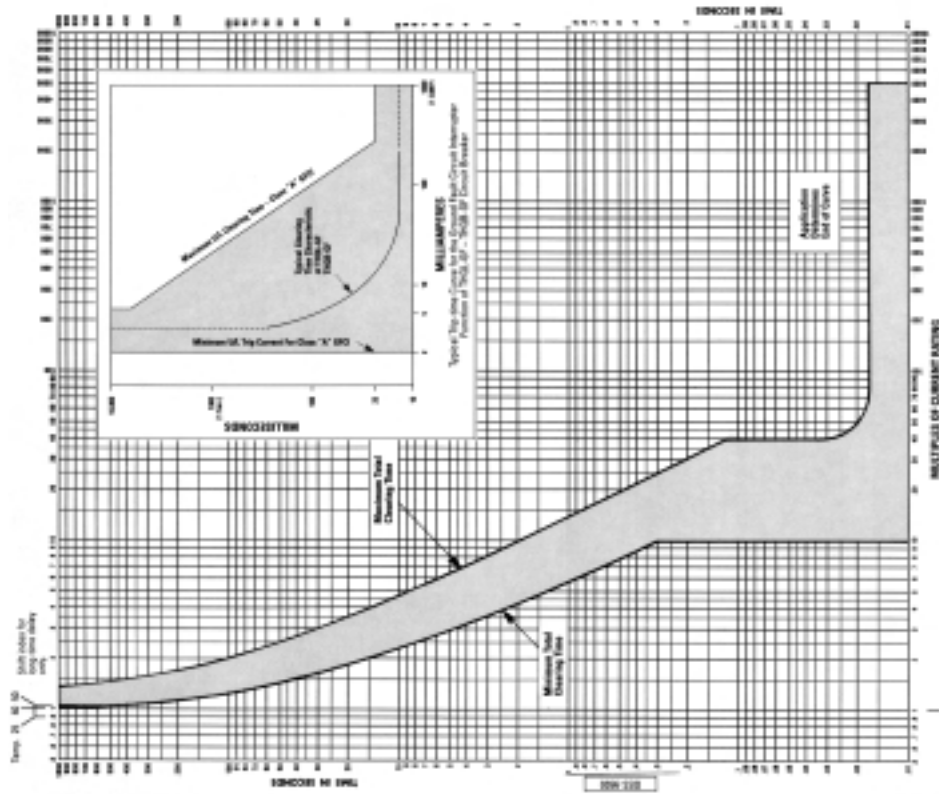
ET Electrical Distribution & Control

Company Name: ET Electrical Distribution & Control
 1, Lane and 2, Lane
 30000, P.O. Box 100
 06037, CT

ET Electrical Distribution & Control

Model: ET Electrical Distribution & Control
 Type: ET Electrical Distribution & Control
 Application: Long time delay for overcurrent and undervoltage
 Features: Long time delay for overcurrent and undervoltage
 Features: Long time delay for overcurrent and undervoltage
 Features: Long time delay for overcurrent and undervoltage

THQB...GF, THQC...GF,
THHOB...GF, THHC...GF 15-20



ET Electrical Distribution & Control 611-6107
 20 and 21 Toulon
 Ridgeville, OH 44079
 216-485-1100 • 216-485-1101
 Fax: 216-485-1102
 www.et-electrical.com

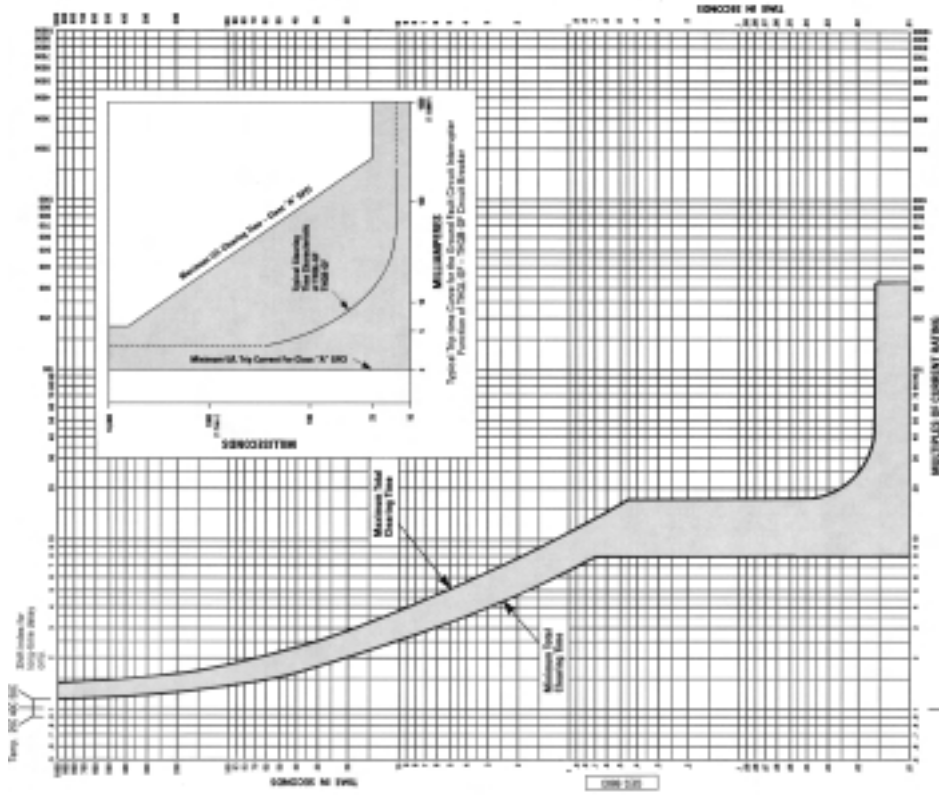
Metal Case Circuit Breakers
 Type THQB, THQC, THHOB, THHC, GF
 (Breakers Manufactured After 1991.2, 1994)
 Using the Safety and Reliability
 Features of the THQB, THQC, THHOB, THHC, GF
 Circuit Breakers Manufactured Before 1991.2, 1994
 (Circuit Breakers Manufactured Before 1991.2, 1994
 are not covered by this listing.)

Adjustments
 Using the Safety and Reliability
 Features of the THQB, THQC, THHOB, THHC, GF
 Circuit Breakers Manufactured After 1991.2, 1994

Application Performance List of Cables

ET Electrical Distribution & Control • 47 Woodland Ave. Plymouth, CT 06302

THQB...GF, THQC...GF,
THHOB...GF, THHC...GF 25-30



ET Electrical Distribution & Control 611-6107
 20 and 21 Toulon
 Ridgeville, OH 44079
 216-485-1100 • 216-485-1101
 Fax: 216-485-1102
 www.et-electrical.com

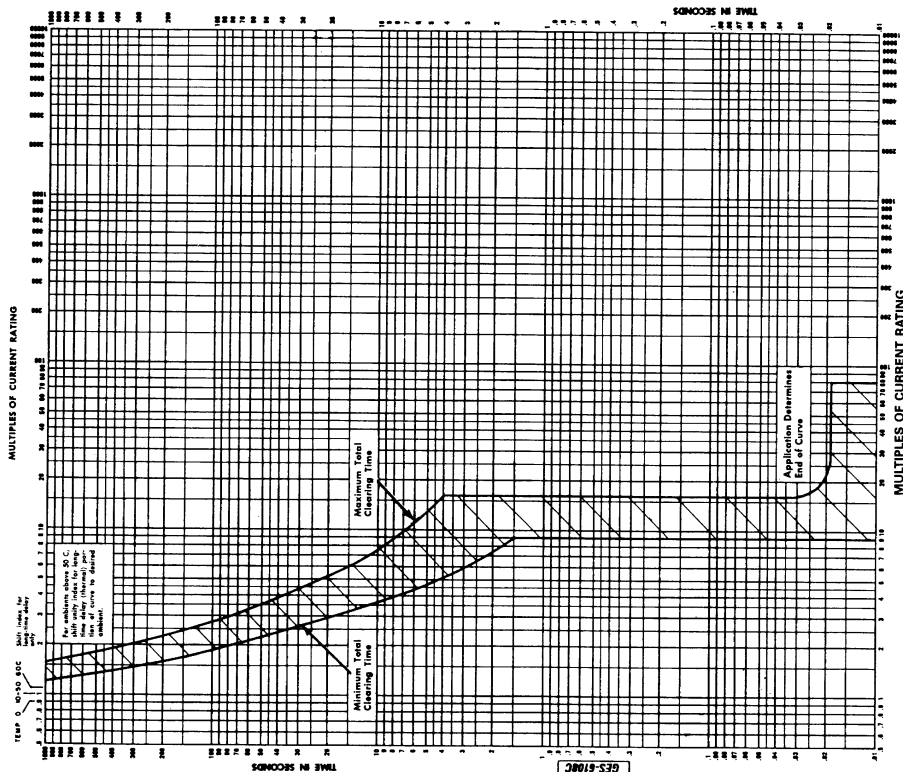
**Metal Case Circuit Breakers with Ground Fault
 Circuit Interrupter**
 Type THQB, THQC, THHOB, THHC, GF
 (Breakers Manufactured After 1991.2, 1994)
 Using the Safety and Reliability
 Features of the THQB, THQC, THHOB, THHC, GF
 Circuit Breakers Manufactured Before 1991.2, 1994
 (Circuit Breakers Manufactured Before 1991.2, 1994
 are not covered by this listing.)

Adjustments
 Using the Safety and Reliability
 Features of the THQB, THQC, THHOB, THHC, GF
 Circuit Breakers Manufactured After 1991.2, 1994

Application Performance List of Cables

ET Electrical Distribution & Control • 47 Woodland Ave. Plymouth, CT 06302

TQD, THQD



GE Electrical Distribution & Control
General Electric Company
Framingham, CT 06032

GES-6108C

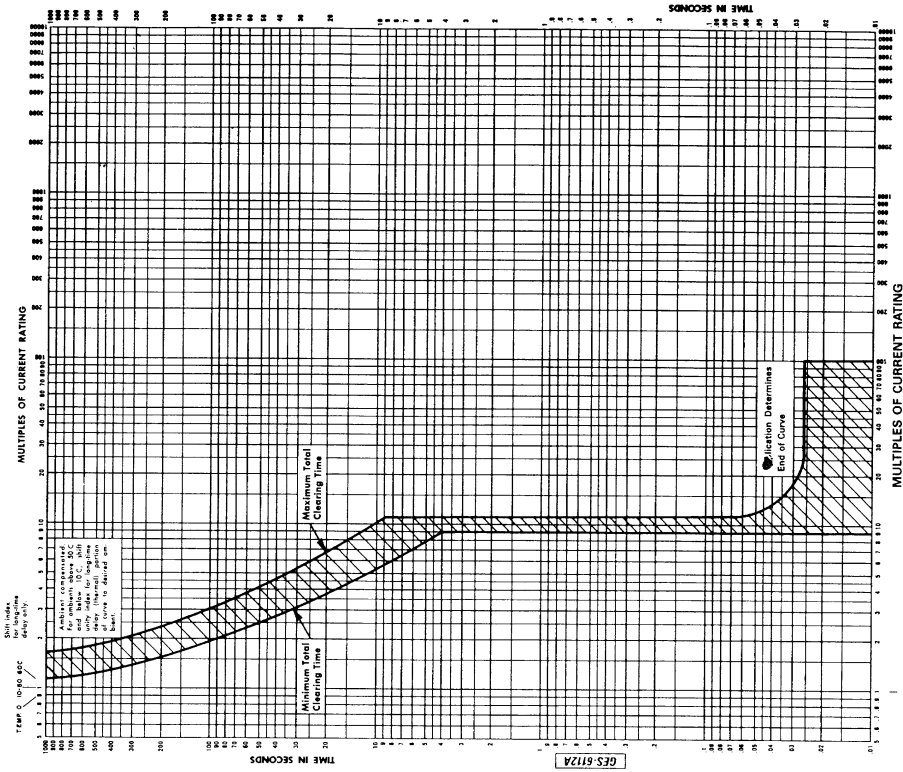
Molded Case Circuit Breakers
Type TQD
Long-time Delay and Instantaneous
Time-current Curves

Current Ratings
100, 125, 175, 250 and 375 Amperes
Maximum Working Voltage: 240 Volts AC
Frequency Rating: 50/60 Hertz

Adjustments
Long-time delay thermal trip: not adjustable
Instantaneous magnetic trip: not adjustable

4-88 (1M) (K215-482)

TJD



GE Electrical Distribution & Control
General Electric Company
Framingham, CT 06032

GES-6112A

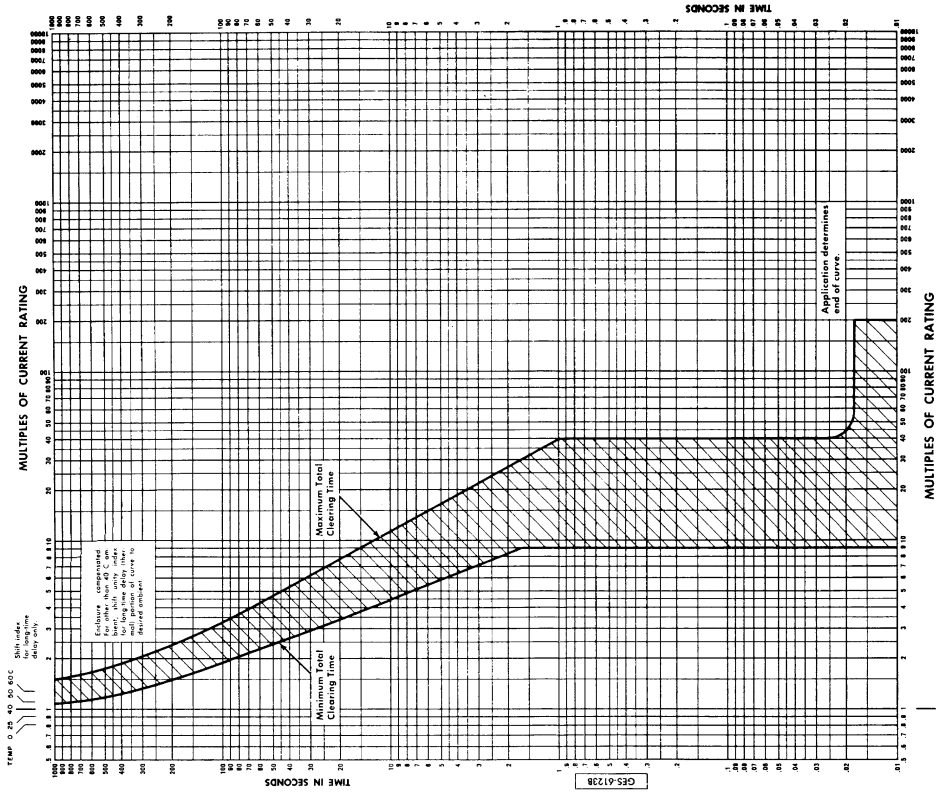
Molded Case Circuit Breakers
Type JTD (400 Amps Max.)
Long-time Delay and Instantaneous
Time-current Curves

Current Ratings
250, 300, 350 and 400 Amperes
Voltage Ratings
2 and 3 pole—240 Volts AC, 120 Volts DC
Maximum Working Voltage: 240 Volts AC
Frequency Rating: 50/60 Hertz

Adjustments
Long-time delay thermal trip: not adjustable
Instantaneous magnetic trip: not adjustable

4-88 (1M) (K215-862)

TEB 60-80



GENERAL ELECTRIC

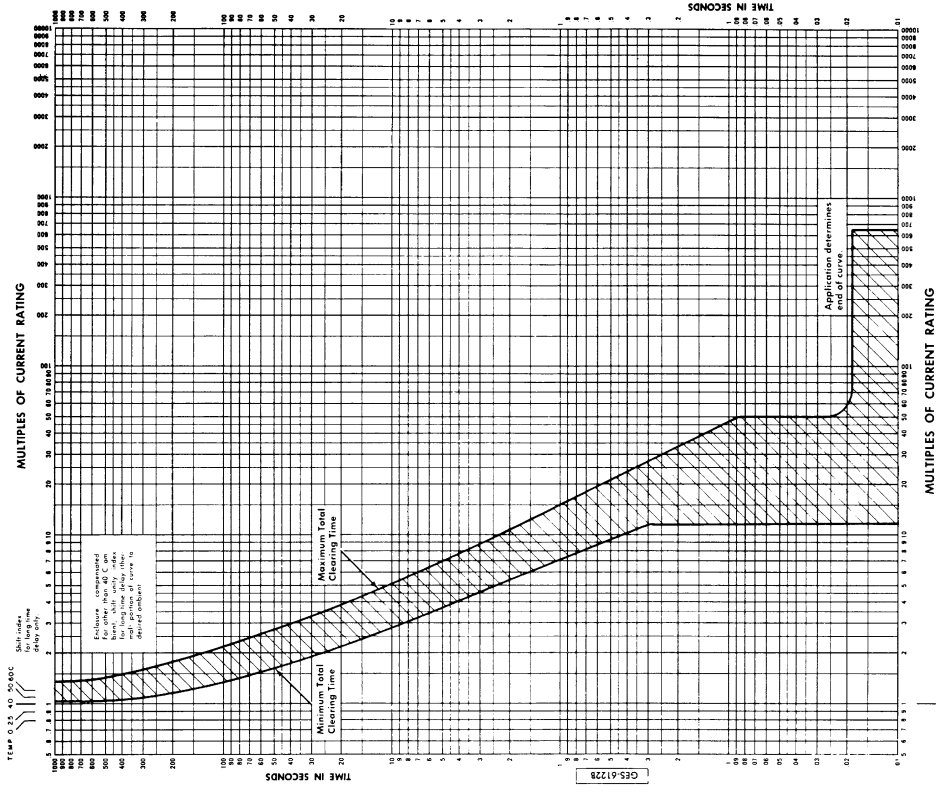
MOLDED-CASE CIRCUIT BREAKER
E 100 LINE
Type TEB, 60-80 Amperes
Enclosure Compensated
Long-time Delay and Instantaneous Time-current Curves

Current Ratings:
60, 80, 100 Amperes
Voltage Rating:
2 and 3-pole-240 volt or 1200 volt, 480 V
Frequency Rating:
60 Hz/Hz

Adjustments:
Long time delay normal trip, not adjustable.
Instantaneous magnetic trip, not adjustable.

GENERAL ELECTRIC CO., DISTRIBUTION EQUIPMENT DIVISION, PLAINVILLE, CONN. 06062

TEB 15-50



GENERAL ELECTRIC

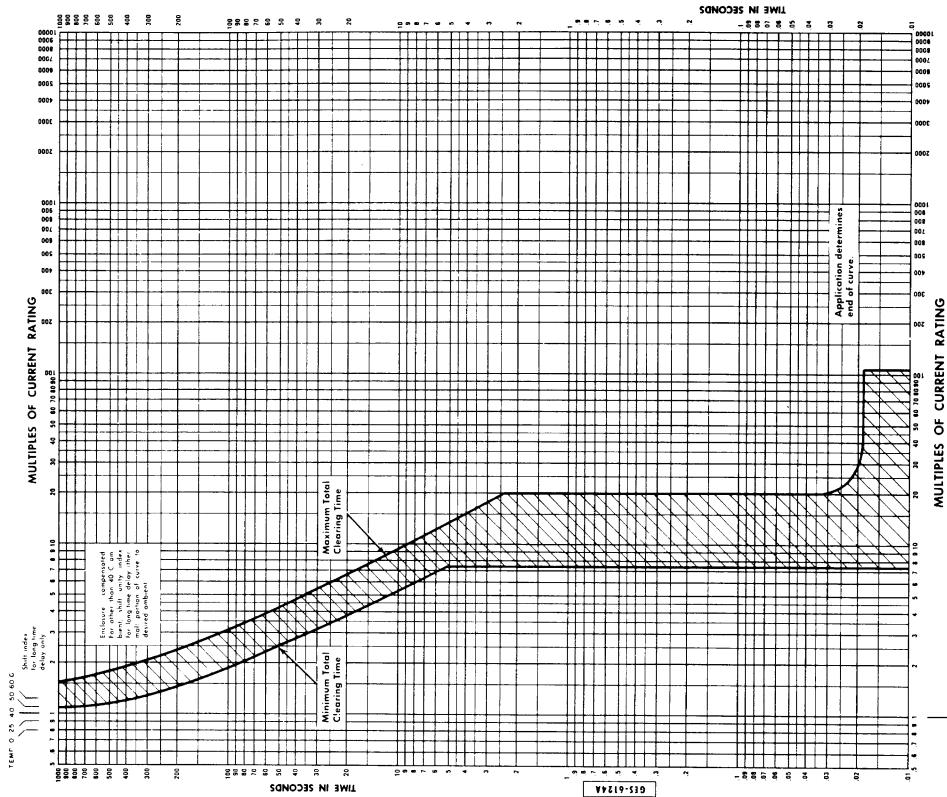
MOLDED-CASE CIRCUIT BREAKER
E 100 LINE
Type TEB, 15-50 Amperes
Enclosure Compensated
Long-time Delay and Instantaneous Time-current Curves

Current Ratings:
15, 20, 25, 30, 35, 40, 45 and 50 amperes
Voltage Rating:
2 and 3-pole-240 volt or 1200 volt, 480 V
Frequency Rating:
60 Hz/Hz

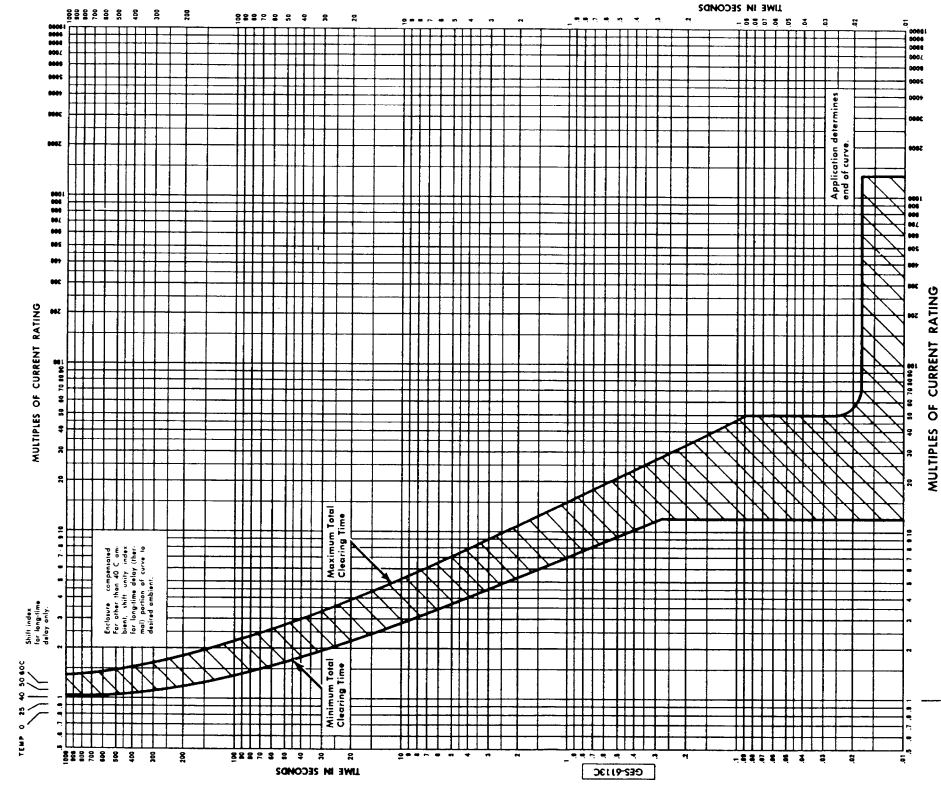
Adjustments:
Long time delay normal trip, not adjustable.
Instantaneous magnetic trip, not adjustable.

GENERAL ELECTRIC CO., DISTRIBUTION EQUIPMENT DIVISION, PLAINVILLE, CONN. 06062

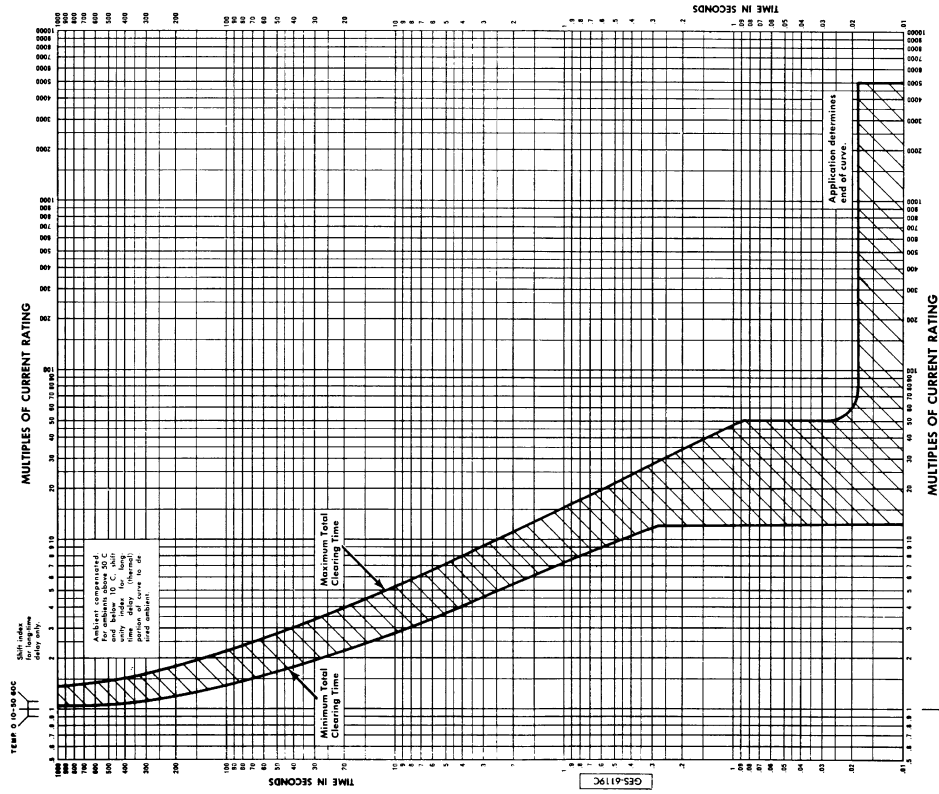
TEB 90, 100



TED 15-50



TED6 & THED6 15-50



GENERAL ELECTRIC

MOLDED-CASE CIRCUIT BREAKER
E 150 LINE

Types TED and THED, 15-50 Amperes
Ambient Compensated

Current Ratings: 15, 20, 25, 30, 35, 40, 45 and 50 amperes
Voltage Ratings: 2 and 3 pole-500 volts ac
Frequency Rating: 60 Hertz

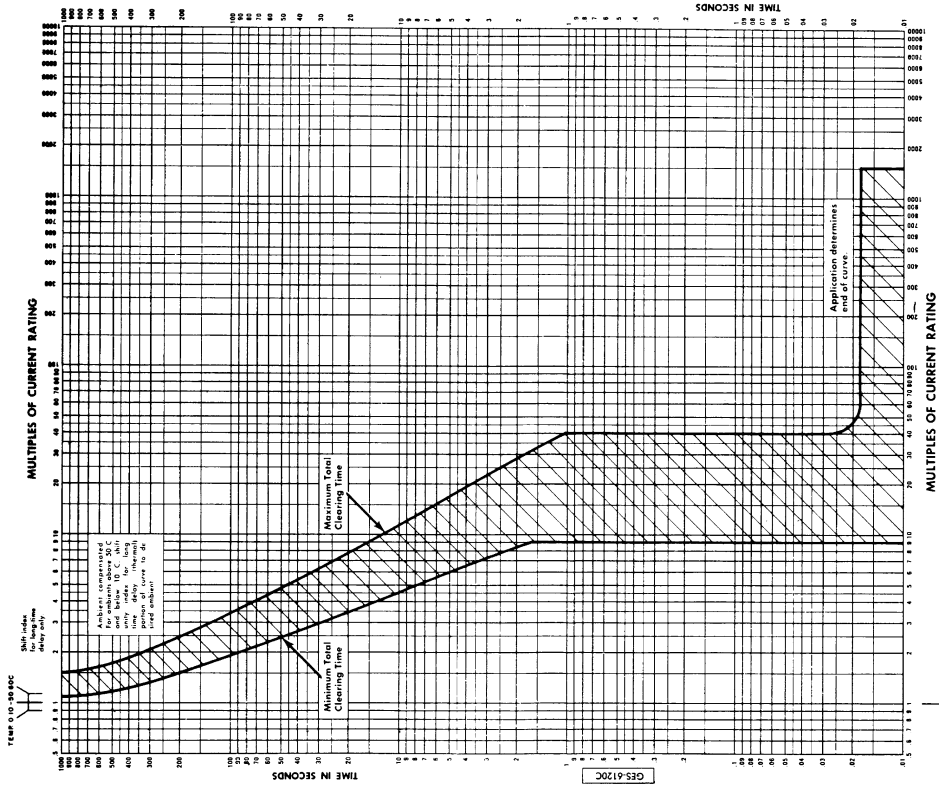
Adjustments: Long time delay thermal trip not adjustable. Instantaneous magnetic trip not adjustable.

Long-time Delay and Instantaneous Time-current Curves (30°C ambient, wired with conductors of corresponding rating, in pair) (Apply for all other ambient, use rating, full index, or trip of sheet)

GENERAL ELECTRIC CO. DISTRIBUTION EQUIPMENT DIVISION, PLAINVILLE, CONN. 06062

9411131 (M) N219189

TED6 & THED6 60-80



GENERAL ELECTRIC

MOLDED-CASE CIRCUIT BREAKER
E 150 LINE

Types TED and THED, 60-80 amperes
Ambient Compensated

Current Ratings: 60, 70 and 80 amperes
Voltage Ratings: 2 and 3 pole-500 volts ac
Frequency Rating: 60 Hertz

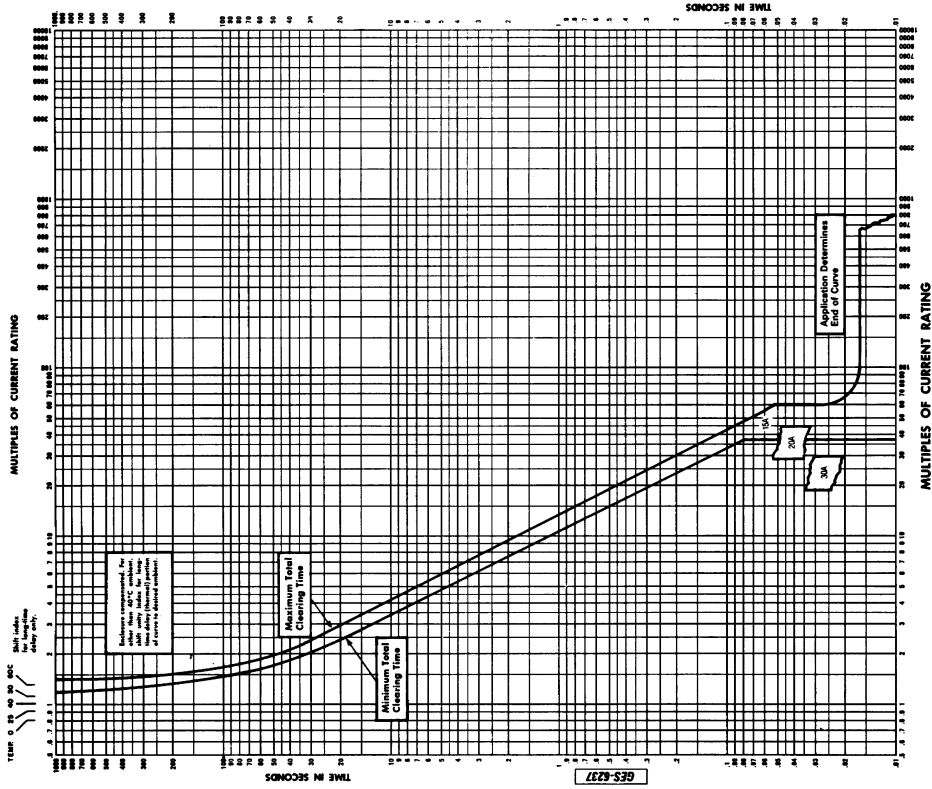
Adjustments: Long time delay thermal trip not adjustable. Instantaneous magnetic trip not adjustable.

Long-time Delay and Instantaneous Time-current Curves (30°C ambient, wired with conductors of corresponding rating, in pair) (Apply for all other ambient, use rating, full index, or trip of sheet)

GENERAL ELECTRIC CO. CIRCUIT PROTECTIVE DEVICES DEPT., PLAINVILLE, CONN. 06062

9411131 (M) N219189

TEY 15-50



GE Electrical Distribution & Control
General Electric Company
Framingham, CT 06032

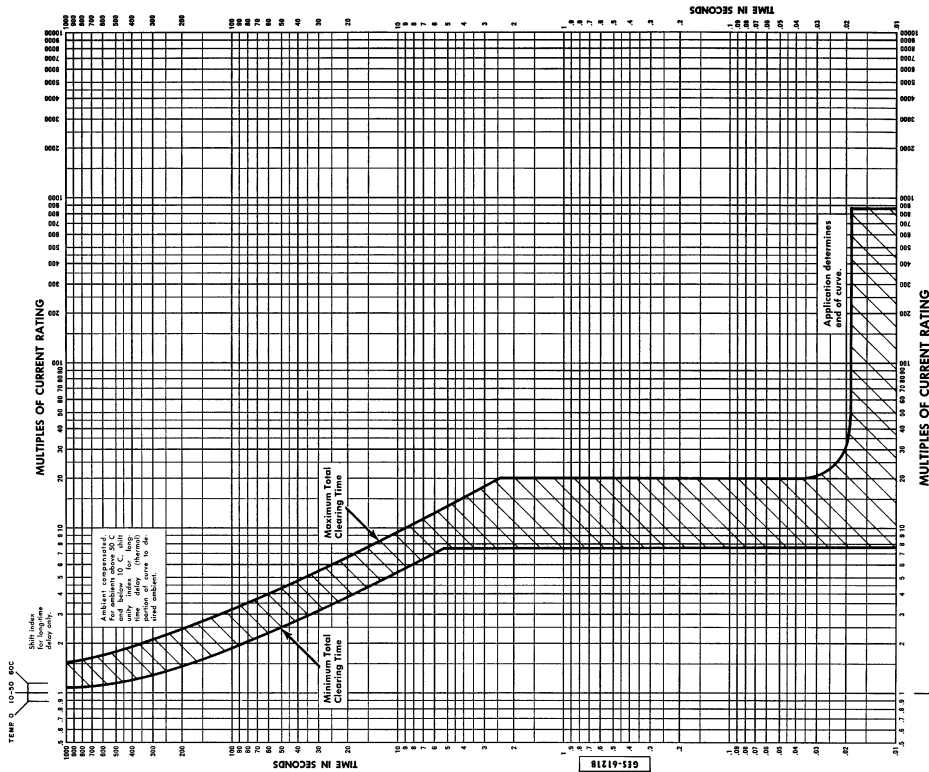
Current Ratings
15, 30 and 50 amperes
Voltage Ratings
1-pole—277 (125 volts dc)
2- and 3-pole—480 volts ac (250 volts dc)
Frequency Rating
60 Hertz

GES-6237
Molded Case Circuit Breaker
Type TEY, 15-30 Amperes
Enclosure Compensated, Long-time Delay and Instantaneous Time-current Curves

Adjustments
Long-time delay thermal trip: not adjustable.
Instantaneous magnetic trip: not adjustable.

Curves show enclosure compensated circuit breaker in open air, ambient, unless with conditions of corresponding rating, no prior listing. For all other ambients, use rating shift index at top of sheet.

TED6 & THED6 90-150



GE Electrical Distribution & Control
General Electric Company
41 Woodland Avenue, Framingham, CT 06032

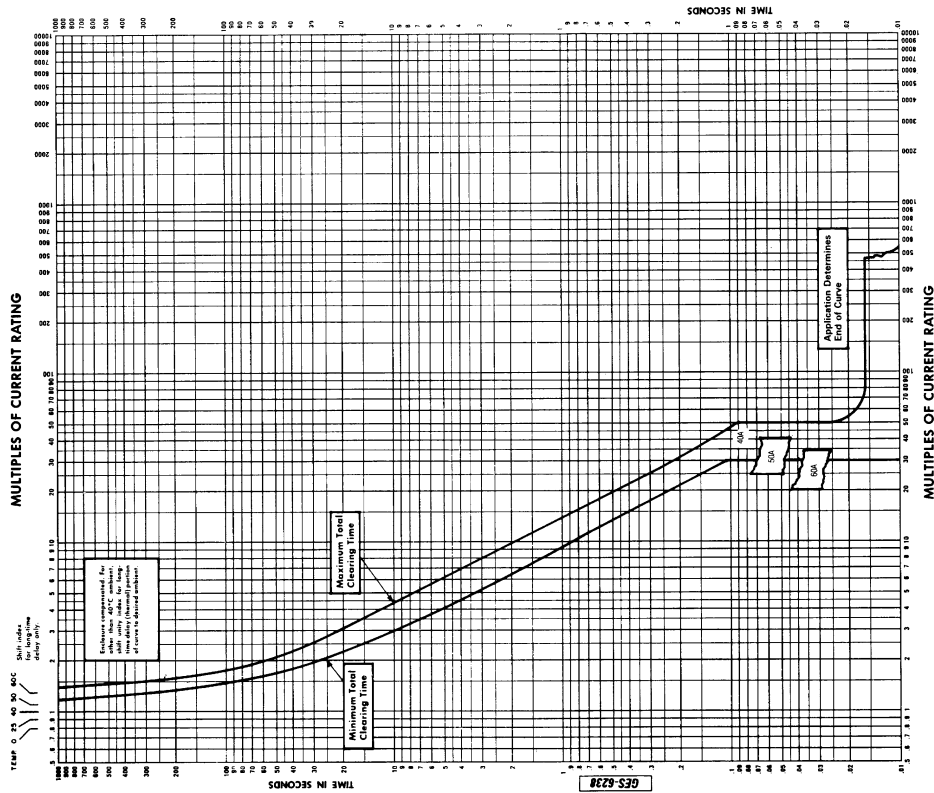
Current Ratings
90, 100, 110, 125 and 150 Amperes
Voltage Ratings
2 and 3-pole—600 Volts ac
Frequency Rating
60 Hertz

GES-6121C
Molded Case Circuit Breaker
E 150 LINE
Type TED and THED, 90 - 150 Amperes
Ambient Compensated
Long Time Delay and Instantaneous Time Current Curves

Adjustments
Long Time delay thermal trip: not adjustable.
Instantaneous magnetic trip: not adjustable.

Curves show ambient compensated circuit breaker in open air, ambient, unless with conditions of corresponding rating, no prior listing. For all other ambients, use rating shift index at top of sheet.

TEY 60



GE Electrical Distribution & Control
General Electric Company
Pittsfield, CT 06857

GES-6238

Molded Case Circuit Breaker Type TEY, 40-60 Amperes Enclosure Compensated, Long-time Delay and Instantaneous Time-current Curves

Adjustments
Long time delay thermal trip, not adjustable.
Instantaneous magnetic trip, not adjustable.

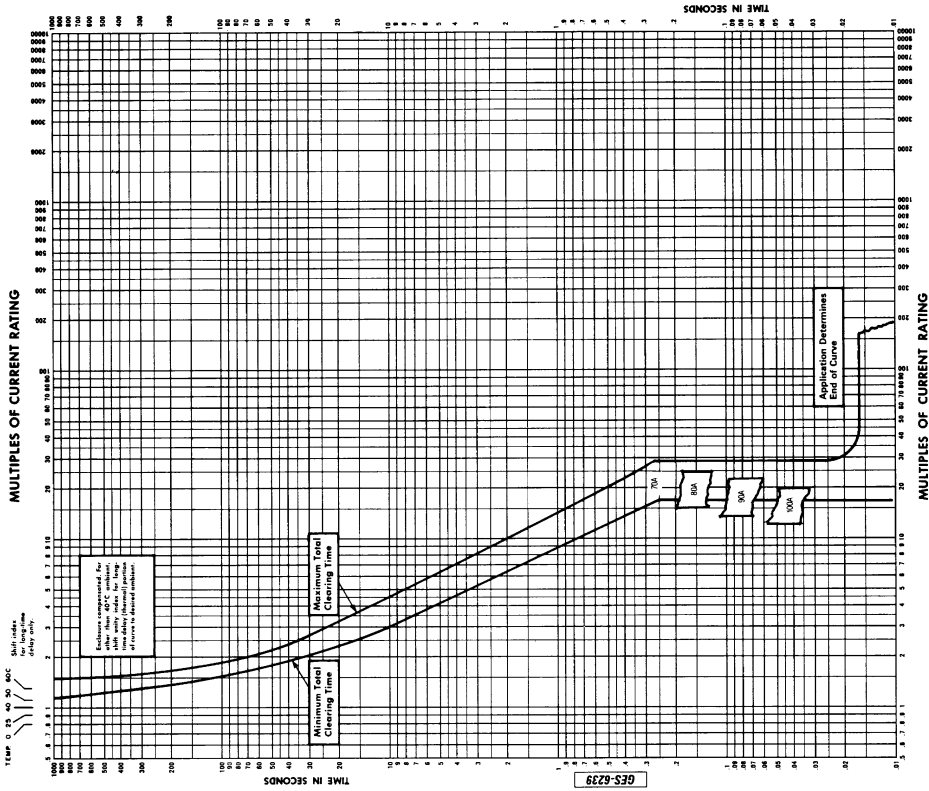
Current Ratings
40, 50 and 60 amperes

Voltage Ratings
1-pole—277 volts ac (120/240 volts dc)
2- and 3-pole—480 volts ac (120/240 volts dc)

Frequency Ratings
60 Hertz

4-188-13M

TEY—100



GE Electrical Distribution & Control
General Electric Company
Pittsfield, CT 06857

GES-6239

Molded Case Circuit Breaker Type TEY, 70-100 Amperes Enclosure Compensated, Long-time Delay and Instantaneous Time-current Curves

Adjustments
Long time delay thermal trip, not adjustable.
Instantaneous magnetic trip, not adjustable.

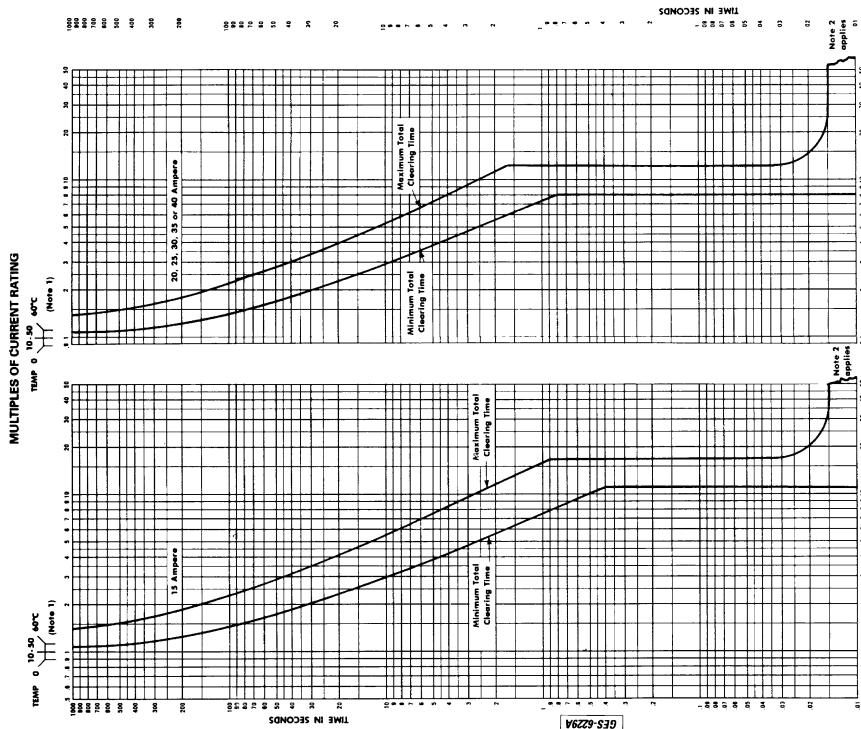
Current Ratings
70, 80, 90 and 100 amperes

Voltage Ratings
1-pole—277 volts ac (120/240 volts dc)
2- and 3-pole—480 volts ac (120/240 volts dc)

Frequency Ratings
60 Hertz

4-188-13M

TEL 15-40



GE Electrical Distribution & Control
 General Electric Company
 Pawtucket, CT 06872

GES-6229A

Current Ratings
 15, 20, 25, 30, 35, or 40 Amperes

Voltage Ratings
 240, 480, 600 Volts AC
 3000 Volts DC

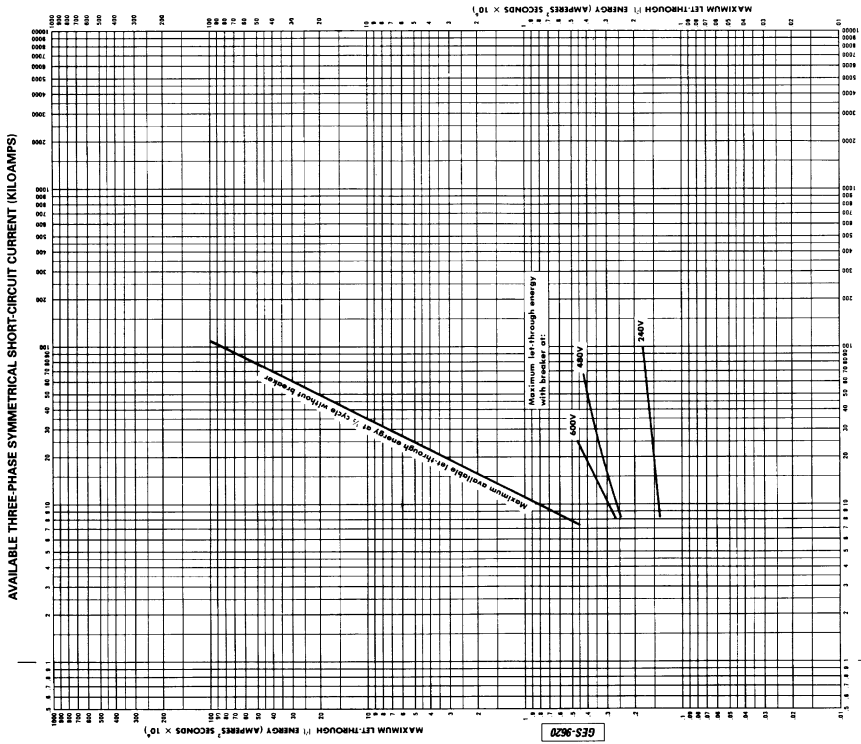
Frequency Rating
 60 Hz

Adjustments
 Long time delay (thermal trip) not applicable. Instantaneous magnetic trip not adjustable. Short time delay adjustable. For long time delay, minimum portion of curve to be cleared ambient temperature. For short time delay, minimum portion of curve to be cleared 100°F (38°C). For additional clear time, refer to Note 2.

Notes:
 Note 1: Curves show ambient compensated current breaker in open air, 10-30°C. Note 2: For additional clear time, refer to Note 2.

1289 030A

TEL 15-40 I²t-MAXIMUM LET-THRU ENERGY



GE Electrical Distribution & Control
 General Electric Company
 Pawtucket, CT 06872

GES-9620

Current Ratings
 15-40 Amperes

Voltage Ratings
 240, 480, 600 Volts AC
 3000 Volts DC

Frequency Rating
 60 Hz

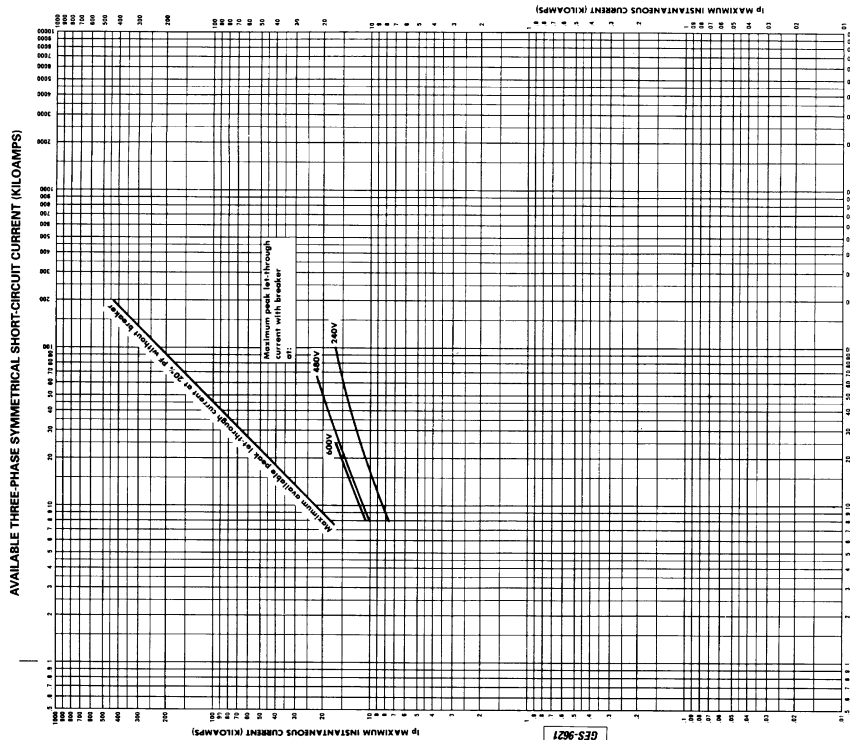
Type TEL

Let-through Energy Curves

Current-Limiting Molded Case Circuit Breaker

1289 030A

TEL 15-40 Ip-MAXIMUM INSTANTANEOUS CURRENT



GE Electrical Distribution & Control
General Electric Company
Pittsfield, CT 06897

GES-9621

Type TEL

Current-Limiting Molded Case Circuit Breaker

Peak Let-through Current Curves

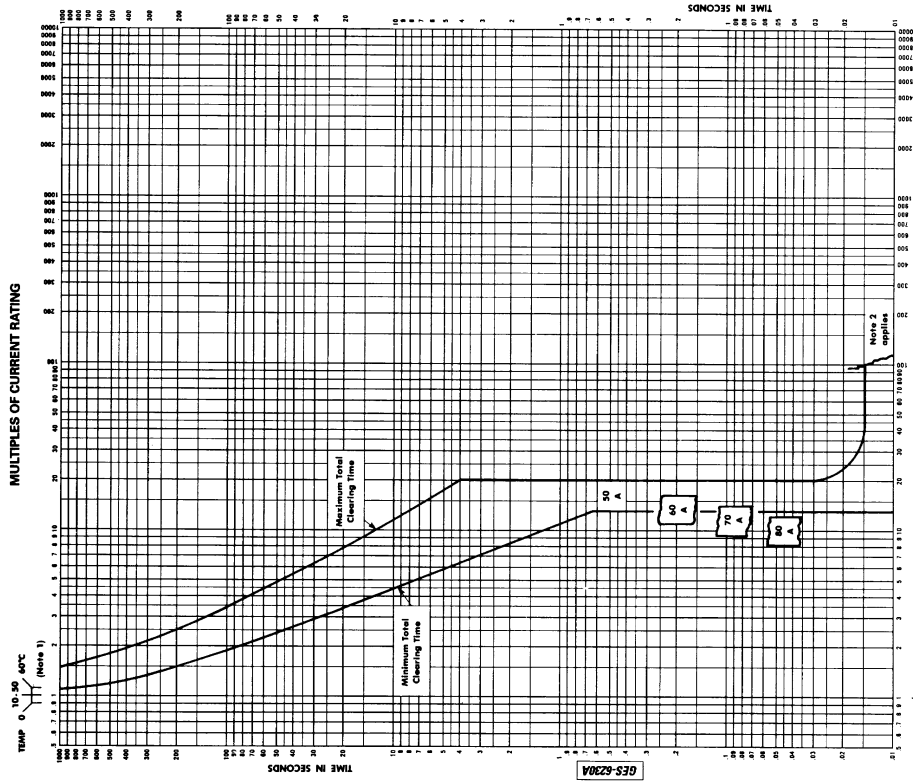
Current Ratings
15-40 AMP/100kVA

Voltage Ratings
240, 480, 600 Volts a.c.

Frequency Rating
50/60 Hertz

12483 (04)

TEL 50-80



GE Electrical Distribution & Control
General Electric Company
Pittsfield, CT 06897

GES-6230A

Type TEL

Current-Limiting Molded Case Circuit Breaker

Ambient Compensated Long-time Delay and Instantaneous Time-current Curves

Current Ratings
50, 60, 70 and 80 Amperes

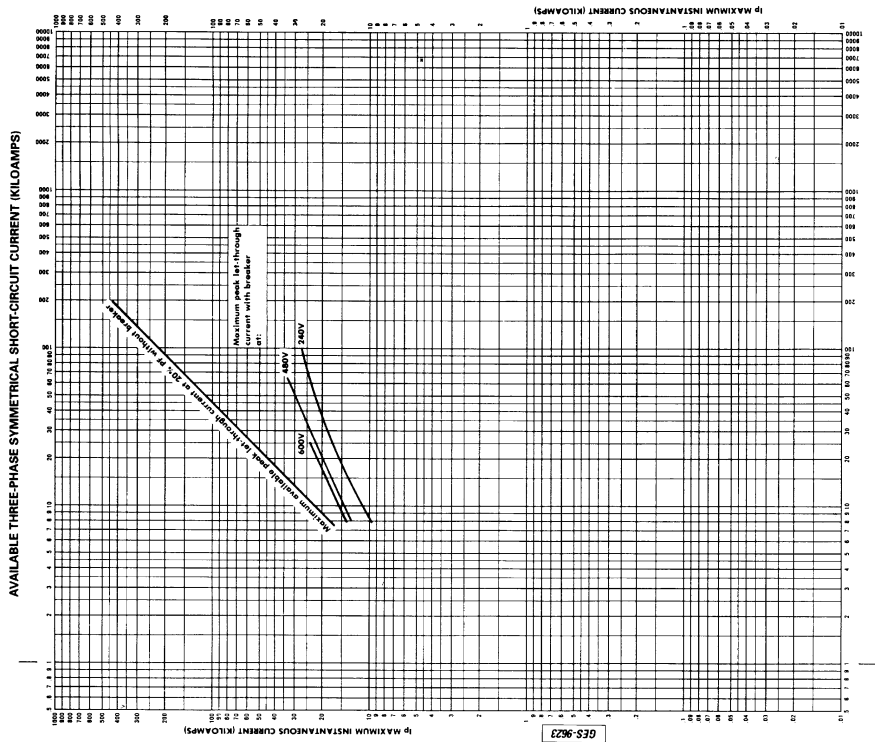
Voltage Ratings
240, 480, 600 Volts a.c.

Frequency Rating
50/60 Hertz

Adjustments
Long time delay thermal trip, not adjustable
Instantaneous magnetic trip, not adjustable
Short time delay, not adjustable
Short time delay, for long time delay (thermal) portion of curve to be selected
Adjustable delay time, see table
Adjustable delay time, see table
Adjustable delay time, see table
Adjustable delay time, see table

12483 (04)

TEL 50-150 Ip-MAXIMUM INSTANTANEOUS CURRENT



GE Electrical Distribution & Control
 General Electric Company
 Fairfield, CT 06424

GE-9623
 Current-Limiting Molded Case Circuit Breaker

Type TEL

Peak Let-through Current Curves

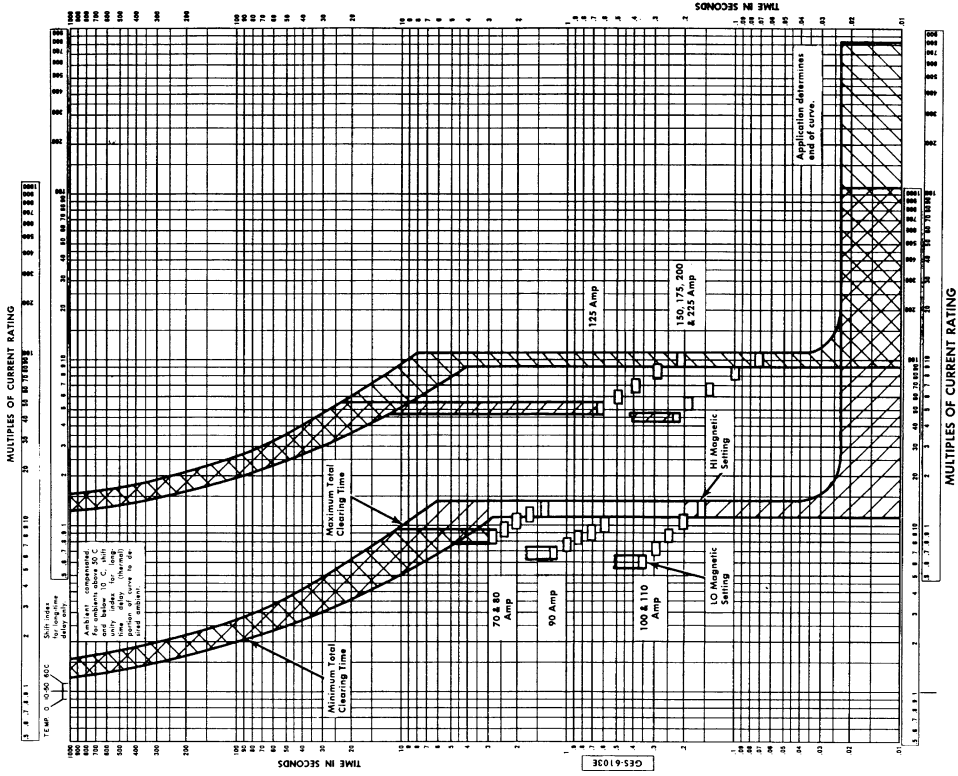
Current Ratings
 50, 150 Amperes

Voltage Ratings
 240, 480, 600 volts ac

Frequency Rating
 60 Hz

12893 D3M

TFJ, TFK, THFK



GENERAL ELECTRIC
 GE-6103E
 Type TFJ, TFK, THFK
 Ambient Compensated
 Long-Time Delay and Instantaneous Time-Current Curves

Molded-Case Circuit Breaker

Current Ratings
 70, 90, 100, 110, 125, 150, 175, 200, 225 Amperes

Voltage Ratings
 480 volts ac (250 volts dc)

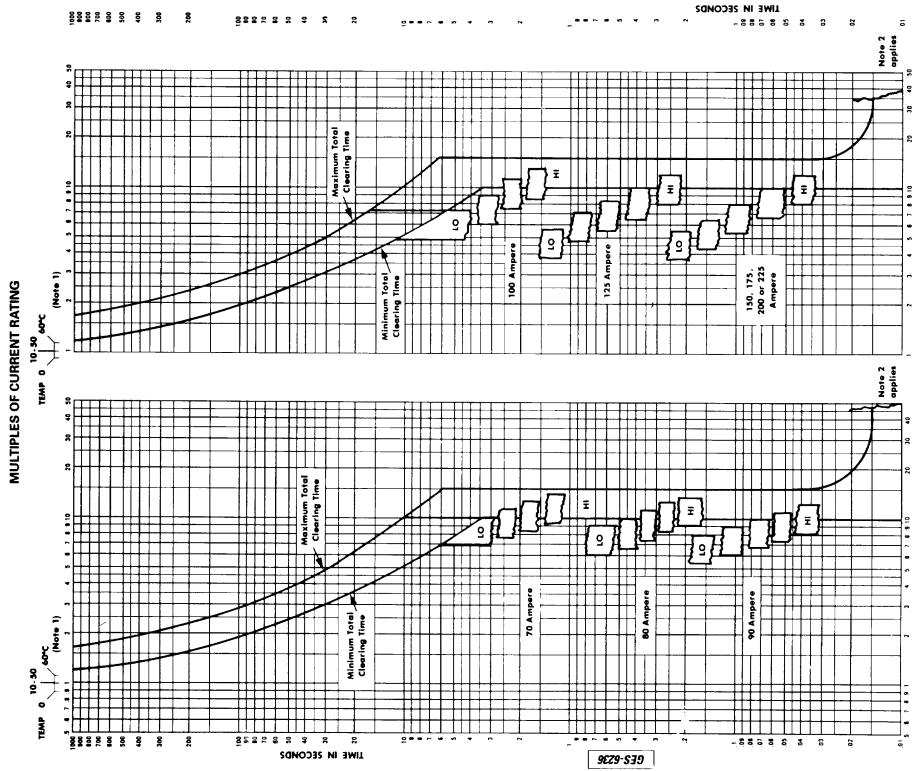
Frequency Rating
 60 Hz

Adjustments
 Long-time delay (selectable) time not adjustable.
 Instantaneous magnetic trip continuously adjustable, factory set on HI.
 Breaker may be factory set on HI or LO magnetic setting.
 For all other adjustments, see instructions on the instruction sheet.

GENERAL ELECTRIC CO., CIRCUIT PROTECTIVE DEVICES DEPT., PLAINVILLE, CONN. 06062

12893 D3M

TFL



GE Electrical Distribution & Control
 General Electric Company
 Philadelphia, CT 06882

Current Ratings
 70, 80, 90, 100, 125, 150, 175, 200, 225 Amperes

Voltage Ratings
 250, 300, 350, 400, 480V

Frequency Rating
 50/60 Hz

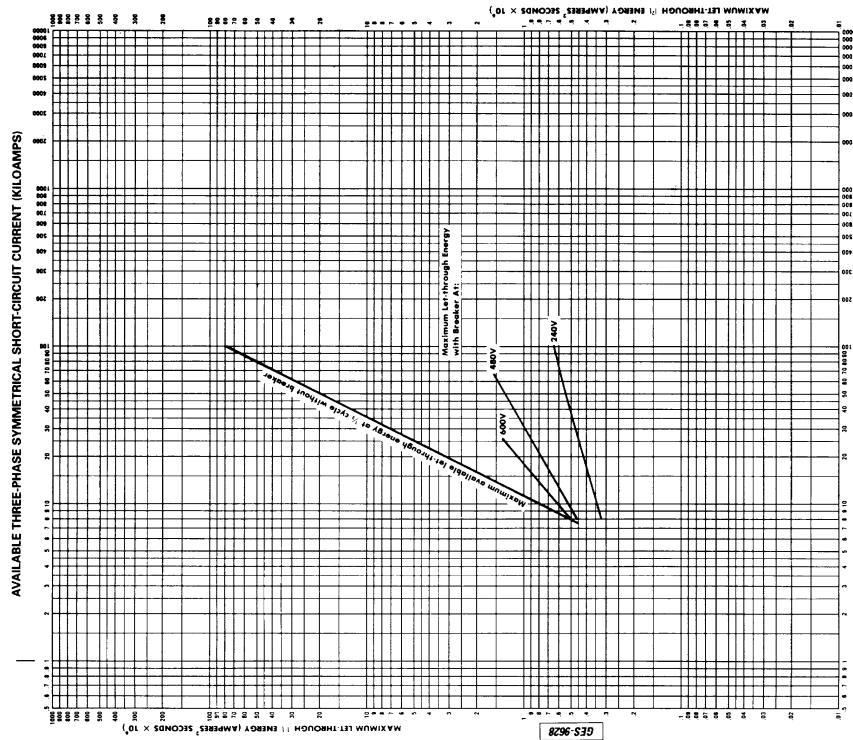
GE Electrical Distribution & Control
 General Electric Company
 Philadelphia, CT 06882

Current Ratings
 175, 200, 225 Amperes

Voltage Ratings
 250, 300, 350, 400, 480V

Frequency Rating
 50/60 Hz

TFL i² MAXIMUM LET-THRU ENERGY



GE Electrical Distribution & Control
 General Electric Company
 Philadelphia, CT 06882

Current Ratings
 175, 200, 225 Amperes

Voltage Ratings
 250, 300, 350, 400, 480V

Frequency Rating
 50/60 Hz

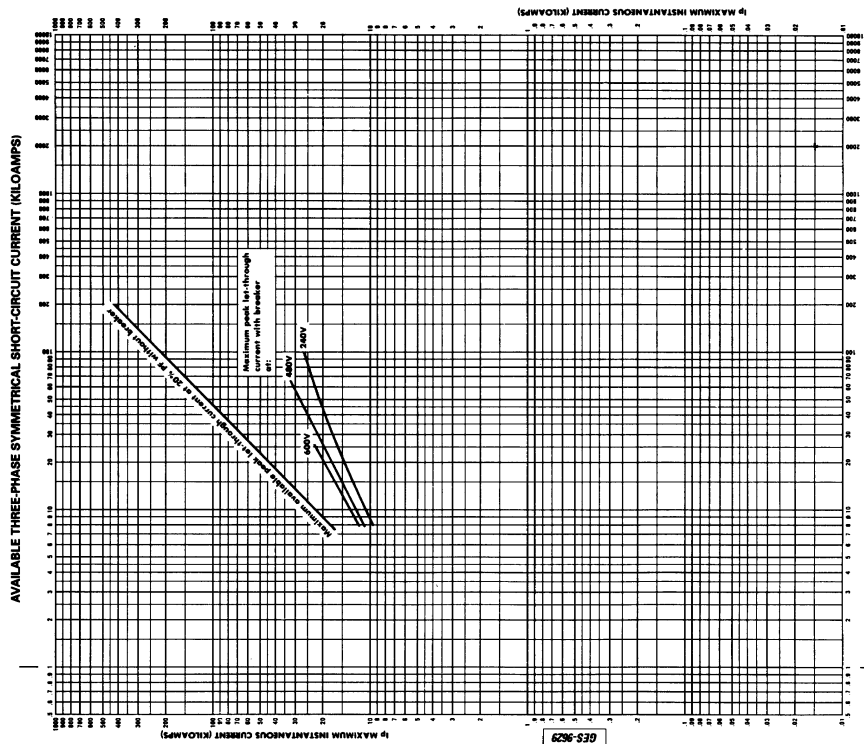
GE Electrical Distribution & Control
 General Electric Company
 Philadelphia, CT 06882

Current Ratings
 175, 200, 225 Amperes

Voltage Ratings
 250, 300, 350, 400, 480V

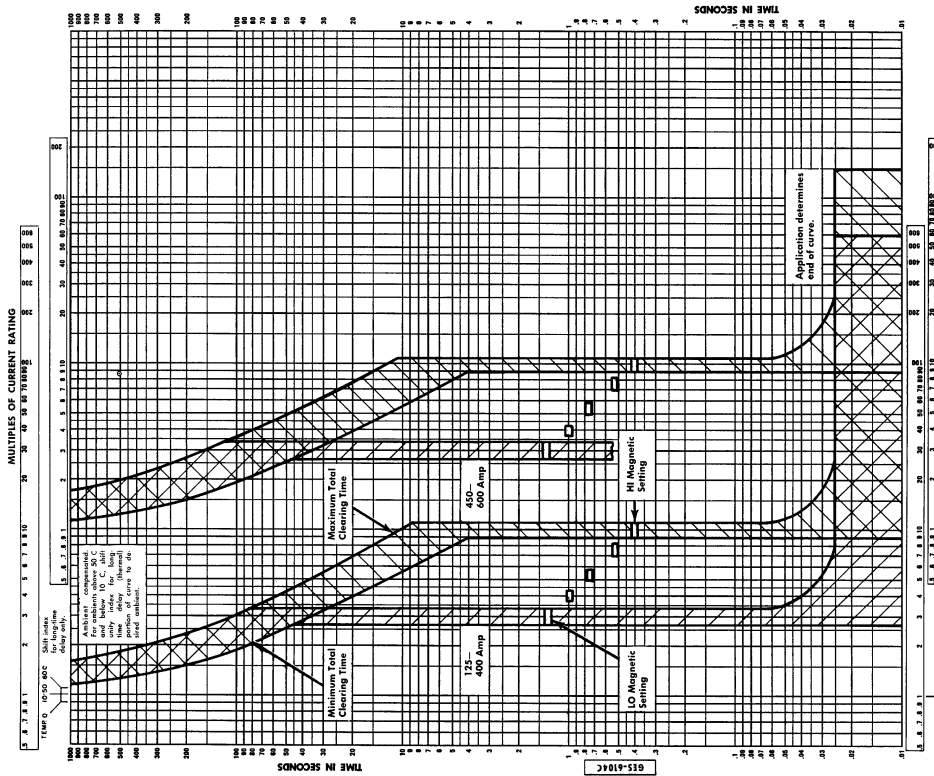
Frequency Rating
 50/60 Hz

TFL Ip-MAXIMUM INSTANTANEOUS CURRENT



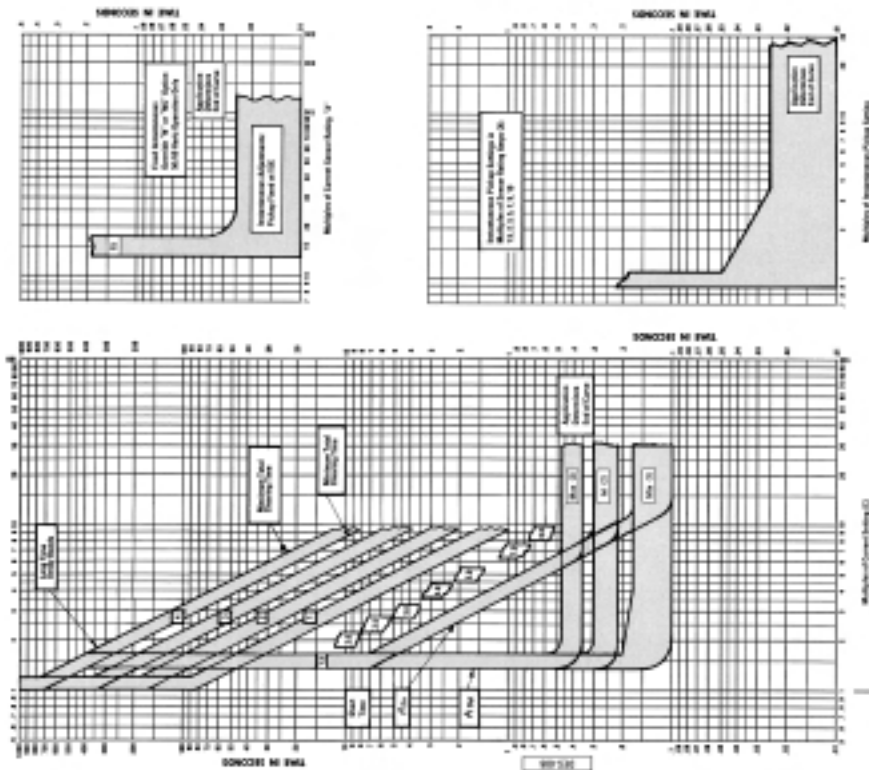
GE Electrical Distribution & Control General Electric Company 41 Woodland Avenue, Fairfield, CT 06424	625-9529 Current-Limiting Molded Case Circuit Breaker Type TFL Peak Let-through Current Curves
Current Ratings 125, 150, 175, 200, 225, 250, 300, 350, 400, 450, 500, 600 Amperes Voltage Ratings 240, 480, 600 Volts AC Frequency Rating 50/60 Hertz	GE-9529 Molded Case Circuit Breaker J 600 LINE Types TJJ (400A Max.), TJK, THJK, THJK2 (225A Max.) Long Time Delay and Instantaneous Time Current Curves

TJJ, TJK, THJK



GE Electrical Distribution & Control General Electric Company 41 Woodland Avenue, Fairfield, CT 06424	615-618C Molded Case Circuit Breaker J 600 LINE Types TJJ (400A Max.), TJK, THJK, THJK2 (225A Max.) Long Time Delay and Instantaneous Time Current Curves
Current Ratings 125, 150, 175, 200, 225, 250, 300, 350, 400, 450, 500, 600 Amperes Voltage Ratings 240, 480, 600 Volts AC Frequency Ratings 50/60 Hertz	GE-6104D Legend Position Only Adjustments Long Time delay thermal trip: not adjustable. Instantaneous magnetic trip: continuously adjustable, factory set on 10. Blocks the range of marked points on instantaneous disks.

**TJ4V, THJ4V, TJJ4V,
TK4V, TKL4V — WITH POWER+ 4
DIGITAL RMS TRIP UNITS**



GE Industrial Systems
General Electric Company
41 Madison Avenue, Research, CT 06502

Available Ratings (Optional)

Frame	Current Rating (A)
100	100, 150, 200, 300, 400, 500
150	150, 200, 300, 400, 500
200	200, 300, 400, 500
300	300, 400, 500

Multiple Rating: 100, 150, 200, 300, 400, 500

DES-008

Modular Case Circuit Breakers
Types TJ4V, TH4V, TJJ4V, TK4V, TKL4V, TJK4V, THK4V, TJK4V, THK4V, TJJ4V, TK4V, TKL4V, TJK4V, THK4V, TJJ4V, TK4V, TKL4V

Long-Time Delay, Short-Time Delay and Instantaneous Trip Units
Current Rating: 100, 150, 200, 300, 400, 500 A
Voltage Rating: 100, 150, 200, 300, 400, 500 V

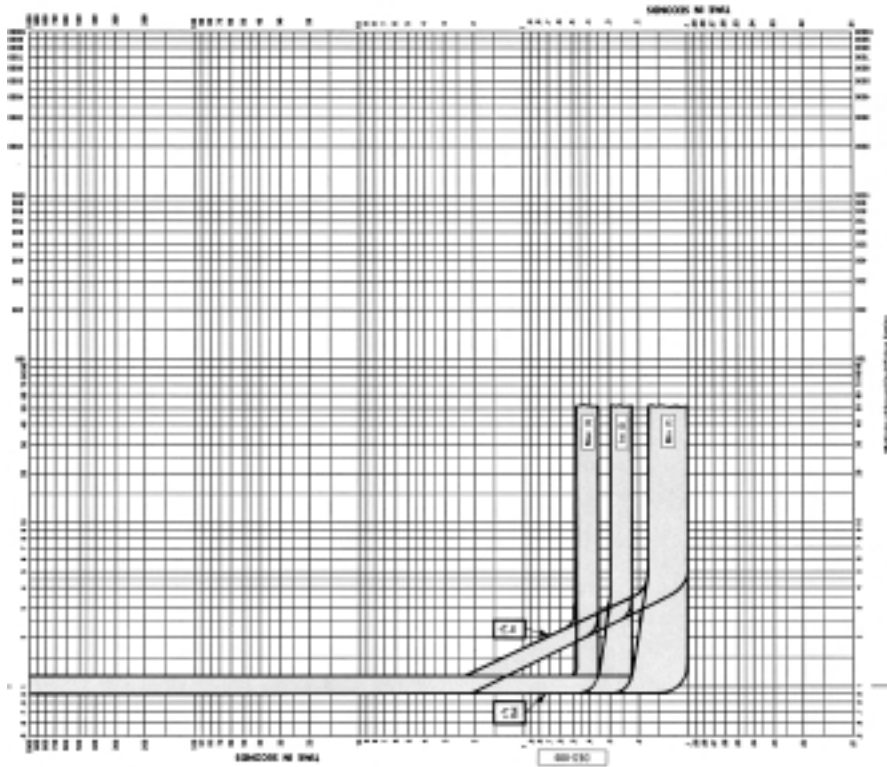
Instantaneous Rating:
100, 150, 200, 300, 400, 500 A

Short-Time Rating:
100, 150, 200, 300, 400, 500 A

Long-Time Rating:
100, 150, 200, 300, 400, 500 A

Notes:
1. See Catalog for detailed information.
2. A Circuit Breaker Rating is given in the Catalog.
3. See Catalog for detailed information.

**TJ4V, THJ4V, THL4V,
TK4V, TKL4V — POWER+ 4 — GROUND**



GE Industrial Systems
General Electric Company
41 Madison Avenue, Research, CT 06502

Available Ratings (Optional)

Frame	Current Rating (A)
100	100, 150, 200, 300, 400, 500
150	150, 200, 300, 400, 500
200	200, 300, 400, 500
300	300, 400, 500

Multiple Rating: 100, 150, 200, 300, 400, 500

DES-009

Modular Case Circuit Breakers
Types TJ4V, TH4V, TJJ4V, TK4V, TKL4V, TJK4V, THK4V, TJK4V, THK4V, TJJ4V, TK4V, TKL4V, TJK4V, THK4V, TJJ4V, TK4V, TKL4V

Ground Fault Trip Units
Current Rating: 100, 150, 200, 300, 400, 500 A
Voltage Rating: 100, 150, 200, 300, 400, 500 V

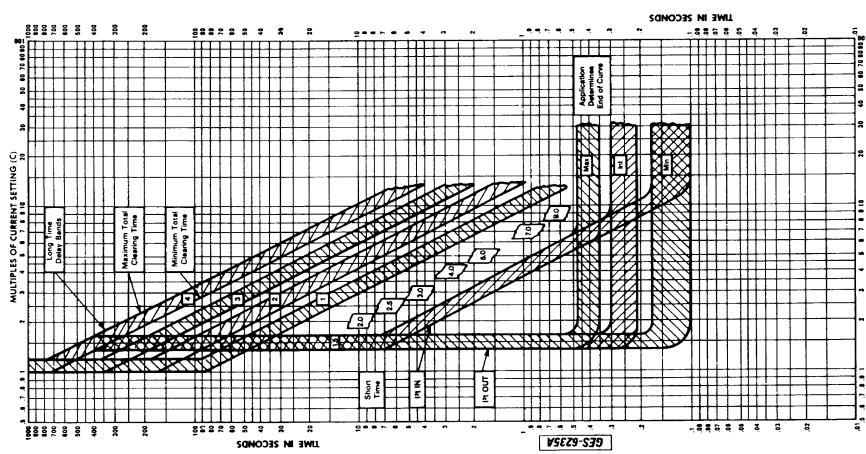
Instantaneous Rating:
100, 150, 200, 300, 400, 500 A

Short-Time Rating:
100, 150, 200, 300, 400, 500 A

Long-Time Rating:
100, 150, 200, 300, 400, 500 A

Notes:
1. See Catalog for detailed information.
2. A Circuit Breaker Rating is given in the Catalog.
3. See Catalog for detailed information.

TJH, TJJ, TKH, TKL—RMS-9



GE Electrical Distribution & Control
General Electric Company
Pittsfield, CT 06897

Available Ratings (Amperes)

Type	100	150	200	250	300	350	400	450	500	600	700	800	900	1000
100	100	150	200	250	300	350	400	450	500	600	700	800	900	1000
150	150	200	250	300	350	400	450	500	600	700	800	900	1000	
200	200	250	300	350	400	450	500	600	700	800	900	1000		
250	250	300	350	400	450	500	600	700	800	900	1000			
300	300	350	400	450	500	600	700	800	900	1000				
350	350	400	450	500	600	700	800	900	1000					
400	400	450	500	600	700	800	900	1000						
450	450	500	600	700	800	900	1000							
500	500	600	700	800	900	1000								
600	600	700	800	900	1000									
700	700	800	900	1000										
800	800	900	1000											
900	900	1000												
1000	1000													

Voltage Rating: 600 volts ac, 50-60 Hz

Insulated Case Circuit Breakers
Types TP, THP, TC, THC
Molded Case Circuit Breakers
Types TJH, TJJ, TKH, TKL
All with MicroVersaTrip™ RMS-9
Long-time delay, Short-time delay,
and instantaneous time-current curves

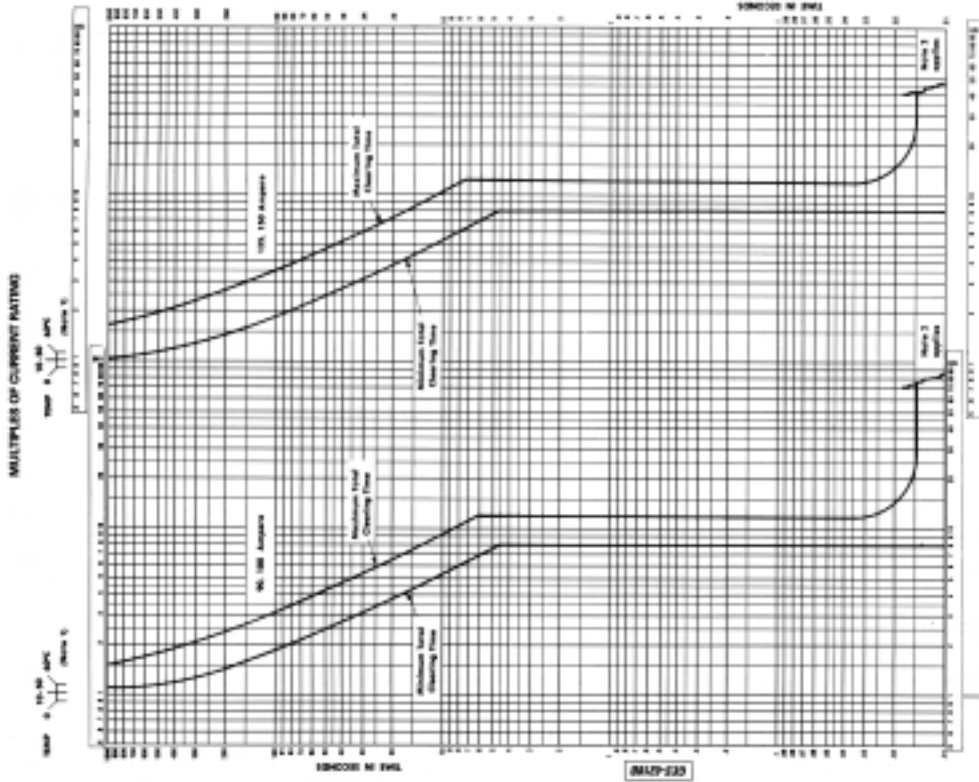
Curves apply at 50 to 400 Hertz and from
-20°C to +55°C breaker ambient.

Note: Operation above 60 Hertz requires thermal
and inrush starting of the circuit breaker.

GES-6235A

Programmer Adjustments
Low current settings: 0.5, 0.6, 0.7, 0.8, 0.9, 1.0, 1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.8, 1.9, 2.0, 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7, 2.8, 2.9, 3.0, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 3.9, 4.0, 4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7, 4.8, 4.9, 5.0, 5.1, 5.2, 5.3, 5.4, 5.5, 5.6, 5.7, 5.8, 5.9, 6.0, 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 7.0, 7.1, 7.2, 7.3, 7.4, 7.5, 7.6, 7.7, 7.8, 7.9, 8.0, 8.1, 8.2, 8.3, 8.4, 8.5, 8.6, 8.7, 8.8, 8.9, 9.0, 9.1, 9.2, 9.3, 9.4, 9.5, 9.6, 9.7, 9.8, 9.9, 10.0, 10.1, 10.2, 10.3, 10.4, 10.5, 10.6, 10.7, 10.8, 10.9, 11.0, 11.1, 11.2, 11.3, 11.4, 11.5, 11.6, 11.7, 11.8, 11.9, 12.0, 12.1, 12.2, 12.3, 12.4, 12.5, 12.6, 12.7, 12.8, 12.9, 13.0, 13.1, 13.2, 13.3, 13.4, 13.5, 13.6, 13.7, 13.8, 13.9, 14.0, 14.1, 14.2, 14.3, 14.4, 14.5, 14.6, 14.7, 14.8, 14.9, 15.0, 15.1, 15.2, 15.3, 15.4, 15.5, 15.6, 15.7, 15.8, 15.9, 16.0, 16.1, 16.2, 16.3, 16.4, 16.5, 16.6, 16.7, 16.8, 16.9, 17.0, 17.1, 17.2, 17.3, 17.4, 17.5, 17.6, 17.7, 17.8, 17.9, 18.0, 18.1, 18.2, 18.3, 18.4, 18.5, 18.6, 18.7, 18.8, 18.9, 19.0, 19.1, 19.2, 19.3, 19.4, 19.5, 19.6, 19.7, 19.8, 19.9, 20.0, 20.1, 20.2, 20.3, 20.4, 20.5, 20.6, 20.7, 20.8, 20.9, 21.0, 21.1, 21.2, 21.3, 21.4, 21.5, 21.6, 21.7, 21.8, 21.9, 22.0, 22.1, 22.2, 22.3, 22.4, 22.5, 22.6, 22.7, 22.8, 22.9, 23.0, 23.1, 23.2, 23.3, 23.4, 23.5, 23.6, 23.7, 23.8, 23.9, 24.0, 24.1, 24.2, 24.3, 24.4, 24.5, 24.6, 24.7, 24.8, 24.9, 25.0, 25.1, 25.2, 25.3, 25.4, 25.5, 25.6, 25.7, 25.8, 25.9, 26.0, 26.1, 26.2, 26.3, 26.4, 26.5, 26.6, 26.7, 26.8, 26.9, 27.0, 27.1, 27.2, 27.3, 27.4, 27.5, 27.6, 27.7, 27.8, 27.9, 28.0, 28.1, 28.2, 28.3, 28.4, 28.5, 28.6, 28.7, 28.8, 28.9, 29.0, 29.1, 29.2, 29.3, 29.4, 29.5, 29.6, 29.7, 29.8, 29.9, 30.0, 30.1, 30.2, 30.3, 30.4, 30.5, 30.6, 30.7, 30.8, 30.9, 31.0, 31.1, 31.2, 31.3, 31.4, 31.5, 31.6, 31.7, 31.8, 31.9, 32.0, 32.1, 32.2, 32.3, 32.4, 32.5, 32.6, 32.7, 32.8, 32.9, 33.0, 33.1, 33.2, 33.3, 33.4, 33.5, 33.6, 33.7, 33.8, 33.9, 34.0, 34.1, 34.2, 34.3, 34.4, 34.5, 34.6, 34.7, 34.8, 34.9, 35.0, 35.1, 35.2, 35.3, 35.4, 35.5, 35.6, 35.7, 35.8, 35.9, 36.0, 36.1, 36.2, 36.3, 36.4, 36.5, 36.6, 36.7, 36.8, 36.9, 37.0, 37.1, 37.2, 37.3, 37.4, 37.5, 37.6, 37.7, 37.8, 37.9, 38.0, 38.1, 38.2, 38.3, 38.4, 38.5, 38.6, 38.7, 38.8, 38.9, 39.0, 39.1, 39.2, 39.3, 39.4, 39.5, 39.6, 39.7, 39.8, 39.9, 40.0, 40.1, 40.2, 40.3, 40.4, 40.5, 40.6, 40.7, 40.8, 40.9, 41.0, 41.1, 41.2, 41.3, 41.4, 41.5, 41.6, 41.7, 41.8, 41.9, 42.0, 42.1, 42.2, 42.3, 42.4, 42.5, 42.6, 42.7, 42.8, 42.9, 43.0, 43.1, 43.2, 43.3, 43.4, 43.5, 43.6, 43.7, 43.8, 43.9, 44.0, 44.1, 44.2, 44.3, 44.4, 44.5, 44.6, 44.7, 44.8, 44.9, 45.0, 45.1, 45.2, 45.3, 45.4, 45.5, 45.6, 45.7, 45.8, 45.9, 46.0, 46.1, 46.2, 46.3, 46.4, 46.5, 46.6, 46.7, 46.8, 46.9, 47.0, 47.1, 47.2, 47.3, 47.4, 47.5, 47.6, 47.7, 47.8, 47.9, 48.0, 48.1, 48.2, 48.3, 48.4, 48.5, 48.6, 48.7, 48.8, 48.9, 49.0, 49.1, 49.2, 49.3, 49.4, 49.5, 49.6, 49.7, 49.8, 49.9, 50.0, 50.1, 50.2, 50.3, 50.4, 50.5, 50.6, 50.7, 50.8, 50.9, 51.0, 51.1, 51.2, 51.3, 51.4, 51.5, 51.6, 51.7, 51.8, 51.9, 52.0, 52.1, 52.2, 52.3, 52.4, 52.5, 52.6, 52.7, 52.8, 52.9, 53.0, 53.1, 53.2, 53.3, 53.4, 53.5, 53.6, 53.7, 53.8, 53.9, 54.0, 54.1, 54.2, 54.3, 54.4, 54.5, 54.6, 54.7, 54.8, 54.9, 55.0, 55.1, 55.2, 55.3, 55.4, 55.5, 55.6, 55.7, 55.8, 55.9, 56.0, 56.1, 56.2, 56.3, 56.4, 56.5, 56.6, 56.7, 56.8, 56.9, 57.0, 57.1, 57.2, 57.3, 57.4, 57.5, 57.6, 57.7, 57.8, 57.9, 58.0, 58.1, 58.2, 58.3, 58.4, 58.5, 58.6, 58.7, 58.8, 58.9, 59.0, 59.1, 59.2, 59.3, 59.4, 59.5, 59.6, 59.7, 59.8, 59.9, 60.0, 60.1, 60.2, 60.3, 60.4, 60.5, 60.6, 60.7, 60.8, 60.9, 61.0, 61.1, 61.2, 61.3, 61.4, 61.5, 61.6, 61.7, 61.8, 61.9, 62.0, 62.1, 62.2, 62.3, 62.4, 62.5, 62.6, 62.7, 62.8, 62.9, 63.0, 63.1, 63.2, 63.3, 63.4, 63.5, 63.6, 63.7, 63.8, 63.9, 64.0, 64.1, 64.2, 64.3, 64.4, 64.5, 64.6, 64.7, 64.8, 64.9, 65.0, 65.1, 65.2, 65.3, 65.4, 65.5, 65.6, 65.7, 65.8, 65.9, 66.0, 66.1, 66.2, 66.3, 66.4, 66.5, 66.6, 66.7, 66.8, 66.9, 67.0, 67.1, 67.2, 67.3, 67.4, 67.5, 67.6, 67.7, 67.8, 67.9, 68.0, 68.1, 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129.8, 129.9, 130.0, 130.1, 130.2, 130.3, 130.4, 130.5, 130.6, 130.7, 130.8, 130.9, 131.0, 131.1, 131.2, 131.3, 131.4, 131.5, 131.6, 131.7, 131.8, 131.9, 132.0, 132.1, 132.2, 132.3, 132.4, 132.5, 132.6, 132.7, 132.8, 132.9, 133.0, 133.1, 133.2, 133.3, 133.4, 133.5, 133.6, 133.7, 133.8, 133.9, 134.0, 134.1, 134.2, 134.3, 134.4, 134.5, 134.6, 134.7, 134.8, 134.9, 135.0, 135.1, 135.2, 135.3, 135.4, 135.5, 135.6, 135.7, 135.8, 135.9, 136.0, 136.1, 136.2, 136.3, 136.4, 136.5, 136.6, 136.7, 136.8, 136.9, 137.0, 137.1, 137.2, 137.3, 137.4, 137.5, 137.6, 137.7, 137.8, 137.9, 138.0, 138.1, 138.2, 138.3, 138.4, 138.5, 138.6, 138.7, 138.8, 138.9, 139.0, 139.1, 139.2, 139.3, 139.4, 139.5, 139.6, 139.7, 139.8, 139.9, 140.0, 140.1, 140.2, 140.3, 140.4, 140.5, 140.6, 140.7, 140.8, 140.9, 141.0, 141.1, 141.2, 141.3, 141.4, 141.5, 141.6, 141.7, 141.8, 141.9, 142.0, 142.1, 142.2, 142.3, 142.4, 142.5, 142.6, 142.7, 142.8, 142.9, 143.0, 143.1, 143.2, 143.3, 143.4, 143.5, 143.6, 143.7, 143.8, 143.9, 144.0, 144.1, 144.2, 144.3, 144.4, 144.5, 144.6, 144.7, 144.8, 144.9, 145.0, 145.1, 145.2, 145.3, 145.4, 145.5, 145.6, 145.7, 145.8, 145.9, 146.0, 146.1, 146.2, 146.3, 146.4, 146.5, 146.6, 146.7, 146.8, 146.9, 147.0, 147.1, 147.2, 147.3, 147.4, 147.5, 147.6, 147.7, 147.8, 147.9, 148.0, 148.1, 148.2, 148.3, 148.4, 148.5, 148.6, 148.7, 148.8, 148.9, 149.0, 149.1, 149.2, 149.3, 149.4, 149.5, 149.6, 149.7, 149.8, 149.9, 150.0, 150.1, 150.2, 150.3, 150.4, 150.5, 150.6, 150.7, 150.8, 150.9, 151.0, 151.1, 151.2, 151.3, 151.4, 151.5, 151.6, 151.7, 151.8, 151.9, 152.0, 152.1, 152.2, 152.3, 152.4, 152.5, 152.6, 152.7, 152.8, 152.9, 153.0, 153.1, 153.2, 153.3, 153.4, 153.5, 153.6, 153.7, 153.8, 153.9, 154.0, 154.1, 154.2, 154.3, 154.4, 154.5, 154.6, 154.7, 154.8, 154.9, 155.0, 155.1, 155.2, 155.3, 155.4, 155.5, 155.6, 155.7, 155.8, 155.9, 156.0, 156.1, 156.2, 156.3, 156.4, 156.5, 156.6, 156.7, 156.8, 156.9, 157.0, 157.1, 157.2, 157.3, 157.4, 157.5, 157.6, 157.7, 157.8, 157.9, 158.0, 158.1, 158.2, 158.3, 158.4, 158.5, 158.6, 158.7, 158.8, 158.9, 159.0, 159.1, 159.2, 15

THLC-1 90-150



GE Electrical Distribution & Control
 Newark, N.J. 07102

Current Rating
 90 and 150 amperes

Voltage Rating
 240, 480, 600 volts

Frequency Rating
 60 Hz

Current-Limiting Method Case Circuit Breaker
 Type THLC1

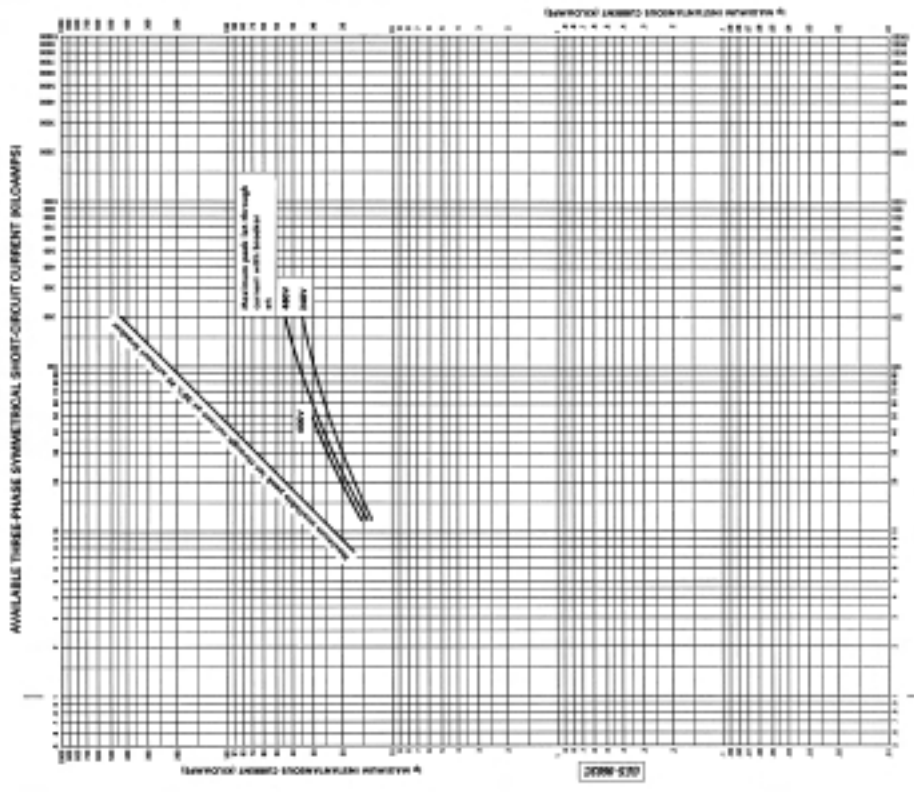
Ambient Temperature
 Long-time delay and instantaneous time-current curves

Long-time Delay and Instantaneous Time-current Curves
 Current curves indicate compressed period between 100°C and 150°C ambient, tested with 15°C and 50°C ambient. 100°C ambient is indicated with dashed lines representing 100°C ambient. No zero fault.

GE-52780
 Advances
 Long-time delay circuit breaker, 90 and 150 amperes, non-magnetic magnetic core, for use with 240, 480, 600 volt, 60 Hz, 3-phase, 3-wire, 4-wire, and 5-wire systems. For information on the location of your distributor, contact your nearest GE office.

GE-52780
 Advances
 Long-time delay circuit breaker, 90 and 150 amperes, non-magnetic magnetic core, for use with 240, 480, 600 volt, 60 Hz, 3-phase, 3-wire, 4-wire, and 5-wire systems. For information on the location of your distributor, contact your nearest GE office.

THLC-1 Ip-MAXIMUM INSTANTANEOUS CURRENT



GE Electrical Distribution & Control
 Newark, N.J. 07102

Current Rating
 90 and 150 amperes

Voltage Rating
 240, 480, 600 volts

Frequency Rating
 60 Hz

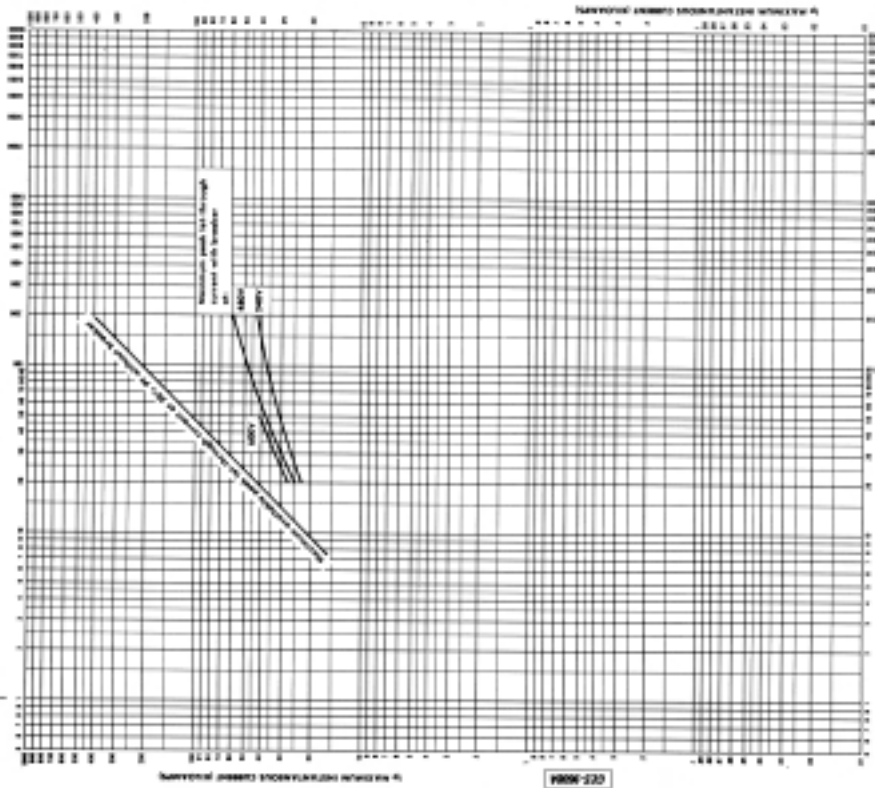
Current-Limiting Method Case Circuit Breaker
 Type THLC1

Peak Let-Through Current Curves

GE-5630C

THLC-2 I_p -MAXIMUM INSTANTANEOUS CURRENT

AVAILABLE THREE-PHASE SYMMETRICAL SHORT-CIRCUIT CURRENT (KILOAMPERE)

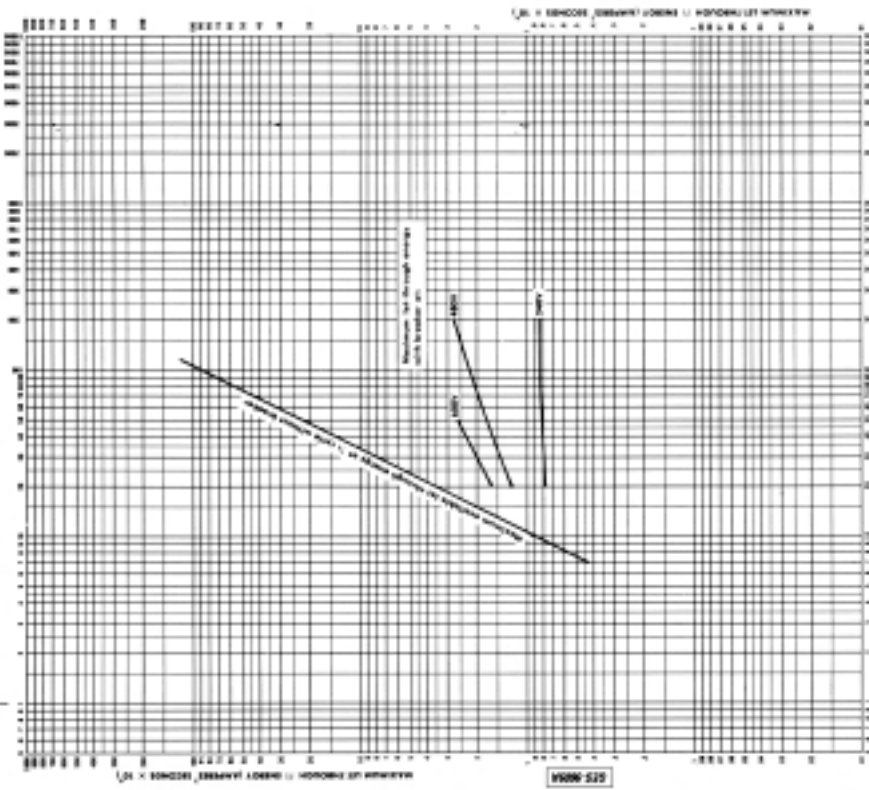


AVAILABLE THREE-PHASE SYMMETRICAL SHORT-CIRCUIT CURRENT (KILOAMPERE)

GE Electrical Distribution & Control GE Power Systems Atlanta, GA 30339	GEES-5833M Current-Limiting Molded Case Circuit Breaker
	Type THLC2 Peak Let-Through Current Curves
Current Ratings 150 - 1250 Amperes Voltage Ratings 240 - 480 Volts AC Performance Rating Type THLC2	GEES-5833M Current-Limiting Molded Case Circuit Breaker

THLC-2 i^2t -MAXIMUM LET-THRU ENERGY

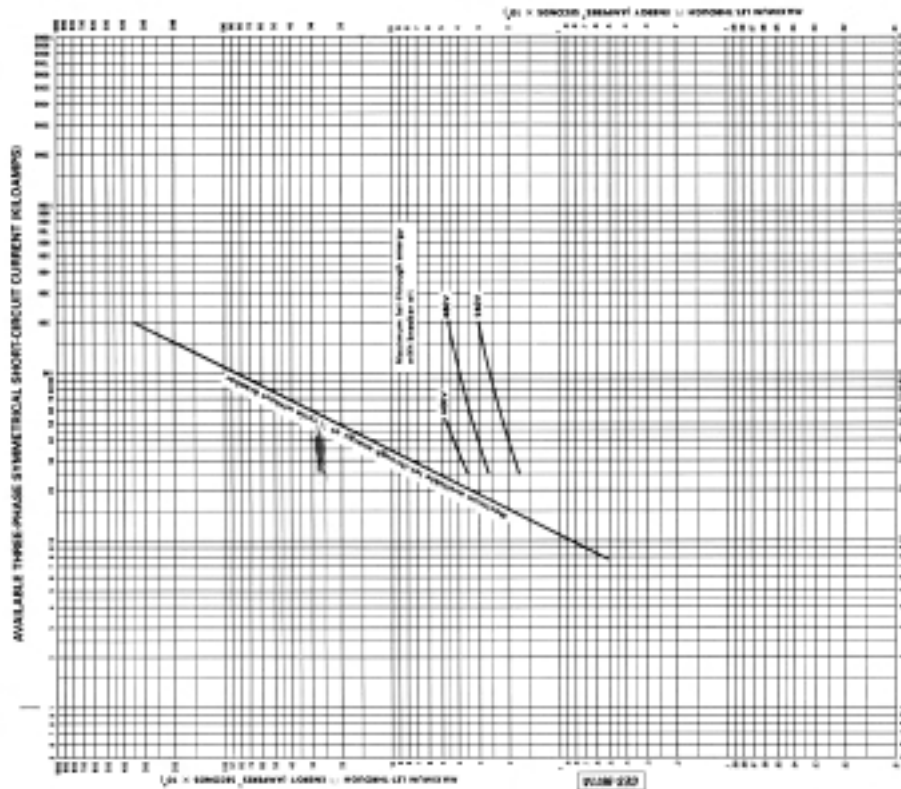
AVAILABLE THREE-PHASE SYMMETRICAL SHORT-CIRCUIT CURRENT (KILOAMPERE)



AVAILABLE THREE-PHASE SYMMETRICAL SHORT-CIRCUIT CURRENT (KILOAMPERE)

GE Electrical Distribution & Control GE Power Systems Atlanta, GA 30339	GEES-5833M Current-Limiting Molded Case Circuit Breaker
	Type THLC2 Let-Through Energy Curves
Current Ratings 150 - 1250 Amperes Voltage Ratings 240 - 480 Volts AC Performance Rating Type THLC2	GEES-5833M Current-Limiting Molded Case Circuit Breaker

THLC-4 i^2t -MAXIMUM LET-THRU ENERGY



GE Electrical Division
A General Electric Company
12300 University Avenue
Atlanta, GA 30340

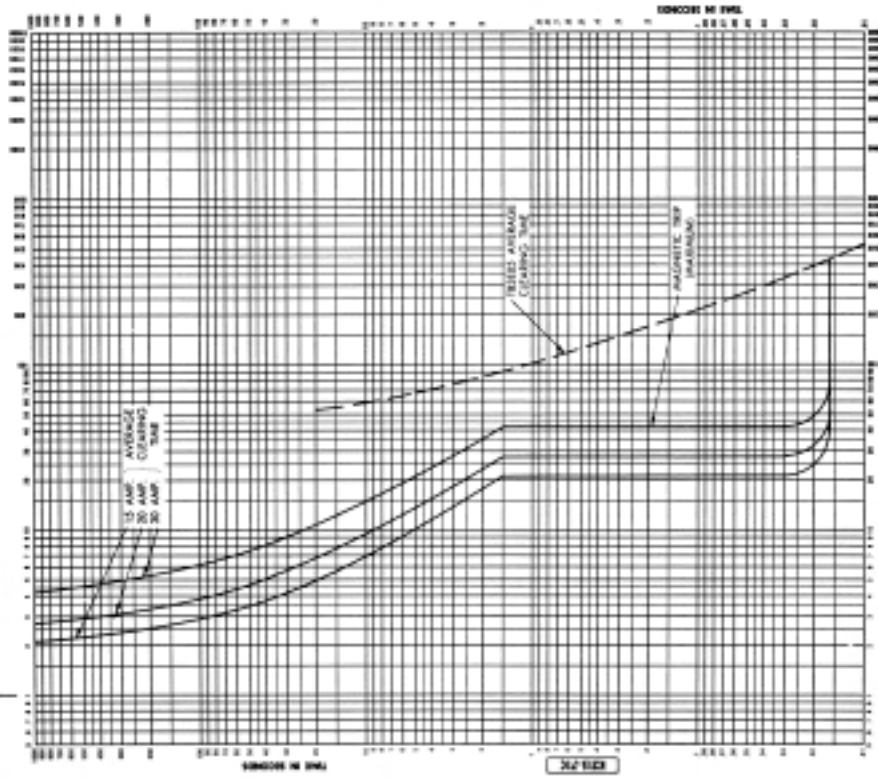
GES-3611A
Type THLC4
Let-Through Energy Curves

GES-3611A
Current-Limiting Moulded Case Circuit Breaker

GES-3611A
Type THLC4
Let-Through Energy Curves

Current Rating: 15, 20 and 30 Amperes
Voltage Rating: 480V, 600V and 690V
Frequency Rating: 50/60 Hz AC

TB-1 15-30



GE Electrical Division
A General Electric Company
12300 University Avenue
Atlanta, GA 30340

GES-3611A
Type TB1
Thermal Trip, Magnetic Trip and Current-Limiting Characteristics

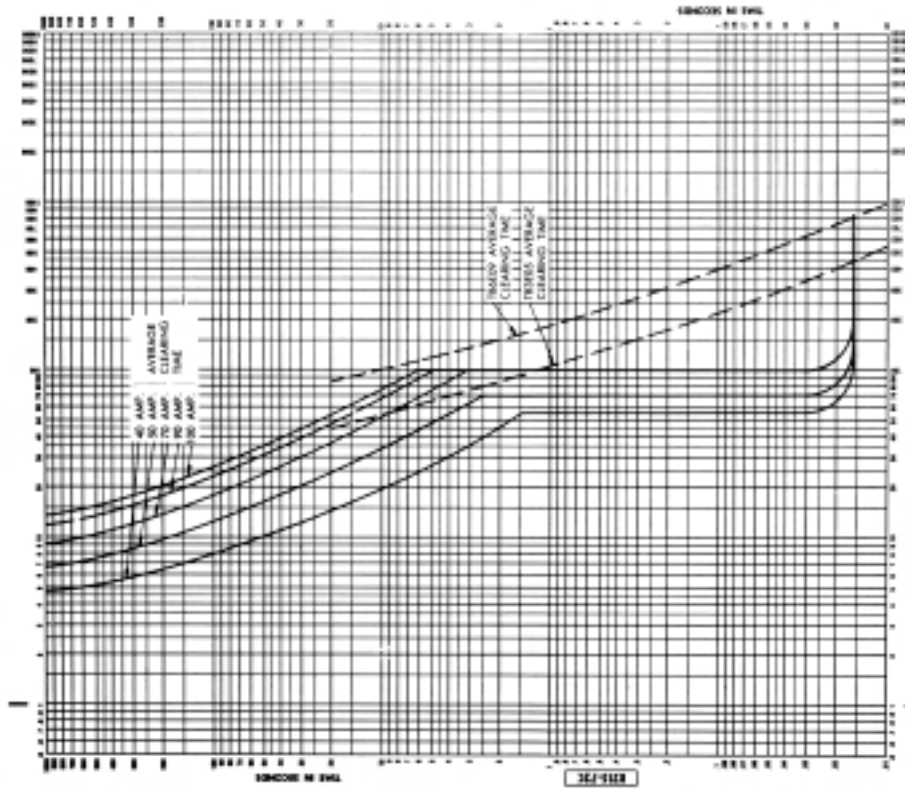
GES-3611A
Type TB1
Thermal Trip, Magnetic Trip and Current-Limiting Characteristics

Current Rating: 15, 20 and 30 Amperes
Voltage Rating: 480V, 600V and 690V
Frequency Rating: 50/60 Hz AC

GES-3611A
Type TB1
Thermal Trip, Magnetic Trip and Current-Limiting Characteristics

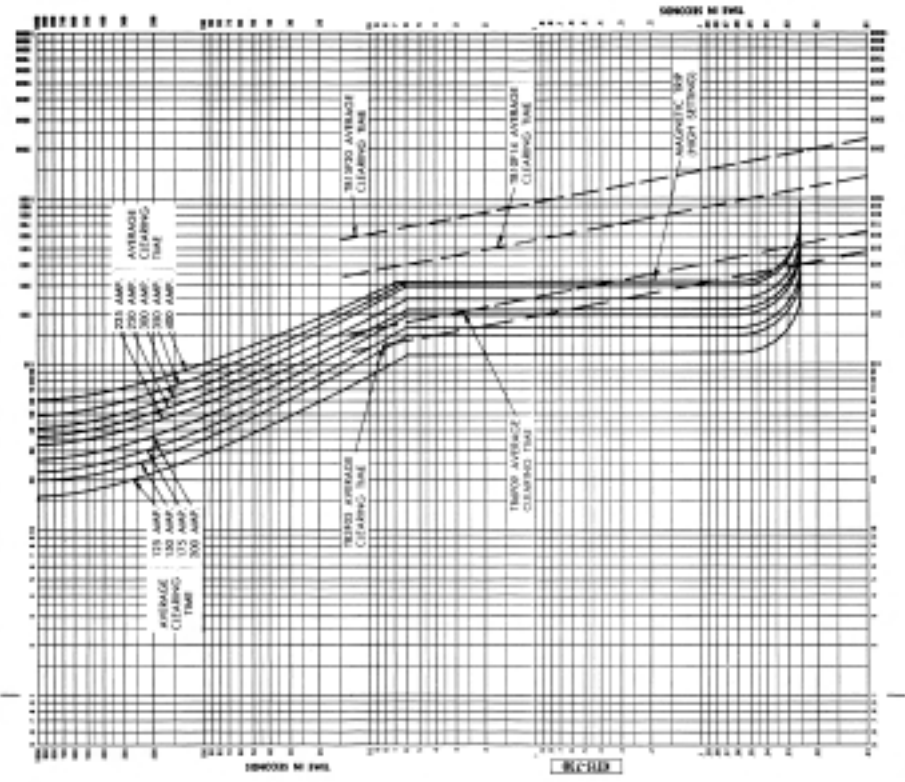
Adjustments:
Long time delay required for all adjustments.
Instantaneous magnetic trip not adjustable.

TB-1 40-100



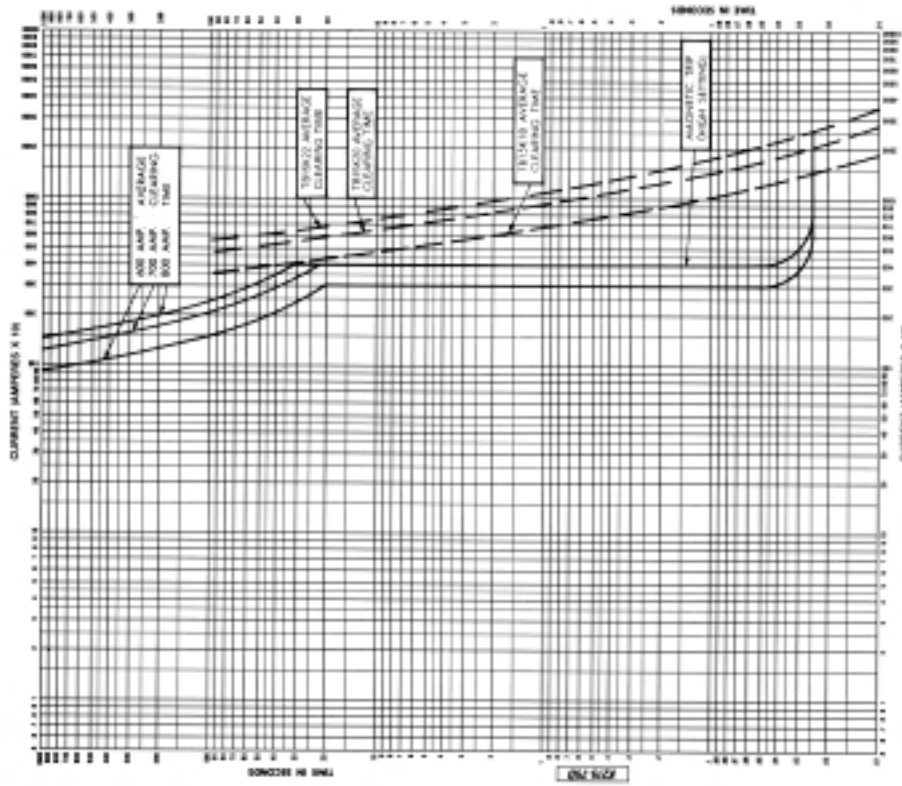
GENERAL ELECTRIC General Ratings 40, 50, 70, 100 and 200 Amperes Voltage Ratings 480 Volts ac, 240 Volts dc Frequency Rating 60 Hz ac only	INTERRUPTIBLY FUSED MODIFIED CASE CIRCUIT BREAKER TB-BREAK LINE Type TB-1 40-100 (Amperes) Thermal Trip, Magnetic Trip & Current Limiter Characteristics Time vs RMS Current	K215-71K Adjustments Long time delay maximum trip rate adjustment instantaneous magnetic trip rate adjustment factory set at 50%
	80-11148 CIRCUIT PROTECTIVE DEVICES BRANCHED, FLUORVUL, CONNECTICUT	

TB-4



GE Electrical Division General Ratings 125, 150, 175, 200, 225, 300, 350, 400 Amperes Voltage Ratings 480 Volts ac, 240 Volts dc Frequency Rating 60 Hz ac only	Integrally Fused Modified Case Circuit Breaker TB-BREAK LINE Type TB-4 125-500 (Amperes) Thermal Trip, Magnetic Trip and Current Limiter Characteristics Time vs RMS Current	K215-72K Adjustments Long time delay maximum trip rate adjustment instantaneous magnetic trip rate adjustment factory set at 50%
	80-11148 CIRCUIT PROTECTIVE DEVICES BRANCHED, FLUORVUL, CONNECTICUT	

TB8



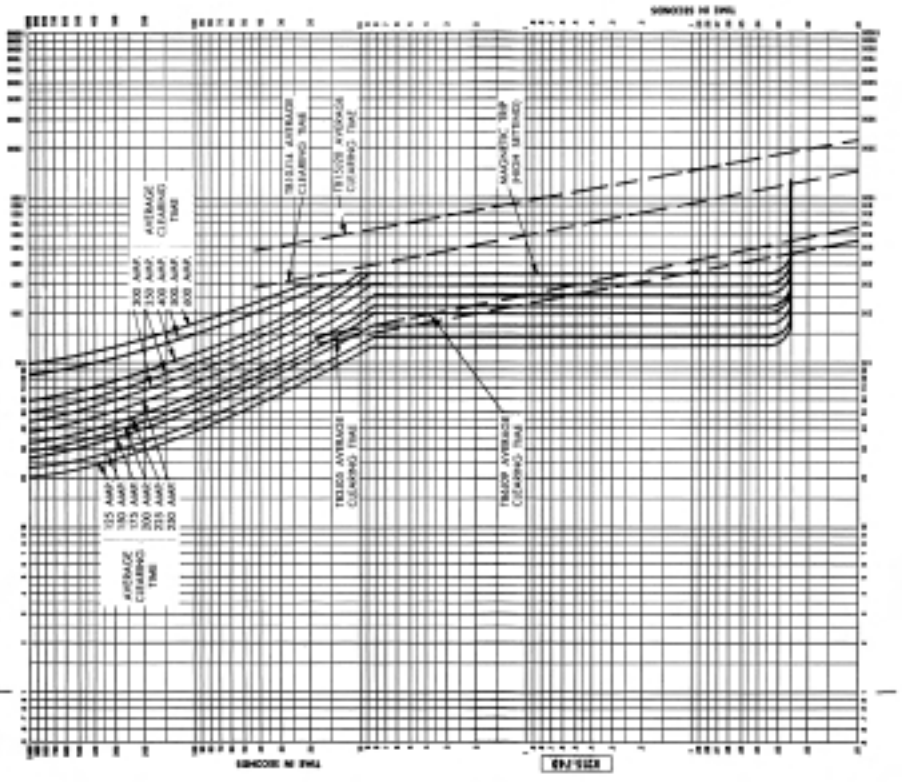
GE **Electric** **Switchgear** **& Control**
 General Electric Company
 Research and Development
 Schenectady, NY 12302

Current Ratings
 400, 750 and 1000 Amperes
Voltage Ratings
 480 Volts to 15.5 kV a.c. 60 Hz
Frequency Ratings
 50 and 60 Hz

**Integrity Pinned
 Moulded Case Circuit Breaker
 Tri-Break Line
 Type TB8 (500-800 Amperes)**
 Thermal, Magnetic Trip and
 Current Limiter Characteristics Curves

K215-75D
 Adjustments
 Long time delay magnetic trip not adjustable
 Intermediate magnetic trip adjustable in
 1000 steps up to 1000 ms

TB6



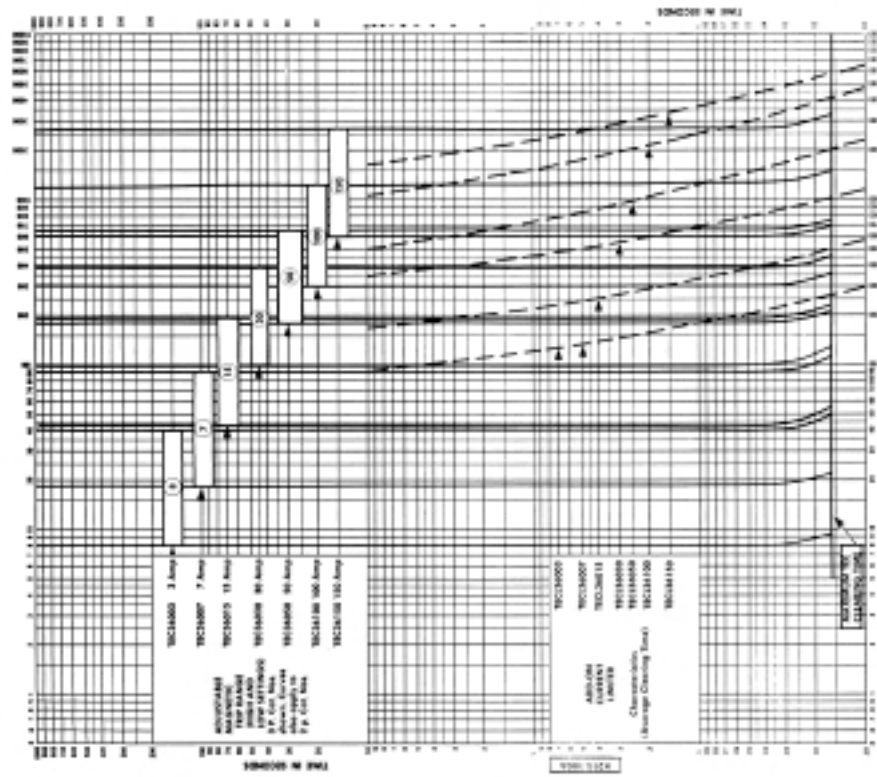
GE **Electric** **Switchgear** **& Control**
 General Electric Company
 Research and Development
 Schenectady, NY 12302

Current Ratings
 100, 150, 200, 250, 300, 400, 500 and 600 Amperes
Voltage Ratings
 480 Volts to 15.5 kV a.c. 60 Hz
Frequency Ratings
 50 and 60 Hz

**Integrity Pinned Moulded Case Circuit Breaker
 TRI-BREAK™ LINE
 Type TB6 (100-600 Amperes)**
 Thermal Trip, Magnetic Trip and Current
 Limiter Characteristics
 Time vs. RMS Current

K215-74E
 Adjustments
 Long Time delay magnetic trip not adjustable
 Intermediate magnetic trip adjustable in
 1000 steps up to 1000 ms

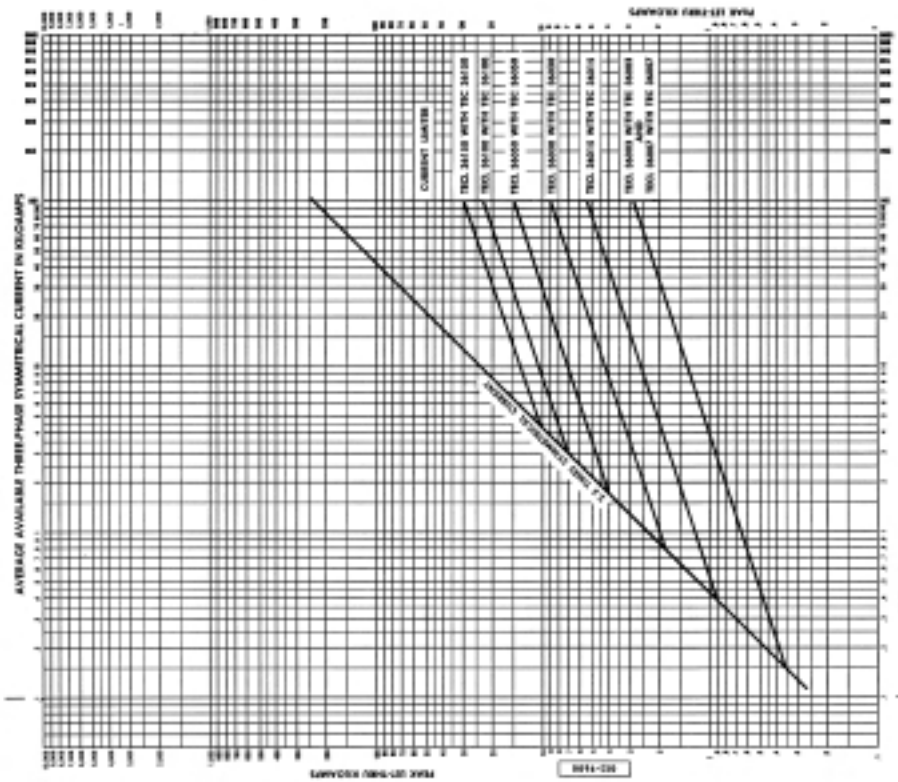
TEC, TECL



CURRENT IN AMPERES

<p>GE Electrical Distributors A General General Electric Company 400 North Avenue, Fairfield, CT 06424 Telephone: (203) 231-1000 Telex: 251100 Cable: GE</p>	<p>K215-108B Legend: See page 108</p> <p>Adjustments: None vs. RMS Current Frequency Rating 50/60 Hz</p>
<p>Model Case Master Circuit Protector MAG-BREAK® Type TEC</p> <p>Type TEC adjustable magnetic trip plus TEC. Current Limiter. Magnetic Trip range and Current Limiter Characteristics Time vs. RMS Current</p>	<p>Adjustments: Undercurrent magnetic trip continuously adjustable.</p>

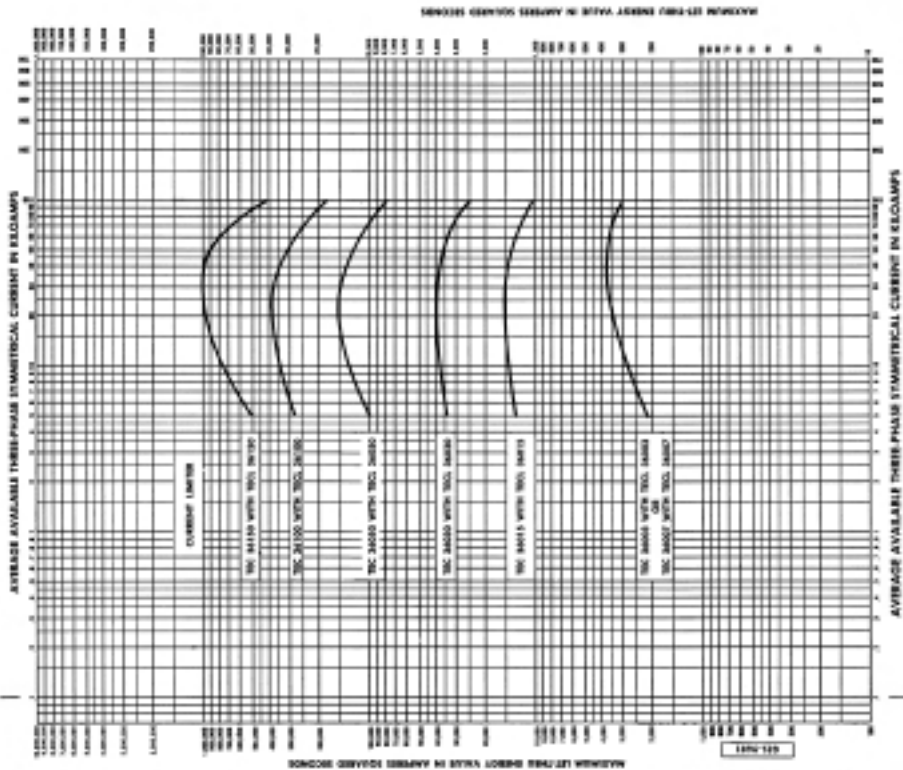
TEC, TECL I_p -MAXIMUM INSTANTANEOUS CURRENT



AVERAGE AVAILABLE THREE-PHASE SYMMETRICAL CURRENT IN KILOAMPS

<p>GE Electrical Distributors A General General Electric Company 400 North Avenue, Fairfield, CT 06424 Telephone: (203) 231-1000 Telex: 251100 Cable: GE</p>	<p>GES-8900A Legend: See page 89</p> <p>Adjustments: None</p>
<p>Model Case Circuit Protector MAG-BREAK® Type TEC with TEC. Current Limiter</p> <p>Peak Let-Through Available Current Curves</p>	<p>Adjustments: None</p>

TEC, TECL, i^2t -MAXIMUM LET-THRU CURRENT



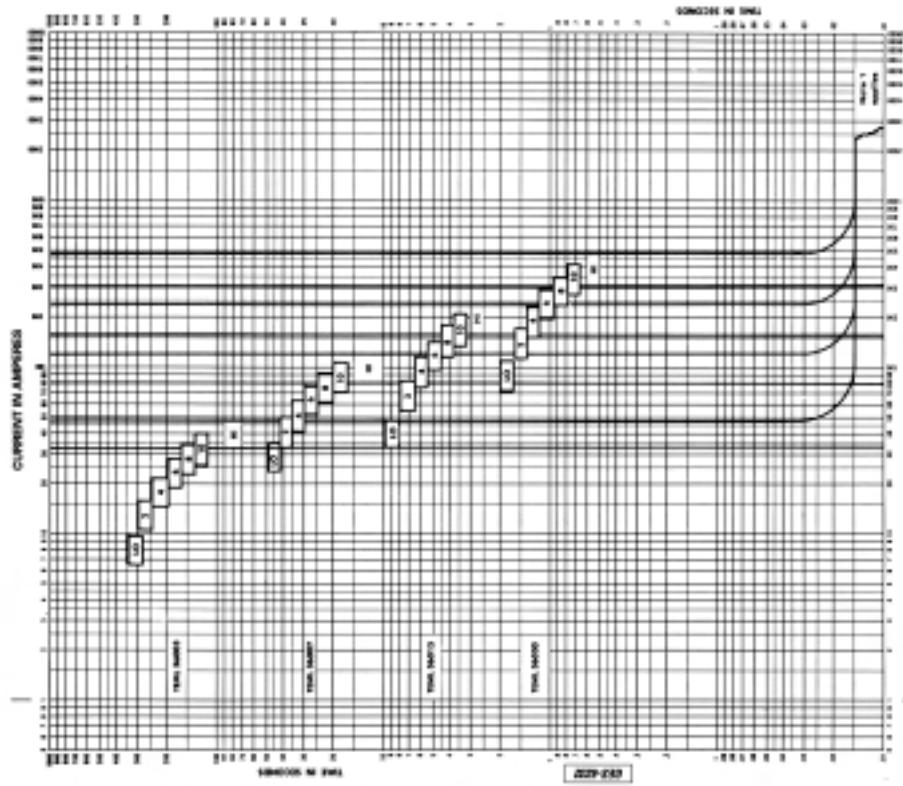
GE Electrical Distribution & Control
General Electric Company
41 Broadway Avenue, Pittsburgh, PA 15222

Linkage Rating
1000 AMP

GE-3010A
Adjustable Linkage
Adjustments
with Linkage Rating, 1000 AMP, 1000 VAC, 50/60 HZ

Model Case Circuit Protector
MAG-BREAK®
Type TEC with 1000 Amp Linkage
Maximum Let-Through Energy (I²t)
Available Current Curves

TEML 3-30



GE Electrical Distribution & Control
General Electric Company
41 Broadway Avenue, Pittsburgh, PA 15222

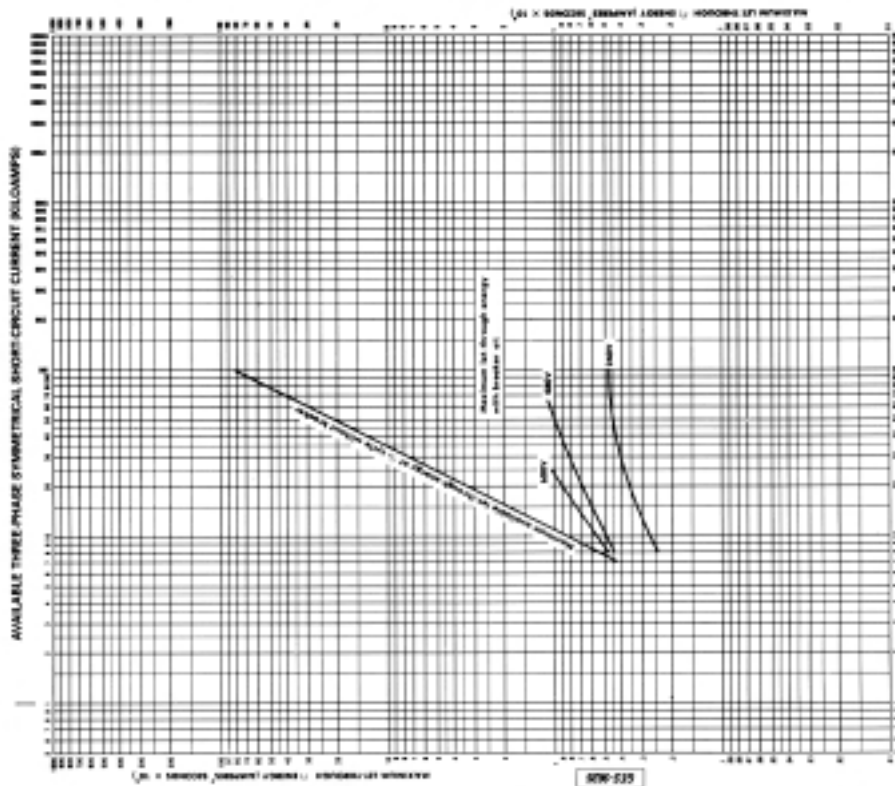
Linkage Rating
1000 AMP

GE-6232
Adjustments
Instantaneous magnetic current
ratings

Current Limiting Mag-Break® Motor Circuit Protector
Type TEML
Instantaneous
Three-current Curves

Note 1: Current limiting mag-break motor circuit protectors are available in 1000 and 1500 AMP ratings.

TEML 50-150 i^2t MAXIMUM LET-THRU ENERGY



AVAILABLE THREE-PHASE SYMMETRICAL SHORT-CIRCUIT CURRENT (KILIAMPS)

SE Electrical Distribution & Control
General/Service Company
Atlanta, GA 30307

Current Ratings
60, 100 and 150 Amps
Voltage Ratings
240, 480 and 600 Volts
Performance Rating
Type TEML

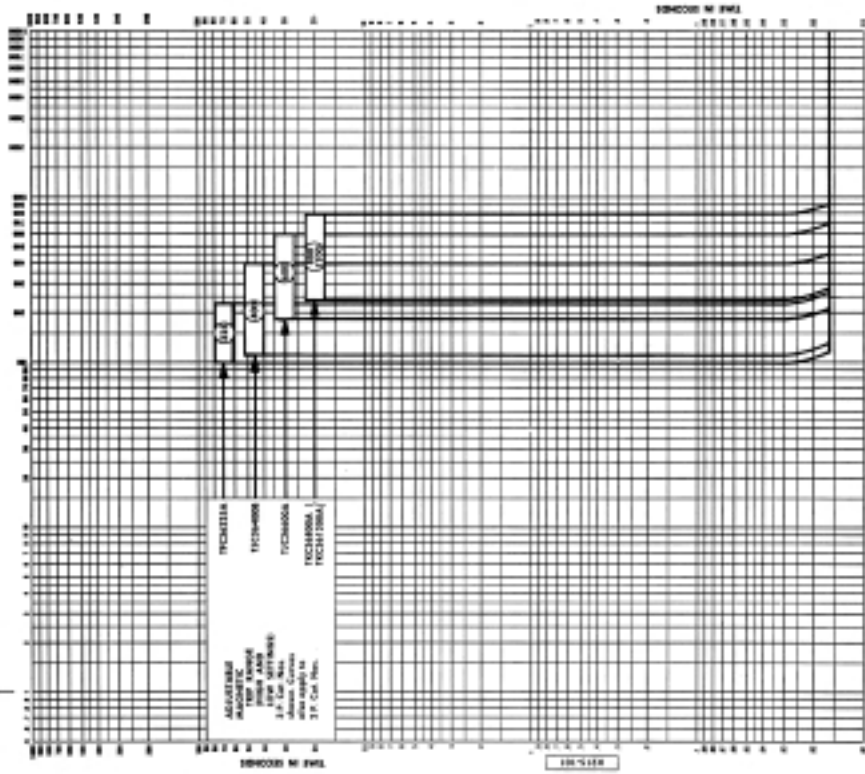
**Current-Limiting Mag-Break®
Master Circuit Protector**

Type TEML

Let-through Energy Curves

GES-963F

TFC



CURRENT (AMPERES) X100

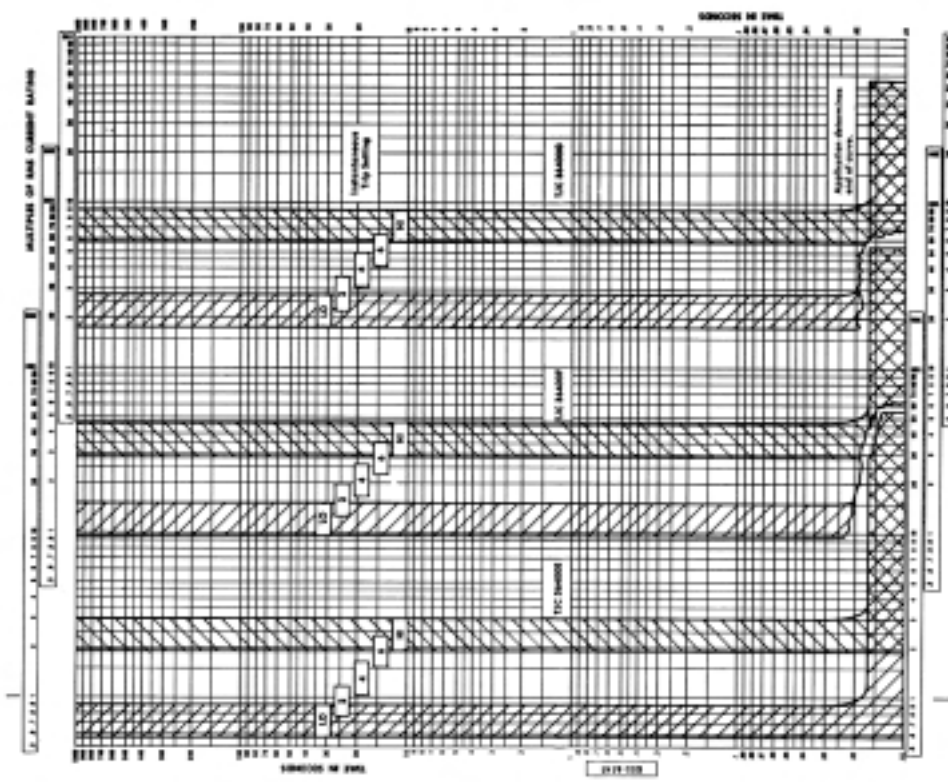
SE Electrical Distribution & Control
General/Service Company
Atlanta, GA 30307

Current Ratings
60, 100 and 150 Amps
Voltage Rating
240, 480 and 600 Volts
Performance Rating
Type TFC

**Modular Case Motor Circuit Protector
MAG-BREAK®
Types TFC, TJC 1400 and 600A; TRC
Magnetic Trip Characteristics
Time vs. RMS Current**

AZ715-351A
Adjustments
In accordance with the
Continuously Adjustable

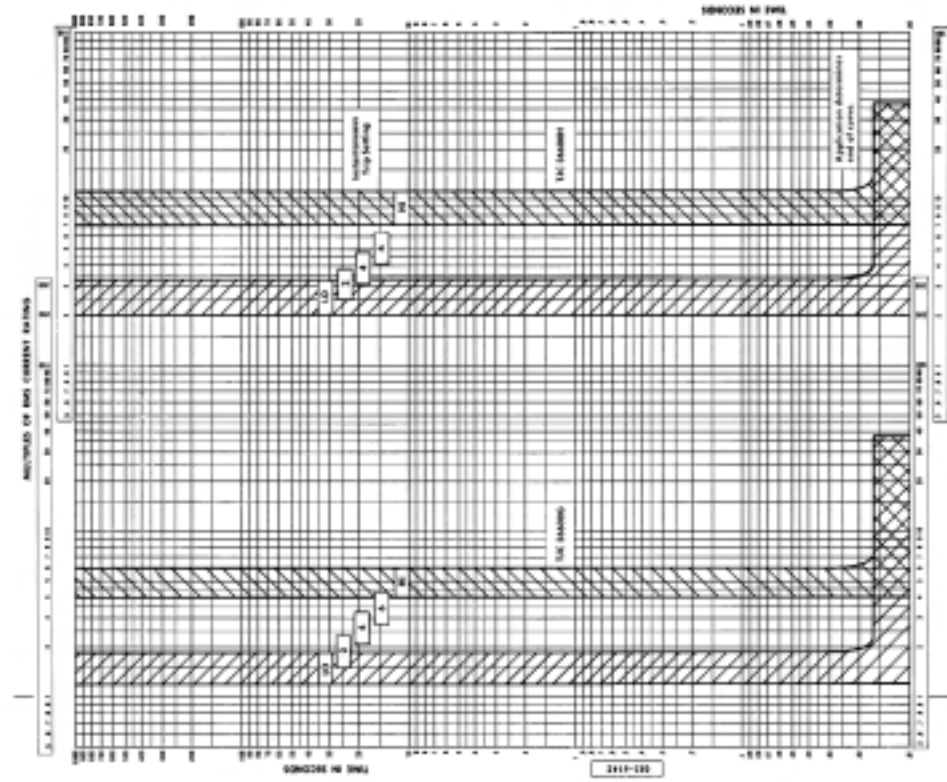
TJC 400 AMPERES



GENERAL ELECTRIC Distribution Circuit Breaker 400 Ampere 400 Ampere Frequency Rating 60 Hz	MAG-BREAK™ Type TJC-400 Ampere Instantaneous Time-Current Curve	SES-6141 Adjustments Instantaneous Time-Current Curve with 10% tolerance with 10% tolerance
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GENERAL ELECTRIC CO., CIRCUIT PROTECTIVE DEVICES DEPT., FARMVILLE, CONN. 06031

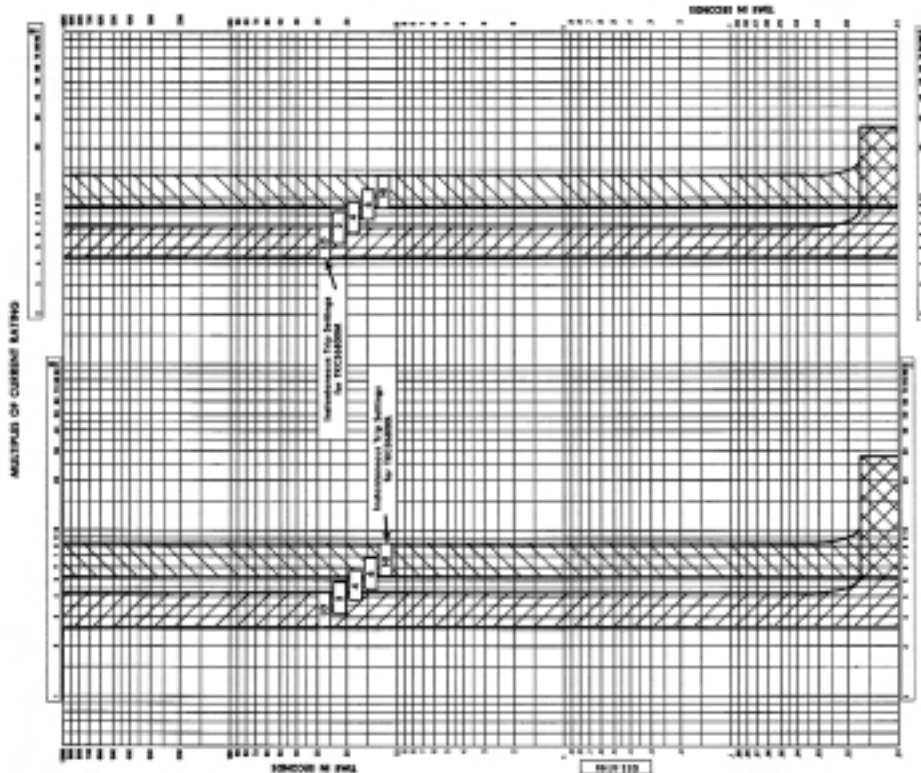
TJC 600 AMPERES



GE Distribution Circuit Breaker 600 Ampere 600 Ampere Frequency Rating 60 Hz	MAG-BREAK™ Type TJC-600 Ampere Instantaneous Time-Current Curve	SES-6142B Adjustments Instantaneous Time-Current Curve with 10% tolerance with 10% tolerance
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GENERAL ELECTRIC CO., CIRCUIT PROTECTIVE DEVICES DEPT., FARMVILLE, CONN. 06031

TKC 800 AMPERES



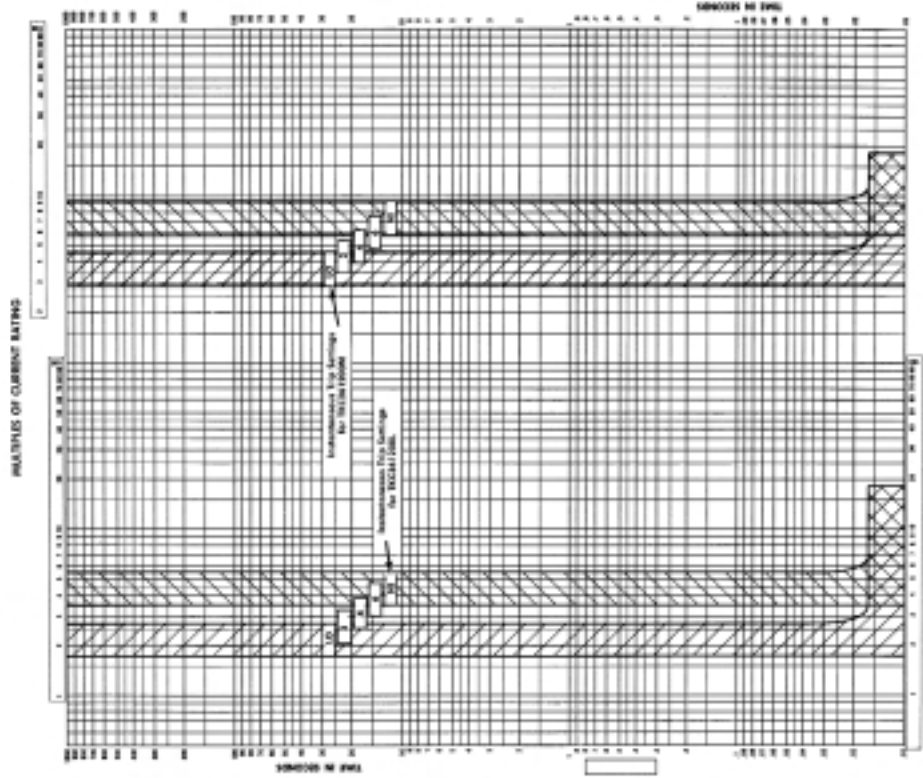
GE
 GE Electrical Solutions
 & Control
 One South Street
 Hartford, CT 06183

GES-6146A
 1000 Series
 Adjustments
 Instructions for Customarily selectable
 models. Contact GE
 GE, U.S. cannot be held responsible for use in
 non-approved applications.

GES-6146A
 1000 Series
 Adjustments
 Instructions for Customarily selectable
 models. Contact GE
 GE, U.S. cannot be held responsible for use in
 non-approved applications.

1000

TKC 1200 AMPERES



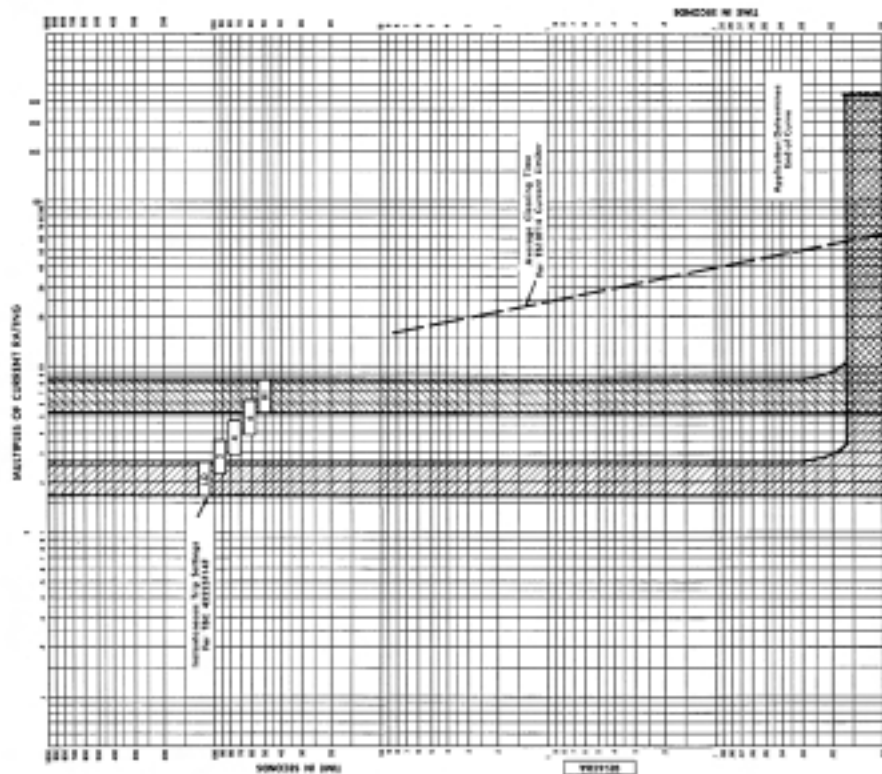
GE
 GE Electrical Solutions
 & Control
 One South Street
 Hartford, CT 06183

GES-6167A
 1000 Series
 Adjustments
 Instructions for Customarily selectable
 models. Contact GE
 GE, U.S. cannot be held responsible for use in
 non-approved applications.

GES-6167A
 1000 Series
 Adjustments
 Instructions for Customarily selectable
 models. Contact GE
 GE, U.S. cannot be held responsible for use in
 non-approved applications.

1000

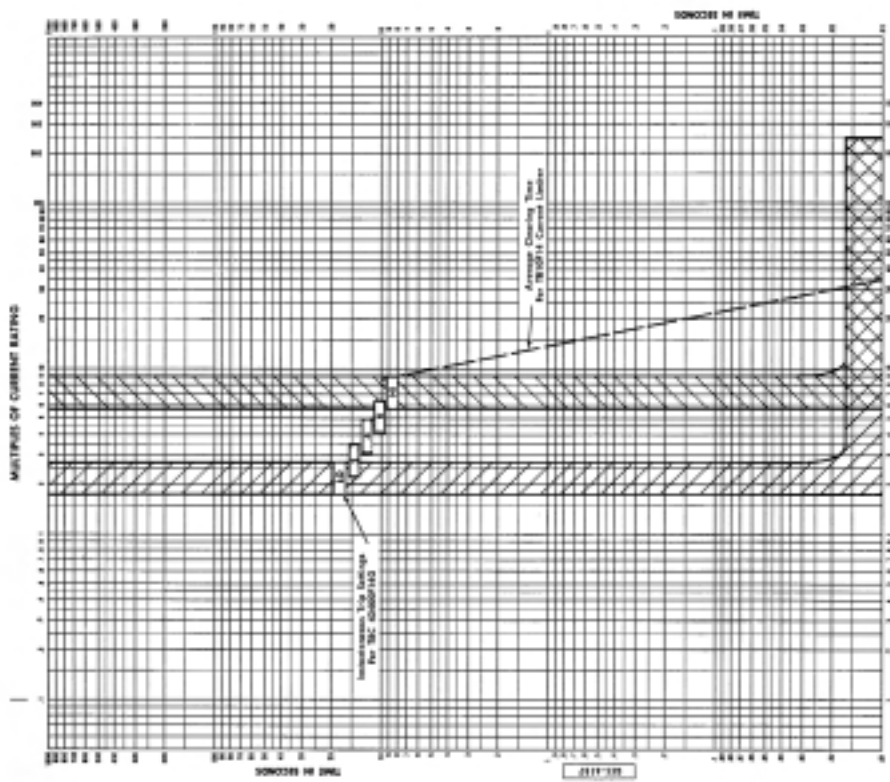
TBC 225 AMPERES



<p>GE Electrical Division & Control General Electric Company 475 Riverside Avenue, Pittsburgh, CT 06872</p>	<p>Modular Case Motor Circuit Protector MAG-BREAK® Type TBC 225 Amperes Magnetic Trip and Linear Time Current Curves</p>	<p>GES-6136B Light Section Data</p>
	<p>Continuous Current Rating 225 Amperes Voltage Rating 600 Volts ac Frequency Rating 50/60 Hz</p>	<p>Adjustments Inrush and Continuous adjustable Inrush 1.5 and 2.0 MFR. A, adjustment range for use in combination motor circuits.</p>

22525

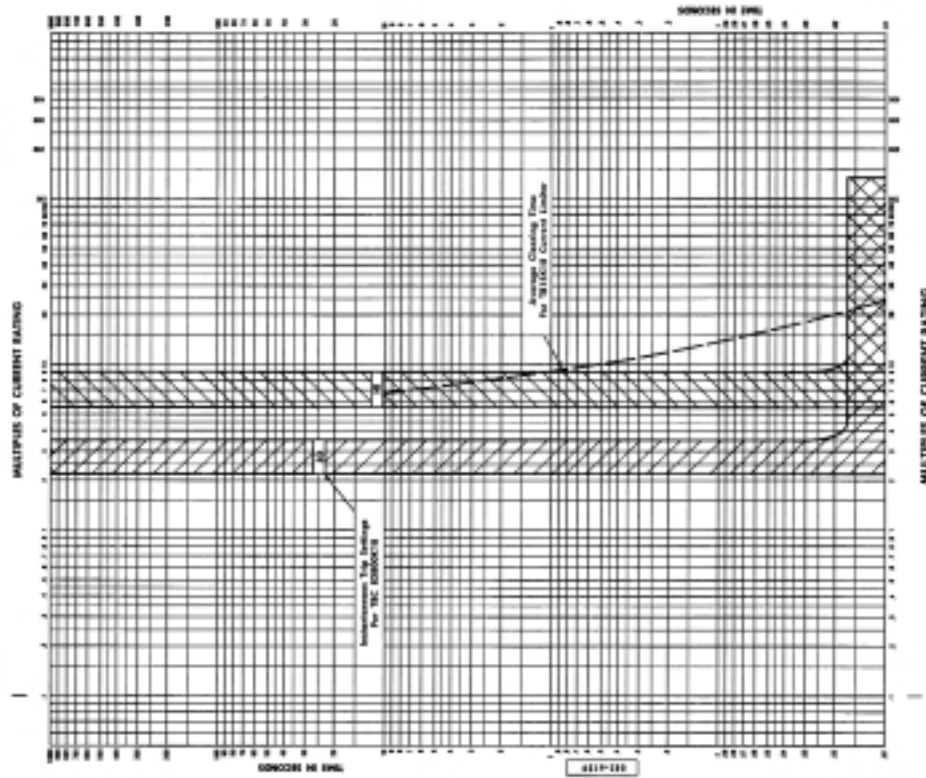
TBC 400 AMPERES



<p>GE Electrical Division & Control General Electric Company 475 Riverside Avenue, Pittsburgh, CT 06872</p>	<p>Modular Case Motor Circuit Protector MAG-BREAK® Type TBC 400 Amperes Magnetic Trip and Linear Time Current Curves</p>	<p>GES-6137A Light Section Data</p>
	<p>Adjustments Inrush and Continuous adjustable Inrush 1.5 and 2.0 MFR. A, adjustment range for use in combination motor circuits.</p>	<p>Continuous Current Rating 400 Amperes Voltage Rating 600 Volts ac Frequency Rating 50/60 Hz</p>

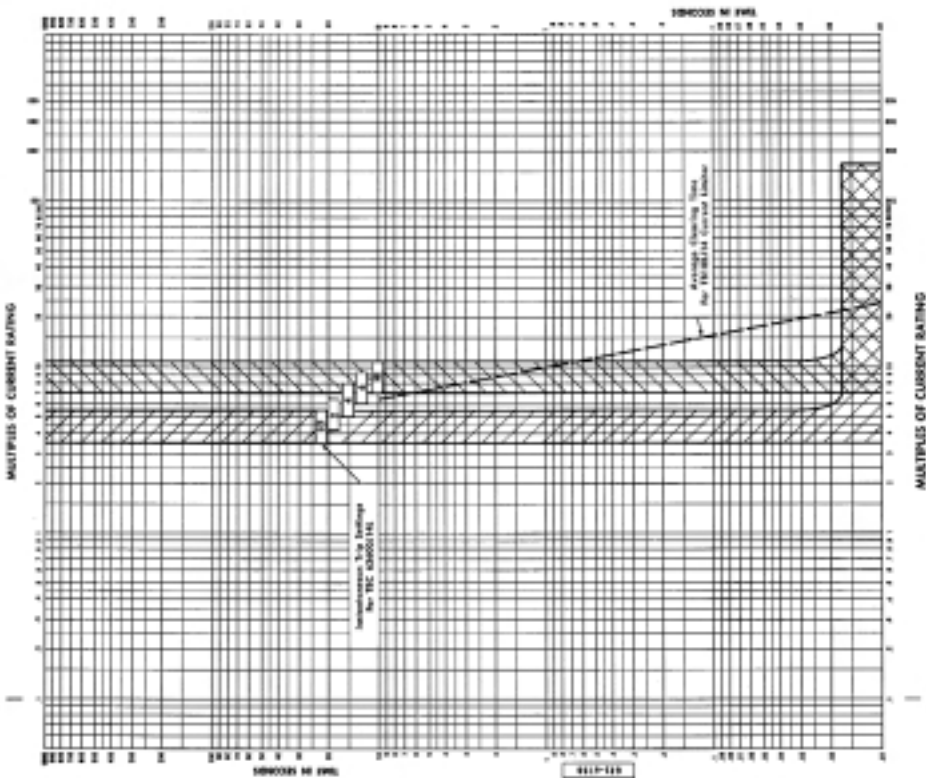
22526

TBC 800 AMPERES



<p>GE Electrical Distributor & Carrier General Service Company 41 Broadway Avenue, Fairfield, CT 06424</p> <p>Continental Current Rating Voltage Rating 500 Volts ac Frequency Rating 60 Hz</p>	<p>Model Case Motor Circuit Protector MAG-BREAK® Type TBC 800 Ampere Magnetic Trip and Limiter Time Current Curves</p>	<p>GES-61284 Adjustments Only</p> <p>Adjustments In accordance with instructions available from GE.</p>
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TBC 600 AMPERES



<p>GE Electrical Distributor & Carrier General Service Company 41 Broadway Avenue, Fairfield, CT 06424</p> <p>Continental Current Rating Voltage Rating 500 Volts ac Frequency Rating 60 Hz</p>	<p>Model Case Motor Circuit Protector MAG-BREAK® Type TBC 600 Ampere Magnetic Trip and Limiter Time Current Curves</p>	<p>GES-61284 Adjustments Only</p> <p>Adjustments In accordance with instructions available from GE. NOTE: U.S. Department of Regulation for use in applications under authority.</p>
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Inspection and Testing

The need for inspection of molded case breakers will vary depending on operating conditions. Suggested inspection and testing is defined in NEMA AB 4-1996, "Guidelines for inspection and preventive maintenance of molded case circuit breakers used in commercial and industrial applications."

In Making Connections with Aluminum Wire Refer to GEH-3445.

NOTE: When using aluminum wire, use a joint compound recommended by the wire manufacturer.

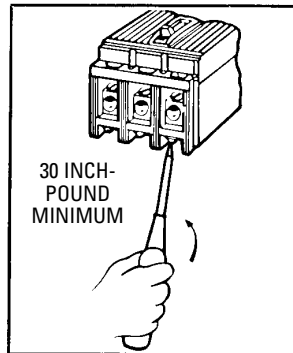
Lug Mounting Torque Values

GEJ-4654

TCAL12, 12A, 15, TC012

Mounting Lugs for E150 Line

Lugs must be securely fastened to terminal straps. Lugs are mounted at the factory with a torque wrench set at 30 inch-pounds minimum.

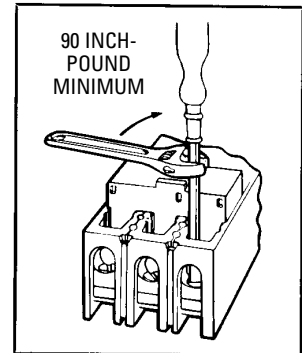


GEJ-4639

TCAL24, TC024, TCAL25, TC026, TCAL27

Mounting Lugs for F225 Line

Lugs must be securely fastened to terminal straps. Lugs are mounted at the factory with a torque wrench set at 90 inch-pounds minimum.



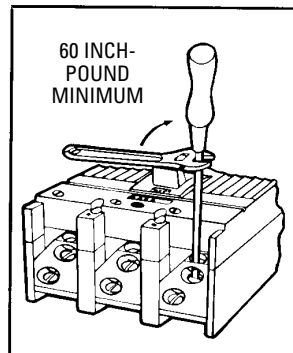
Suggested method for attachment or removal is illustrated.

GEJ-4655

TCAL43, TCAL63, TC043, TC063, TCAL47

Mounting Lugs for J600 Line

Lugs must be securely fastened to terminal straps. Lugs are mounted at the factory with a torque wrench set at 60 inch-pounds minimum.



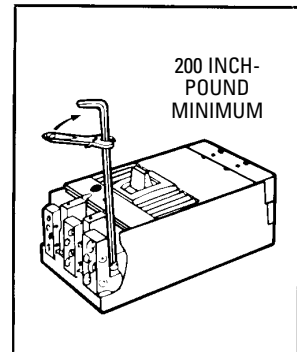
Suggested method for attachment or removal is illustrated.

GEJ-4656

TCAL41, TCAL61, TCAL81, TCAL91, TCAL121, TCAL131, TCAL122, TC041, TC061, TC081A, TC0121, TC0131, TC091

Mounting Lugs for K1200 Line

Lugs must be securely fastened to terminal straps. Lugs, when factory installed, are torqued to 200 inch-pounds minimum.



Suggested method for attachment or removal is illustrated.

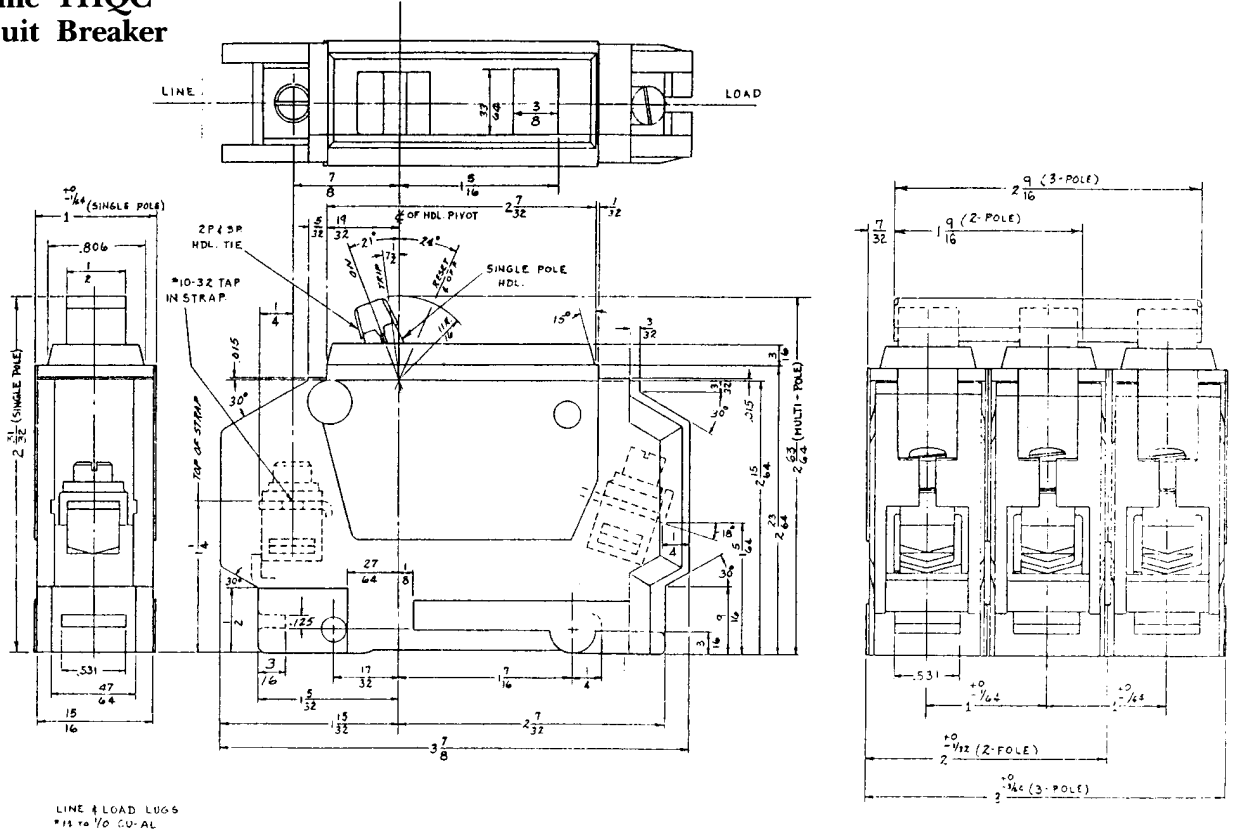
Cable Connector (Wiring Lug) Torque Values

All Type THQP, THQL, THQB, THQC (including ground fault circuit breakers) and all TEB, TEC, TED, THED and TB1 circuit breakers and molded case switches are marked with the appropriate lug tightening torque values.

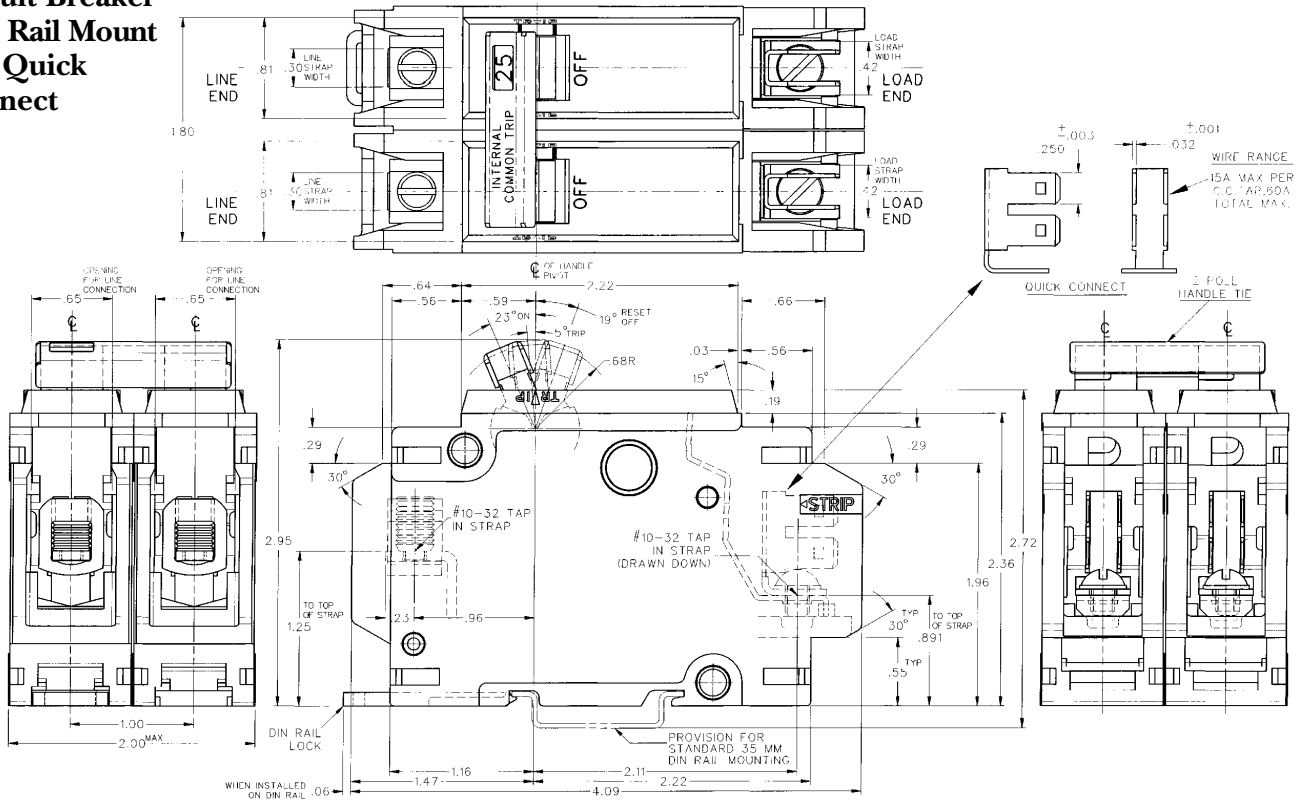
All other circuit breakers employ lugs with screws having an internal hexagonal socket with dimension "across the flats" of 1/4, 5/16 or 3/8 inch. The following table gives the recommended cable tightening torque for these lugs.

Socket Size (Across Flats)	Recommended Tightening Torque (inch-pounds)	Circuit Breaker Types
1/4	200	TQD, TQDL
5/16	275	TFJ/K, TJJ/K/D/C, TJ-V, TB4
3/8	375	TKM/C-TKOV, TB6/TB8

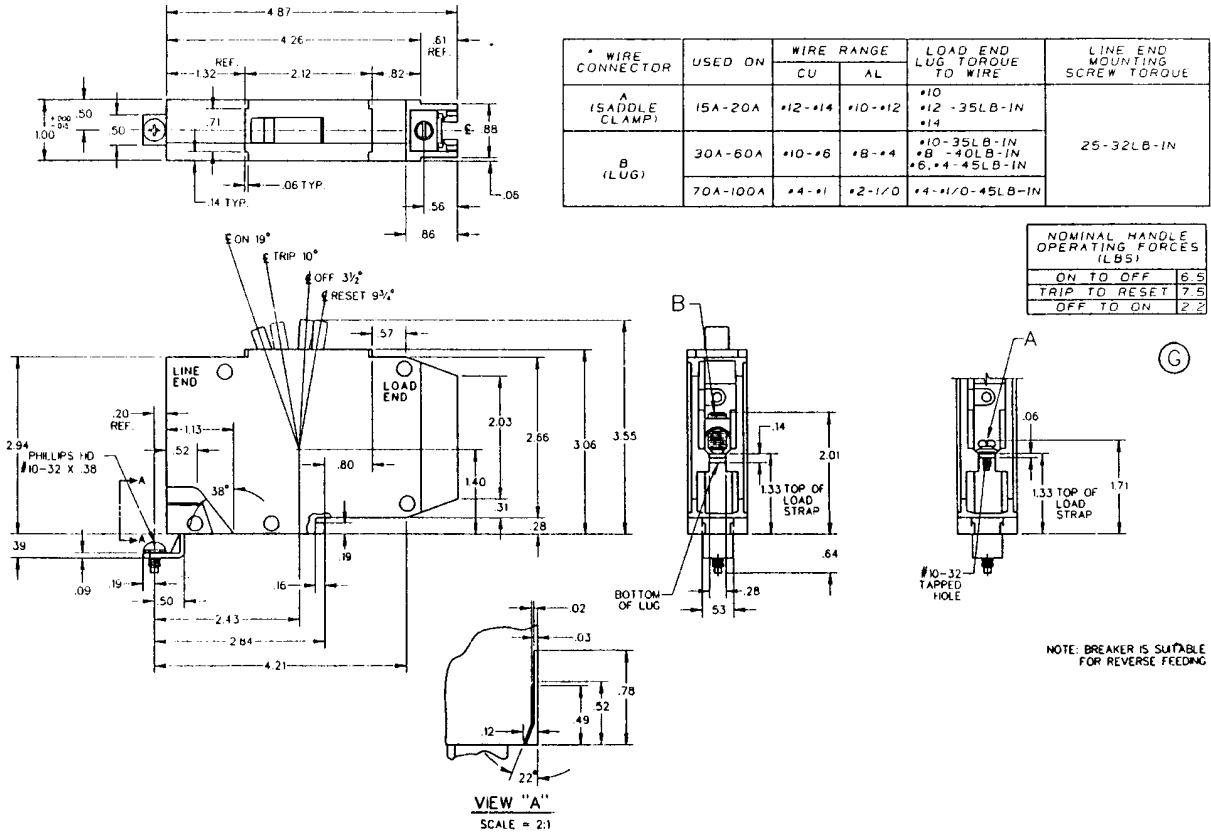
Q-Line THQC Circuit Breaker



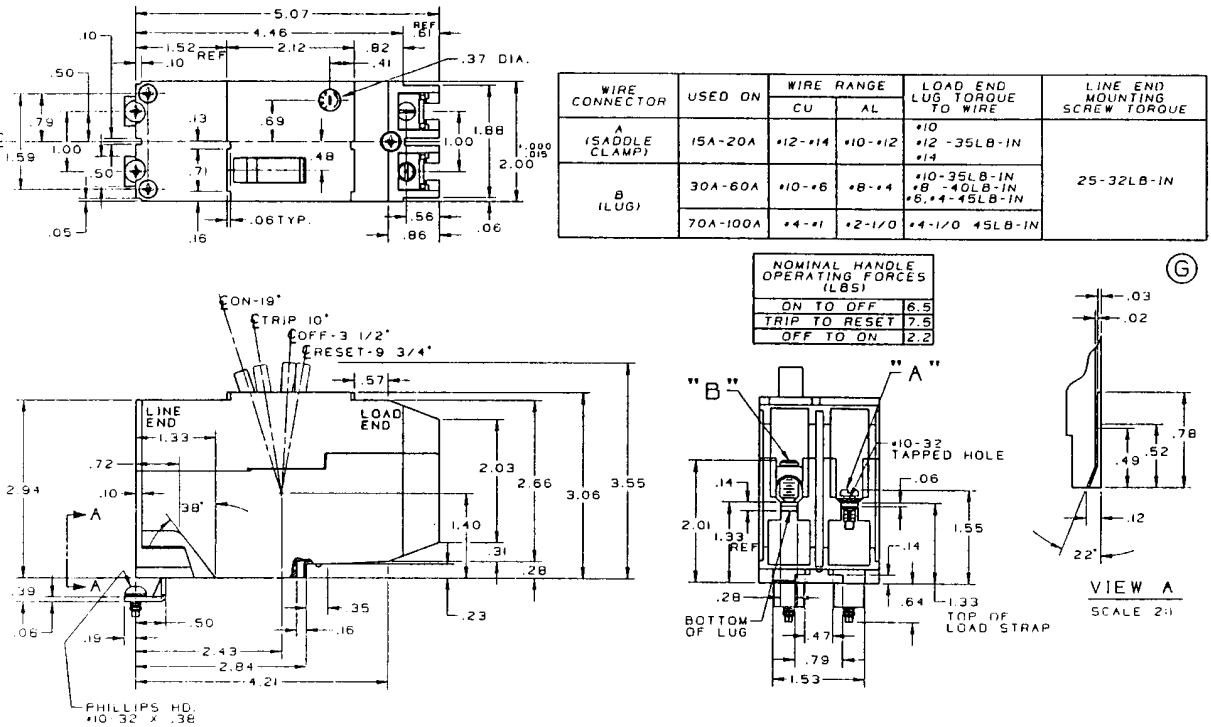
Q-Line THQC Circuit Breaker DIN Rail Mount and Quick Connect



TEY Line- One Pole Circuit Breaker

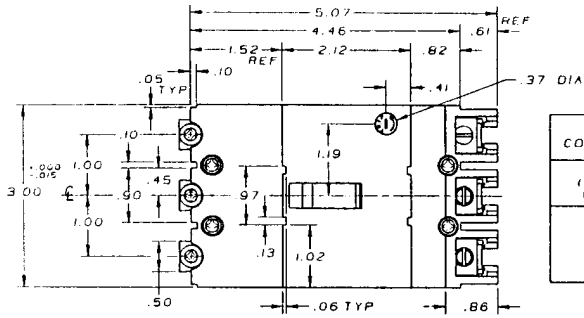


TEY Line- Two Pole Circuit Breaker

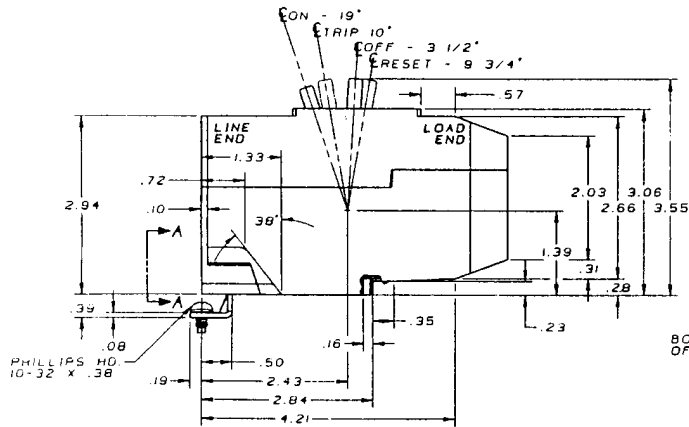


NOTE: BREAKER IS SUITABLE FOR REVERSE FEEDING

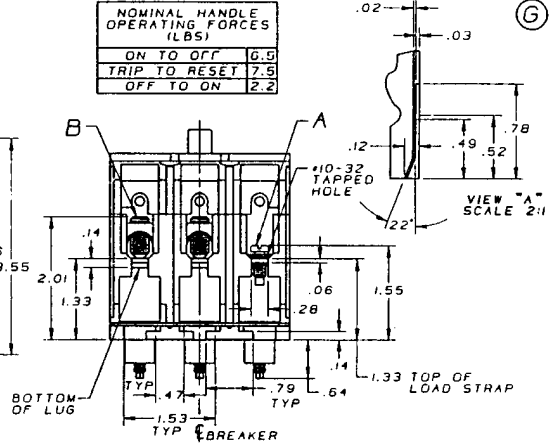
TEY Line- Three Pole Circuit Breaker



WIRE CONNECTOR	USED ON	WIRE RANGE		LOAD END LUG TORQUE TO WIRE	LINE END MOUNTING - SCREW TORQUE
		CU	AL		
A (SADDLE CLAMP)	15A-20A	#12-#14	#10-#12	#10 #12 - 35LB-IN #14	25-32LB-IN
B (LUG)	30A-60A	#10-#6	#8-#4	#10-35LB-IN #8 - 40LB-IN #6, #4 - 45LB-IN	
	70A-100A	#4-#1	#2-1/0	#4-#1/0 45LB-IN	

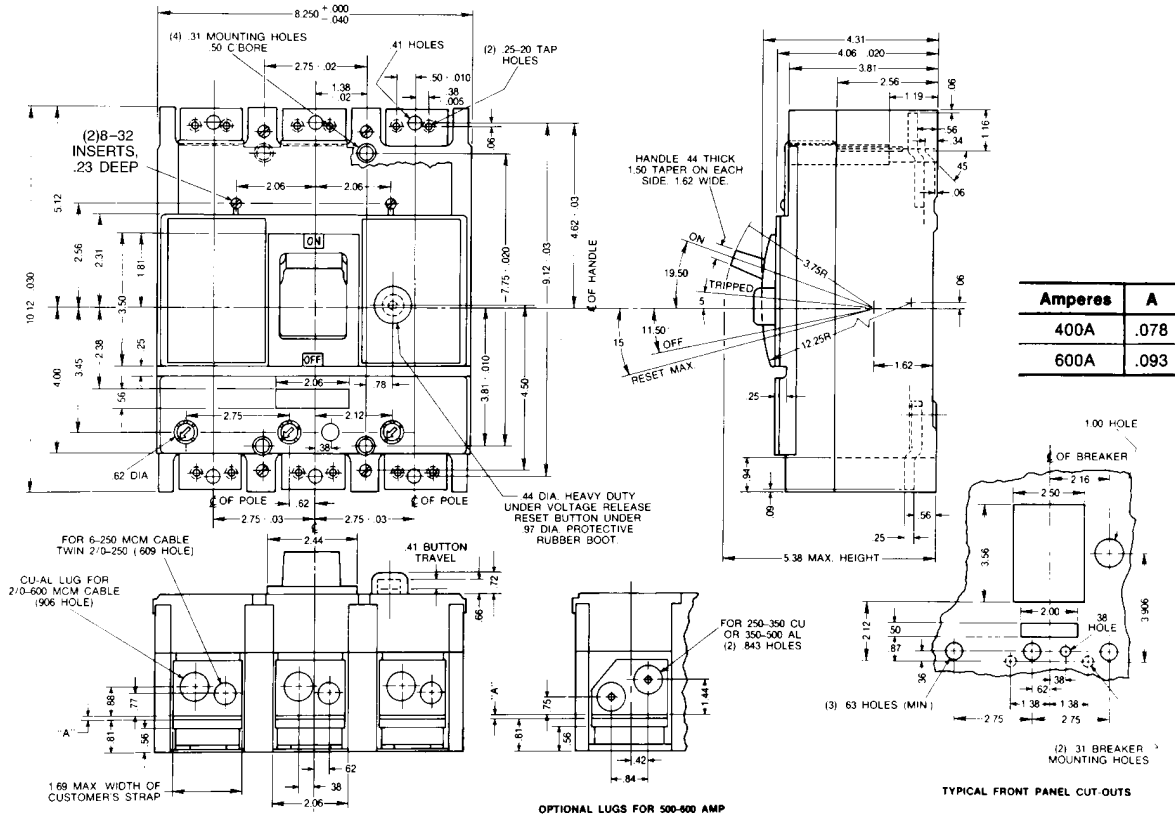


NOMINAL HANDLE OPERATING FORCES (LBS)	
ON TO OFF	6.9
TRIP TO RESET	7.5
OFF TO ON	2.2



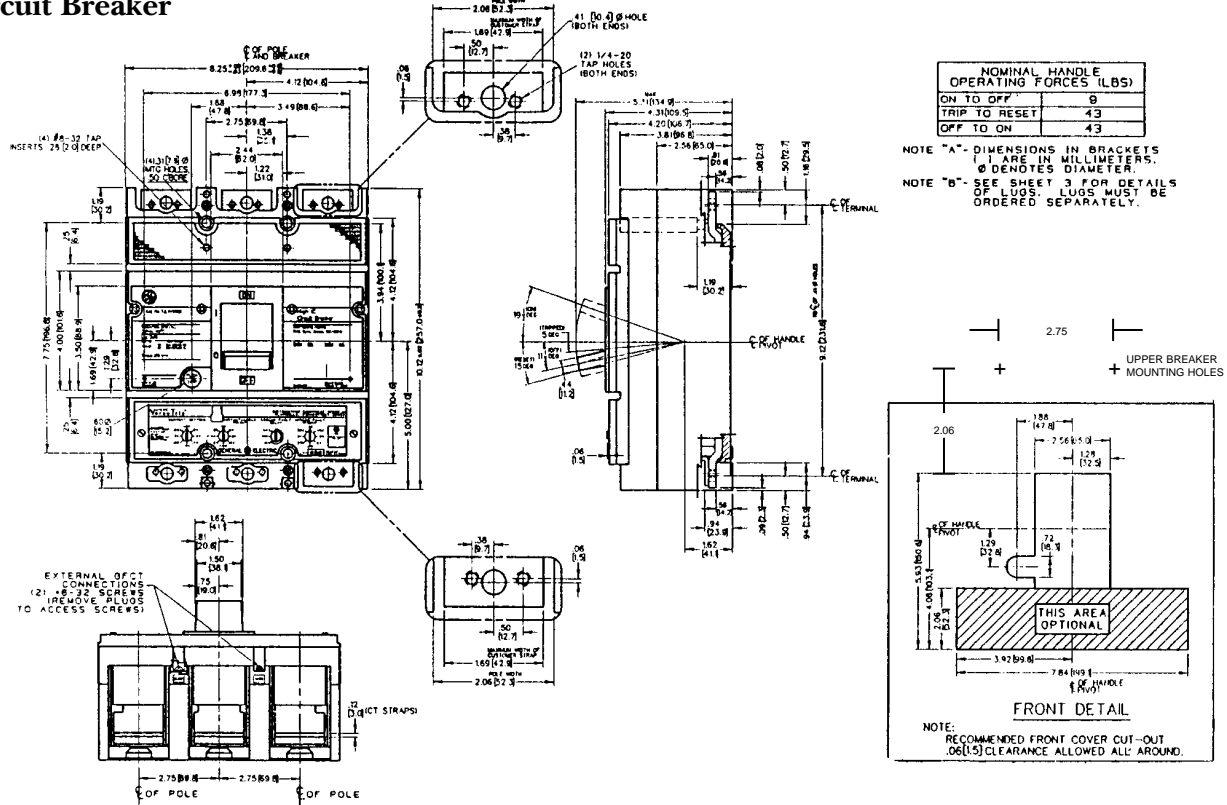
NOTE: BREAKER IS SUITABLE FOR REVERSE FEEDING

J600 Line-J Frame Circuit Breaker

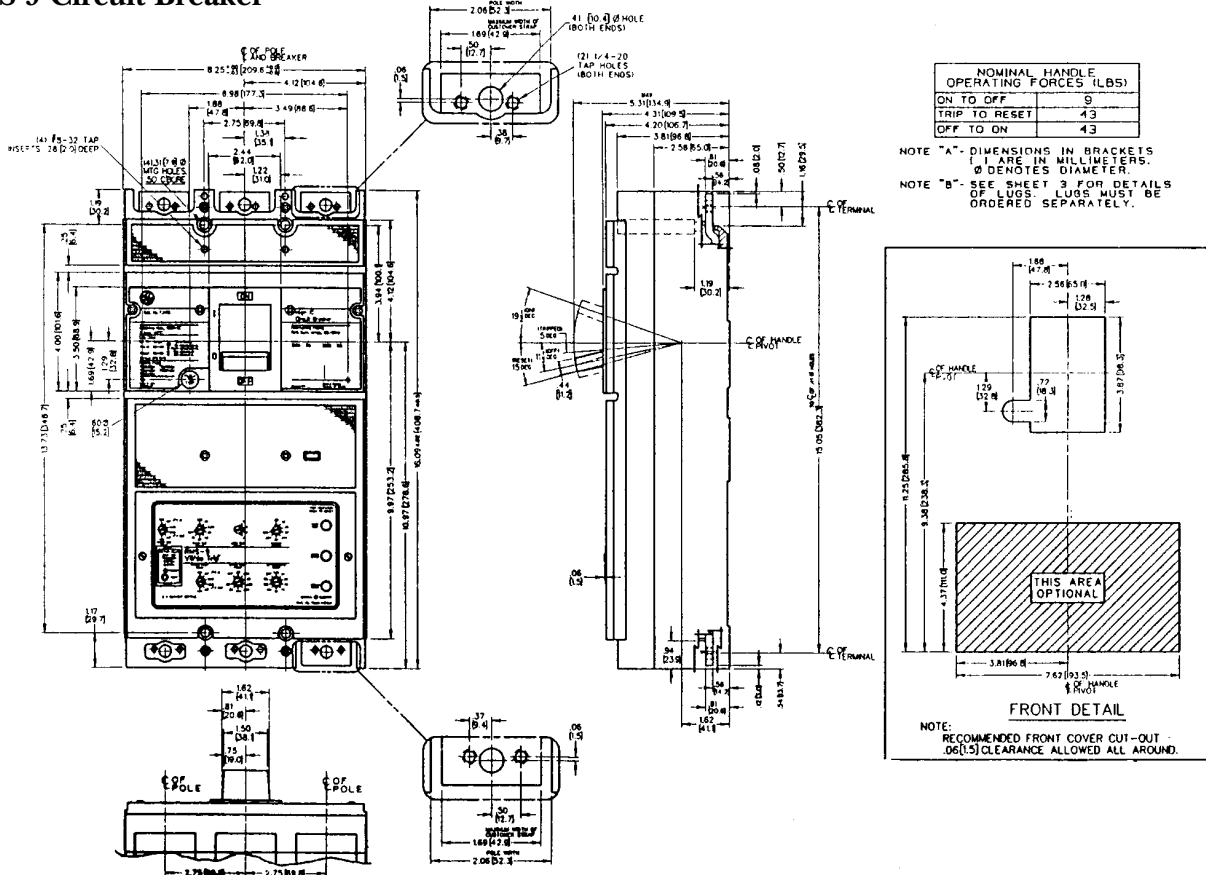


Amperes	A
400A	.078
600A	.093

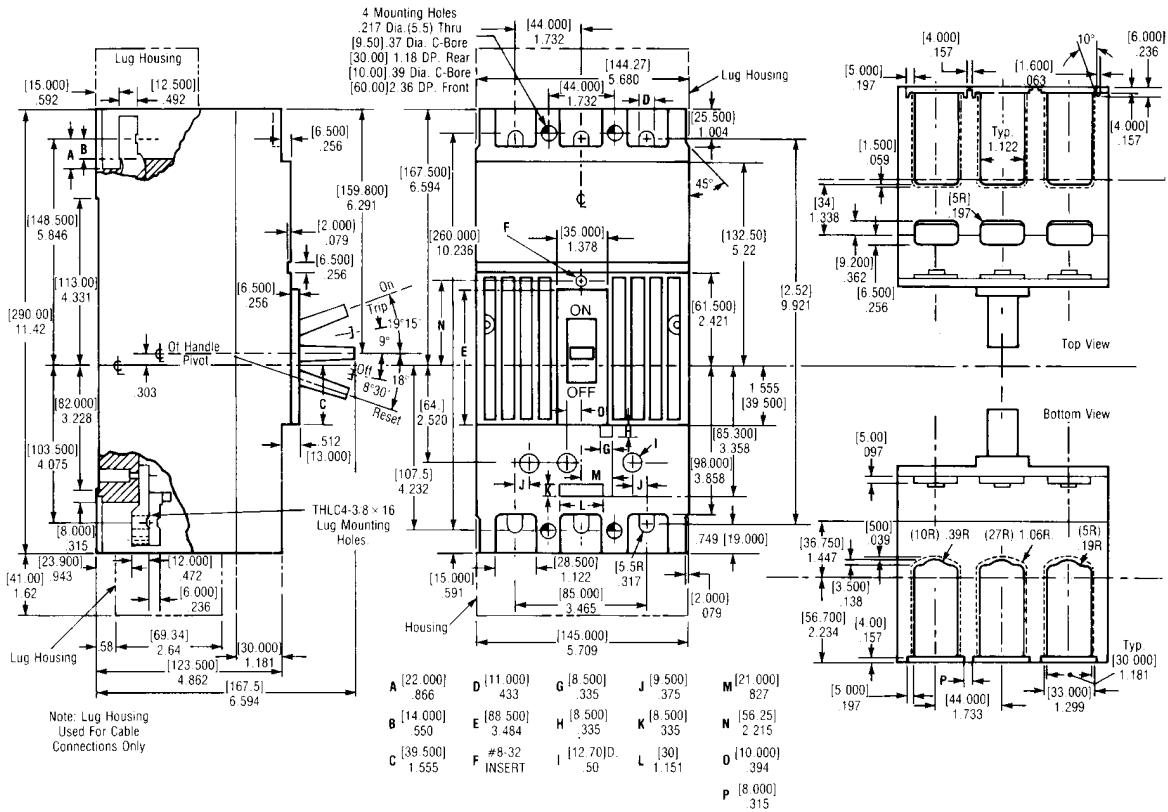
J600 Line-Power+ 4 Circuit Breaker



J600 Line-MicroVersaTrip® Plus or RMS-9 Circuit Breaker

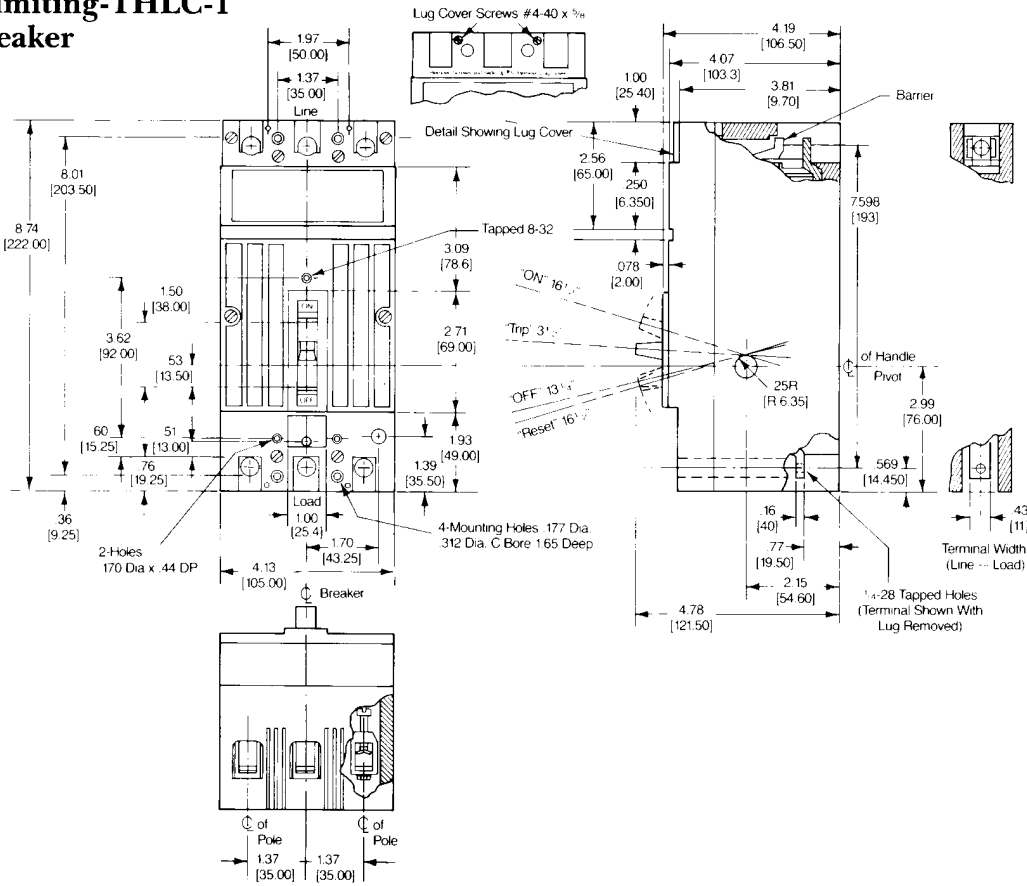


TLB4—65KAIC Circuit Breaker

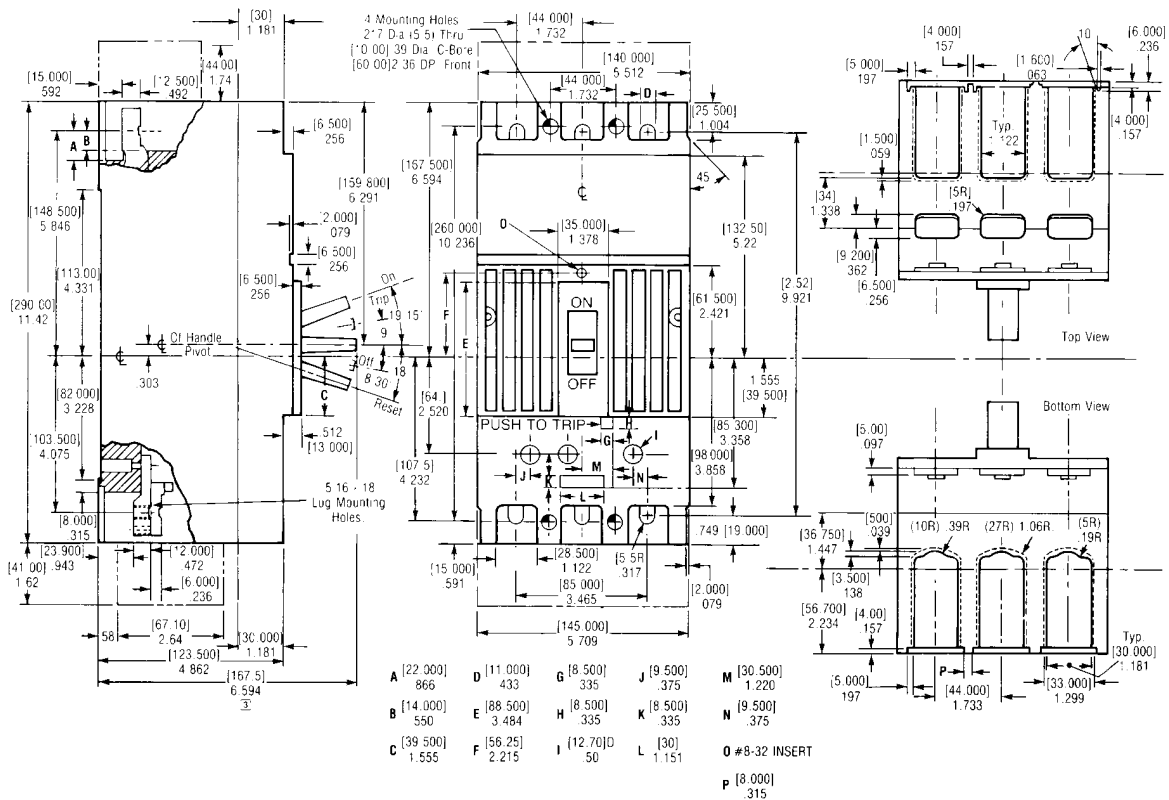


Note: OBSOLETE — for reference use only.

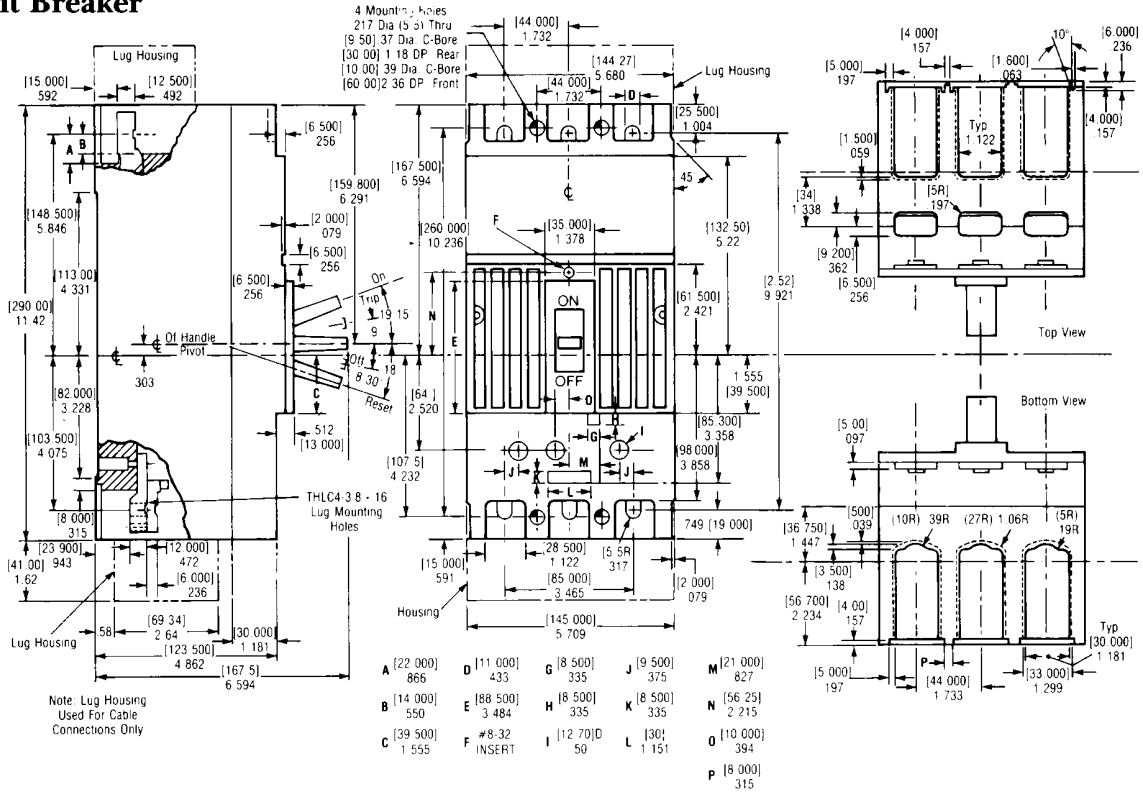
Current Limiting-THLC-1 Circuit Breaker



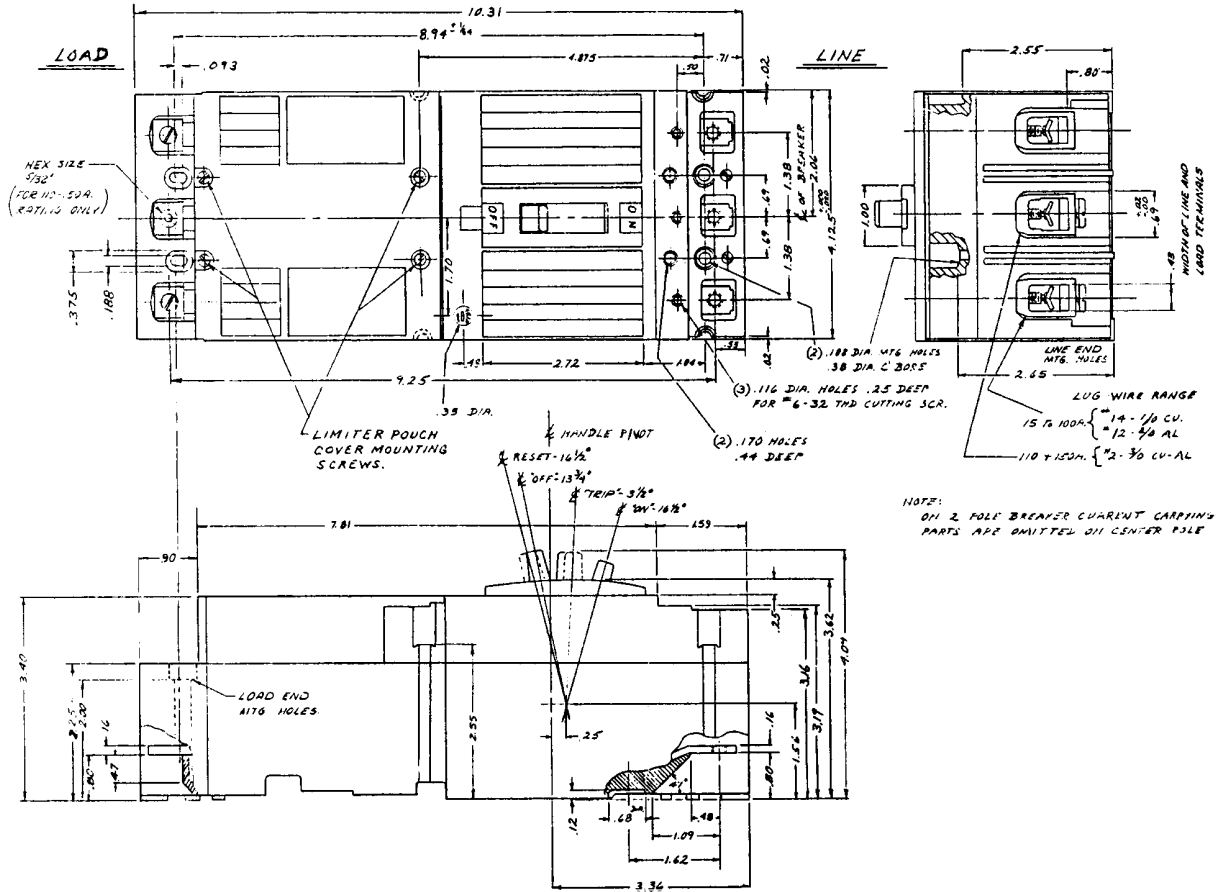
Current Limiting-THLC-2 Circuit Breaker



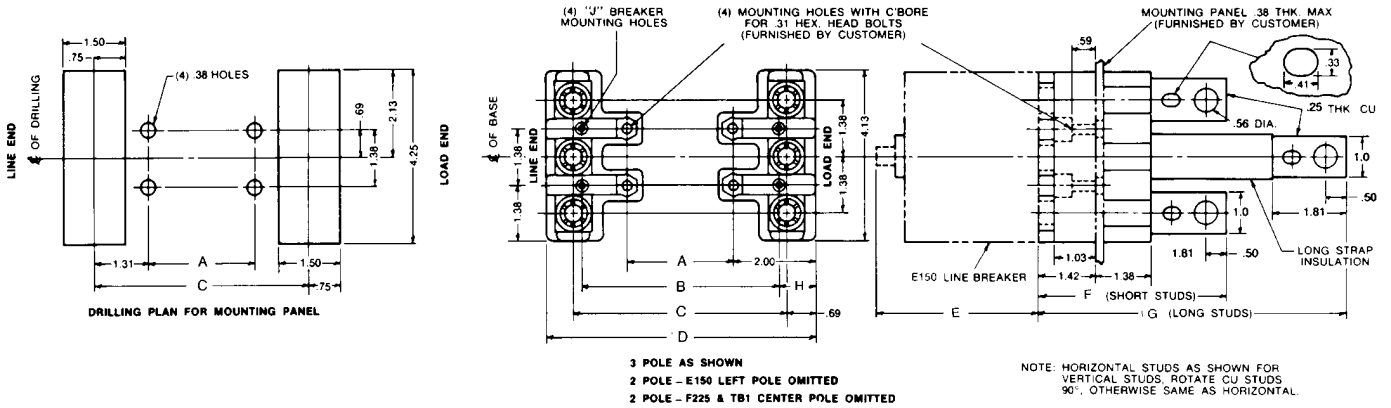
Current Limiting-THLC-4 Circuit Breaker



Tri-Break® TB-1 Circuit Breaker



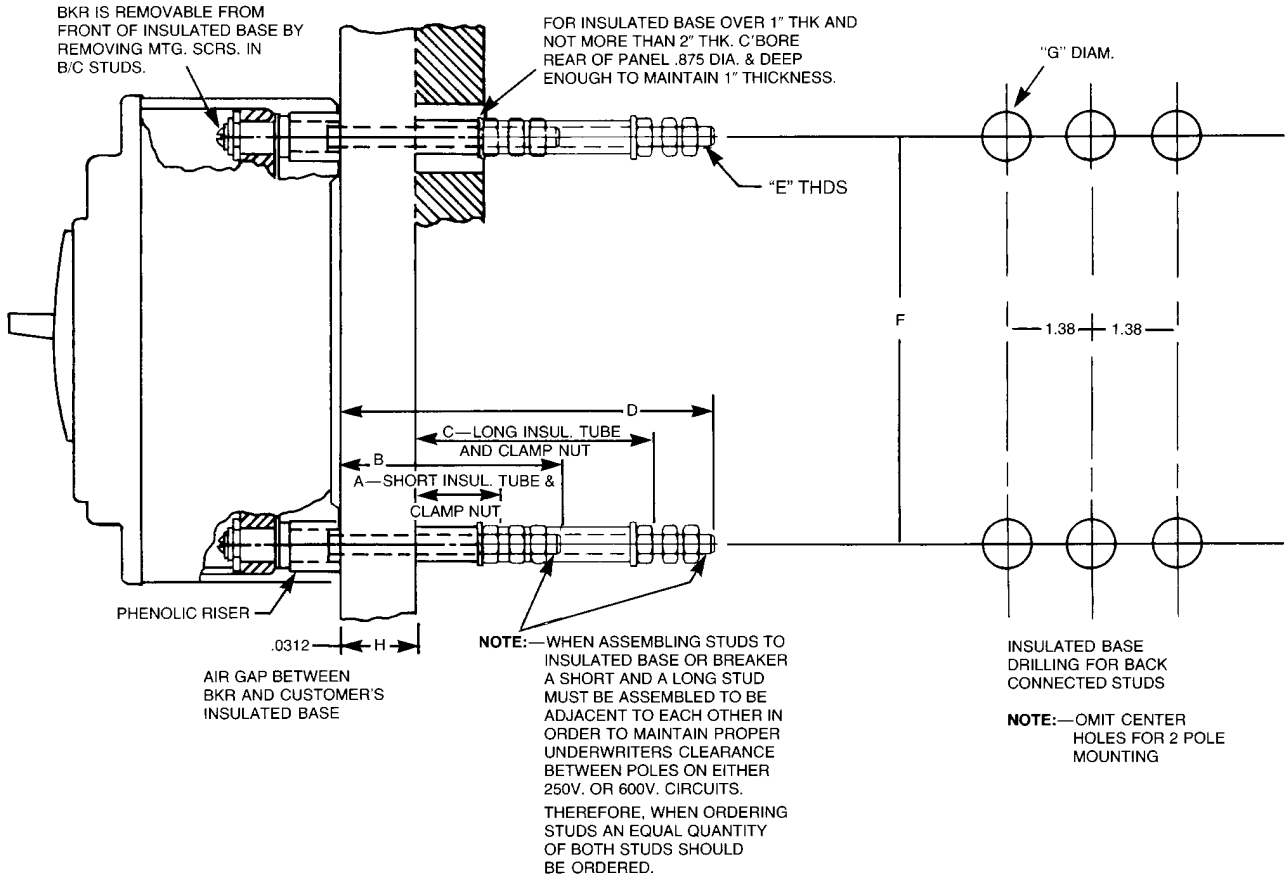
Plug-In Bases



Breaker Type	Dimensions in Inches								
	A	B	C	D	E	F	G	H	J
E150	2.63	4.88	5.25	6.63	4.09	4.16	6.84	.88	#8-32 TAP
F225	5.75	7.25	8.38	9.75	5.50	4.66	7.66	1.00	#10-32 TAP
TB-1	7.00	8.94	9.25	10.69	4.09	4.16	6.84	.88	#8-32 TAP

E150 and F225 Line

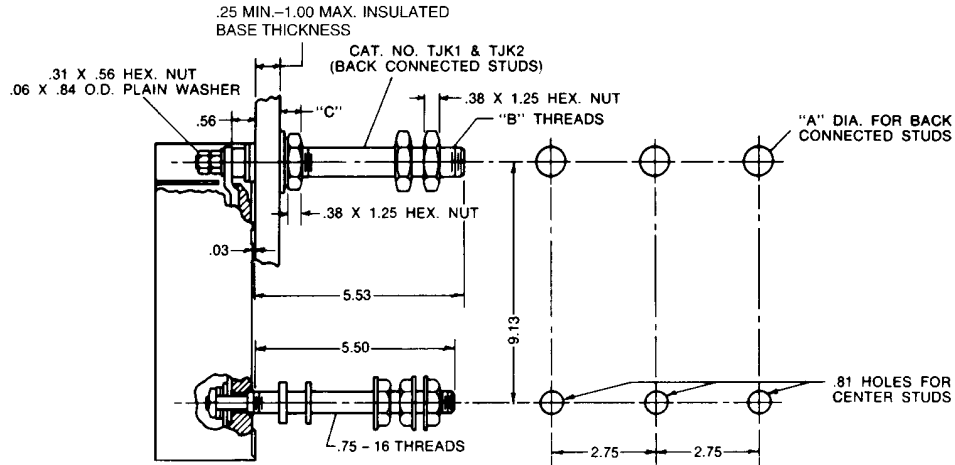
Back Connected Studs



Breaker	Stud Cat.	Rating & Length	A	B	C	D	E	F	G	H	
										Min	Max
E-150	TEF 1	15-50A Short	1.06	2.75			1/4-20	5.25	.32	.5	1
	TEF 2	15-50A Long			2.56	4.38	1/4-20	5.25	.32	.5	1
	TEF 3	60-150A Short	1.25	3.375			3/8-16	5.25	.44	.5	1
	TEF 4	60-150A Long			3.62	5.75	3/8-16	5.25	.44	.5	1
F-225	TFK 1	225A Short	.44	2.69			1/2-13	8.38	.56	.25	1
	TFK 2	225A Long			3.69	5.94	1/2-13	8.38	.56	.25	1

E150 and F225 Line

Back Connected Studs

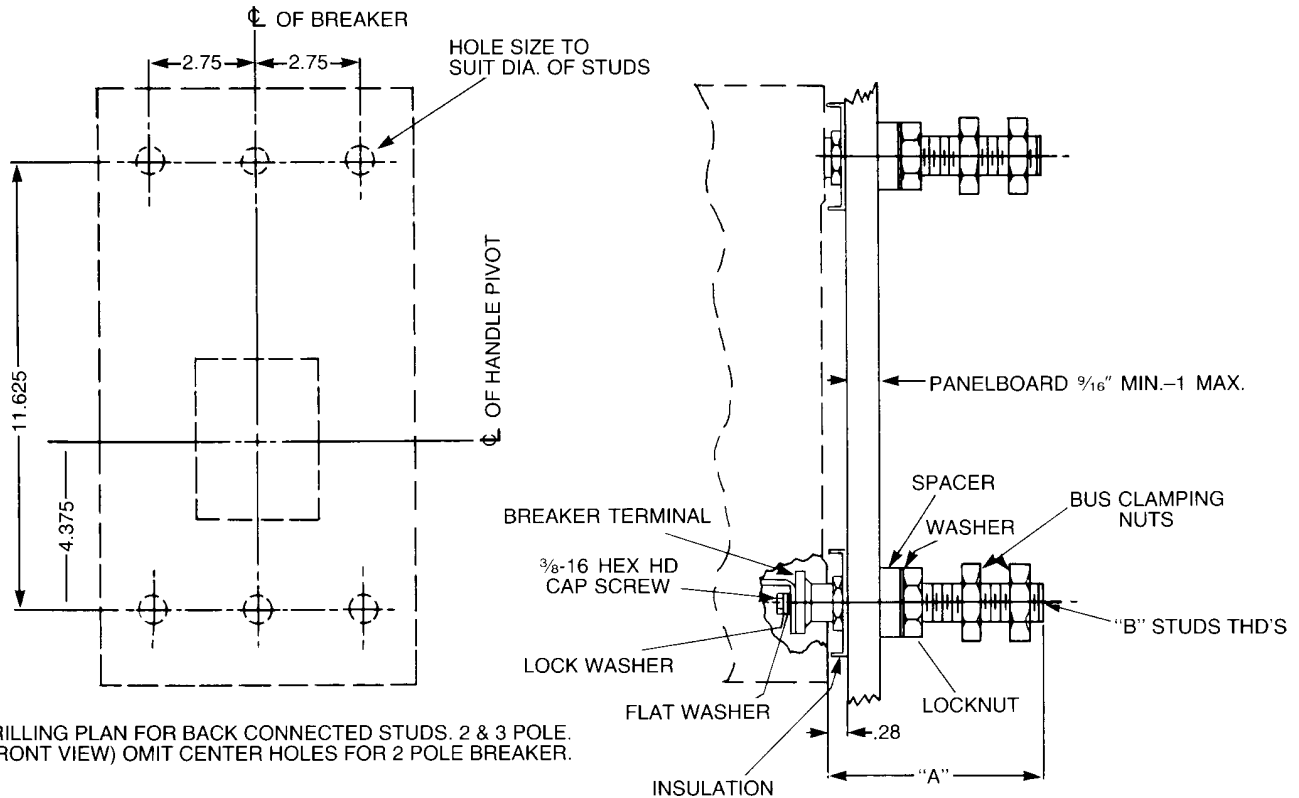


Catalog No.	A	B	C
TJK1	.81	.75-16.00	.63
TJK2	1.00	.94-16.00	.88

INSULATED BASE DRILLING FOR BACK CONNECTED STUDS & CENTER STUDS

NOTE: OMIT CENTER HOLES FOR 2 POLE MOUNTING

J600 Line



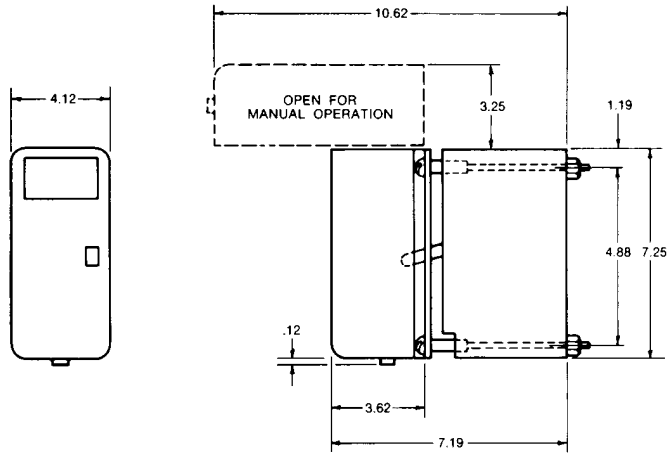
DRILLING PLAN FOR BACK CONNECTED STUDS. 2 & 3 POLE. (FRONT VIEW) OMIT CENTER HOLES FOR 2 POLE BREAKER.

Cat. No.	Amp. Max.	"A"	"B" Stud THD'S
TKM9*	400	5.5	.75 × 16
TKM10*	600	5.5	.9375 × 16
TKM11	800 to 1200	5.5	1.125 × 16
TKM12		8	1.125 × 16

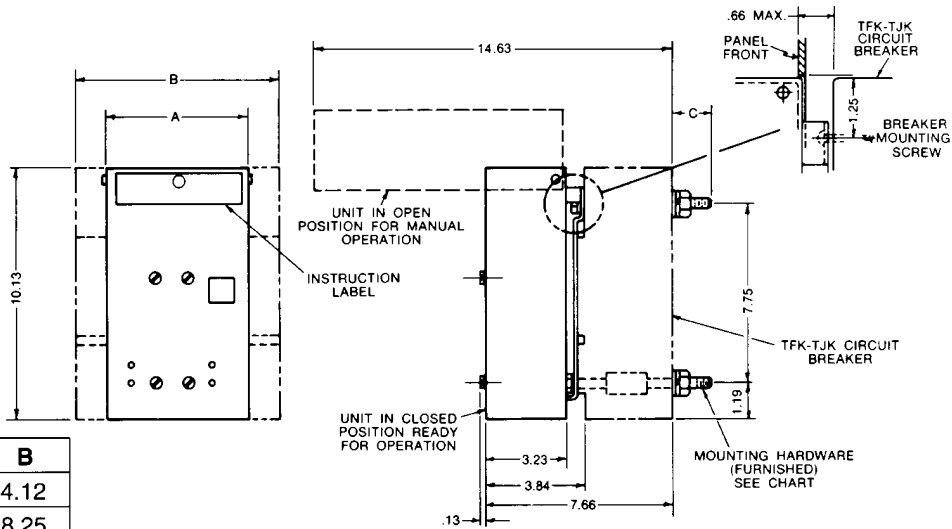
*Discontinued

K1200 Line

Motor Operated Mechanisms

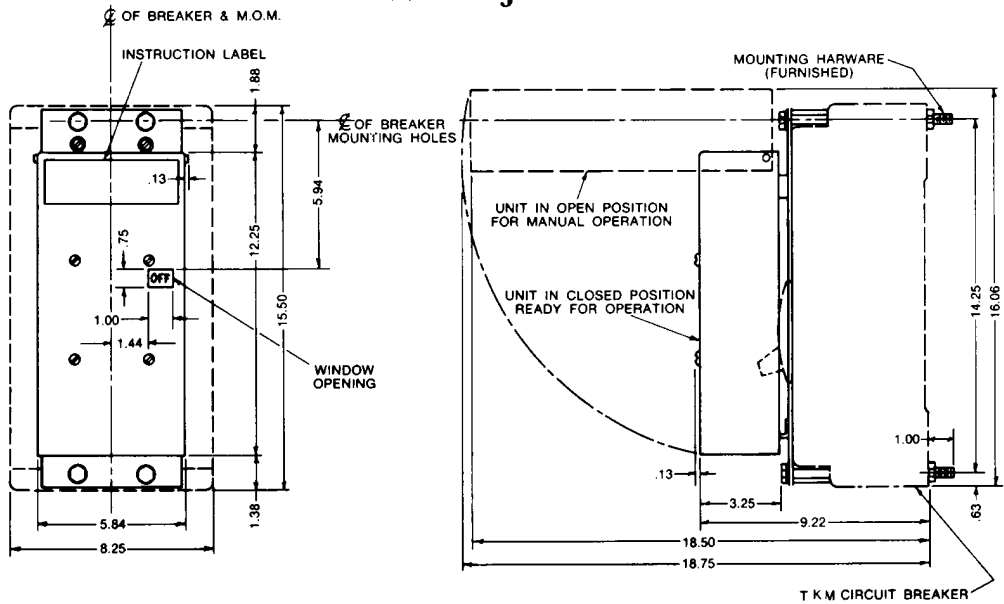


E150 Line



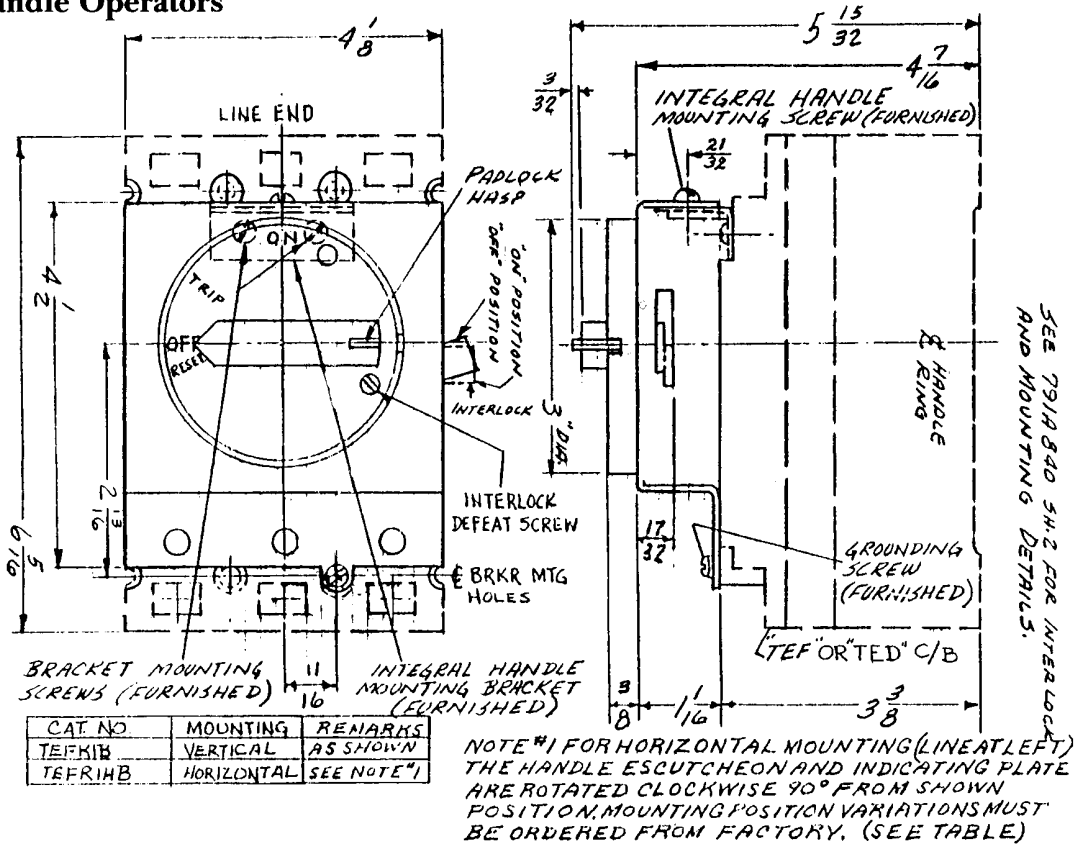
	A	B
F225	3.97	4.12
J600	5.85	8.25

F225 and J600 Lines

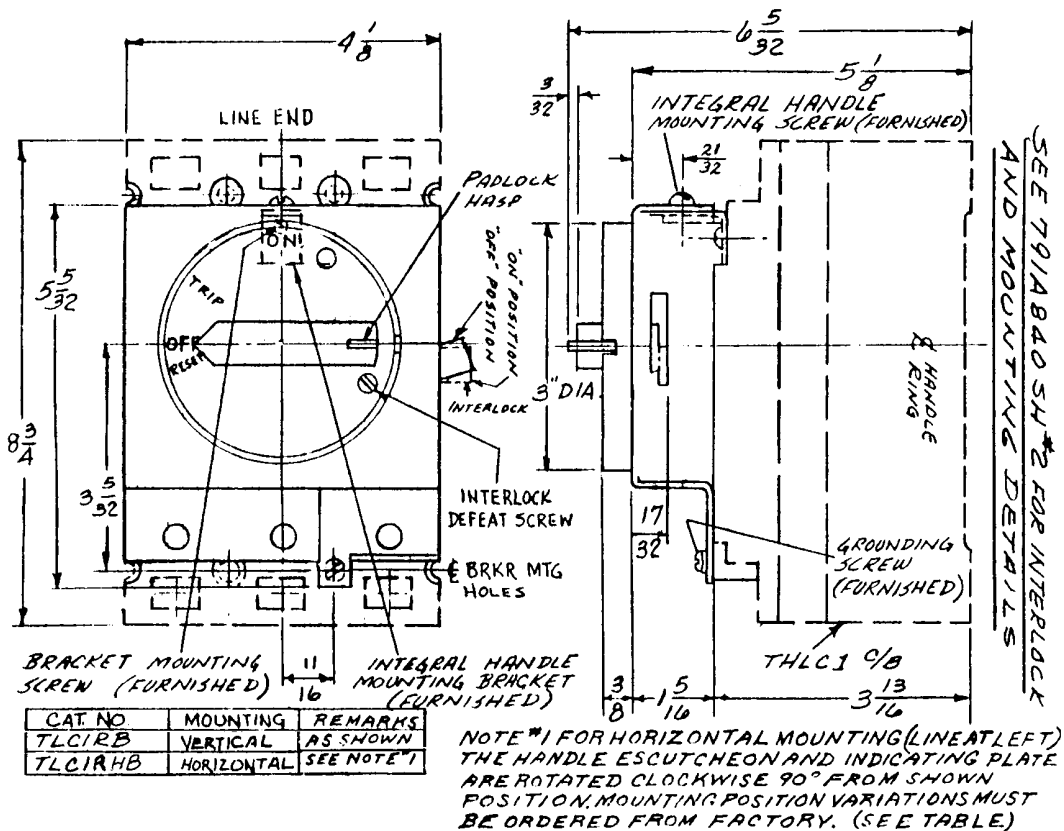


K1200 Line

TDR Handle Operators

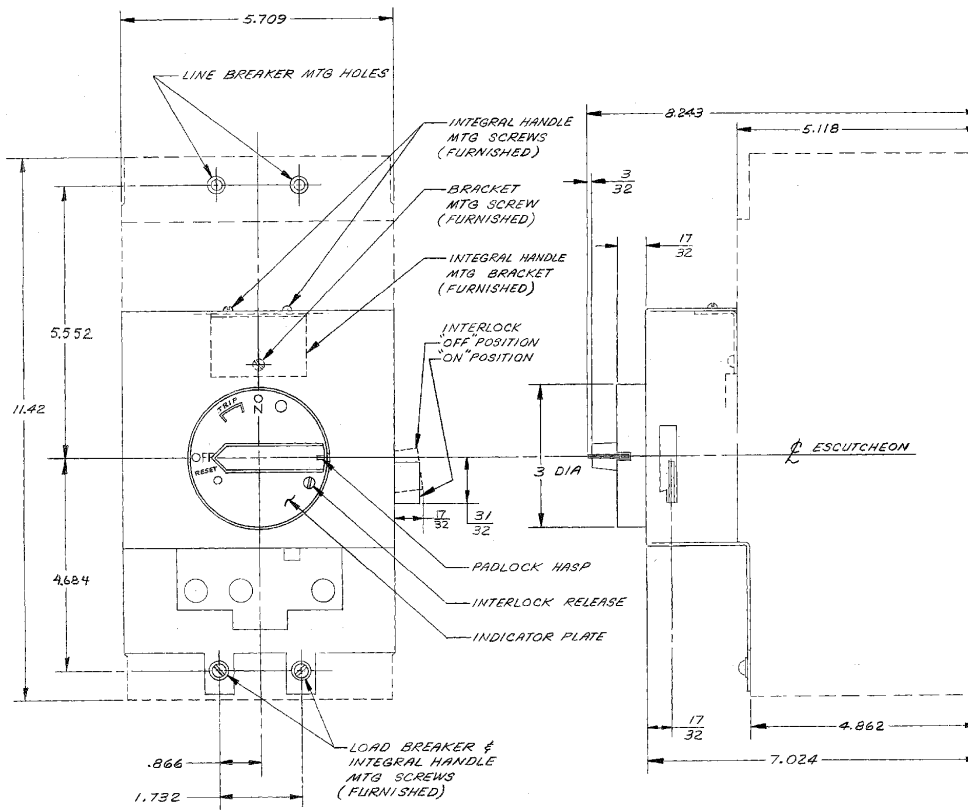


E150 Line



THLC-1

TDR Handle Operators

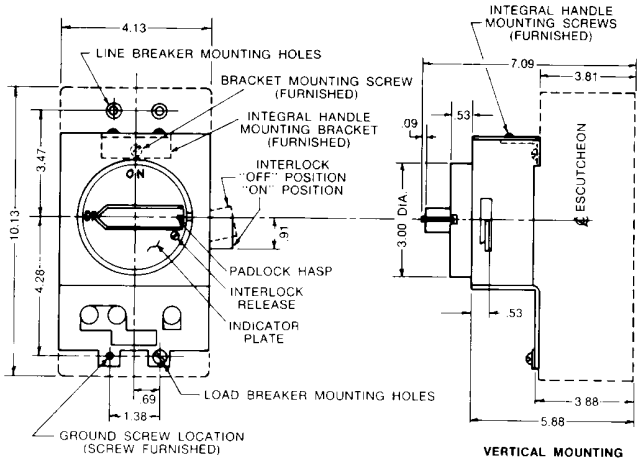


CAT NO	BREAKER MOUNTING	INDICATOR PLATE COLOR	REMARKS
TLCA8B	VERTICAL	BLUE	AS SHOWN
TLCA8H	HORIZONTAL	BLUE	SEE NOTE 1

- NOTES
- 1) FOR HORIZONTAL MOUNTING (LINE AT LEFT) THE HANDLE ESCUTCHEON AND INDICATING PLATE ARE ROTATED 90° CLOCKWISE FROM SHOWN POSITION. MOUNTING POSITION VARIATIONS MUST BE ORDERED FROM FACTORY. (SEE TABLE)
 - 2) SEE 791A840 SH 3 FOR INTERLOCK AND MOUNTING DETAILS.

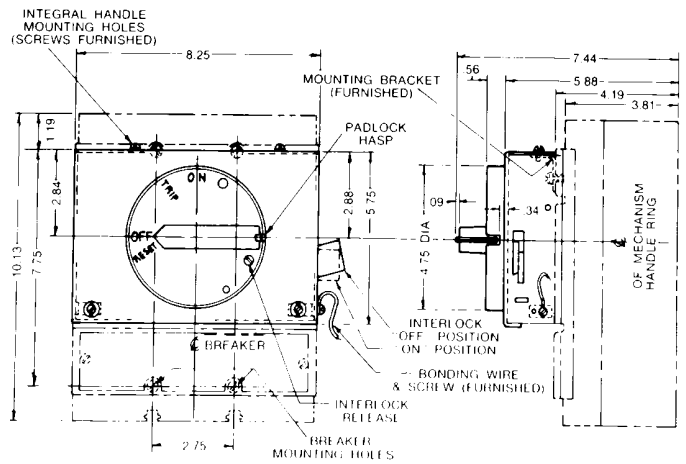
THLC2 and THLC4

TDR Handle Operators (cont.)



VERTICAL MOUNTING

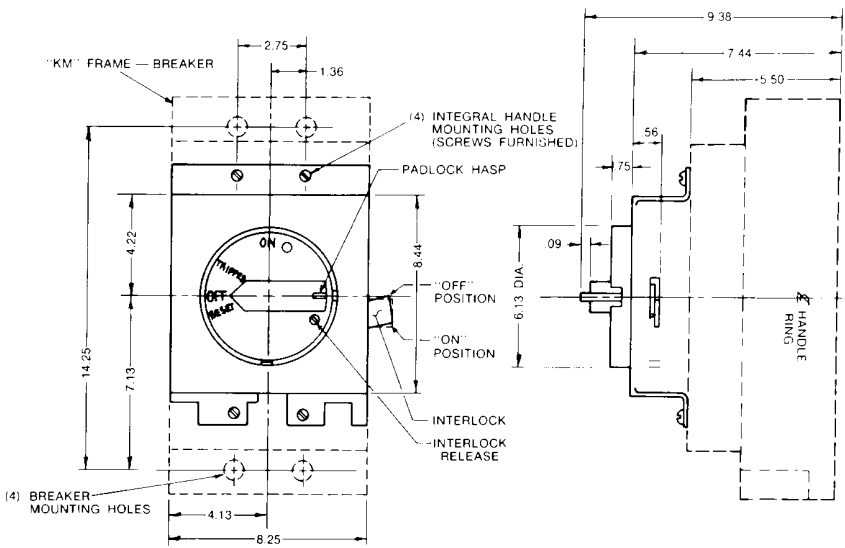
NOTE 1: FOR HORIZONTAL MOUNTING (LINE AT LEFT) THE HANDLE ESCUTCHEON AND INDICATING PLATE ARE ROTATED CLOCKWISE 90 FROM SHOWN POSITION. MOUNTING POSITION VARIATIONS MUST BE ORDERED FROM FACTORY.



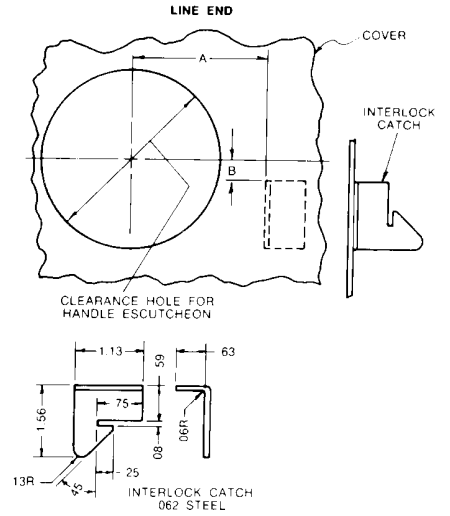
NOTE 1: FOR HORIZONTAL MOUNTING (LINE AT LEFT) THE HANDLE ESCUTCHEON AND INDICATING PLATE ARE ROTATED CLOCKWISE 90 FROM SHOWN POSITION. MOUNTING POSITION VARIATIONS MUST BE ORDERED FROM FACTORY.

F225 Line

J600 Line



NOTE 1: FOR HORIZONTAL MOUNTING (LINE AT LEFT) THE HANDLE ESCUTCHEON AND INDICATING PLATE ARE ROTATED CLOCKWISE 90 FROM SHOWN POSITION. MOUNTING POSITION VARIATIONS MUST BE ORDERED FROM FACTORY.



DOOR INTERLOCK BRACKET

TDR Handle for	A	B
J600 Line	4.50	.69
E150 Line F225 Line	2.25	.31
K1200 Line	4.63	.91

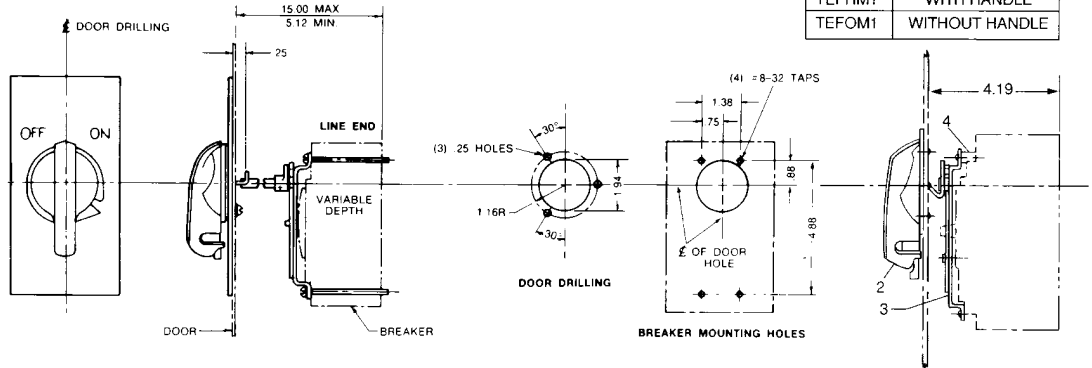
K1200 Line

Door Interlock Bracket

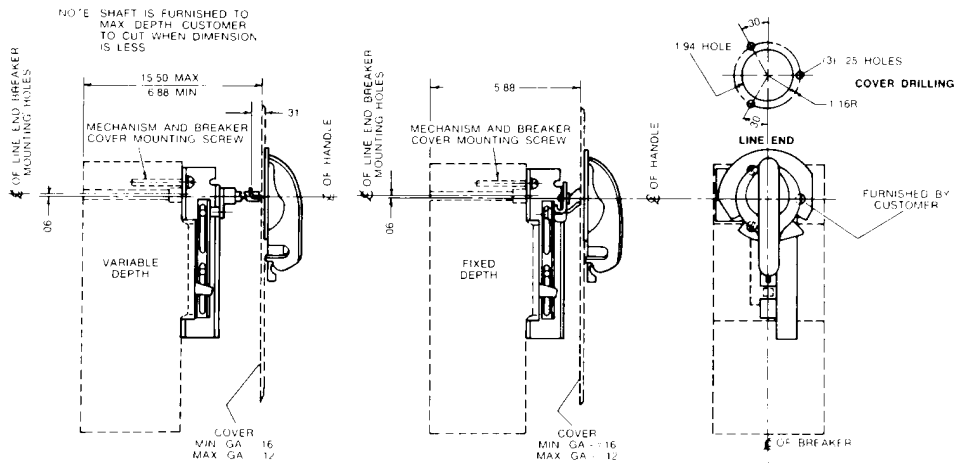
TDM Handle Operators

CAT. NO.	REMARKS
TEFHM1	WITH HANDLE
TEFOM1	WITHOUT HANDLE

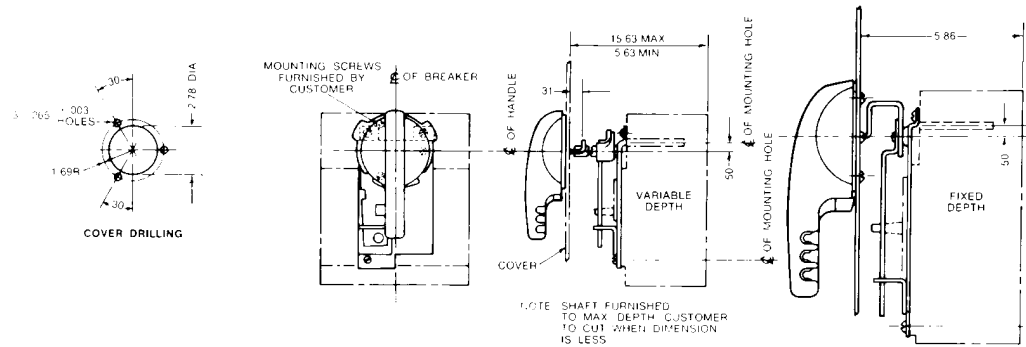
E150 Line



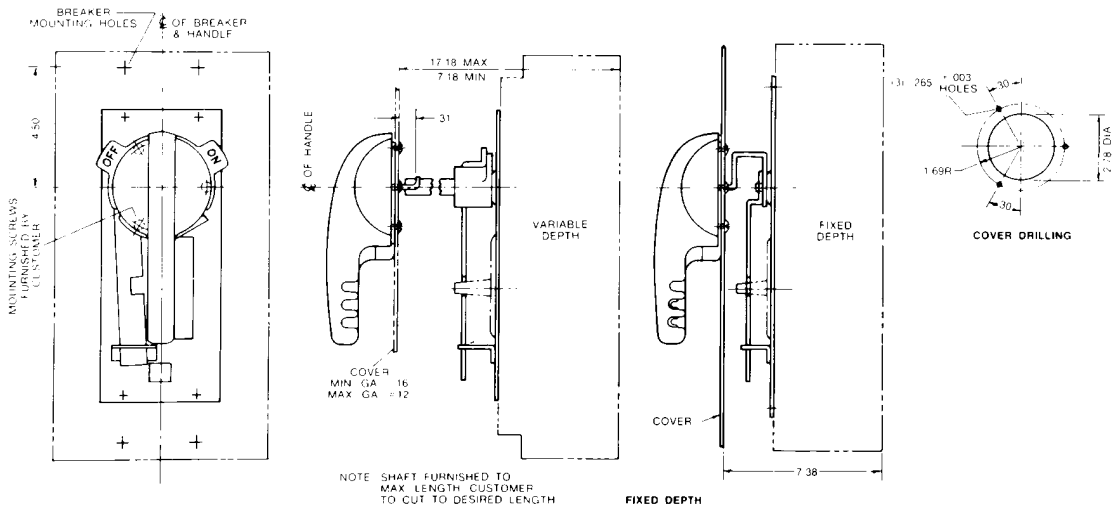
F225 Line



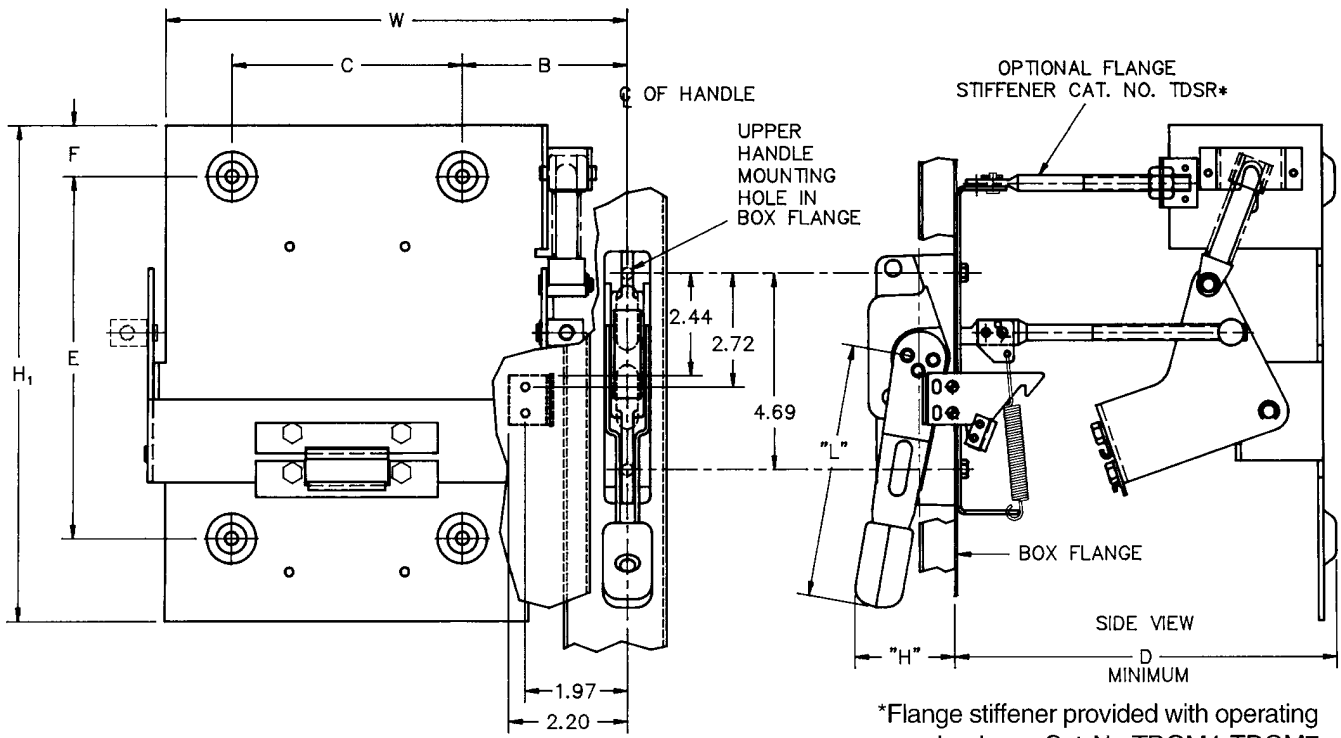
J600 Line



K1200 Line



STDA Handle Operators



*Flange stiffener provided with operating mechanisms. Cat. No. TDOM4-TDOM7.

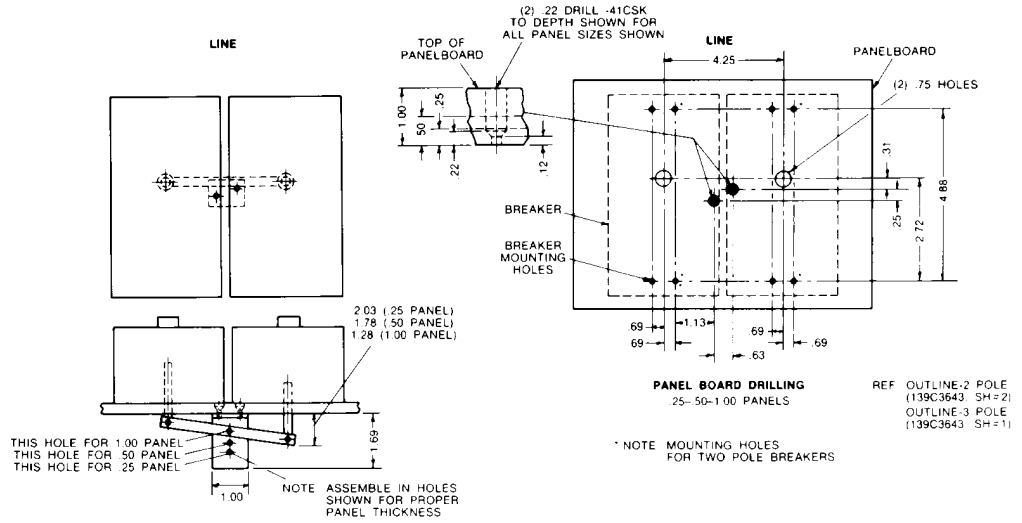
Handle Cat. No.	"L"	"H"
STDA1, STDA1X	6.04	2.38
STDA2, STDA2X	9.38	3.00

Circuit Breaker Type	Operating Mechanism Cat. No.	A	B	C	D	E	F	H ₁	W
E-150	SDOM1A	1.62	1.78	3.00	6.50	6.75	1.20	9.69	6.25
TEL, TEMPL	TDOM1C								
THLC1	TDOM1D								
TB1	TDOM1B								
F225, TFL	TDOM3	2.72	2.75	6.75	10.88	1.38	13.38	6.75	
J-600	TDOM4	2.25	2.66	5.50	8.00	8.62	1.30	11.81	10.33
TB4	TDOM5	2.25			8.00	14.62	1.30	17.75	
①	TDOM6	6.00			9.00	10.50	1.00	18.75	
TB6, TB8	TDOM7	6.00			9.00	23.12	1.00	25.12	

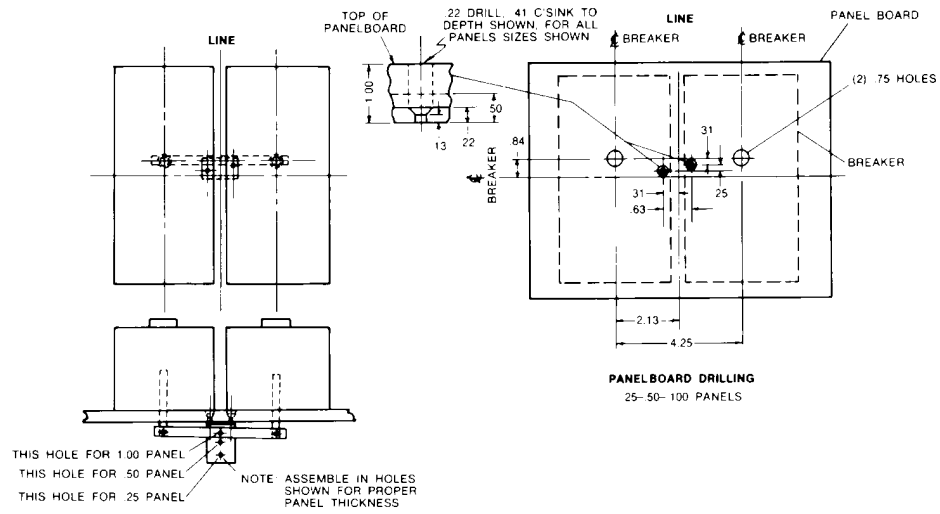
①K-1200, THLC2, TLB2, THLC4, TB4

Mechanical Interlocks

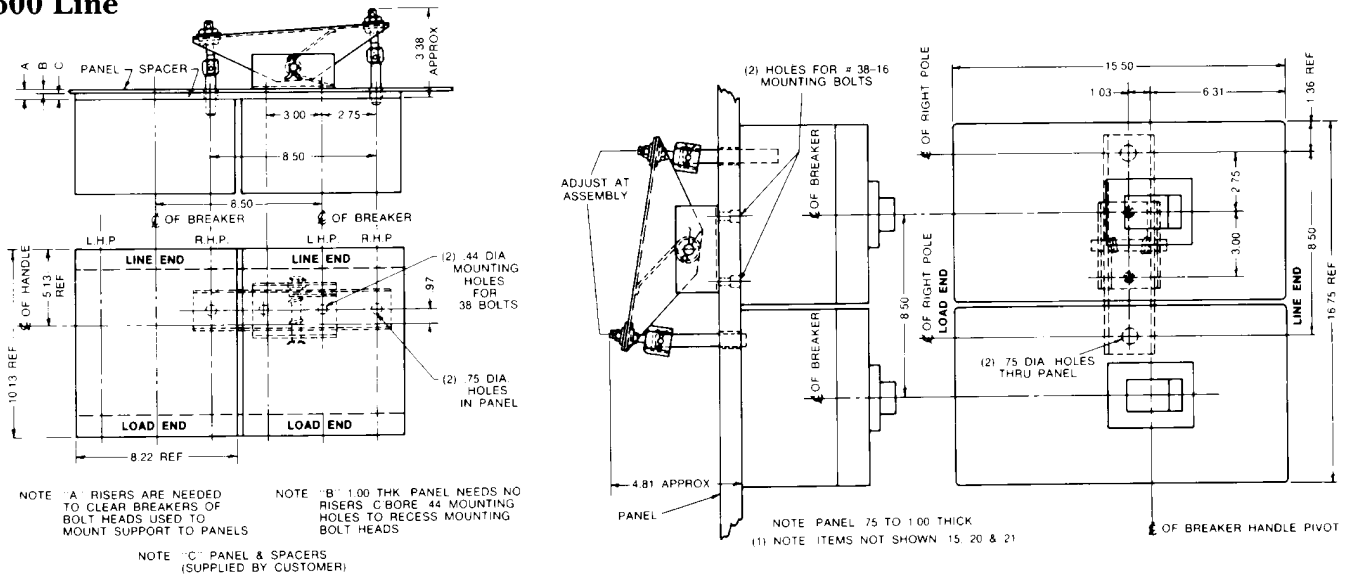
E150 Line



F225 Line



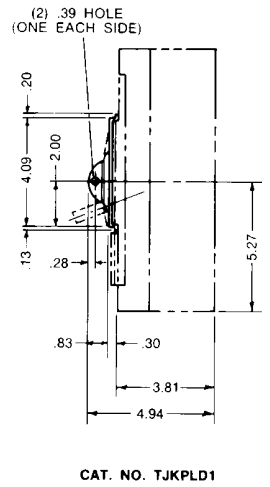
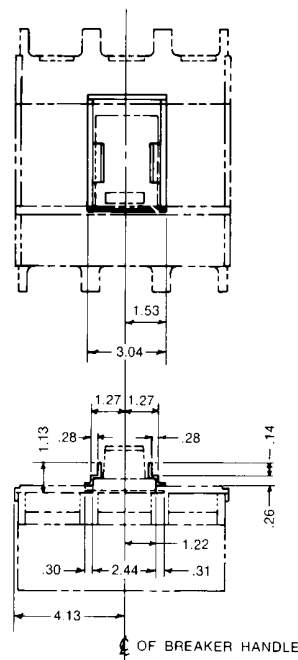
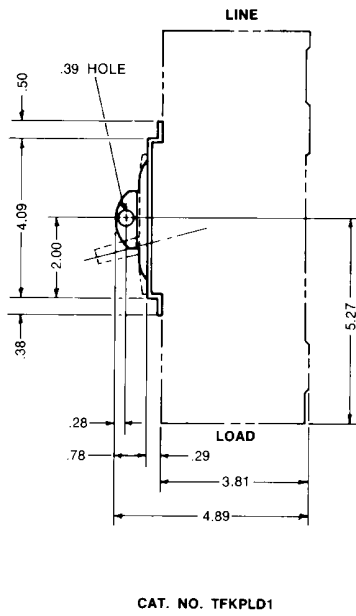
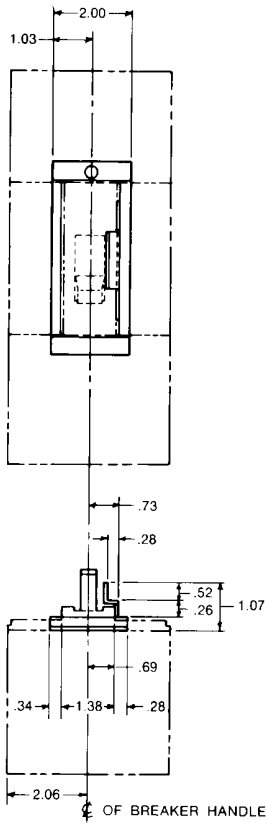
J600 Line



Catalog No.	A	B	C	Remarks
TJKMIB	.38	.13	.25	See Note "A"
TJKMIE	1.00	None	None	See Note "B"

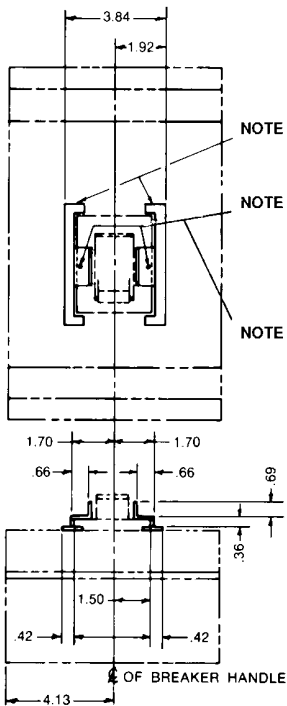
K1200 Line

Handle Locking Plates

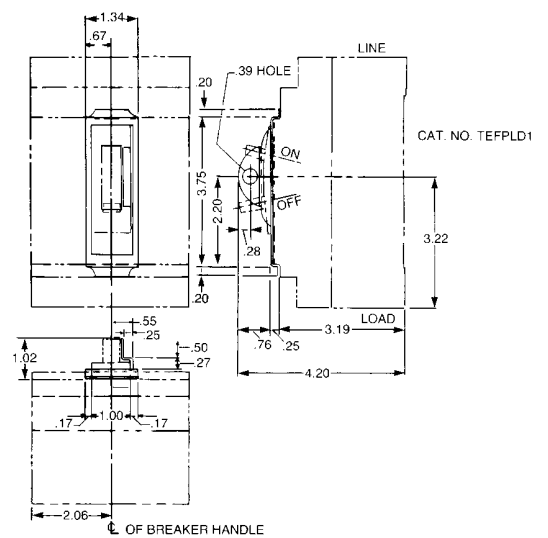
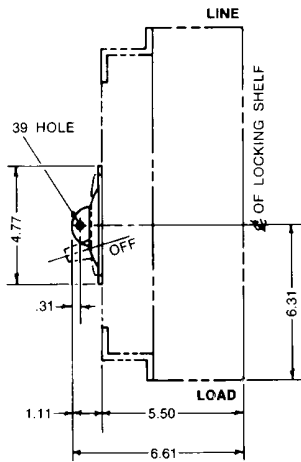


J600 Line

F225 Line



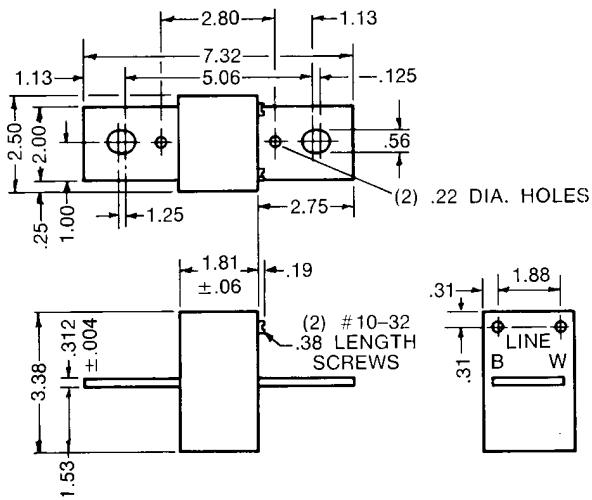
- NOTE 1: PLACE LOCKING SHELF ON EACH SIDE OF ESCUTCHEON.
- NOTE 2: USING #31 DRILL, DRILL .31 DEEP HOLE IN ESCUTCHEON. (DO NOT DRILL CLEAR THROUGH.) USE HOLE IN SHELF AS GUIDE.
- NOTE 3: SECURE LOCKING SHELF BY HAMMERING DRIVE SCREW (SUPPLIED IN KIT) IN PLACE.



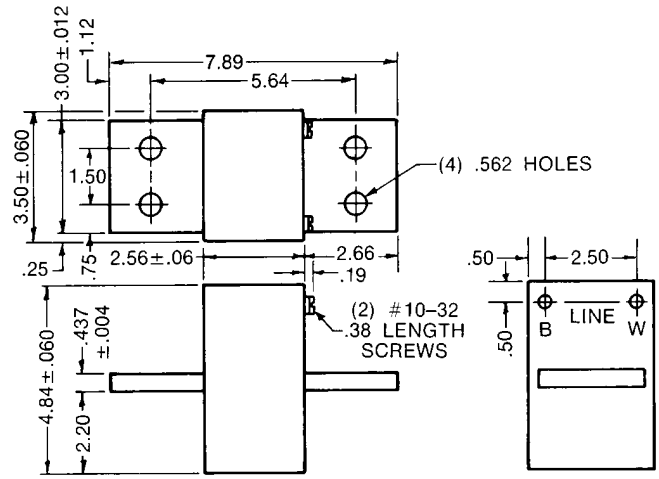
E150 Line

K1200 Line

Neutral Current Sensors

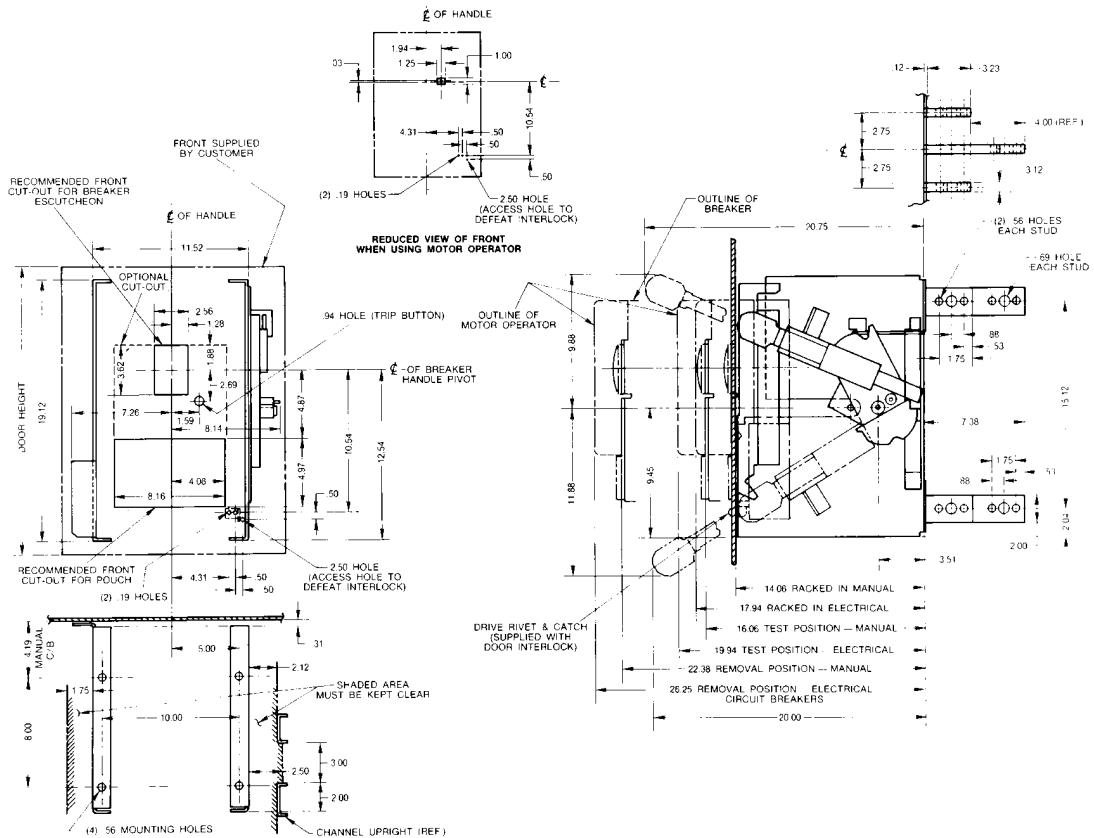


J600 Line



K1200 Line

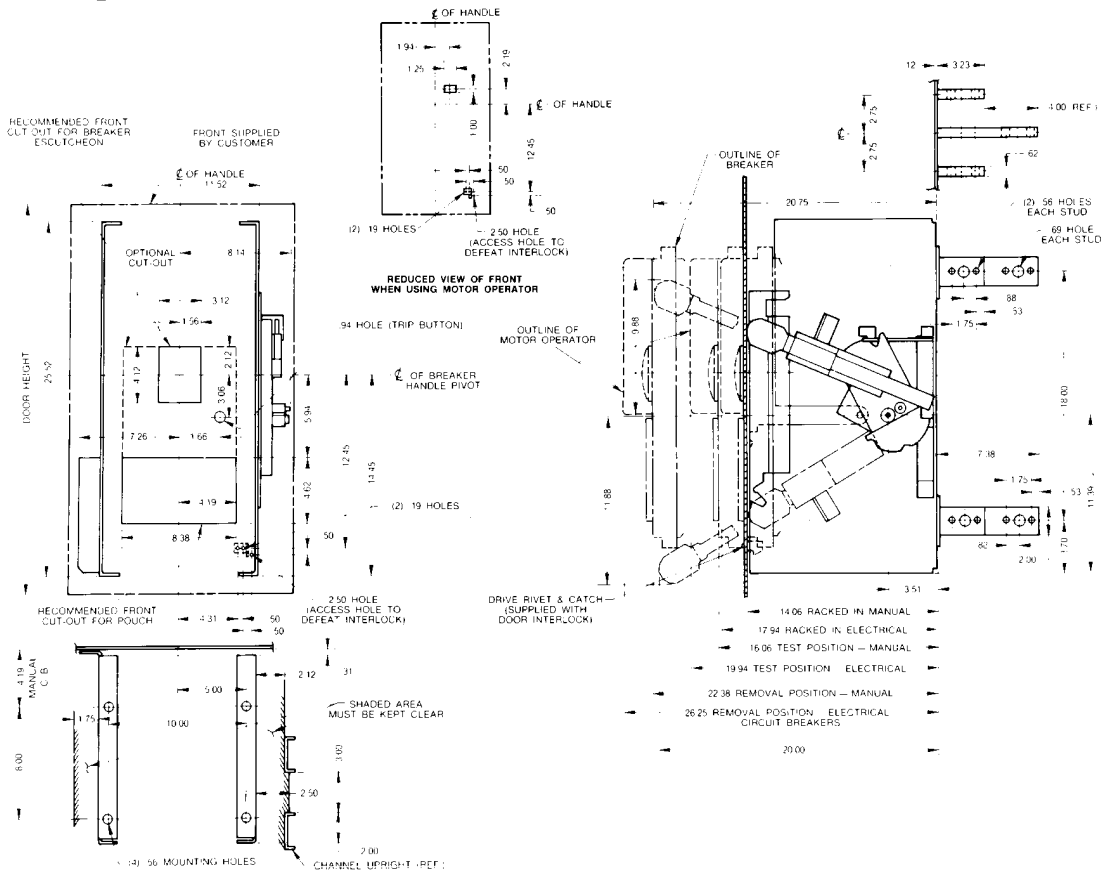
Drawout Mechanism MicroVersaTrip® RMS-9



J600 Line

Note: OBSOLETE — for reference use only.

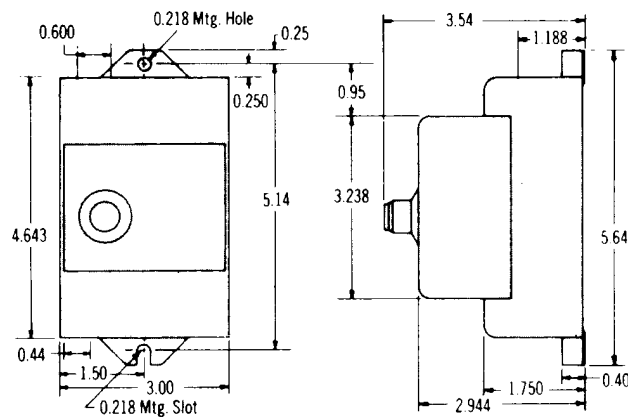
Drawout Mechanism MicroVersaTrip® RMS-9



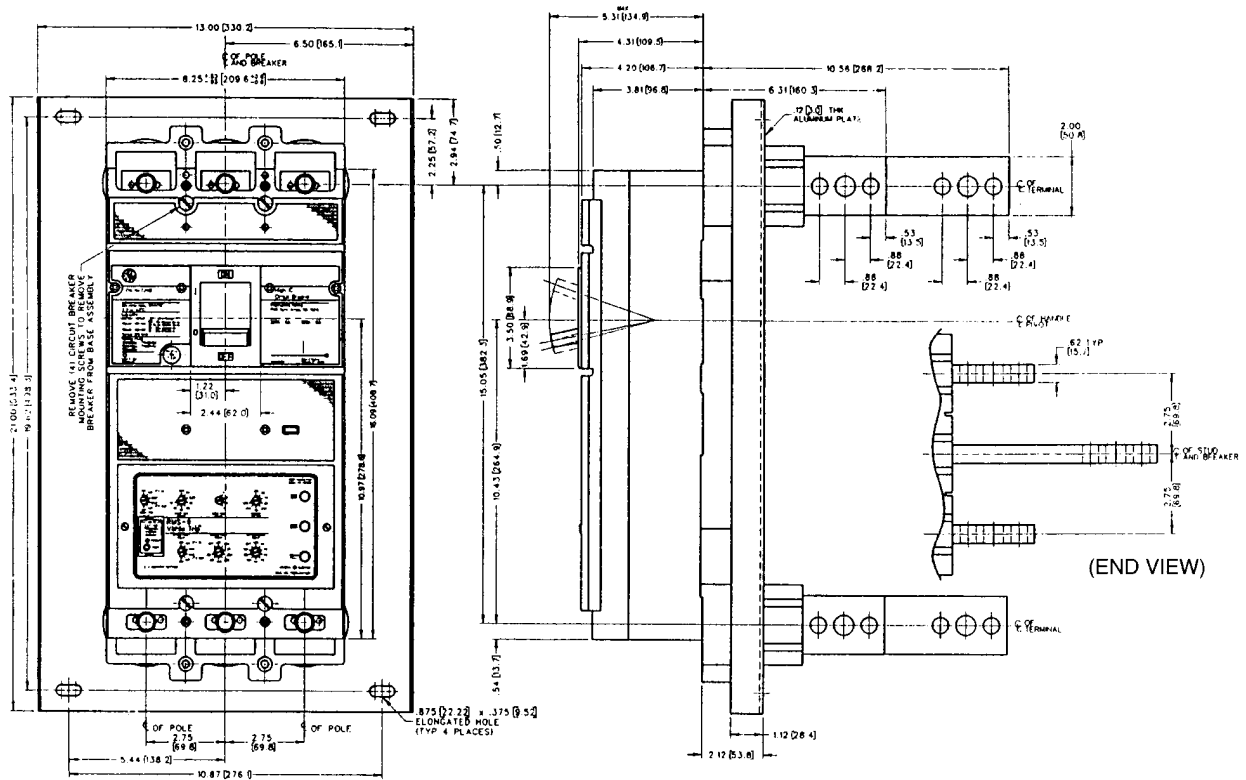
K1200 Line

Note: OBSOLETE — for reference use only.

Time Delay Modules (Cat. Nos. TD1000, TD110A530)



100% Equipment Rated Mounting MicroVersaTrip® Plus or RMS-9



NOTE "A":
SEE CIRCUIT BREAKER OUTLINE
page 86 FOR ADDITIONAL
INFORMATION

NOTE "B":
DIMENSIONS IN BRACKETS () ARE
IN MILLIMETERS.

J600 Line



GE Industrial Systems

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www.GEindustrial.com***