Molded Case Circuit Breakers

Contents

Series C

Series G

Typical Applications

Machine Tool Control Panels and Motor Control Centers

Designed for these equipment requirements, including new world-class accessories.

Panelboards

As both main and branch circuit protection devices.

Feeder Pillars

In distribution systems to provide main and branch circuit protection.

Switchgear

In distribution systems to provide main and branch circuit protection up to 2500 amperes (RG-Frame).

Bus Bar Trunking Tap-Offs

In bus bar trunking tap-offs to provide circuit protection.

Individual Enclosures

Completely assembled in enclosures to meet specific customer requirements.

Additional Applications

Special versions of each Cutler-Hammer frame are available to provide safe equipment control and protection in mining and other applications. Contact your Eaton agent or distributor for additional information.

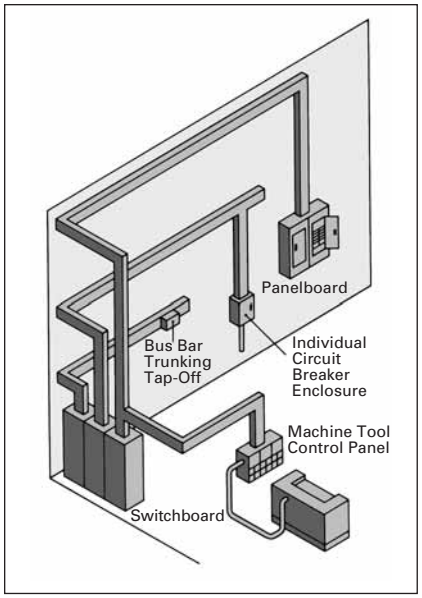

Figure 12-1. Typical Cutler-Hammer Applications

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Table 12-1. Cutler-Hammer Molded Case Circuit Breakers in Eaton Assembles

Frame	Ampere Range	Panelboards					Switchboards		Motor Control Centers		Enclosed Control	Bus Plugs	Enclosed Breaker
		1A	2A	3A	4	5P	PRL-C	IFS	Freedom	*IT.*			
Series G													
EG	15 – 160 ①								●	●	●		
JG	20 – 250												
LG	100 – 630 ②				●		●	●					●
NG	400 – 1600 ③								●	●			●
RG	800 – 2500								●	●			
Series C													
FD/ED	15 – 225	●	●	●	●	●	●	●	●	●	●	●	●
JD	70 – 250	●	●	●	●	●	●	●	●	●	●	●	●
KD	70 – 400	●	●	●	●	●	●	●	●	●	●	●	●
LD	400 – 600				●	●	●	●	●	●	●	●	●
MDL	300 – 800				●	●	●	●			●	●	●
ND	400 – 1200				●	●	●	●	●	●	●	●	●
RD	800 – 2500					●	●	●	●	●			

① 125 amperes is the maximum UL and CSA rating for EG.
② 600 amperes is the maximum UL and CSA rating for LG.
③ 1200 amperes is the maximum UL and CSA rating for NG.

Cutler-Hammer Molded Case Circuit Breakers cover the widest range of applications in the industry:

- Electrical OEMs.
- Machinery OEMs.
- Navy Breakers:
  - UL Supplement SA and SB
  - MIL-C-17588
  - MIL-C-17361
- Mining Breakers up to 1100 Vac.
- Earth Leakage.
- DC Breakers 125 – 750 Vdc.
- Engine Generator Breakers 15 – 1200 amperes.
- Current Limiting Breakers.

General Information

Cutler-Hammer Series G Molded Case Circuit Breakers provide increased performance in considerably less space than standard circuit breakers or comparable fusible devices.

The "G" signifies global applications: Series G circuit breakers are marked with UL, CSA®, CE, IEC and KEMA KEUR listings. Other advantages include:

- Field-fit accessories.
- Common accessories through 630 amperes.
- Electronic trip units from 20 to 2500 amperes.
- UL-listed and IEC-rated, 30 mA ground fault/earth leakage modules.
- Built-in ground fault protection down to 20 amperes.

The EG, JG and LG frames are designed around space-saving footprints. The NG and RG use the proven Cutler-Hammer Series C® ND and RD designs but use metric threading on their line and load conductors.

Cutler-Hammer Series G Circuit Breakers meet applicable UL 489 and IEC 60947-2 standards.

The Cutler-Hammer Series G family includes five frame sizes in ratings from 15 to 2500 amperes. Series G offers a choice of several interrupting capacities up to 200 kA at 480 volts ac (200 kA at 240 volts ac).

Standard calibration is 40°C. For applications in high ambient temperature conditions, 50°C factory calibration is available on thermal magnetic breakers (not UL).

The Most Logically Designed Contact Assembly

The flexibility and outstanding performance characteristics of Cutler-Hammer Circuit Breakers are made possible by the best contact designs in circuit breaker history. Our patented technology creates a high-speed "blow-open" action using the electromechanical forces produced by high-level fault currents.

Cutler-Hammer Circuit Breakers are operated by a toggle-type mechanism that is mechanically trip-free from the handle so that the contacts cannot be held closed against short circuit currents. Tripping due to overload or short circuits is clearly indicated by the position on the handle. This remarkably fast and dependable contact action is designed to enhance safety.

Thorough In-Plant Testing

The quality, dependability and reliability of every Cutler-Hammer Circuit Breaker is ensured by a thorough program of in-plant testing. Two calibration tests are conducted on every pole of every circuit breaker to verify the trip mechanism, operating mechanism, continuity and accuracy.

ISO Certification

Cutler-Hammer Circuit Breakers are manufactured in ISO® certified facilities.

Current Limiting Characteristics

Circuit breakers are current limiting because of their high repulsion contact arrangement and use of state-of-the-art arc extinguishing technology.

Eaton offers one of the most complete lines of current limiting breakers in the industry. The industrial breakers are available in current limiting versions with interrupting capacities up to 200 kA at 480 V without fuses in the same physical size as standard and high interrupting capacity breakers.

Operating Mechanisms

Cutler-Hammer Circuit Breakers have a toggle handle operating mechanism, which also serves as a switching position indicator. The indicator shows the positions of: ON, OFF and TRIPPED.

The toggle handle snaps into the TRIPPED position if the breaker is tripped by one of its overcurrent, short circuit, shunt or undervoltage releases. Before the circuit breaker can be reclosed following a trip-out, the toggle handle must be brought beyond the OFF position (RESET). The circuit breaker can then be reclosed.

As an additional switching position indicator for EG- to RG-Frame circuit breakers, there are two windows on the right and on the left of the toggle handle, in which the switching state is indicated by means of the colors red, green and white corresponding to the ON, OFF and TRIPPED positions respectively.

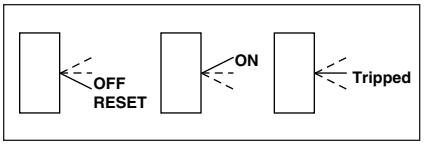

Figure 12-2. Positions of the Toggle Handle Drive

Standards and Certifications

Cutler-Hammer® Molded Case Circuit Breakers from Eaton are designed to conform with the following international standards:

- Australian Standard AS 2184 and AS 3947-2 Molded Case Circuit Breakers.
- British Standards Institution Standard EN60947.2.
- International Electrotechnical Commission Recommendations IEC 60947.2 Circuit Breakers. CE
- Japanese T-Mark Standard Molded Case Circuit Breakers.
- National Electrical Manufacturers Association Standards Publication No. AB1-1993 Molded Case Circuit Breakers.
- South African Bureau of Standards, Standard SANS 156, Standard Specification for Molded Case Circuit Breakers.
- Swiss Electro-Technical Association Standard SEV 947.2, Safety Regulations for Circuit Breakers.
- Union Technique de l'Electricite Standard NF C 63-120, Low Voltage Switchgear and Control Gear Circuit Breaker Requirements.
- Verband Deutscher Elektrotechnike (Association of German Electrical Engineers) Standard VDE 0660, Low Voltage Switchgear and Control Gear, Circuit Breakers.

Global Third-Party Certification

Certification marks ensure product compliance with the total standard via the third party witnessing of tests by globally recognized independent certification organizations.

KEMA is a highly recognized, independent international organization that offers certification and inspection facilities for equipment in many industries. The KEMA-KEUR mark is the highest certification an electrical product can receive from KEMA. Our IEC 60947-2 Molded Case Circuit Breakers are KEMA tested and certified. These breakers are also listed in accordance with UL® 489, as well as CSA C22.2 No. 5-02.

KEMA, UL and CSA provide ongoing follow-up testing and inspections to ensure that Cutler-Hammer Molded Case Circuit Breakers continue to meet their exacting standards.

General Information

Eaton's electrical business, under the Cutler-Hammer brand, offers the widest variety of molded case circuit breakers available today. Designed for electrical and machinery OEMs serving a range of industries and applications, these proven designs incorporate the latest in innovation with the high reliability that has been our hallmark since the advent of the circuit breaker in the 1920s.

The Series C family ranges from 15 – 2500 amperes, and includes thermal-magnetic breakers, electronic trip breakers, molded case switches, motor circuit protectors, and specially designed breakers for Engine Generator, DC and mining applications.

The new Series G line features an average 35% size reduction, common field-installable internal accessories, and advanced trip unit functionality that eliminates the need for rating plugs. These breakers meet the requirements of UL, CSA, IEC, CCC and CE, allowing the OEM to standardize on a design that meets the needs of their global customer base.

Electrical Characteristics

Table 12-2. Electrical Characteristics

Maximum Rated Current (Amperes)			**EG**								**JG**						**LG**					
			125, 160 ①								**250**						**400, 630** ②					
Breaker Type			**B**		**E**	**S**		**H**		**C**	**E**	**S**	**H**	**C**	**U**	**X**	**E**	**S**	**H**	**C**	**U**	**X**
Number of Poles			1	2, 3, 4	2, 3, 4	1	2, 3, 4	1	2, 3, 4	3, 4	2, 3, 4			3, 4	3, 4	3, 4	3, 4				3, 4	3, 4
Breaker Capacity (kA rms) ac 50 – 60 Hz																						
NEMA®, UL, CSA	240 Vac		25	25	35	85	85	100	100	200	65	85	100	200	200	200	65	85	100	200	200	200
	480 Vac		—	18	25	—	35	—	65	100	25	35	65	100	150	200	35	50	65	100	150	200
	600 Vac ③		—	—	18	—	22	—	25	35	18	18	25	35	50	50	18	25	35	50	65	65
	125/250 Vdc ④		10 ⑥	10	10	35 ⑥	35	42 ⑥	42	42	10	22	22	42	50	50	22	22	42	42	50	50
IEC 60947-2	220 – 240 Vac	I_{cu}	25	25	35	85	85	100	100	200	65	85	100	200	200	200	65	85	100	200	200	200
		I_{cs}	25	25	35	43	43	50	50	200	65	85	100	200	200	200	65	85	100	200	200	200
	380 – 415 Vac	I_{cu}	—	18	25	—	40	—	70	100	25	40	70	100	150	200	35	50	70	100	150	200
		I_{cs}	—	18	25	—	30	—	35	100	25	40	70	100	150	200	35	50	70	100	150	200
	660 – 690 Vac	I_{cu}	—	—	—	—	—	—	—	—	12	12	14	16	18	18	12	20	25	30	35	35
		I_{cs}	—	—	—	—	—	—	—	—	6	6	7	12	14	14	6	10	13	15	18	18
	125/ 250 Vdc ④	I_{cu}	10 ⑥	10	10	35 ⑥	35	42 ⑥	42	42	10	22	22	42	50	50	22	22	42	42	50	50
		I_{cs}	10 ⑥	10	10	35 ⑥	35	42 ⑥	42	42	10	22	22	42	50	50	22	22	42	42	50	50
Ampere Range			15 – 160 A ①								20 – 250 A						100 – 630 A ②					
Trip Units F = Fixed A = Adjustable T = Thermal M = Magnetic			FT-FM AT-FM								FT-AM AT-AM Electronic (Digitrip RMS 310)						FT-AM AT-AM Electronic (Digitrip RMS 310)					
	Interchangeable		—								■						■					
	Built-in		■								■						■					
Thermal Magnetic	Fixed Thermal		■								■						■					
	Adjustable Thermal		■								■						■					
	Magnetic		Fixed								Adjustable						Adjustable					
Elec-tronic rms ⑤	LS		—								■						■ ④					
	LSI		—								■						■ ④					
	LSG		—								■						■ ④					
	LSIG		—								■						■ ④					
Dimen-sions Inches (mm)			H		W			D			H		W			D	H		W			D
	1-Pole		5.50 (139.7)		1.00 (25.4)			2.99 (76.0)			—		—			—	—		—			—
	2-Pole				2.00 (50.8)						7.00 (177.8)		4.13 (105.0)			3.57 (87.4)	—		—			—
	3-Pole				3.00 (76.2)												10.13 (258.0)		5.48 (140.0)			4.09 (104.0)
	4-Pole				4.00 (101.6)								5.34 (135.6)						7.22 (183.0)			
Weight (approximate) lbs. (kg)		1-Pole		2-Pole		3-Pole		4-Pole		2-Pole		3-Pole			4-Pole		3-Pole				4-Pole	
		0.85 (0.39)		1.57 (0.71)		2.28 (1.04)		2.85 (1.29)		11.3 (5.13)		5.06 (2.30) T/M 5.31 (2.41) ETU			6.76 (3.07) T/M 7.12 (3.23) ETU		12.36 (5.61) T/M 13.04 (5.92) ETU				16.27 (7.39) T/M 16.92 (7.68) ETU	
Utilization Category		A								A							A					

① 125 amperes is the maximum UL and CSA rating for the EG.
② 630 amperes is not a UL or CSA listed rating. 600 amperes is the maximum UL and CSA listed rating for the LG.
③ EG breaker rated 600/347 Vac.
④ Two poles in series.
⑤ Not suitable for dc application. 4-pole ground fault not available.
⑥ 125 Vdc only for 1-pole breakers.

Table 12-2. Electrical Characteristics (Continued)

Maximum Rated Current (Amperes)			NG ① 					RG ① 	
			800, 1200			1600 ②	800	1600, 2000, 2500	
Breaker Type			**S**	**H**	**C** ③	**S**	**U**	**H**	**C** ③
Number of Poles			2, 3, 4			3	3	3, 4	
Breaker Capacity (kA rms) ac 50 – 60 Hz									
NEMA, UL, CSA	240 Vac		85	100	200	—	200	125	200
	480 Vac		50	65	100	—	150	65	100
	600 Vac		25	35	65	—	65	50	65
IEC 60947-2	220 – 240 Vac	I_{cu}	85	100	200	85	—	135	200
		I_{cs}	85	100	100	85	—	100	100
	380 – 415 Vac	I_{cu}	50	70	100	50	—	70	100
		I_{cs}	50	50	50	50	—	50	50
	660 – 690 Vac	I_{cu}	20 ④	25 ④	35	20 ④	—	25 ④	35 ④
		I_{cs}	10	13	18	10	—	13	18
	250 Vdc	I_{cu}	—	—	—	—	—	—	—
		I_{cs}	—	—	—	—	—	—	—
Ampere Range			400 – 1200 A			1600 A	800 A	800 – 2500 A	
Trip Units			Electronic					Electronic (Digitrip RMS 310, 610 and 910)	
	Interchangeable		—					—	
	Built-in		■					■	
Electronic ⑤	LI		—					■ ⑥	
	LS		■					■	
	LSI		■					■	
	LIG		—					■ ⑥	
	LSG		■					■	
	LSIG		■					■	
Dimensions Inches (mm)			H	W	D	H	W	D	
	1-Pole		—	—	—	—	—	—	
	2-Pole		—	—	—	—	—	—	
	3-Pole		16.00 (406.0)	8.25 (210.0)	5.50 (140.0)	16.00 (406.0)	15.50 (394.0)	9.75 (229.0)	
	4-Pole			11.13 (280.0)			20.00 (508.0)		
Weight (approximate) lbs. (kg)			3-Pole	4-Pole		3-Pole	4-Pole		
			46.8 (21.3)	62.0 (28.3)		103.0 (47.0)	118.4 (54.0)		
Utilization Category			A			A			

① The NG and RG MCCBs use metric threading in their line and load terminals. If English (Imperial) threading is needed, use Series C ND and RD MCCBs. Contact Eaton for more information.
② NG 1600 ampere frame is not UL or CSA listed.
③ Not KEMA-KEUR listed.
④ IEC 60947-2 H.5 Annex H is not KEMA-KEUR tested.
⑤ Not suitable for dc application. 4-pole ground fault not available.
⑥ Available only on Digitrip 610 and 910 trip units.

Table 12-3. EG through RG Electrical Characteristics

Technical Data	EG	JG	LG	NG	RG
Maximum Rated Current I_n Depending on the Version	160 A ①	250 A	400, 630 A ②	800, 1200, 1600 A ③	1600, 2000, 2500 A
Rated Insulation Voltage U, According to IEC 60947-2 Main Conducting Paths Auxiliary Circuits	 500 Vac 500 Vac	 750 Vac 690 Vac	 750 Vac 690 Vac	 750 Vac 690 Vac	 750 Vac 690 Vac
Rated Impulse Withstand Voltage U_{imp} Main Conducting Paths Auxiliary Circuits	 6 kV 4 kV	 8 kV 4 kV	 8 kV 4 kV	 8 kV 4 kV	 8 kV 4 kV
Rated Operational Voltage U_e IEC NEMA	 690 Vac 600 Y/347 Vac	 690 Vac 600 Vac	 690 Vac 600 Vac	 690 Vac 600 Vac	 690 Vac 600 Vac
UL and CSA Listed	Yes ④	Yes ④	Yes ④	Yes ④	Yes ④
Permissible Ambient Temperature	-20 to +70°C	-20 to +70°C	-20 to +70°C	-5 to +60°C	-5 to +60°C
Permissible Load for Various Ambient Temperatures Close to the Circuit Breaker, Related to the Rated Current of the Circuit Breaker	⑤ / ⑥	⑤ / ⑥	⑤ / ⑥	—	—
■ Circuit Breakers for Plant Protection					
– At 40°C	100% / 100%	100% / 100%	100% / 100%	100%	100%
– At 50°C	96% / 92%	96% / 94%	96% / 91%	91%	91%
– At 55°C	93% / 87%	94% / 90%	93% / 86%	85%	85%
– At 60°C	91% / 83%	92% / 87%	90% / 82%	81%	81%
– At 70°C	86% / 73%	88% / 80%	84% / 70%	—	—
■ Circuit Breakers for Motor Protection					
– At 40°C	—	100%	100%	—	—
– At 50°C	—	100%	100%	—	—
– At 55°C	—	100%	100%	—	—
– At 60°C	—	100%	100%	—	—
– At 70°C	—	90%	90%	—	—
■ Circuit Breakers for Starter Combinations and Isolating Circuit Breakers					
– At 40°C	100%	100%	100%	100%	100%
– At 50°C	100%	100%	100%	91%	91%
– At 55°C	96%	96%	95%	85%	85%
– At 60°C	91%	82%	90%	81%	81%
– At 70°C	86%	88%	84%	—	—
Rated Short Circuit Breaking Capacity (dc) Not for Circuit Breakers for Motor Protection (Time Constant τ = 10 rms) 2 Conducting Paths in Series For EG to LG up to 250 Vdc NEMA (Time Constant τ = 8 rms) 2 Conducting Paths in Series 250 Vdc	 42 kA Max. 42 kA Max.	 42 kA Max. 42 kA Max.	 42 kA Max. 42 kA Max.	 ⑦ ⑦ ⑦	 ⑦ ⑦ ⑦
Main Switch Characteristics According to IEC 60947-2 in Combination with Lockable Rotary Drives	Yes	Yes	Yes	Yes	Yes
Rated Short Circuit Breaking Capacity According to IEC 60947-2 (at ac 50/60 Hz)	Rated Short Circuit Breaking Capacity See **Table 12-2** on **Page 12-5**				
Endurance (Operating Cycles)	10,000	10,000	8,000	3,000	3,000
Maximum Switching Frequency	300 1/h	240 1/h	240 1/h	60 1/h	20 1/h

① 125 amperes is the maximum UL and CSA rating for the EG.
② 630 amperes is not a UL or CSA listed rating. 600 amperes is the maximum UL and CSA rating for the LG.
③ 1200 amperes is the maximum UL and CSA rating for the NG.
④ See footnotes for exceptions.
⑤ Thermal overload release set to the lower value.
⑥ Thermal overload release set to the upper value.
⑦ Not suitable for dc switching.

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Table 12-3. EG through RG Electrical Characteristics (Continued)

Technical Data	EG	JG	LG		NG	RG
Conductor Cross Sections and Terminal Types for Main Conductors	Box Terminals	Box Terminals	Box Terminals	Flat Bar Terminals	Flat Bar Terminals	Flat Bar Terminals
■ Solid or Stranded	2.5 to 95 mm^2	50 to 150 mm^2	95 to 240 mm^2	—	—	—
■ Finely Stranded with End Sleeve	2.5 to 50/70 mm^2	35 to 120 mm^2	70 to 150 mm^2	—	—	—
■ Bus Bar	—	—	—	600 A	Optional	Optional
Tightening Torque for Box Terminals	5.6 Nm	20 Nm	42 Nm	31 Nm	31 Nm	—
Tightening Torque for Bus Bar Connection Pieces	5.6 Nm	15 Nm	30 Nm	6 Nm	50 Nm	20 Nm
Conductor Cross Sections for Auxiliary Circuits with Terminal Connection or Terminal Strip						
■ Solid	0.75 to 2.5 mm^2	0.75 to 2.5 mm^2	0.75 to 2.5 mm^2		Up to 2x4 mm^2	Up to 2x4 mm^2
■ Finely Stranded with End Sleeve	0.75 to 2.5 mm^2	0.75 to 2.5 mm^2	0.75 to 2.5 mm^2		Up to 2x2.5 mm^2	Up to 2x2.5 mm^2
■ With Brought-out Cable Ends		0.82 (AWG 18) mm^2	0.82 (AWG 18) mm^2		0.82 (AWG 18) mm^2	0.82 (AWG 18) mm^2
■ Tightening Torque for Fitting Screws		0.8 to 1.4 Nm	0.8 to 1.4 Nm		0.8 to 1.4 Nm	0.8 to 1.4 Nm
Power Loss per Circuit Breaker at Maximum Rated Current I_n (The Power Losses of the Undervoltage Releases ("r" Releases) Must Be Observed if Necessary) at Three-Phase Symmetrical Load)			**400 A:**	**600 A:**		
■ For Plant Protection	40 W	45 W	65 W	120 W	87/210 W	220/270/400 W
■ As Isolating Circuit Breaker	40 W	45 W	65 W	120 W	87/210 W	220/270/400 W
■ For Starter Combinations	40 W	45 W	65 W	120 W	—	—
■ For Motor Protection	—	45 W	65 W	120 W	—	—
Permissible Mounting Position						
Arc Spacing — Suitable for Reverse-Feed Applications	Yes (Except HMCPE)	Yes	Yes		Yes	Yes

Table 12-3. EG through RG Electrical Characteristics (Continued)

Technical Data	EG	JG	LG	NG	RG
Auxiliary Switches					
Rated Thermal Current I_{th} Rated Making Capacity	6 A 20 A	6 A 20 A	6 A 20 A	6 A 20 A	6 A 20 A
ac (ac-15) ■ Rated Operational Voltage ■ Rated Operational Current	 230/400/600 V 6/3/0.25 A	 230/400/600 V 6/3/0.25 A	 230/400/600 V 6/3/0.25 A	 600 V 6 A	 600 V 6 A
dc (dc-13) ■ Rated Operational Voltage ■ Rated Operational Current	 125/250 V 0.5/0.25 A	 125/250 V 0.5/0.15 A	 125/250 V 0.5/0.15 A	 125/250 V 0.5/0.25 A	 125/250 V 0.5/0.25 A
Backup Fuse Miniature Circuit Breaker	6/4/4 A 6/4 A	4 6/4/4 A 6/4 A	4 6/4/4 A 6/4 A	4 6/4/4 A 6/4 A	4 6/4/4 A 6/4 A
Releases					
Undervoltage Releases (“r” Releases) Response Voltage: ■ Drop (Breaker Tripped) U_S ■ Pickup (Breaker May Be Switched on) U_S	 35 – 70% 85 – 110%	 35 – 70% 85 – 110%	 35 – 70% 85 – 110%	 35 – 70% 85 – 110%	 35 – 70% 85 – 110%
Power Consumption in Continuous Operation at: ■ 50/60 Hz 12 Vac ■ 50/60 Hz 24 Vac ■ 50/60 Hz 48 – 60 Vac ■ 50/60 Hz 110 – 127 Vac ■ 50/60 Hz 208 – 240 Vac ■ 50/60 Hz 380 – 500 Vac ■ 50/60 Hz 525 – 600 Vac ■ 12 Vdc ■ 24 Vdc ■ 48 – 60 Vdc ■ 110 – 125 Vdc ■ 220 – 250 Vdc Maximum Opening Time	 0.95 VA 0.72 VA 1.15 – 1.78 VA 0.96 – 1.25 VA 1.28 – 1.68 VA 2.2 – 3.9 VA 3.4 – 4.3 VA 0.88 W 0.70 W 1.12 – 1.76 W 0.94 – 1.21 W 1.45 – 1.86 W 50 ms	 1.9 VA 3.9 VA 2.5 – 3.8 VA 1.8 – 2.4 VA 2.7 – 3.8 VA 3.4 – 5.8 VA 3.4 – 4.3 VA 1.6 W 3.1 W 2.0 – 3.1 W 1.6 – 2.2 W 3.1 – 4 W 50 ms	 1.9 VA 3.9 VA 2.5 – 3.8 VA 1.8 – 2.4 VA 2.7 – 3.8 VA 3.4 – 5.8 VA 3.4 – 4.3 VA 1.6 W 3.1 W 2.0 – 3.1 W 1.6 – 2.2 W 3.1 – 4 W 50 ms	 1.9 VA 2.4 VA 2.3 – 4.1 VA 3.4 – 4.2 VA 4.8 – 6.5 VA 6.8 – 12.0 VA — 2.6 W 3.6 W 3.5 – 5.5 W 2.9 – 3.6 W 4.8 – 6.3 W 62 ms	 2.9 VA 3.1 VA 3.4 – 6.0 VA 3.3 – 3.8 VA 4.2 – 7.2 VA 3.8 – 10.0 VA — 3.4 W 4.3 W 4.8 – 7.2 W 3.3 – 3.8 W 6.6 – 7.5 W 62 ms
Shunt Trips					
Shunt Trips (“f” Releases) Response Voltage: ■ Pickup (Breaker Tripped) U_S	 70 – 110%	 70 – 110%	 70 – 110%	 70 – 110%	 70 – 110%
Power Consumption in (Short Time) at: ■ 50/60 Hz 24 Vac ■ 50/60 Hz 48 – 60 Vac ■ 50/60 Hz 48 – 127 Vac ■ 50/60 Hz 110 – 240 Vac ■ 50/60 Hz 380 – 440 Vac ■ 50/60 Hz 380 – 600 Vac ■ 50/60 Hz 480 – 600 Vac ■ 12 – 24 Vdc ■ 48 – 60 Vdc ■ 110 – 125 Vdc ■ 220 – 250 Vdc	 10 – 41 VA 139 – 210 VA — 83 – 360 VA — 418 – 1080 VA — 29 – 120 W 475 – 720 W 99 – 121 W —	 87 – 405 VA 710 – 1105 VA — 66 – 432 VA 127 – 188 VA — 34 – 60 VA 164 – 631 W 830 – 1580 W 112 – 150 W 40 – 58 W	 87 – 405 VA 710 – 1105 VA — 66 – 432 VA 127 – 188 VA — 34 – 60 VA 164 – 631 W 830 – 1580 W 112 – 150 W 40 – 58 W	 98 – 475 VA 24 – 50 VA — 67 – 432 VA 76 – 110 VA — 19 – 42 VA 145 – 610 W 67 – 102 W 121 – 150 W 46 – 55 W	 612 VA 403 – 666 VA — 396 – 1896 VA 1596 – 2156 VA — 230 – 384 VA 396 W 341 – 528 W 264 – 350 W 374 – 475 W
Maximum Load Duration	Interrupts Automatically				
Maximum Opening Time	50 ms	50 ms	50 ms	62 ms	62 ms
Molded Case Switch (with High Magnetic Trip)					
Unfused kAIC at 480 Vac (415 Vac) Self-Protected, Will Trip Above: 	65 (70) 1250 for EG125; 1600 for EG160	65 (70) 2500	65 (70) 4000/6300	65 (70) 12,500	65 (70) 20,000

12

DC Switching Duty

The EG- to LG-Frame circuit breakers are also suitable for switching dc currents.

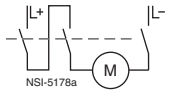
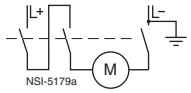
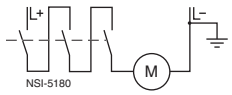
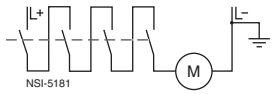
The NG- and RG-Frame circuit breakers are not suitable for dc currents due to the solid-state overcurrent release system.

For switching dc currents, however, the maximum permissible dc voltage per conducting path has to be considered.

For voltages higher than 250 volts, the series connection of two or three conducting paths is required.

As the current has to flow through all conducting paths so as to maintain the thermal tripping characteristics, the following circuit arrangements are recommended. With dc, the trip values of the instantaneous short circuit release ("n" release) are increased by 30 to 40%.

Table 12-4. For 3- and 4-Pole Circuit Breakers

Proposed Circuit	Maximum Permissible Vdc U_e	Remarks
	250 Vdc	Double-pole switching. If there is no risk of an earth fault, or if any earth fault which occurs is immediately eliminated (earth fault monitoring), the maximum permissible dc voltage can be 600 volts.
	440 Vdc	Double-pole switching (earth system). The earthed pole must always be assigned to the individual conducting path, so that two paths are always in series in the event of an earth fault.
	600 Vdc	Single-pole switching (earthed system). Three conducting paths in series. The earthed pole must be assigned to the nonswitched conducting path.
	750 Vdc	Single-pole switching (earthed system). Four conducting paths in series. The earthed pole must be assigned to the nonswitched conducting path.

12

Multi-Function Electronic Trip Units for All Applications

Digitrip RMS Trip Units

True rms Sensing

Digitrip RMS Trip Units utilize our patented microprocessor-based intelligence to provide true rms sensing, permitting increased accuracy and reliable system protection. True rms sensing is not susceptible to nuisance tripping when waveforms containing high harmonic currents are present.

Digitrip RMS 310+

Digitrip RMS 310+ Electronic Trip Units are available with Cutler-Hammer Circuit Breakers JG and LG. They are selectable long time delay (t_{LD}) and pickup settings (I_r). A rating plug is not required. The Digitrip 310+ offers true rms sensing, is front adjustable and has an optional local display of current and cause of trip.

Rating Plugs

If rating plugs are needed for N- and R-Frame, they are marked for 50/60 Hz applications. Both fixed and adjustable rating plugs are available, providing further flexibility when applied to selectively coordinated systems.

Curve Shaping

When selectively coordinated systems are called for, Digitrip RMS 310+ will provide a cost-effective solution for a variety of applications.

The standard Digitrip RMS 310+ includes an adjustable short time pickup setting encompassing an I^2t ramp function which provides the basic LS curve shaping function. JG- and LG-Frames have an adjustable long time delay.

JG- and LG-Frames have selectable long time delay (t_{LD}) and pickup settings (I_r). A rating plug is not required.

The optional Digitrip RMS 310+ provides additional flat response short time delay adjustments on an instantaneous setting to provide LSI curve shaping capability.

Digitrip RMS 310+ Trip Units are available with ground fault pickup and flat response ground fault delay which provides the trip unit with full function LSG and LSIG curve shaping flexibility.

Note: Contact factory for availability of ground fault for LG-Frame trip unit.

Digitrip RMS 310+ Trip Units can effectively coordinate with both sophisticated upstream power breakers as well as downstream thermal magnetic breakers…making Digitrip RMS 310+ Trip Units the cost-effective reliable choice for selectively coordinated systems.

Thermal Memory

All Digitrip RMS Trip Units incorporate a long delay. Thermal memory prevents the system from cumulative overheating due to repeated overcurrent events that may occur in quick succession.

Field Testing

A field test kit is available for Digitrip RMS 310+ trip units.

Digitrip RMS 610 and 910

RMS 610

RMS 910

Digitrip RMS 610 and 910 Trip Units are available with Cutler-Hammer R-Frame Circuit Breakers 800 through 2500 amperes. Digitrip 610 and 910 Trip Units provide unparalleled system protection with the added convenience of a local display.

Curve Shaping

Digitrip RMS 610 and 910 Trip Units are available with up to nine curve shaping choices achieved by adjusting up to seven switches on the front of the unit for optimum system coordination. Maximum curve shaping flexibility is provided by dependent long and short delay adjustments that are long delay pickup (I_r) based, depicted on the front of the unit by the blue portion of the time-current curve.

Additional coordination capability can be provided by utilizing the short delay and ground fault zone selective interlocking features available on these trip units.

System Diagnostics

Digitrip RMS 610 and 910 models of trip units provide long delay, short delay, instantaneous, and ground fault cause of trip LEDs on the front of the unit. Their display shows a magnitude of trip information, as well as remote signal contacts, for improved system alarming.

System Monitoring

Digitrip 610 and 910 Trip Units have the capability to monitor phase currents, as well as neutral or ground currents. This information is displayed on a large digital display mounted on the unit.

Digitrip RMS 910 Trip Units can also provide the user with power and energy monitoring capability. Peak power demand, present power demand, and total energy, as well as forward and reverse energy can be monitored with this unit.

Digitrip RMS 910 Trip Units have the additional capability of monitoring line-to-line voltage, as well as system power factor. Both parameters are displayed in the digital display window and are supported by LEDs to indicate which parameter is being displayed.

Harmonics Monitoring

Digitrip RMS 910 Trip Units are capable of displaying values of current harmonics in the digital display window. Percentage of harmonic content can be monitored for each phase, up to the 27th harmonic. Additionally, a total harmonic distortion value can be calculated and displayed.

Communications

Digitrip RMS 910 units have built-in communications options to allow all protection, monitoring, and control information to be transmitted back to a central location via the Cutler-Hammer PowerNet™ system.

Field Testing

Integral field testing capability is provided on all 610 and 910 Trip Units. No additional test set is needed to perform both trip and no trip field testing.

Digitrip RMS Electronic Trip Unit Selection Guide

Table 12-5. Digitrip RMS Electronic Trip Unit Selection Guide

Digitrip		RMS 310		RMS 610	RMS 910
		 RG  JG  LG/NG			
Breaker Type					
Cutler-Hammer Frame(s)		JG-, LG-, NG- and RG-Frames		RG-Frame	RG-Frame
Ampere Rating		20 – 2500 A		800 – 2500 A	800 – 2500 A
Interrupting Rating at 415 V		35, 70, 100 kA		70, 100 kA	70, 100 kA
Trip Unit Sensing					
rms Sensing		Yes		Yes	Yes
Protection and Coordination					
Protection	Ordering Options	LS, LSG	LSI, LSIG	LI, LS, LSI, LIG, LSG, LSIG	LI, LS, LSI, LIG, LSG, LSIG
	Fixed Rating Plug (I_n) ①	Yes	Yes	Yes	Yes
	Overtemperature Trip	Yes	Yes	Yes	Yes
Long Delay	Adjustable Rating Plug (I_n) ①	Yes	Yes	No	No
	Long Delay Setting	0.5 – 1.0 (I_n) ②	0.5 – 1.0 (I_n) ②	0.5 – 1.0 x (I_n)	0.5 – 1.0 x (I_n)
	Long Delay Time I^2t at 6x	10 Seconds ②	10 Seconds ②	2 – 24 Seconds	2 – 24 Seconds
	Long Delay Thermal Memory	Yes	Yes	Yes	Yes
	High Load Alarm	No	No	0.85 x I_r	0.85 x I_r
Short Delay	Short Delay Setting	Var/Frame ③	Var/Frame ③	200 – 600% S1 & S2 x (I_r)	200 – 600% S1 & S2 x (I_r)
	Short Delay Time I^2t	100 ms	No	100, 300, 500 ms	100, 300, 500 ms
	Short Delay Time Flat	No	I – 300 ms	100 – 500 ms	100 – 500 ms
	Short Delay Time ZSI	No	No	Yes	Yes
Instantaneous	Instantaneous Setting	No	200 – 800% x (I_n) ④	200 – 600% M1 & M2 x (I_n)	200 – 600% M1 & M2 x (I_n)
	Discriminator	No	No	Yes ⑤	Yes ⑤
	Instantaneous Override	Yes	Yes	Yes	Yes
Ground Fault	Ground Fault Setting	Var/Frame ⑥	Var/Frame ⑥	25 – 100% x (I_n) ⑥	25 – 100% x (I_n) ⑥
	Ground Fault Delay I^2t at .62x	No	No	100, 300, 500 ms	100, 300, 500 ms
	Ground Fault Delay Flat	I – 500 ms ⑦	I – 500 ms ⑦	100 – 500 ms	100 – 500 ms
	Ground Fault ZSI	No	No	Yes	Yes
	Ground Fault Thermal Memory	No	No	Yes	Yes
System Diagnostics					
Cause of Trip LEDs		No	No	Yes	Yes
Magnitude of Trip Information		No	No	Yes	Yes
Remote Signal Contacts		No	No	Yes	Yes
System Monitoring					
Digital Display		No	No	Yes	Yes
Current		No	No	Yes	Yes
Voltage		No	No	No	Yes
Power and Energy		No	No	No	Yes
Power Quality — Harmonics		No	No	No	Yes
Power Factor		No	No	No	Yes
System Communications					
PowerNet		No	No	No	Yes
Field Testing					
Testing Method		Test Set	Test Set	Integral	Integral

① JG- and LG-Frames have selectable settings instead of a rating plug.
② JG-, LG- and NG-Frames have adjustable long delay times of 2 – 24 seconds.
③ JG/LG: 2X – 14X (I_n); NG: 2X – 8X (I_n); RG: 2X – 8X (I_n); 2500 ampere RG-Frame 200 – 600% x (I_n).
④ JG-Frame also has a 14X setting.
⑤ LS, LSG only.
⑥ Not to exceed 1200 amperes.
⑦ JG- and LG-Frames are Instantaneous, 120 ms. NG- and RG-Frames are Instantaneous, 100, 300 and 500 ms.

Note: I_n = Rating plug rating.
I_r = Long delay setting.

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EG-Frame

Eaton's Cutler-Hammer EG

Product Description

- EG breaker is HACR rated.

Technical Data and Specifications

Table 12-6. UL 489/IEC 60947-2 Interrupting Capacity Ratings

Circuit Breaker Type	Number of Poles	Interrupting Capacity (Symmetrical Amperes) (kA)															
		Volts ac (50/60 Hz)												Volts dc ①			
		120	220 – 240		277	347	380 – 415		480	600Y/ 347	690 ②		125		250 ③④	
			I_{cu}	I_{cs}			I_{cu}	I_{cs}			I_{cu}	I_{cs}	I_{cu}	I_{cs}	I_{cu}	I_{cs}
EGB125	1	35	25	25	18	—	—	—	—	—	—	—	10	10	—	—
	2, 3, 4	—	25	25	—	—	18	18	18	—	—	—	—	—	10	10
EGE125	2, 3, 4	—	35	35	—	—	25	25	25	18	—	—	—	—	10	10
EGS125	1	100	85	43	35	22	—	—	—	—	—	—	35	35	—	—
	2, 3, 4	—	85	43	—	—	40	30	35	22	—	—	—	—	35	35
EGH125	1	200	100	50	65	30	—	—	—	—	—	—	42	42	—	—
	2, 3, 4	—	100	50	—	—	70	35	65	25	—	—	—	—	42	42
EGC125	3, 4	—	200	200	—	—	100	100	100	35	—	—	—	—	42	42

① dc ratings apply to substantially non-inductive circuits.
② IEC only.
③ 2-pole circuit breaker, or two poles of 3-pole circuit breaker.
④ Time constant is 3 milliseconds minimum at 10 kA and 8 milliseconds minimum at 42 kA.

Dimensions/Weights

Table 12-7. Dimensions in Inches (mm)

Number of Poles	Width	Height	Depth
1	1.00 (25.4)	5.50 (139.7)	2.99 (75.9)
2	2.00 (50.8)	5.50 (139.7)	2.99 (75.9)
3	3.00 (76.2)	5.50 (139.7)	2.99 (75.9)
4	4.00 (101.6)	5.50 (139.7)	2.99 (75.9)

Table 12-8. Approximate Shipping Weight in Lbs. (kg)

Breaker Type	Number of Poles			
	1	2	3	4
EGB125, EGE125, EGS125, EGH125, EGC125	1.5 (.68)	2.0 (.91)	3.0 (1.36)	4.9 (1.82)

Product Selection

Table 12-9. Main Catalog Numbering System

E G H 3 015 FF G

Frame
E

Standard/Application
G = IEC/CE/UL/CSA

Poles
1 = One
2 = Two
3 = Three
4 = Four — Neutral 0% Protected
7 = Four — Neutral 100% Protected

Amperes
016 ①
015
020
025
030
032 ①
035
040
045
050
060
063 ①
070
080
090
100
110
125

Terminations/Hardware	
Terminals	**Mounting Hardware**
M = Metric End Caps	Metric
E = Imperial End Caps	Imperial
G = Line/Load Standard	Metric
B = Bolt-On	—

Trip Unit
FF = Fixed Fixed
AF = Adj. Fixed
KS = Molded Case Switch

Performance				
	600Y/347	**480**	**415**	**240**
B	—	18	18	25
E	18	25	25	35
S	22	35	40	85
H	25	65	70	100
C	35	100	100	200
K	Molded Case Switch ②			

① Cannot be UL rated.
② Available only as 125 and 160 A sizes.

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Product Selection

Table 12-10. Complete Breaker (Includes Frame, Trip Unit, Standard Terminals and Mounting Hardware) — IC Rating at 415/480 Volts

Max. Cont. Amps at 40°C ①	1-Pole		2-Pole		3-Pole				4-Pole 0% Protected Neutral ③			
	Fixed Thermal Fixed Magnetic	Price U.S. $	Fixed Thermal Fixed Magnetic	Price U.S. $	Fixed Thermal Fixed Magnetic	Price U.S. $	Adjustable ② Thermal Fixed Magnetic	Price U.S. $	Fixed Thermal Fixed Magnetic	Price U.S. $	Adjustable Thermal Fixed Magnetic	Price U.S. $
18/18												
15	EGB1015FFG		EGB2015FFG		EGB3015FFG		—		EGB4015FFG		—	
16	EGB1016FFG		EGB2016FFG		EGB3016FFG		—		EGB4016FFG		—	
20	EGB1020FFG		EGB2020FFG		EGB3020FFG		—		EGB4020FFG		EGB4020AFG	
25	EGB1025FFG		EGB2025FFG		EGB3025FFG		EGB3025AFG		EGB4025FFG		EGB4025AFG	
30	EGB1030FFG		EGB2030FFG		EGB3030FFG		—		EGB4030FFG		—	
32	EGB1032FFG		EGB2032FFG		EGB3032FFG		EGB3032AFG		EGB4032FFG		EGB4032AFG	
35	EGB1035FFG		EGB2035FFG		EGB3035FFG		—		EGB4035FFG		—	
40	EGB1040FFG		EGB2040FFG		EGB3040FFG		EGB3040AFG		EGB4040FFG		EGB4040AFG	
45	EGB1045FFG		EGB2045FFG		EGB3045FFG		—		EGB4045FFG		—	
50	EGB1050FFG		EGB2050FFG		EGB3050FFG		EGB3050AFG		EGB4050FFG		EGB4050AFG	
60	EGB1060FFG		EGB2060FFG		EGB3060FFG		—		EGB4060FFG		—	
63	EGB1063FFG		EGB2063FFG		EGB3063FFG		EGB3063AFG		EGB4063FFG		EGB4063AFG	
70	EGB1070FFG		EGB2070FFG		EGB3070FFG		—		EGB4070FFG		—	
80	EGB1080FFG		EGB2080FFG		EGB3080FFG		EGB3080AFG		EGB4080FFG		EGB4080AFG	
90	EGB1090FFG		EGB2090FFG		EGB3090FFG		—		EGB4090FFG		—	
100	EGB1100FFG		EGB2100FFG		EGB3100FFG		EGB3100AFG		EGB4100FFG		EGB4100AFG	
125	EGB1125FFG		EGB2125FFG		EGB3125FFG		EGB3125AFG		EGB4125FFG		EGB4125AFG	
25/25												
15	—		EGE2015FFG		EGE3015FFG		—		EGE4015FFG		—	
16	—		EGE2016FFG		EGE3016FFG		—		EGE4016FFG		—	
20	—		EGE2020FFG		EGE3020FFG		—		EGE4020FFG		EGE4020AFG	
25	—		EGE2025FFG		EGE3025FFG		EGE3025AFG		EGE4025FFG		EGE4025AFG	
30	—		EGE2030FFG		EGE3030FFG		—		EGE4030FFG		—	
32	—		EGE2032FFG		EGE3032FFG		EGE3032AFG		EGE4032FFG		EGE4032AFG	
35	—		EGE2035FFG		EGE3035FFG		—		EGE4035FFG		—	
40	—		EGE2040FFG		EGE3040FFG		EGE3040AFG		EGE4040FFG		EGE4040AFG	
45	—		EGE2045FFG		EGE3045FFG		EGE3050AFG		EGE4045FFG		—	
50	—		EGE2050FFG		EGE3050FFG		—		EGE4050FFG		EGE4050AFG	
60	—		EGE2060FFG		EGE3060FFG		—		EGE4060FFG		—	
63	—		EGE2063FFG		EGE3063FFG		EGE3063AFG		EGE4063FFG		EGE4063AFG	
70	—		EGE2070FFG		EGE3070FFG		—		EGE4070FFG		—	
80	—		EGE2080FFG		EGE3080FFG		EGE3080AFG		EGE4080FFG		EGE4080AFG	
90	—		EGE2090FFG		EGE3090FFG		—		EGE4090FFG		—	
100	—		EGE2100FFG		EGE3100FFG		EGE3100AFG		EGE4100FFG		EGE4100AFG	
125	—		EGE2125FFG		EGE3125FFG		EGE3125AFG		EGE4125FFG		EGE4125AFG	
40/35												
15	EGS1015FFG		EGS2015FFG		EGS3015FFG		—		EGS4015FFG		—	
16	EGS1016FFG		EGS2016FFG		EGS3016FFG		—		EGS4016FFG		—	
20	EGS1020FFG		EGS2020FFG		EGS3020FFG		—		EGS4020FFG		EGS4020AFG	
25	EGS1025FFG		EGS2025FFG		EGS3025FFG		EGS3025AFG		EGS4025FFG		EGS4025AFG	
30	EGS1030FFG		EGS2030FFG		EGS3030FFG		—		EGS4030FFG		—	
32	EGS1032FFG		EGS2032FFG		EGS3032FFG		EGS3032AFG		EGS4032FFG		EGS4032AFG	
35	EGS1035FFG		EGS2035FFG		EGS3035FFG		—		EGS4035FFG		—	
40	EGS1040FFG		EGS2040FFG		EGS3040FFG		EGS3040AFG		EGS4040FFG		EGS4040AFG	
45	EGS1045FFG		EGS2045FFG		EGS3045FFG		—		EGS4045FFG		—	
50	EGS1050FFG		EGS2050FFG		EGS3050FFG		EGS3050AFG		EGS7050FFG		EGS4050AFG	
60	EGS1060FFG		EGS2060FFG		EGS3060FFG		—		EGS7060FFG		—	
63	EGS1063FFG		EGS2063FFG		EGS3063FFG		EGS3063AFG		EGS7063FFG		EGS4063AFG	
70	EGS1070FFG		EGS2070FFG		EGS3070FFG		—		EGS7070FFG		—	
80	EGS1080FFG		EGS2080FFG		EGS3080FFG		EGS3080AFG		EGS7080FFG		EGS4080AFG	
90	EGS1090FFG		EGS2090FFG		EGS3090FFG		—		EGS7090FFG		—	
100	EGS1100FFG		EGS2100FFG		EGS3100FFG		EGS3100AFG		EGS7100FFG		EGS4100AFG	
125	EGS1125FFG		EGS2125FFG		EGS3125FFG		EGS3125AFG		EGS7125FFG		EGS4125AFG	

① 16, 32, 63 A are not UL listed ratings.
② Adjustable thermal are not UL listed.
③ Change the fourth digit to **7** for 100% neutral protection. Neutral is on the LH side.

Table 12-10. Complete Breaker (Includes Frame, Trip Unit, Standard Terminals and Mounting Hardware) — IC Rating at 415/480 Volts (Continued)

Max. Cont. Amps at 40°C ①	1-Pole Fixed Thermal Fixed Magnetic	Price U.S. $	2-Pole Fixed Thermal Fixed Magnetic	Price U.S. $	3-Pole Fixed Thermal Fixed Magnetic	Price U.S. $	3-Pole Adjustable ② Thermal Fixed Magnetic	Price U.S. $	4-Pole 0% Protected Neutral ③ Fixed Thermal Fixed Magnetic	Price U.S. $	4-Pole 0% Protected Neutral ③ Adjustable Thermal Fixed Magnetic	Price U.S. $
70/65												
15	EGH1015FFG		EGH2015FFG		EGH3015FFG		—		EGH4015FFG		—	
16	EGH1016FFG		EGH2016FFG		EGH3016FFG		—		EGH4016FFG		—	
20	EGH1020FFG		EGH2020FFG		EGH3020FFG		EGH3020AFG		EGH4020FFG		EGH4020AFG	
25	EGH1025FFG		EGH2025FFG		EGH3025FFG		EGH3025AFG		EGH4025FFG		EGH4025AFG	
30	EGH1030FFG		EGH2030FFG		EGH3030FFG		—		EGH4030FFG		—	
32	EGH1032FFG		EGH2032FFG		EGH3032FFG		EGH3032AFG		EGH4032FFG		EGH4032AFG	
35	EGH1035FFG		EGH2035FFG		EGH3035FFG		—		EGH4035FFG		—	
40	EGH1040FFG		EGH2040FFG		EGH3040FFG		EGH3040AFG		EGH4040FFG		EGH4040AFG	
45	EGH1045FFG		EGH2045FFG		EGH3045FFG		—		EGH4045FFG		EGH4050AFG	
50	EGH1050FFG		EGH2050FFG		EGH3050FFG		EGH3050AFG		EGH4050FFG		—	
60	EGH1060FFG		EGH2060FFG		EGH3060FFG		—		EGH4060FFG		—	
63	EGH1063FFG		EGH2063FFG		EGH3063FFG		EGH3063AFG		EGH4063FFG		EGH4063AFG	
70	EGH1070FFG		EGH2070FFG		EGH3070FFG		—		EGH4070FFG		—	
80	EGH1080FFG		EGH2080FFG		EGH3080FFG		EGH3080AFG		EGH4080FFG		EGH4080AFG	
90	EGH1090FFG		EGH2090FFG		EGH3090FFG		—		EGH4090FFG		—	
100	EGH1100FFG		EGH2100FFG		EGH3100FFG		EGH3100AFG		EGH4100FFG		EGH4100AFG	
125	EGH1125FFG		EGH2125FFG		EGH3125FFG		EGH3125AFG		EGH4125FFG		EGH4125AFG	
100/100												
15	—		—		EGC3015FFG		—		EGC7015FFG		—	
16	—		—		EGC3016FFG		—		EGC7016FFG		—	
20	—		—		EGC3020FFG		EGC3020AFG		EGC7020FFG		EGC7020AFG	
25	—		—		EGC3025FFG		EGC3025AFG		EGC7025FFG		EGC7025AFG	
30	—		—		EGC3030FFG		—		EGC7030FFG		—	
32	—		—		EGC3032FFG		EGC3032AFG		EGC7032FFG		EGC7032AFG	
35	—		—		EGC3035FFG		—		EGC7035FFG		—	
40	—		—		EGC3040FFG		EGC3040AFG		EGC7040FFG		EGC7040AFG	
45	—		—		EGC3045FFG		—		EGC7045FFG		—	
50	—		—		EGC3050FFG		EGC3050AFG		EGC7050FFG		EGC7050AFG	
60	—		—		EGC3060FFG		—		EGC7060FFG		—	
63	—		—		EGC3063FFG		EGC3063AFG		EGC7063FFG		EGC7063AFG	
70	—		—		EGC3070FFG		—		EGC7070FFG		—	
80	—		—		EGC3080FFG		EGC3080AFG		EGC7080FFG		EGC7080AFG	
90	—		—		EGC3090FFG		—		EGC7090FFG		—	
100	—		—		EGC3100FFG		EGC3100AFG		EGC7100FFG		EGC7100AFG	
125	—		—		EGC3125FFG		EGC3125AFG		EGC7125FFG		EGC7125AFG	

① 16, 32, 63 A are not UL listed ratings.
② Adjustable thermal is not UL listed.
③ Change the fourth digit to 7 for 100% neutral protection. Neutral is on LH side.

Table 12-11. Molded Case Switches

Catalog Number	Price U.S. $
EGK3125KSG EGK7125KSG	

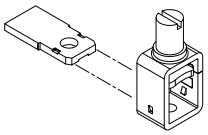
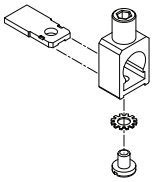
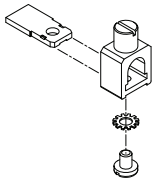
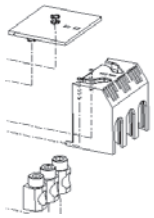
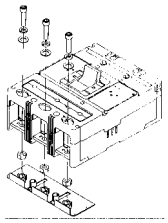
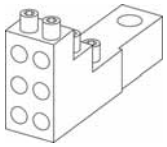
Note: Molded case switches may open above 1250 A.

Table 12-12. EG Bolt-On Complete Breaker (Includes Frame, Trip Unit and Mounting Hardware)

Max. Cont. Amps	1-Pole		2-Pole		3-Pole	
	Fixed Thermal Fixed Magnetic	Price U.S. $	Fixed Thermal Fixed Magnetic	Price U.S. $	Fixed Thermal Fixed Magnetic	Price U.S. $
18 kAIC at 480 Vac						
15	EGB1015FFB		EGB2015FFB		EGB3015FFB	
20	EGB1020FFB		EGB2020FFB		EGB3020FFB	
25	EGB1025FFB		EGB2025FFB		EGB3025FFB	
30	EGB1030FFB		EGB2030FFB		EGB3030FFB	
35	EGB1035FFB		EGB2035FFB		EGB3035FFB	
40	EGB1040FFB		EGB2040FFB		EGB3040FFB	
45	EGB1045FFB		EGB2045FFB		EGB3045FFB	
50	EGB1050FFB		EGB2050FFB		EGB3050FFB	
60	EGB1060FFB		EGB2060FFB		EGB3060FFB	
63	EGB1070FFB		EGB2070FFB		EGB3070FFB	
70	EGB1080FFB		EGB2080FFB		EGB3080FFB	
80	EGB1090FFB		EGB2090FFB		EGB3090FFB	
90	EGB1100FFB		EGB2100FFB		EGB3100FFB	
100	EGB1110FFB		EGB2110FFB		EGB3110FFB	
125	EGB1125FFB		EGB2125FFB		EGB3125FFB	
35 kAIC at 480 Vac						
15	EGS1015FFB		EGS2015FFB		EGS3015FFB	
20	EGS1020FFB		EGS2020FFB		EGS3020FFB	
25	EGS1025FFB		EGS2025FFB		EGS3025FFB	
30	EGS1030FFB		EGS2030FFB		EGS3030FFB	
35	EGS1035FFB		EGS2035FFB		EGS3035FFB	
40	EGS1040FFB		EGS2040FFB		EGS3040FFB	
45	EGS1045FFB		EGS2045FFB		EGS3045FFB	
50	EGS1050FFB		EGS2050FFB		EGS3050FFB	
60	EGS1060FFB		EGS2060FFB		EGS3060FFB	
63	EGS1070FFB		EGS2070FFB		EGS3070FFB	
70	EGS1080FFB		EGS2080FFB		EGS3080FFB	
80	EGS1090FFB		EGS2090FFB		EGS3090FFB	
90	EGS1100FFB		EGS2100FFB		EGS3100FFB	
100	EGS1110FFB		EGS2110FFB		EGS3110FFB	
125	EGS1125FFB		EGS2125FFB		EGS3125FFB	
65 kAIC at 480 Vac						
15	EGH1015FFB		EGH2015FFB		EGH3015FFB	
20	EGH1020FFB		EGH2020FFB		EGH3020FFB	
25	EGH1025FFB		EGH2025FFB		EGH3025FFB	
30	EGH1030FFB		EGH2030FFB		EGH3030FFB	
35	EGH1035FFB		EGH2035FFB		EGH3035FFB	
40	EGH1040FFB		EGH2040FFB		EGH3040FFB	
45	EGH1045FFB		EGH2045FFB		EGH3045FFB	
50	EGH1050FFB		EGH2050FFB		EGH3050FFB	
60	EGH1060FFB		EGH2060FFB		EGH3060FFB	
63	EGH1070FFB		EGH2070FFB		EGH3070FFB	
70	EGH1080FFB		EGH2080FFB		EGH3080FFB	
80	EGH1090FFB		EGH2090FFB		EGH3090FFB	
90	EGH1100FFB		EGH2100FFB		EGH3100FFB	
100	EGH1110FFB		EGH2110FFB		EGH3110FFB	
125	EGH1125FFB		EGH2125FFB		EGH3125FFB	

Discount Symbol **CB-2**

Selection Guide and Ordering Information

						
3T125EF	**3TA125EF**	**3TA150EF**	**3TA160EFK**	**EF2RTWK, 2-Pole – Metric** **EF3RTWK, 3-Pole – Metric** **EF4RTWK, 4-Pole – Metric** **EF2RTDK, 2-Pole – Imperial** **EF3RTDK, 3-Pole – Imperial** **EF4RTDK, 4-Pole – Imperial**	**Control Wire Terminal Kit GCWTK**	**Multiwire Connectors**

Line and Load Terminals

EG-Frame circuit breakers and molded case switches have line and load terminals as standard equipment.

Table 12-13. Line and Load Terminals

Max. Breaker Amps	Terminal Body Material	Wire Type	Metric Wire Range mm^2	AWG Wire Range	Catalog Number Package of 3 Terminals	Price U.S. $
Standard Cu/Al Pressure Type Terminals						
125	Steel	Cu	2.5-95	#14-3/0	**3T125EF** ①	
125 125/160	Aluminum Aluminum	Cu/Al Cu/Al	2.5-50 16-95	#14-1/0 #6-3/0	**3TA125EF** **3TA150EF**	
160 160	Aluminum Aluminum	Cu/Al Cu/Al	35-120 35-120	#3-250 #3-250	**3TA160EFK** **4TA160EFK**	

① Standard line and load terminals.

Insert collar enclosing conductor as shown. Locate nut on top of conductor and tighten securely with screw and washer.

Caution: Collar must surround conductor.

Insert collar enclosing conductor and center on extrusion. Tighten securely with screw and washer. Endcap kits are used on the E-Frame breaker line side to connect bus bar or similar electrical connections. Includes hardware.

Control Wire Terminal Kit

For use with steel or stainless steel standard line and load terminals only.

Table 12-14. Control Wire Terminal Kit

Package of 12 — Priced Individually	Catalog Number	Price U.S. $
Control Wire Terminal Kit	**5652B38G01**	

Interphase Barriers

The interphase barrier is available for extended insulation between circuit breaker poles. Specify quantity when ordering.

Table 12-15. Interphase Barriers

Package of 2 — Priced Individually	Catalog Number	Price U.S. $
Interphase Barriers	**EIPBK**	

Base Mounting Hardware

Metric base mounting hardware is included with a circuit breaker or molded case switch. (Included with breaker.)

Note: English mounting hardware kit can be supplied separate. Catalog number is **BMHE** #6 – 32 x 3 inches.

Table 12-16. DIN Rail Mounting

DIN Rail Adapter	Catalog Number	Price U.S. $
3- or 4-Pole	**EF34DIN**	

Multiwire Connectors

Field-installed multiwire connectors for the load side (OFF) end terminals. They are used to distribute the load from the circuit breaker to multiple devices without the use of separate distribution terminal blocks.

Multiwire lug kits include mounting hardware, terminal shield insulators and tin-plated aluminum connectors to replace three mechanical load lugs. UL listed as used on the load side (OFF) end.

Table 12-17. EG-Frame Multiwire Connectors Ordering Information (Package of 3)

Max. Amps	Wires per Terminal	Wire Size Range AWG Cu	Kit Catalog Number	Price U.S. $
125 125	3 6	14 – 2 14 – 6	**3TA125E3K** **3TA125E6K**	

Terminal Shields

The terminal shield is available for line terminal areas in 3- and 4-pole circuit breakers. Special terminal shields are also available for use when an electrical (solenoid) operator is mounted on the circuit breaker. The standard style number by pole for each terminal shield is for a package of 10 and is priced per each package. Special terminal shields are packaged individually.

Table 12-18. Terminal Shields

Number of Poles	IP30 Protection Catalog Numbers	Price U.S. $
3 4	**EFTS3K** **EFTS4K**	

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Terminal End Covers (Gas Barrier)

The terminal end cover is available for 3-pole circuit breakers only. Two conductor opening sizes are available. Specify quantity (one per circuit breaker) when ordering.

Table 12-19. Terminal End Covers

Conductor Opening Diameter – Inches (mm)	Catalog Number	Price U.S. $
6.35 (0.25) 10.41 (0.41)	EEC3K EEC4K	

Allowable Accessory Combinations

Different combinations of accessories can be supplied, depending on the types of accessories and the number of poles in the circuit breaker.

Table 12-20. Accessories

Description	Reference Page	1-Pole	2-Pole		3-Pole			4-Pole			
		Center	Left	Right	Left	Center	Right	Left	Center	Right	Neutral
Internal Accessories (Only one internal accessory per pole)											
Alarm Lockout (Make/Break)	12-65			■			■			■	
Alarm Lockout (2Make/2Break)	12-65			■			■			■	
Auxiliary Switch (1A, 1B)	12-65			■			■			■	
Auxiliary Switch (2A, 2B)	12-65			■			■			■	
Auxiliary Switch and Alarm Switch Combination	12-65			■			■			■	
Shunt Trip — Standard	12-65				■			■			
Undervoltage Release Mechanism	12-65				■			■			
External Accessories											
End Cap Kit	12-19		●		●			●			
Control Wire Terminal Kit	12-19	●	●		●			●			
Multiwire Connectors	12-19	●	●		●			●			
Base Mounting Hardware	12-19	●	●		●			●			
Terminal Shields	12-19	●	●		●			●			
Terminal End Covers	12-20				●						
Interphase Barriers	12-19		●		●			●			
Non-Padlockable Handle Block	12-64	■	■			■			■		
Snap-On Padlockable Handle Lock Hasp	12-64	■	■			■			■		
Padlockable Handle Lock Hasp	12-64			■	❑		❑	❑		❑	
Walking Beam Interlock — Requires Two Breakers	12-64				●			●			
Plug-in Adapters	12-66		●		●			●			
Electrical Operator	12-64				●						
Handle Mechanisms	12-67				●						
Modifications (Refer to Eaton)											
Moisture Fungus Treatment	12-73	●	●		●			●			
Freeze-Tested Circuit Breakers	—	●	●		●			●			
Marine Application	—	●	●		●			●			

■ Applicable in indicated pole position

❑ May be mounted on left or right pole — not both

● Accessory available/Modification available

JG-Frame

Eaton's Cutler-Hammer J250

Product Description

- JG breaker is HACR rated.

Technical Data and Specifications

Table 12-21. UL 489/IEC 60947-2 Interrupting Capacity Ratings

Circuit Breaker Type	Number of Poles	Interrupting Capacity (kA Symmetrical Amperes)								
		Volts ac (50/60 Hz)								Volts dc ①
		220 – 240		380 – 415		480	600	690		250 ②③
		I_{cu}	I_{cs}	I_{cu}	I_{cs}			I_{cu}	I_{cs}	
JGE250	2, 3, 4	65	65	25	25	25	18	12	6	10
JGS250	2, 3, 4	85	85	40	40	35	18	12	6	22
JGH250	2, 3, 4	100	100	70	70	65	25	14	7	22
JGC250	3, 4	200	200	100	100	100	35	16	12	42
JGU250	3, 4	200	200	150	150	150	50	18	14	50
JGX250	3, 4	200	200	200	200	200	50	18	14	50

① dc ratings apply to substantially non-inductive circuits.
② 2-pole circuit breaker, or two poles of 3-pole circuit breaker.
③ Time constant is 3 milliseconds minimum at 10 kA and 8 milliseconds minimum at 22 kA.

Dimensions/Weights

Table 12-22. Dimensions in Inches (mm)

Number of Poles	Width	Height	Depth
2/3	4.13 (104.9)	7.00 (177.8)	3.57 (90.7)
4	5.34 (135.6)	7.00 (177.8)	3.57 (90.7)

Table 12-23. Approximate Shipping Weight in Lbs. (kg)

Breaker Type	Number of Poles	
	2/3	4
JGE, JGS, JGH, JGC, JGU, JGX	6 (2.7)	8 (3.6)

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Product Selection

Table 12-24. Main Catalog Numbering System

J G S 3 250 FA G C

Frame
J

Standard/Application
G = IEC/CE/UL/CSA

Poles
2 = Two
3 = Three
4 = Four — Neutral 0% Protected
8 = Four — Neutral 0 – 60% Protected
9 = Four — Neutral 0 – 100 Protected

Amperes
050
070
080
090
100
125
150
160
175
200
225
250

Trip Unit
AA = Adj. Adj.
FA = Fixed Adj.
KS = Molded Case Switch
33 = 310+ Electronic LS
32 = 310+ Electronic LSI
35 = 310+ Electronic LSG
36 = 310+ Electronic LSIG
NN = Frame Only (No Trip)

Performance				
	600	**480**	**415**	**240**
E	18	25	25	65
S	18	35	40	85
H	25	65	70	100
C	35	100	100	200
U	50	150	150	200
X	50	200	200	200
K	Molded Case Switch			

Terminations/Hardware	
Terminals	**Mounting Hardware**
M = Metric End Caps	Metric
E = Imperial End Caps	Imperial
G = Line/Load Standard	Metric

Rating
Blank = 80% Rated
C = 100% Rated ①

① 100% rating only available on breakers with electronic trip unit.

Table 12-25. Trip Unit Catalog Numbering System

JT 4 100 FA

Trip
JT

Poles
2 = Two
3 = Three
4 = Four — Neutral 0% Protected
8 = Four — Neutral 0/60% Protected
9 = Four — Neutral 0/100% Protected

Amperes	
T/M	**ETU**
080	**050**
090	**100**
100	**160**
110	**250**
125	
150	
160	
175	
200	
225	
250	

Trip Unit
AA = Adj. Adj.
FA = Fixed Adj.
KS = Molded Case Switch
33 = 310+ Electronic LS
32 = 310+ Electronic LSI
35 = 310+ Electronic LSG
36 = 310+ Electronic LSIG

Product Selection

Table 12-26. Complete Breaker (Includes Frame, Trip Unit, Standard Terminals and Mounting Hardware) — IC Rating at 415/480 Volts

Maximum Continuous Amperes	Magnetic Range	2-Pole		3-Pole				4-Pole 0% ①			
		Fixed Thermal Adjustable Magnetic		Fixed Thermal Adjustable Magnetic		Adjustable Thermal Adjustable Magnetic ②		Fixed Thermal Adjustable Magnetic		Adjustable Thermal Adjustable Magnetic ②	
		Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
IEC/CE/UL/CSA 25/25											
70	350 – 700	JGE2070FAG		JGE3070FAG		—		JGE4070FAG		—	
90	450 – 900	JGE2090FAG		JGE3090FAG		—		JGE4090FAG		—	
100	500 – 1000	JGE2100FAG		JGE3100FAG		JGE3100AAG		JGE4100FAG		JGE4100AAG	
125	625 – 1250	JGE2125FAG		JGE3125FAG		JGE3125AAG		JGE4125FAG		JGE4125AAG	
150	750 – 1550	JGE2150FAG		JGE3150FAG		—		JGE4150FAG		—	
160	800 – 1600	—		—		JGE3160AAG		—		JGE4160AAG	
175	875 – 1750	JGE2175FAG		JGE3175FAG		—		JGE4175FAG		—	
200	1000 – 2000	JGE2200FAG		JGE3200FAG		JGE3200AAG		JGE4200FAG		JGE4200AAG	
225	1125 – 2250	JGE2225FAG		JGE3225FAG		—		JGE4225FAG		—	
250	1250 – 2500	JGE2250FAG		JGE3250FAG		JGE3250AAG		JGE4250FAG		JGE4250AAG	
IEC/CE/UL/CSA 40/35											
70	350 – 700	JGS2070FAG		JGS3070FAG		—		JGS4070FAG		—	
90	450 – 900	JGS2090FAG		JGS3090FAG		—		JGS4090FAG		—	
100	500 – 1000	JGS2100FAG		JGS3100FAG		JGS3100AAG		JGS4100FAG		JGS4100AAG	
125	625 – 1250	JGS2125FAG		JGS3125FAG		JGS3125AAG		JGS4125FAG		JGS4125AAG	
150	750 – 1550	JGS2150FAG		JGS3150FAG		—		JGS4150FAG		—	
160	800 – 1600	—		—		JGS3160AAG		—		JGS4160AAG	
175	875 – 1750	JGS2175FAG		JGS3175FAG		—		JGS4175FAG		—	
200	1000 – 2000	JGS2200FAG		JGS3200FAG		JGS3200AAG		JGS4200FAG		JGS4200AAG	
225	1125 – 2250	JGS2225FAG		JGS3225FAG		—		JGS4225FAG		—	
250	1250 – 2500	JGS2250FAG		JGS3250FAG		JGS3250AAG		JGS4250FAG		JGS4250AAG	
IEC/CE/UL/CSA 70/65											
70	350 – 700	JGH2070FAG		JGH3070FAG		—		JGH4070FAG		—	
90	450 – 900	JGH2090FAG		JGH3090FAG		—		JGH4090FAG		—	
100	500 – 1000	JGH2100FAG		JGH3100FAG		JGH3100AAG		JGH4100FAG		JGH4100AAG	
125	625 – 1250	JGH2125FAG		JGH3125FAG		JGH3125AAG		JGH4125FAG		JGH4125AAG	
150	750 – 1550	JGH2150FAG		JGH3150FAG		—		JGH4150FAG		—	
160	800 – 1600	—		—		JGH3160AAG		—		JGH4160AAG	
175	875 – 1750	JGH2175FAG		JGH3175FAG		—		JGH4175FAG		—	
200	1000 – 2000	JGH2200FAG		JGH3200FAG		JGH3200AAG		JGH4200FAG		JGH4200AAG	
225	1125 – 2250	JGH2225FAG		JGH3225FAG		—		JGH4225FAG		—	
250	1250 – 2500	JGH2250FAG		JGH3250FAG		JGH3250AAG		JGH4250FAG		JGH4250AAG	
IEC/CE/UL/CSA 100/100											
70	350 – 700	—		JGC3070FAG		—		JGC4070FAG		—	
80	400 – 800	—		—		JGC3080AAG		—		JGC4080AAG	
90	450 – 900	—		JGC3090FAG		—		JGC4090FAG		—	
100	500 – 1000	—		JGC3100FAG		JGC3100AAG		JGC4100FAG		JGC4100AAG	
125	625 – 1250	—		JGC3125FAG		JGC3125AAG		JGC4125FAG		JGC4125AAG	
150	750 – 1550	—		JGC3150FAG		—		JGC4150FAG		—	
160	800 – 1600	—		—		JGC3160AAG		—		JGC4160AAG	
175	875 – 1750	—		JGC3175FAG		—		JGC4175FAG		—	
200	1000 – 2000	—		JGC3200FAG		JGC3200AAG		JGC4200FAG		JGC4200AAG	
225	1125 – 2250	—		JGC3225FAG		—		JGC4225FAG		—	
250	1250 – 2500	—		JGC3250FAG		JGC3250AAG		JGC4250FAG		JGC4250AAG	
IEC/CE/UL/CSA 150/150											
70	350 – 700	—		JGU3070FAG		—		JGU4070FAG		—	
80	400 – 800	—		—		JGU3080AAG		—		JGU4080AAG	
90	450 – 900	—		JGU3090FAG		—		JGU4090FAG		—	
100	500 – 1000	—		JGU3100FAG		JGU3100AAG		JGU4100FAG		JGU4100AAG	
125	625 – 1250	—		JGU3125FAG		JGU3125AAG		JGU4125FAG		JGU4125AAG	
150	750 – 1550	—		JGU3150FAG		—		JGU4150FAG		—	
160	800 – 1600	—		—		JGU3160AAG		—		JGU4160AAG	
175	875 – 1750	—		JGU3175FAG		—		JGU4175FAG		—	
200	1000 – 2000	—		JGU3200FAG		JGU3200AAG		JGU4200FAG		JGU4200AAG	
225	1125 – 2250	—		JGU3225FAG		—		JGU4225FAG		—	
250	1250 – 2500	—		JGU3250FAG		JGU3250AAG		JGU4250FAG		JGU4250AAG	
IEC/CE/UL/CSA 200/200											
70	350 – 700	—		JGX3070FAG		—		JGX4070FAG		—	
80	400 – 800	—		—		JGX3080AAG		—		JGX4080AAG	
90	450 – 900	—		JGX3090FAG		—		JGX4090FAG		—	
100	500 – 1000	—		JGX3100FAG		JGX3100AAG		JGX4100FAG		JGX4100AAG	
125	625 – 1250	—		JGX3125FAG		JGX3125AAG		JGX4125FAG		JGX4125AAG	
150	750 – 1550	—		JGX3150FAG		—		JGX4150FAG		—	
160	800 – 1600	—		—		JGX3160AAG		—		JGX4160AAG	
175	875 – 1750	—		JGX3175FAG		—		JGX4175FAG		—	
200	1000 – 2000	—		JGX3200FAG		JGX3200AAG		JGX4200FAG		JGX4200AAG	
225	1125 – 2250	—		JGX3225FAG		—		JGX4225FAG		—	
250	1250 – 2500	—		JGX3250FAG		JGX3250AAG		JGX4250FAG		JGX4250AAG	

① Change the fourth digit to **8** for adjustable 0 – 60% neutral protection, **9** for 0 – 100% neutral protection. Neutral is on LH side.
② IEC-EN 60947-2 only. Adjustment is .8 and 1.0.

Discount Symbol **CB-2**

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Product Selection

Table 12-27. Thermal-Magnetic Trip Unit

Ampere Rating	Range	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Range	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
70	350 – 700	**JT2070FA**		**JT3070FA**		**—**		—	**JT4070FA**		**—**	
80	400 – 800	**—**		**—**		**JT3080AA** ①		64 – 100	**—**		**JT4080AA** ①	
90	450 – 900	**JT2090FA**		**JT3090FA**		**—**		—	**JT4090FA**		**—**	
100	500 – 1000	**JT2100FA**		**JT3100FA**		**JT3100AA** ①		80 – 100	**JT4100FA**		**JT4100AA** ①	
125	625 – 1250	**JT2125FA**		**JT3125FA**		**JT3125AA** ①		100 – 125	**JT4125FA**		**JT4125AA** ①	
150	750 – 1500	**JT2150FA**		**JT3150FA**		**—**		—	**JT4150FA**		**—**	
160	800 – 1600	**—**		**—**		**JT3160AA** ①		128 – 160	**—**		**JT4160AA** ①	
175	875 – 1750	**JT2175FA**		**JT3175FA**		**—**		—	**JT4175FA**		**—**	
200	1000 – 2000	**JT2200FA**		**JT3200FA**		**JT3200AA** ①		160 – 200	**JT4200FA**		**JT4200AA** ①	
225	1125 – 2250	**JT2225FA**		**JT3225FA**		**—**		—	**JT4225FA**		**—**	
250	1250 – 2500	**JT2250FA**		**JT3250FA**		**JT3250AA** ①		200 – 250	**JT4250FA**		**JT4250AA** ①	

① Adjustable thermal trip units are typically used in IEC markets and are not UL or CSA listed.

Table 12-28. Molded Case Switches

Catalog Number	Price U.S. $
JGK3250KSK **JGK7250KSG**	

Note: Molded case switches will trip above 2500 amperes.

Table 12-29. Components — Line and Load Terminal

Maximum Breaker Amperes	Terminal Body Material	Wire Type	AWG Wire Range No. Conductors	Metric Wire Range mm^2	Catalog Number	Price U.S. $
Standard Cu/Al Pressure Terminals						
250	Aluminum	Cu/Al	4 – 350 kcmil	25 – 185	**TA250FJ**	
250	Stainless Steel	Cu	4 – 350 kcmil	25 – 185	**T250FJ** ②	

② Standard line and load terminals.

Product Selection

Table 12-30. Components — Frame — IC Rating at 415/480 Volts

Maximum Amperes	2-Pole		3-Pole		4-Pole 0%	
	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
25/25						
250	**JGE2250NN**		**JGE3250NN**		**JGE4250NN**	
40/35						
250	**JGS2250NN**		**JGS3250NN**		**JGS4250NN**	
70/65						
250	**JGH2250NN**		**JGH3250NN**		**JGH4250NN**	
100/100						
250	**—**		**JGC3250NN**		**JGC4250NN**	
150/150						
250	**—**		**JGU3250NN**		**JGU4250NN**	
200/200						
250	**—**		**JGX3250NN**		**JGX4250NN**	
25/25 ①						
250	**—**		**JGE3250NNC**		**—**	
40/35 ①						
250	**—**		**JGS3250NNC**		**—**	
70/65 ①						
250	**—**		**JGH3250NNC**		**—**	

① Components — 100% rated frame. To be used with electronic trip units only.

Table 12-31. Plug-in Test Kit

Voltage Rating	Catalog Number	Price U.S. $
120 Vac 230 Vac	**MTST120V** **MTST230V**	

Table 12-32. Breaker Mount Ammeter

Description	Catalog Number	Price U.S. $
Breaker Mount Ammeter	**DIGIVIEW**	

Note: Use on electronic trip only.

Table 12-33. JG Electronic Trip Units

Ampere Rating	LS	Price U.S. $	LSI	Price U.S. $	LSG	Price U.S. $	LSIG	Price U.S. $	Neutral CT for LSG & LSIG ②	Price U.S. $
3-Pole										
50	**JT305033**		**JT305032**		**JT305035**		**JT305036**		**JGFCT050**	
100	**JT310033**		**JT310032**		**JT310035**		**JT310036**		**JGFCT100**	
160	**JT316033**		**JT316032**		**JT316035**		**JT316036**		**JGFCT160**	
250	**JT325033**		**JT325032**		**JT325035**		**JT325036**		**JGFCT250**	
4-Pole ③										
50	**JT405033**		**JT405032**		**JT405035**		**JT405036**		**—**	
100	**JT410033**		**JT410032**		**JT410035**		**JT410036**		**—**	
160	**JT416033**		**JT416032**		**JT416035**		**JT416036**		**—**	
250	**JT425033**		**JT425032**		**JT425035**		**JT425036**		**—**	

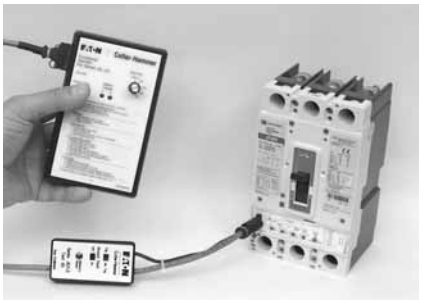
② For use on a 3-pole breaker used in a 4-wire system if ground fault protection for the neutral is required.

③ Neutral protection 4 = 0%, 6 = 60%, 7 = 100% electronic trip unit neutral protection is not adjustable.

Note: Long time pickup — no rating plug.
250 Ampere Settings — 250, 225, 200, 175, 160, 150, 125, 100.
160 Ampere Settings — 160, 150, 125, 110, 100, 90, 80, 63.
100 Ampere Settings — 100, 90, 80, 70, 63, 50, 45, 40.
50 Ampere Settings — 50, 45, 40, 32, 30, 25, 20.

Note: Adjustable long time delay — 2 – 24 seconds at 6 x Ir.
Adjustable short time delay — Inst., 120, 300 ms

Digitrip 310+ Test Kit



Digitrip 310+ Test Kit Shown with JG MCCB

JG Digitrip 310+ Electronic Trip Unit

Ammeter

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Discount Symbol **CB-2**

Table 12-34. Complete Breaker with Electronic Trip Units

Ampere Rating	LS	Price U.S. $	LSI	Price U.S. $	LSG	Price U.S. $	LSIG	Price U.S. $	Neutral CT for LSG & LSIG ①	Price U.S. $
IEC/UL/CSA 25/25 — 3-Pole										
50	JGE305033G		JGE305032G		JGE305035G		JGE305036G		JGFCT050	
100	JGE310033G		JGE310032G		JGE310035G		JGE310036G		JGFCT100	
160	JGE316033G		JGE316032G		JGE316035G		JGE316036G		JGFCT160	
250	JGE325033G		JGE325032G		JGE325035G		JGE325036G		JGFCT250	
IEC/UL/CSA 25/25 — 4-Pole ②										
50	JGE405033G		JGE405032G		JGE405035G		JGE405036G		—	
100	JGE410033G		JGE410032G		JGE410035G		JGE410036G		—	
160	JGE416033G		JGE416032G		JGE416035G		JGE416036G		—	
250	JGE425033G		JGE425032G		JGE425035G		JGE425036G		—	
IEC/UL/CSA 40/35 — 3-Pole										
50	JGS305033G		JGS305032G		JGS305035G		JGS305036G		JGFCT050	
100	JGS310033G		JGS310032G		JGS310035G		JGS310036G		JGFCT100	
160	JGS316033G		JGS316032G		JGS316035G		JGS316036G		JGFCT160	
250	JGS325033G		JGS325032G		JGS325035G		JGS325036G		JGFCT250	
IEC/UL/CSA 40/35 — 4-Pole ②										
50	JGS405033G		JGS405032G		JGS405035G		JGS405036G		—	
100	JGS410033G		JGS410032G		JGS410035G		JGS410036G		—	
160	JGS416033G		JGS416032G		JGS416035G		JGS416036G		—	
250	JGS425033G		JGS425032G		JGS425035G		JGS425036G		—	
IEC/UL/CSA 70/65 — 3-Pole										
50	JGH305033G		JGH305032G		JGH305035G		JGH305036G		JGFCT050	
100	JGH310033G		JGH310032G		JGH310035G		JGH310036G		JGFCT100	
160	JGH316033G		JGH316032G		JGH316035G		JGH316036G		JGFCT160	
250	JGH325033G		JGH325032G		JGH325035G		JGH325036G		JGFCT250	
IEC/UL/CSA 70/65 — 4-Pole ②										
50	JGH405033G		JGH405032G		JGH405035G		JGH405036G		—	
100	JGH410033G		JGH410032G		JGH410035G		JGH410036G		—	
160	JGH416033G		JGH416032G		JGH416035G		JGH416036G		—	
250	JGH425033G		JGH425032G		JGH425035G		JGH425036G		—	
IEC/UL/CSA 100/100 — 3-Pole										
50	JGC305033G		JGC305032G		JGC305035G		JGC305036G		JGFCT050	
100	JGC310033G		JGC310032G		JGC310035G		JGC310036G		JGFCT100	
160	JGC316033G		JGC316032G		JGC316035G		JGC316036G		JGFCT160	
250	JGC335033G		JGC325032G		JGC325035G		JGC325036G		JGFCT250	
IEC/UL/CSA 100/100 — 4-Pole ②										
50	JGC405033G		JGC405032G		JGC405035G		JGC405036G		—	
100	JGC410033G		JGC410032G		JGC410035G		JGC410036G		—	
160	JGC416033G		JGC416032G		JGC416035G		JGC416036G		—	
250	JGC435033G		JGC425032G		JGC425035G		JGC425036G		—	
IEC/UL/CSA 150/150 — 3-Pole										
50	JGU305033G		JGU305032G		JGU305035G		JGU305036G		JGFCT050	
100	JGU310033G		JGU310032G		JGU310035G		JGU310036G		JGFCT100	
160	JGU316033G		JGU316032G		JGU316035G		JGU316036G		JGFCT160	
250	JGU335033G		JGU325032G		JGU325035G		JGU325036G		JGFCT250	
IEC/UL/CSA 150/150 — 4-Pole ②										
50	JGU405033G		JGU405032G		JGU405035G		JGU405036G		—	
100	JGU410033G		JGU410032G		JGU410035G		JGU410036G		—	
160	JGU416033G		JGU416032G		JGU416035G		JGU416036G		—	
250	JGU435033G		JGU425032G		JGU425035G		JGU425036G		—	
IEC/UL/CSA 200/200 — 3-Pole										
50	JGX305033G		JGX305032G		JGX305035G		JGX305036G		JGFCT050	
100	JGX310033G		JGX310032G		JGX310035G		JGX310036G		JGFCT100	
160	JGX316033G		JGX316032G		JGX316035G		JGX316036G		JGFCT160	
250	JGX325033G		JGX325032G		JGX325035G		JGX325036G		JGFCT250	
IEC/UL/CSA 200/200 — 4-Pole ②										
50	JGX405033G		JGX405032G		JGX405035G		JGX405036G		—	
100	JGX410033G		JGX410032G		JGX410035G		JGX410036G		—	
160	JGX416033G		JGX416032G		JGX416035G		JGX416036G		—	
250	JGX425033G		JGX425032G		JGX425035G		JGX425036G		—	

① Required for 4-wire systems if neutral protection is required.

② Neutral protection 4 = 0%, 6 = 60%, 7 = 100% electronic trip unit neutral protection is not adjustable.

Discount Symbol **CB-2**

Table 12-35. JG 100% Rated Circuit Breaker

Ampere Rating	LS		LSI		LSG		LSIG		Neutral CT for LSG & LSIG ①	
	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
IEC/UL/CSA 25/25										
50	JGE305033GC		JGE305032GC		JGE305035GC		JGE305036GC		JGFCT050	
100	JGE310033GC		JGE310032GC		JGE310035GC		JGE310036GC		JGFCT100	
160	JGE316033GC		JGE316032GC		JGE316035GC		JGE316036GC		JGFCT160	
250	JGE325033GC		JGE325032GC		JGE325035GC		JGE325036GC		JGFCT250	
IEC/UL/CSA 40/35										
50	JGS305033GC		JGS305032GC		JGS305035GC		JGS305036GC		JGFCT050	
100	JGS310033GC		JGS310032GC		JGS310035GC		JGS310036GC		JGFCT100	
160	JGS316033GC		JGS316032GC		JGS316035GC		JGS316036GC		JGFCT160	
250	JGS325033GC		JGS325032GC		JGS325035GC		JGS325036GC		JGFCT250	
IEC/UL/CSA 70/65										
50	JGH305033GC		JGH305032GC		JGH305035GC		JGH305036GC		JGFCT050	
100	JGH310033GC		JGH310032GC		JGH310035GC		JGH310036GC		JGFCT100	
160	JGH316033GC		JGH316032GC		JGH316035GC		JGH316036GC		JGFCT160	
250	JGH325033GC		JGH325032GC		JGH325035GC		JGH325036GC		JGFCT250	

① Required for 4-wire systems if neutral protection is required.

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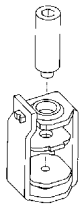
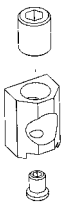
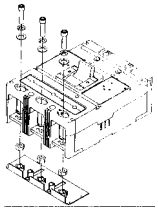
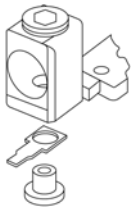
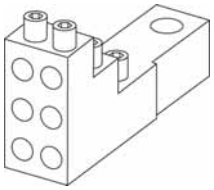
Selection Guide and Ordering Information

				
T250FJ	**TA250FJ**	**Endcap Kit**	**Control Wire Terminal Kit**	**Multiwire Connectors**

Line and Load Terminals

JG-Frame circuit breakers include Cu/Al terminals T250FJ as standard. When optional copper only terminals are required, order by catalog number.

Table 12-36. Line and Load Terminals

Maximum Breaker Amps	Terminal Body Material	Wire Type	Metric Wire Range mm^2	AWG Wire Range/ Number of Conductors	Catalog Number	Price U.S. $
Standard Pressure Type Terminals						
250	Stainless Steel	Cu	25 – 185	#4 – 350 (1)	**T250FJ** ①②	
250	Aluminum	Cu/Al	25 – 185	#4 – 350 (1)	**TA250FJ** ①	

① Individually packed.
② Standard line and load.
③ Contact factory for availability.

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Endcap Kits

Endcap kits are used on J250-Frame breaker line side to connect bus bar or similar electrical connections. Includes hardware.

Table 12-37. Kit Catalog Number

Number of Poles	Catalog Number		Price U.S. $
	Metric	Imperial	
3 4	**FJ3RTWK** **FJ4RTWK**	**FJ3RTDK** **FJ4RTDK**	

Control Wire Terminal Kit

For use with aluminum or copper terminals only.

Table 12-38. Control Wire Terminal Kit

Control Wire Terminal Kit	Catalog Number	Price U.S. $
Package of 14 — Priced Individually	**FJCWTK**	

Multiwire Connectors

Field-installed multiwire connectors for the load side (OFF) end terminals. They are used to distribute the load from the circuit breaker to multiple devices without the use of separate distribution terminal blocks.

Multiwire lug kits include terminal shield, mounting hardware, insulators and tin-plated aluminum connectors to replace three mechanical load lugs. UL listed as used on the load side (OFF) end.

Table 12-39. JG-Frame Multiwire Connectors Ordering Information (Package of 3)

Max. Amps	Wires per Terminal	Wire Size Range AWG Cu	Kit Catalog Number	Price U.S. $
250 250	3 6	14 – 2 14 – 6	**3TA250FJ3** **3TA250FJ6**	

Base Mounting Hardware

Base mounting hardware is included with a circuit breaker or molded case switch. (Included with breaker.)

Table 12-40. Terminal Shields IP30

Location	Number of Poles	Catalog Number	Price U.S. $
Line or Load	2, 3 4	**FJTS3K** **FJTS4K**	

Table 12-41. Interphase Barriers

Package of 2		Price U.S. $
Number of Poles	Catalog Number	
3 4	**FJIPBK** **FJIPBK4**	

Discount Symbol **CB-2**

Allowable Accessory Combinations

Different combinations of accessories can be supplied, depending on the types of accessories and the number of poles in the circuit breaker.

Table 12-42. Accessories

Description	Reference Page	2-, 3-Pole			4-Pole			
		Left	Center	Right	Left	Center	Right	Neu.
Internal Accessories (Only One Internal Accessory Per Pole)								
Alarm Lockout (Make/Break)	12-65			■			■	
Auxiliary Switch (1A, 1B)	12-65			■			■	
Auxiliary Switch (2A, 2B)	12-65			■			■	
Auxiliary Switch and Alarm Switch Combination	12-65			■			■	
Shunt Trip — Standard	12-65	■			■			
Undervoltage Release Mechanism	12-65	■			■			
External Accessories								
End Cap Kit	12-28		●			●		
Control Wire Terminal Kit	12-28		●			●		
Multiwire Connectors	12-28		●			●		
Base Mounting Hardware	12-28		●			●		
Interphase Barriers	12-28		●			●		
Padlockable Handle Block	12-64		■			■		
Padlockable Handle Lock Hasp	12-64	❑		❑	❑		❑	
Key Interlock Kit	12-64	❑		❑	❑		❑	
Sliding Bar Interlock — Requires Two Breakers	12-64		●					
Electrical Operator	12-64		●			●		
Plug-in Adapters	12-66		●			●		
Handle Mechanisms	12-67		●			●		
Earth Leakage/Ground Fault Protector	12-62		●			●		
Drawout Cassette	12-66		●			●		
Digitrip 310+ Test Kit	12-25		●			●		
Ammeter/Cause of Trip Display	12-25		●			●		
Modifications (Refer to Eaton)								
Moisture Fungus Treatment	12-73		●			●		
Freeze-Tested Circuit Breakers	—		●			●		
Marine/Naval Application, UL Supplement SA and SB	①		●			●		

■ Applicable in indicated pole position
❑ May be mounted on left or right pole — not both
● Accessory available/Modification available

① Contact Eaton

12

LG-Frame

Typical LG-Frame Circuit Breaker

Product Description

- LG breaker is HACR rated.

Interrupting Capacity Ratings

Table 12-43. UL 489/IEC 60947-2 Interrupting Capacity Ratings

Circuit Breaker Type	Number of Poles	Interrupting Capacity (kA rms Symmetrical Amperes) (kA)									
		Volts ac (50/60 Hz)								Volts dc ①	
		240 – 240		380 – 415		480	600	690		250 ②③	
		Icu	Ics	Icu	Ics			Icu	Ics	Icu	Ics
LGE630	3, 4	65	65	35	35	35	18	12	6	22	22
LGS630	3, 4	85	85	50	50	50	25	20	10	22	22
LGH630	3, 4	100	100	70	70	65	35	25	13	42	42
LGC630	3, 4	200	200	100	100	100	50	30	15	42	42
LGU630	3, 4	200	200	150	150	150	65	35	18	50	50
LGX630	3, 4	200 ⑤	200	200	200	200	65	35	18	50	50

① dc rating apply to substantially non-inductive circuits.
② 2-pole circuit breaker, or two poles of 3-pole circuits.
③ Time constant is 3 milliseconds minimum at 10 kA and 8 milliseconds minimum at – kA.
④ 3-poles in series. 750 Vdc ratings available (4-poles in series, not UL listed). Contact Eaton.
⑤ IEC rating is 300 kA @ 240 Vac.

Dimensions/Weights

Table 12-44. Dimensions in Inches (mm)

Number of Poles	Width	Height	Depth
2/3	5.48 (139.2)	10.13 (257.3)	4.09 (103.9)
4	7.22 (183.4)	10.13 (257.3)	4.09 (103.9)

Table 12-45. Weight in Lbs (kg)

Breaker Type	Number of Poles	
	2/3	4
LGE, LGS, LGH, LGC, LGU, LGX	16 (7.3)	20 (9.1)

Product Selection

Table 12-46. Main Catalog Numbering System

L G S 3 600 FA G C

Frame
L

Standard/Application
G = IEC/CE/UL/CSA

Poles
3 = Three
4 = Four — Neutral 0% Protected
6 = Four — Neutral 60% Protected
7 = Four — Neutral 100% Protected
8 = Four — Neutral 0 – 60% Protected
9 = Four — Neutral 0 – 100 Protected

Amperes
250
300
350
400
500
600
630

Trip Unit
AA = Adj. Adj.
FA = Fixed Adj.
KS = Molded Case Switch
33 = 310+ Electronic LS
32 = 310+ Electronic LSI
35 = 310+ Electronic LSG
36 = 310+ Electronic LSIG
38 = 310+ Electronic ALSI
39 = 310+ Electronic ALSIG
NN = Frame Only (No Trip)

Performance				
	600	**480**	**415**	**240**
E	18	35	35	65
S	25	50	50	85
H	35	65	70	100
C	50	100	100	200
U	65	150	150	200
X	65	200	200	200
K	Molded Case Switch			

Terminations	
Terminals	**Mounting Hardware**
M = Metric End Caps	Metric
E = Imperial End Caps	Imperial
G = Line/Load Standard	Metric
W = Without Terminals	

Rating
Blank = 80% Rated
C = 100% Rated ①

① 100% rating only available on breakers with electronic trip unit.

Table 12-47. Trip Unit Catalog Numbering System

LT 3 600 FA

Trip
LT

Poles
3 = Three
4 = Four — Neutral 0% Protected
8 = Four — Neutral 0/60% Protected
9 = Four — Neutral 0/100% Protected

Amperes
250
300
350
400
500
600
630

Trip Unit
AA = Adj. Adj. Thermal-Magnetic
FA = Fixed Adj. Thermal-Magnetic
KS = Molded Case Switch
33 = 310+ Electronic LS
32 = 310+ Electronic LSI
35 = 310+ Electronic LSG
36 = 310+ Electronic LSIG
38 = 310+ Electronic ALSI
39 = 310+ Electronic ALSIG

LG-Frame, 630 Amperes

Table 12-48. Complete Breaker (Includes Frame, Trip Unit, Standard Terminals and Mounting Hardware) ①②

Ampere Rating	3-Pole ③		4-Pole (0%) ④		3-Pole ③		4-Pole (0%) ④	
	Fixed Thermal Adj. Magnetic	Adj. Thermal Adj. Magnetic ⑤⑥	Fixed Thermal Adj. Magnetic	Adj. Thermal Adj. Magnetic ⑤⑥	Fixed Thermal Adj. Magnetic	Adj. Thermal Adj. Magnetic ⑤⑥	Fixed Thermal Adj. Magnetic	Adj. Thermal Adj. Magnetic ⑤⑥
IC Rating: 35 kAIC at 415 and 480 Vac					**IC Rating: 50 kAIC at 415 and 480 Vac**			
250	LGE3250FAG	LGE3250AAG	LGE4250FAG	LGE4250AAG	LGS3250FAG	LGS3250AAG	LGS4250FAG	LGS4250AAG
300	LGE3300FAG	—	LGE4300FAG	—	LGS3300FAG	—	LGS4350FAG	—
320	—	LGE3320AAG	—	LGE4320AAG	—	LGS3320AAG	—	LGS4320AAG
350	LGE3350FAG	—	LGE4350FAG	—	LGS3350FAG	—	LGS4350FAG	—
400	LGE3400FAG	LGE3400AAG	LGE4400FAG	LGE4400AAG	LGS3400FAG	LGS3400AAG	LGS4400FAG	LGS4400AAG
500	LGE3500FAG	LGE3500AAG	LGE4500FAG	LGE4500AAG	LGS3500FAG	LGS3500AAG	LGS4500FAG	LGS4500AAG
600	LGE3600FAG	—	LGE4600FAG	—	LGS3600FAG	—	LGS4600FAG	—
630 ⑤	—	LGE3630AAG	—	LGE4630AAG	—	LGS3630AAG	—	LGS4630AAG
IC Rating: 70 kAIC at 415 Vac, 65 kAIC at 480 Vac					**IC Rating: 100 kAIC at 415 and 480 Vac**			
250	LGH3250FAG	LGH3250AAG	LGH4250FAG	LGH4250AAG	LGC3250FAG	LGC3250AAG	LGC4250FAG	LGC4250AAG
300	LGH3300FAG	—	LGH4300FAG	—	LGC3300FAG	—	LGC4300FAG	—
320	—	LGH3320AAG	—	LGH4320AAG	—	LGC3320AAG	—	LGC4320AAG
350	LGH3350FAG	—	LGH4350FAG	—	LGC3350FAG	—	LGC4350FAG	—
400	LGH3400FAG	LGH3400AAG	LGH4400FAG	LGH4400AAG	LGC3400FAG	LGC3400AAG	LGC4400FAG	LGC4400AAG
500	LGH3500FAG	LGH3500AAG	LGH4500FAG	LGH4500AAG	LGC3500FAG	LGC3500AAG	LGC4500FAG	LGC4500AAG
600	LGH3600FAG	—	LGH4600FAG	—	LGC3600FAG	—	LGC4600FAG	—
630 ⑤	—	LGH3630AAG	—	LGH4630AAG	—	LGC3630AAG	—	LGC4630AAG
IC Rating: 150 kAIC at 415 and 480 Vac					**IC Rating: 200 kAIC at 415 and 480 Vac**			
250	LGU3250FAG	LGU3250AAG	LGU4250FAG	LGU4250AAG	LGX3250FAG	LGX3250AAG	LGX4250FAG	LGX4250AAG
300	LGU3300FAG	—	LGU4300FAG	—	LGX3300FAG	—	LGX4300FAG	—
320	—	LGU3320AAG	—	LGU4320AAG	—	LGX3320AAG	—	LGX4320AAG
350	LGU3350FAG	—	LGU4350FAG	—	LGX3350FAG	—	LGX4350FAG	—
400	LGU3400FAG	LGU3400AAG	LGU4400FAG	LGU4400AAG	LGX3400FAG	LGX3400AAG	LGX4400FAG	LGX4400AAG
500	LGU3500FAG	LGU3500AAG	LGU4500FAG	LGU4500AAG	LGX3500FAG	LGX3500AAG	LGX4500FAG	LGX4500AAG
600	LGU3600FAG	—	LGU4600FAG	—	LGX3600FAG	—	LGX4600FAG	—
630 ⑤	—	LGU3630AAG	—	LGU4630AAG	—	LGX3630AAG	—	LGX4630AAG

① Replace suffix "G" with "W" for no line and load terminals.
② See **Table 12-49** below for prices.
③ For 2-pole applications, use two outer poles.
④ Neutral protection is indicated by the fourth character: 4 = 0%, 7 = 100%, 8 = adjustable 0 – 60% and 9 = 0 – 100%. Neutral is on LH side.
⑤ 320/630 amperes is not a UL or CSA listed rating. 600 amperes is the maximum UL and CSA rating for the LG.
⑥ Adjustable thermal units are typically used in IEC markets and are not UL or CSA listed.

Table 12-49. Complete Breaker Prices (Includes Frame, Trip Unit, Standard Terminals and Mounting Hardware)

Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
LGE3250FAG LGE3300FAG LGE3350FAG LGE3500FAG LGE3600FAG		LGE3250AAG LGE3320AAG LGE3400AAG LGE3500AAG LGE3630AAG		LGE4250FAG LGE4300FAG LGE4350FAG LGE4500FAG LGE4600FAG		LGE4250AAG LGE4320AAG LGE4400AAG LGE4500AAG LGE4630AAG	
LGS3250FAG LGS3300FAG LGS3350FAG LGS3500FAG LGS3600FAG		LGS3250AAG LGS3320AAG LGS3400AAG LGS3500AAG LGS3630AAG		LGS4250FAG LGS4300FAG LGS4350FAG LGS4500FAG LGS4600FAG		LGS4250AAG LGS4320AAG LGS4400AAG LGS4500AAG LGS4630AAG	
LGH3250FAG LGH3300FAG LGH3350FAG LGH3500FAG LGH3600FAG		LGH3250AAG LGH3320AAG LGH3400AAG LGH3500AAG LGH3630AAG		LGH4250FAG LGH4300FAG LGH4350FAG LGH4500FAG LGH4600FAG		LGH4250AAG LGH4320AAG LGH4400AAG LGH4500AAG LGH4630AAG	
LGC3250FAG LGC3300FAG LGC3350FAG LGC3500FAG LGC3600FAG		LGC3250AAG LGC3320AAG LGC3400AAG LGC3500AAG LGC3630AAG		LGC4250FAG LGC4300FAG LGC4350FAG LGC4500FAG LGC4600FAG		LGC4250AAG LGC4320AAG LGC4400AAG LGC4500AAG LGC4630AAG	
LGU3250FAG LGU3300FAG LGU3350FAG LGU3500FAG LGU3600FAG		LGU3250AAG LGU3320AAG LGU3400AAG LGU3500AAG LGU3630AAG		LGU4250FAG LGU4300FAG LGU4350FAG LGU4500FAG LGU4600FAG		LGU4250AAG LGU4320AAG LGU4400AAG LGU4500AAG LGU4630AAG	
LGX3250FAG LGX3300FAG LGX3350FAG LGX3500FAG LGX3600FAG		LGX3250AAG LGX3320AAG LGX3400AAG LGX3500AAG LGX3630AAG		LGX4250FAG LGX4300FAG LGX4350FAG LGX4500FAG LGX4600FAG		LGX4250AAG LGX4320AAG LGX4400AAG LGX4500AAG LGX4630AAG	

Discount Symbol **CB-2**

Table 12-50. Thermal-Magnetic Trip Unit

Ampere Rating	3-Pole ①				4-Pole (0%) ②			
	Fixed Thermal/ Adj. Magnetic	Price U.S. $	Adj. Thermal/ Adj. Magnetic ③	Price U.S. $	Fixed Thermal/ Adj. Magnetic	Price U.S. $	Adj. Thermal/ Adj. Magnetic ③	Price U.S. $
250	LT3250FA		LT3250AA		LT4250FA		LT4250AA	
300	LT3300FA		—		LT4300FA		—	
320	—		LT3320AA		—		LT4320AA	
350	LT3350FA		—		LT4350FA		—	
400	LT3400FA		LT3400AA		LT4400FA		LT4400AA	
500	LT3500FA		LT3500AA		LT4500FA		LT4500AA	
600	LT3600FA		—		LT4600FA		—	
630	—		LT3630AA		—		LT4630AA	

① For 2-pole applications, use two outer poles.
② Neutral protection is indicated by the third character: 4 = 0%, 7 = 100%, 8 = adjustable 0 – 60% and 9 = 0 – 100%
③ Adjustable thermal, adjustable magnetic trip units are typically used in IEC markets and are not UL or CSA listed.

Table 12-51. Molded Case Switches

Ampere Rating	Number of Poles	Catalog Number	Price U.S. $
400	3 ④	LGK3400KSG	
	4	LGK4400KSG	
630 ⑤	3 ④	LGK3630KSG	
	4	LGK4630KSG	

④ For 2-pole applications, use two outer poles.
⑤ 630 amperes is not a UL or CSA listed rating. 600 amperes is the maximum UL and CSA rating for the LG.

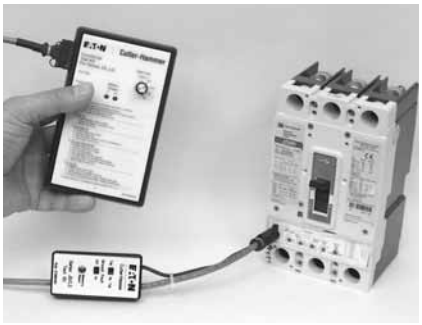
Note: Molded case switches will trip above 6300 amperes.

Table 12-52. Breaker Frame Only

Ampere Rating ⑥	IC Rating at 415/ 480 V	3-Pole ⑦		4-Pole (0%)	
		Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
630	35/35	LGE3630NN		LGE4630NN	
630 ⑧	35/35	LGE3630NNWC		—	
630	50/50	LGS3630NN		LGS4630NN	
630 ⑧	50/50	LGS3630NNWC		—	
630	70/65	LGH3630NN		LGH4630NN	
630 ⑧	70/65	LGH3630NNWC		—	
630	100/100	LGC3630NN		LGC4630NN	
630	150/150	LGU3630NN		LGU4630NN	
630	200/200	LGX3630NN		LGX4630NN	

⑥ 630 amperes is not a UL or CSA listed rating. 600 amperes is the maximum UL and CSA rating for the LG.
⑦ For 2-pole applications, use two outer poles.
⑧ 100% rated frame. For use with electronic trip units only.

Digitrip 310+ Test Kit



Digitrip 310+ Test Kit Shown with JG MCCB

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Table 12-53. Electronic Trip Units — Digitrip 310+

Ampere Rating	LS		LSI		LSG		LSIG		Neutral CT for LSG & LSIG ①	
	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
3-Pole										
250	**LT325033**		**LT325032**		**LT325035**		**LT325036**		**LGFCT250**	
400	**LT340033**		**LT340032**		**LT340035**		**LT340036**		**LGFCT400**	
600	**LT360033**		**LT360032**		**LT360035**		**LT360036**		**LGFCT600**	
630 ②	**LT363033**		**LT363032**		**LT363035**		**LT363036**		**LGFCT600**	
4-Pole ③										
250	**LT425033**		**LT425032**		**LT425035**		**LT425036**		**—**	
400	**LT440033**		**LT440032**		**LT440035**		**LT440036**		**—**	
600	**LT460033**		**LT460032**		**LT460035**		**LT460036**		**—**	
630 ②	**LT463033**		**LT463032**		**LT463035**		**LT463036**		**—**	

① Required for 4-wire systems if neutral protection is desired.

② 630 amperes is not a UL or CSA listed rating. 600 amperes is the maximum UL and CSA listed rating for the LG.

③ Neutral protection: 4= 0%, 6 = 60%, 7 = 100%. Electronic trip unit neutral protection is not adjustable.

Note: Long time pickup — no rating plug needed.
630 Ampere Settings — 630, 600, 500, 400, 350, 315, 300, 250 (315, 630 are IEC ratings only).
600 Ampere Settings — 600, 500, 450, 400, 350, 315, 300, 250 (315 is IEC rating only).
400 Ampere Settings — 400, 350, 315, 300, 250, 225, 200, 160 (315 is IEC rating only).
250 Ampere Settings — 250, 225, 200, 175, 160, 150, 125, 100 (160 is IEC rating only).

Note: Adjustable long time delay — 2 – 24 seconds at 6 x I_r.
Adjustable short time delay — Inst., 120, 300 ms.

LG Digitrip 310+ Electronic Trip Unit

Ammeter

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Table 12-54. Plug-in Test Kit

Voltage Rating	Catalog Number	Price U.S. $
120 Vac 230 Vac	**MTST120V** **MTST230V**	

Note: IL Number is 5721B13.

Table 12-55. Breaker Mount Ammeter

Description	Catalog Number	Price U.S. $
Breaker Mount Ammeter	**DIGIVIEW**	

Note: Use on electronic trip only.

Table 12-56. IC Rating at 415/480 V — Complete LG Breakers with Electronic Trip Unit (Includes Frame, Trip Unit, Standard Terminals and Mounting Hardware) ①

Ampere Rating	LS	Price U.S. $	LSI	Price U.S. $	LSG	Price U.S. $	LSIG	Price U.S. $	Neutral CT for LSG & LSIG ②	Price U.S. $
3-Pole ③ — IC Rating: 35 kAIC at 415 and 480 Vac										
250	LGE325033G		LGE325032G		LGE325035G		LGE325036G		LGFCT250	
400	LGE340033G		LGE340032G		LGE340035G		LGE340036G		LGFCT400	
600	LGE360033G		LGE360032G		LGE360035G		LGE360036G		LGFCT600	
630 ④	LGE363033G		LGE363032G		LGE363035G		LGE363036G		LGFCT600	
4-Pole ⑤ — IC Rating: 35 kAIC at 415 and 480 Vac										
250	LGE425033G		LGE425032G		LGE425035G		LGE425036G		—	
400	LGE440033G		LGE440032G		LGE440035G		LGE440036G		—	
600	LGE460033G		LGE460032G		LGE460035G		LGE460036G		—	
630 ④	LGE463033G		LGE463032G		LGE463035G		LGE463036G		—	
3-Pole ③ — IC Rating: 50 kAIC at 415 and 480 Vac										
250	LGS325033G		LGS325032G		LGS325035G		LGS325036G		LGFCT250	
400	LGS340033G		LGS340032G		LGS340035G		LGS340036G		LGFCT400	
600	LGS360033G		LGS360032G		LGS360035G		LGS360036G		LGFCT600	
630 ④	LGS363033G		LGS363032G		LGS363035G		LGS363036G		LGFCT600	
4-Pole ⑤ — IC Rating: 50 kAIC at 415 and 480 Vac										
250	LGS425033G		LGS425032G		LGS425035G		LGS425036G		—	
400	LGS440033G		LGS440032G		LGS440035G		LGS440036G		—	
600	LGS460033G		LGS460032G		LGS460035G		LGS460036G		—	
630 ④	LGS463033G		LGS463032G		LGS463035G		LGS463036G		—	
3-Pole ③ — IC Rating: 70 kAIC at 415 Vac, 65 kAIC at 480 Vac										
250	LGH325033G		LGH325032G		LGH325035G		LGH325036G		LGFCT250	
400	LGH340033G		LGH340032G		LGH340035G		LGH340036G		LGFCT400	
600	LGH360033G		LGH360032G		LGH360035G		LGH360036G		LGFCT600	
630 ④	LGH363033G		LGH363032G		LGH363035G		LGH363036G		LGFCT600	
4-Pole ⑤ — IC Rating: 70 kAIC at 415 Vac, 65 kAIC at 480 Vac										
250	LGH425033G		LGH425032G		LGH425035G		LGH425036G		—	
400	LGH440033G		LGH440032G		LGH440035G		LGH440036G		—	
600	LGH460033G		LGH460032G		LGH460035G		LGH460036G		—	
630 ④	LGH463033G		LGH463032G		LGH463035G		LGH463036G		—	
3-Pole ③ — IC Rating: 100 kAIC at 415 Vac and 480 Vac										
250	LGC325033G		LGC325032G		LGC325035G		LGC325036G		LGFCT250	
400	LGC340033G		LGC340032G		LGC340035G		LGC340036G		LGFCT400	
600	LGC360033G		LGC360032G		LGC360035G		LGC360036G		LGFCT600	
630 ④	LGC363033G		LGC363032G		LGC363035G		LGC363036G		LGFCT600	
4-Pole ⑤ — IC Rating: 100 kAIC at 415 Vac and 480 Vac										
250	LGC425033G		LGC425032G		LGC425035G		LGC425036G		—	
400	LGC440033G		LGC440032G		LGC440035G		LGC440036G		—	
600	LGC460033G		LGC460032G		LGC460035G		LGC460036G		—	
630 ④	LGC463033G		LGC463032G		LGC463035G		LGC463036G		—	
3-Pole ③ — IC Rating: 150 kAIC at 415 Vac and 480 Vac										
250	LGU325033G		LGU325032G		LGU325035G		LGU325036G		LGFCT250	
400	LGU340033G		LGU340032G		LGU340035G		LGU340036G		LGFCT400	
600	LGU360033G		LGU360032G		LGU360035G		LGU360036G		LGFCT600	
630 ④	LGU363033G		LGU363032G		LGU363035G		LGU363036G		LGFCT600	
4-Pole ⑤ — IC Rating: 150 kAIC at 415 Vac and 480 Vac										
250	LGU425033G		LGU425032G		LGU425035G		LGU425036G		—	
400	LGU440033G		LGU440032G		LGU440035G		LGU440036G		—	
600	LGU460033G		LGU460032G		LGU460035G		LGU460036G		—	
630 ④	LGU463033G		LGU463032G		LGU463035G		LGU463036G		—	
3-Pole ③ — IC Rating: 200 kAIC at 415 Vac and 480 Vac										
250	LGX325033G		LGX325032G		LGX325035G		LGX325036G		LGFCT250	
400	LGX340033G		LGX340032G		LGX340035G		LGX340036G		LGFCT400	
600	LGX360033G		LGX360032G		LGX360035G		LGX360036G		LGFCT600	
630 ④	LGX363033G		LGX363032G		LGX363035G		LGX363036G		LGFCT600	
4-Pole ⑤ — IC Rating: 200 kAIC at 415 Vac and 480 Vac										
250	LGX425033G		LGX425032G		LGX425035G		LGX425036G		—	
400	LGX440033G		LGX440032G		LGX440035G		LGX440036G		—	
600	LGX460033G		LGX460032G		LGX460035G		LGX460036G		—	
630 ④	LGX463033G		LGX463032G		LGX463035G		LGX463036G		—	

① Replace suffix "G" with "W" for no line and load terminals.
② Required for 4-wire systems if neutral protection is desired.
③ For 2-pole applications, use two outer poles.
④ 630 amperes is not a UL or CSA listed rating. 600 amperes is the maximum UL and CSA listed rating for the LG.
⑤ Neutral protection: 4 = 0%, 6 = 60%, 7 = 100%. Electronic trip unit neutral protection is not adjustable.

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Discount Symbol **CB-2**

Table 12-57. LG 100% Rated Electronic Breaker

Ampere Rating	LS		LSI		LSG		LSIG		Neutral CT for LSG & LSIG ②	
	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
IEC/UL/CSA 35 kAIC at 415 and 480 Vac										
250	LGE325033GC		LGE325032GC		LGE325035GC		LGE325036GC		LGFCT250	
400	LGE340033GC		LGE340032GC		LGE340035GC		LGE340036GC		LGFCT400	
600	LGE360033GC		LGE360032GC		LGE360035GC		LGE360036GC		LGFCT600	
630 ①	LGE363033GC		LGE363032GC		LGE363035GC		LGE363036GC		LGFCT600	
IEC/UL/CSA 50 kAIC at 415 and 480 Vac										
250	LGS325033GC		LGS325032GC		LGS325035GC		LGS325036GC		LGFCT250	
400	LGS340033GC		LGS340032GC		LGS340035GC		LGS340036GC		LGFCT400	
600	LGS360033GC		LGS360032GC		LGS360035GC		LGS360036GC		LGFCT600	
630 ①	LGS363033GC		LGS363032GC		LGS363035GC		LGS363036GC		LGFCT600	
IEC/UL/CSA 70 kAIC at 415 and 480 Vac										
250	LGH325033GC		LGH325032GC		LGH325035GC		LGH325036GC		LGFCT250	
400	LGH340033GC		LGH340032GC		LGH340035GC		LGH340036GC		LGFCT400	
600	LGH360033GC		LGH360032GC		LGH360035GC		LGH360036GC		LGFCT600	
630 ①	LGH363033GC		LGH363032GC		LGH363035GC		LGH363036GC		LGFCT600	

① 630 amperes is not a UL or CSA listed rating. 600 amperes is the maximum UL and CSA listed rating for the LG.
② Required for 4-wire systems if neutral protection is required.

LG Electronic Breaker with Arcflash Reduction Maintenance System™

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LG with Arcflash Reduction Maintenance System

Series G LG circuit breakers are available with the Arcflash Reduction Maintenance System integrated into the electronic trip units helping to improve safety by providing a simple and reliable method to reduce fault clearing time. The Arcflash Reduction Maintenance System unit utilizes a separate analog trip circuit that provides faster interruption times than the standard (digital) "instantaneous" protection. Work locations downstream of a circuit breaker with an Arcflash Reduction Maintenance System unit can have a significantly lower incident energy level, reducing arc flash potential to the system.

Table 12-58. LG Electronic Breaker with Arcflash Reduction Maintenance System

Ampere Rating	Catalog Number					
	ALSI	Price U.S. $	ALSIG	Price U.S. $	Neutral CT for LSG & LSIG ③	Price U.S. $
IEC/UL/CSA 35 kAIC at 415 and 480 Vac						
250	LGE325038G		LGE365039G		LGFCT250	
400	LGE340038G		LGE340039G		LGFCT400	
600	LGE360038G		LGE360039G		LGFCT600	
630	LGE363038G		LGE363039G		LGFCT600	
IEC/UL/CSA 50 kAIC at 415 and 480 Vac						
250	LGS325038G		LGS365039G		LGFCT250	
400	LGS340038G		LGS340039G		LGFCT400	
600	LGS360038G		LGS360039G		LGFCT600	
630	LGS363038G		LGS363039G		LGFCT600	
IEC/UL/CSA 70 kAIC at 415 and 480 Vac						
250	LGH325038G		LGH365039G		LGFCT250	
400	LGH340038G		LGH340039G		LGFCT400	
600	LGH360038G		LGH360039G		LGFCT600	
630	LGH363038G		LGH363039G		LGFCT600	
IEC/UL/CSA 100 kAIC at 415 and 480 Vac						
250	LGC325038G		LGC365039G		LGFCT250	
400	LGC340038G		LGC340039G		LGFCT400	
600	LGC360038G		LGC360039G		LGFCT600	
630	LGC363038G		LGC363039G		LGFCT600	
IEC/UL/CSA 150 kAIC at 415 and 480 Vac						
250	LGU325038G		LGU365039G		LGFCT250	
400	LGU340038G		LGU340039G		LGFCT400	
600	LGU360038G		LGU360039G		LGFCT600	
630	LGU363038G		LGU363039G		LGFCT600	
IEC/UL/CSA 200 kAIC at 415 and 480 Vac						
250	LGX325038G		LGX365039G		LGFCT250	
400	LGX340038G		LGX340039G		LGFCT400	
600	LGX360038G		LGX360039G		LGFCT600	
630	LGX363038G		LGX363039G		LGFCT600	

③ Required for 4-wire systems if neutral protection is required.

Table 12-59. LG Electronic Trip Units with Arcflash Reduction Maintenance System

Ampere Rating	Catalog Number					
	ALSI	Price U.S. $	ALSIG	Price U.S. $	Neutral CT for LSG & LSIG ④	Price U.S. $
250	LT325038		LT325039		LGFCT250	
400	LT340038		LT340039		LGFCT400	
600	LT360038		LT360039		LGFCT600	
630	LT363038		LT363039		LGFCT600	

④ Required for 4-wire systems if neutral protection is required.

Discount Symbol **CB-2**

Line and Load Terminals

Table 12-60. Line and Load Terminals

Maximum Breaker Amperes	Terminal Body Material	Wire Type	AWG Wire Range/ Number of Conductors	Metric Wire Range (mm^2)	Number of Terminals Included	Catalog Number	Price U.S. $
400 400	Aluminum Aluminum	Cu/Al Cu/Al	500 – 750 (1) 500 – 750 (1)	240 – 380 (1) 240 – 380 (1)	3 4	**3TA631LK** ① **4TA631LK** ①	
400 400	Copper Copper	Cu Cu	500 – 750 (1) 500 – 750 (1)	240 – 380 (1) 240 – 380 (1)	3 4	**3T631LK** ① **4T631LK** ①	
630 630	Aluminum Aluminum	Cu/Al Cu/Al	2 – 500 (2) 2 – 500 (2)	35 – 240 (2) 35 – 240 (2)	3 4	**3TA632LK** ①② **4TA632LK** ①②	
630 630	Copper Copper	Cu Cu	2 – 500 (2) 2 – 500 (2)	35 – 240 (2) 35 – 240 (2)	3 4	**3T632LK** ① **4T632LK** ①	
400 400	Aluminum Copper	Cu/Al Cu	2 – 500 (1) 2 – 500 (1)	35 – 240 (1) 35 – 240 (1)	1 1	**TA350LK** ② **T350LK**	

① Includes LTS3K (3-pole) or LTS4K (4-pole) terminal covers.
② Standard terminal included with complete breaker.

Table 12-61. Terminal Covers

Description	Catalog Number	Price U.S. $
3-Pole Terminal Cover ③ 4-Pole Terminal Cover ③	**LTS3K** **LTS4K**	

③ Included in TA63IL, T63IL, TA632L kits listed above.

Table 12-62. End Cap Kits (MIO Metric Nuts)

Number of Poles	Catalog Number	Price U.S. $
3 4	**L3RTWK** **L4RTWK**	

Table 12-63. Control Wire Terminal Kit

Description	Terminal Body Type	Catalog Number	Price U.S. $
3-Pole Kit 4-Pole Kit	Aluminum Aluminum	**3TA632LKW** **4TA632LKW**	
3-Pole Kit 4-Pole Kit	Copper Copper	**3T632LKW** **4T632LKW**	

Table 12-64. Terminal Extensions

Number of Poles	Catalog Number	Price U.S. $
3 4	**LGTEW3** **LGTEW4**	

Table 12-65. Terminal Spreaders

Number of Poles	Catalog Number	Price U.S. $
3 4	**LGTES3** **LGTES4**	

Table 12-66. Handle Extension

Description	Catalog Number	Price U.S. $
Handle Extension	**HEXLG**	

Table 12-67. Interphase Barrier

Package of 2	Catalog Number	Price U.S. $
Interphase Barrier	**IPB3**	

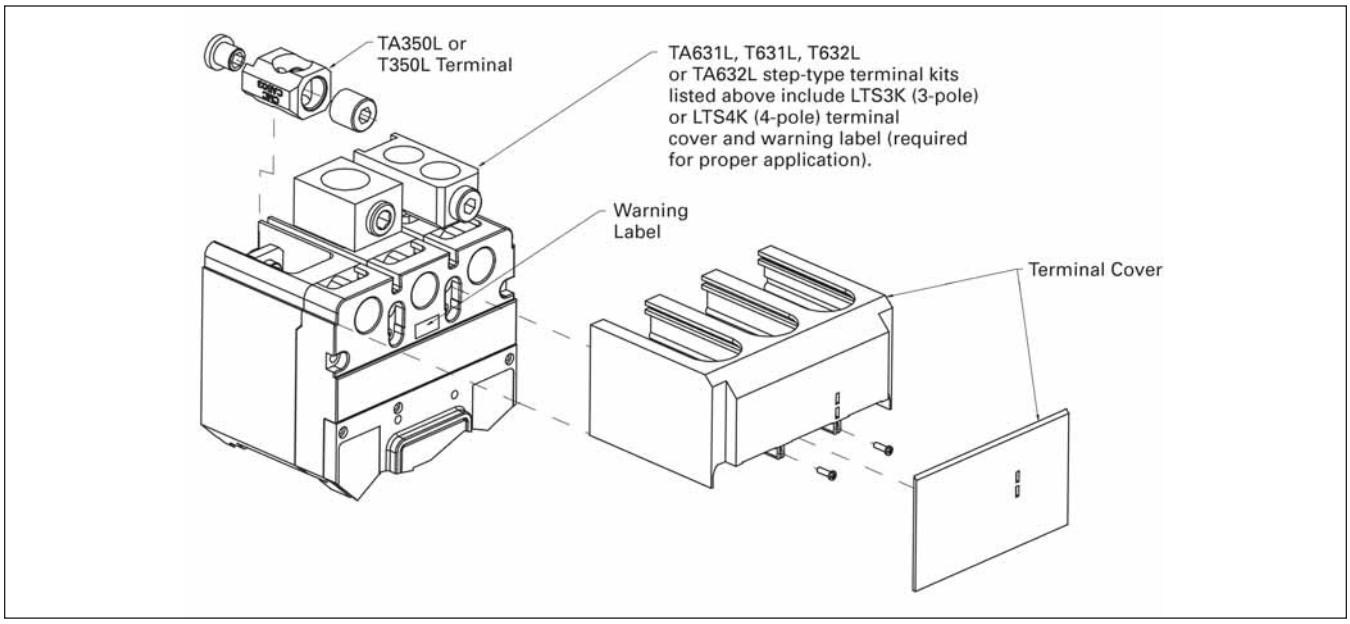

Figure 12-3. Terminals and Terminal Cover for the LG Breaker — Includes LTS3K (3-Pole) or LTS4K (4-Pole) Terminal Covers
Note: Extended terminal covers add 2.13 inches (54.0 mm) to breaker length.

Discount Symbol **CB-2**

Allowable Accessory Combinations

Different combinations of accessories can be supplied, depending on the types of accessories and the number of poles in the circuit breaker.

Table 12-68. Accessories

Description	Reference Page	3-Pole			4-Pole			
		Left	Center	Right	Left	Center	Right	Neu.
Internal Accessories (Only One Internal Accessory Per Pole)								
Alarm Lockout (Make/Break)	12-65			■			■	
Auxiliary Switch (1A, 1B)	12-65			■			■	
Auxiliary Switch (2A, 2B)	12-65			■			■	
Auxiliary Switch and Alarm Switch Combination	12-65			■			■	
Shunt Trip — Standard	12-65	■			■			
Undervoltage Release Mechanism	12-65	■			■			
External Accessories								
End Cap Kit	12-37		●			●		
Handle Extension	12-37		●			●		
Terminal Cover	12-37		●			●		
Padlockable Handle Block	12-64		■			■		
Padlockable Handle Lock Hasp	12-64	❑		❑	❑		❑	
Key Interlock Kit	12-64	❑		❑	❑		❑	
Sliding Bar Interlock — Requires Two Breakers	12-64		●					
Electrical Operator	12-64		●			●		
Plug-in Adapters	12-66		●			●		
Rear Connecting Studs	12-64		●			●		
Handle Mechanisms	12-67		●			●		
Earth Leakage/Ground Fault Protector	12-62		●			●		
Drawout Cassette	12-66		●			●		
Digitrip 310+ Test Kit	12-33		●			●		
Ammeter/Cause of Trip Display	12-33		●			●		
Modifications (Refer to Eaton)								
Moisture Fungus Treatment	12-73		●			●		
Freeze-Tested Circuit Breakers	—		●			●		
Marine/Naval Application, UL Supplement SA and SB	①		●			●		

■ Applicable in indicated pole position ❑ May be mounted on left or right pole — not both ● Accessory available/Modification available

① Contact Eaton.

NG-Frame

Typical NG-Frame Circuit Breaker

Product Description

- All Cutler-Hammer NG-Frame Circuit Breakers by Eaton Corporation are suitable for reverse feed use.
- All NG-Frame circuit breakers are HACR rated.

Technical Data and Specifications

Table 12-69. UL 489/IEC 60947-2 Interrupting Capacity Ratings ①

Circuit Breaker Type	Number of Poles	240 (UL)	Interrupting Capacity (kA Symmetrical Amperes)							
			Volts ac (50/60 Hz)							
			220 – 240		380 – 415		480	600	690	
			I_{cu}	I_{cs}	I_{cu}	I_{cs}			I_{cu}	I_{cs}
NGS ①	2, 3, 4	65	85	85	50	50	50	25	20	10
NGH	2, 3, 4	100	100	100	70	50	65	35	25	13
NGC	2, 3, 4	200	200	100	100	50	100	65	35	18

① 1600 amperes is not a UL or CSA listed rating. 1200 amperes is the maximum UL and CSA rating for NG.

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NG-Frame Digitrip Specifications

Table 12-70. Specifications

Trip Unit Type	Digitrip RMS 310		Digitrip OPTIM 550	Digitrip OPTIM 1050
rms Sensing	Yes		Yes	Yes
Breaker Type				
Frame	N		N	N
Ampere Range	400 A – 1200 A		400 A – 1200 A	400 A – 1200 A
Interrupting Rating at 480 Volts	50, 65, 100 (kA)		50, 65, 100 (kA)	50, 65, 100 (kA)
Protection				
Ordering Options	LS, LSG	LSI, LSIG	LSI, LSIG, LSI(A)	LSI(A), LISG
Fixed Rated Plug (I_n)	Yes	Yes	Yes	Yes
Overtemperature Trip	Yes	Yes	Yes	Yes
Long Delay Protection (L)				
Adjustable Rating Plug (I_n)	Yes	Yes	No	No
Long Delay Pickup	0.5 – 1.0 (I_n) ①	0.5 – 1.0 (I_n) ①	0.4 – 1.0 x (I_n)	0.4 – 1.0 x (I_n)
Long Delay Time I^2t	12 Seconds	12 Seconds	2 – 24 Seconds	2 – 24 Seconds
Long Delay Time I^4t	No	No	1 – 5 Seconds	1 – 5 Seconds
Long Delay Thermal Memory	Yes	Yes	Yes	Yes
High Load Alarm	No	No	No	0.5 – 1.0 x I_r
Short Delay Protection (S)				
Short Delay Pickup	200 – 800% x (I_n)	200 – 800% x (I_n)	150 – 800% x (I_r)	150 – 800% x (I_r)
Short Delay Time I^2t	100 ms	No	100 – 500 ms	100 – 500 ms
Short Delay Time Flat	No	Inst – 300 ms	100 – 500 ms	100 – 500 ms
Short Delay Time Zone Selective Interlocking	No	No	Yes	Yes
Instantaneous Protection (I)				
Instantaneous Pickup	No	200 – 800% x (I_n)	200 – 800% x (I_n)	200 – 800% x (I_n)
Discriminator	No	No	Yes	Yes
Instantaneous Override	Yes	Yes	Yes	Yes
Ground Fault Protection (G)				
Ground Fault Alarm	No	No	20 – 100% x (I_s)	20 – 100% x (I_s)
Ground Fault Pickup	1 – 5 x Ig (160 A)	1 – 5 x Ig (160 A)	20 – 100% x (I_s)	20 – 100% x (I_s)
Ground Fault Delay I^2t	No	No	100 – 500 ms	100 – 500 ms
Ground Fault Delay Flat	Inst – 500 ms	Inst – 500 ms	100 – 500 ms	100 – 500 ms
Ground Fault Zone Selective Interlocking	No	No	Yes ②	Yes
Ground Fault Thermal Memory	Yes	Yes	Yes	Yes
System Diagnostics				
Status LEDs	Yes	Yes	Yes	Yes
Cause of Trip LEDs	No	No	Yes	Yes
Magnitude of Trip Information	No	No	Yes	Yes
Remote Signal Contact — Ground Alarm	Yes ③	Yes ③	Yes ②	Yes
Local Auxiliary and Bell Alarm Contact	Optional	Optional	Optional	Included
System Monitoring				
Digital Display	No	No	Yes ④	Yes ④
Current	No	No	Yes	Yes
Power and Energy	No	No	No	Yes
Power Quality — Harmonics	No	No	No	Yes
Power Factor	No	No	No	Yes
Communications				
Cutler-Hammer PowerNet	No	No	No ⑤	Yes
Testing				
Testing Method	Test Set		OPTIMizer, BIM, Cutler-Hammer PowerNet	OPTIMizer, BIM, Cutler-Hammer PowerNet

① Adjust by rating plug.
② Zone interlock kit.
③ With separate ground fault alarm unit (GFAU).
④ By OPTIMizer/BIM.
⑤ Eaton's Cutler-Hammer PowerNet kit.

Legend: BIM = Breaker Interface Module
(A) = GF Alarm
I_s = Sensor Rating
I_n = Rating Plug
I_r = Long Delay Pickup Setting

Dimensions/Weights

Table 12-71. Dimensions in Inches (mm)

Number of Poles	Width	Height	Depth
2, 3	8.25 (209.6)	16.00 (406.4)	5.50 (139.7)
4	11.13 (282.6)	16.00 (406.4)	5.50 (139.7)

Table 12-72. Approximate Shipping Weight in Lbs. (kg)

Breaker Type	Complete Breaker		
	Number of Poles		
	2	3	4
NGS, NGH, NGC	37 (16.8)	45 (20.4)	58 (26.3)

Product Selection

This information is presented only as an aid to understanding Catalog Numbers. It is not to be used to build Catalog Numbers for circuit breakers or trip units.

Table 12-73. Circuit Breaker/Frame Catalog Numbering System

N G S 3 800 T33 W P18

Frame
N

Standard/Application
G = IEC/CE/UL/CSA

Number of Poles
2 = 2 Poles
3 = 3 Poles
4 = 4 Poles

Trip Unit
33 = LS
32 = LSI
35 = LSG
36 = LSIG

Suffix
W = Without Terminals
K = Molded Case Switch

Rating Plug	
P08 = 1200AF	= 1200/1000/800/600 Adjustable
P09 = 1250AF	= 1250/1000/800/630 Adjustable
P18 = 800AF	= 800/600/500/400 Adjustable
P19 = 800AF	= 800/630/500/400 Adjustable
P35 = 1600AF	= 1600/1250/1000/800 Adjustable
P36 = 1600AF	= 1250/1000/800/630 Adjustable

Performance Rating				
	600	**480**	**415**	**240**
S	25	50	50	65
H	35	65	70	100
C	65	100	100	200
K	Molded Case Switch			

Amperes
800 = 800
12 = 1200
16 = 1600

NG-Frame, 1200 Amperes — Selection Guide and Ordering Information

Table 12-74. Type NGS Standard Interrupting Capacity — U_e Max. 690 Vac, 50 kA I_{cu} at 480 Vac or 415 Vac ①

Maximum Continuous Ampere Rating at 40°C ②③	Number of Poles	Circuit Breaker Frame Including Digitrip RMS 310 Electronic Trip Unit with Adjustable Rating Plugs — Catalog Number ④ L – Adjustable Long Delay Pickup (By Adjustable Rating Plug) S – Adjustable Short Delay Pickup with Fixed Short Delay Time (I^2t Response) or Adjustable Short Delay Time (Flat Response) I – Adjustable Instantaneous Pickup by Setting Short Delay Time to Instantaneous G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Delay (Flat Response)				Interchangeable Rating Plugs (Order as Individual Component)		Included with Breaker
		LS	LSI	LSG	LSIG	Fixed Rating Plug		Adj. Rating Plug
Short Time Range Short Time Delay Ground Fault Pickup Ground Fault Delay		2 – 8 x I_n — — —	2 – 8 x I_n I – 300 ms — —	2 – 8 x I_n — 200 – 1200 A I – 500 ms	2 – 8 x I_n I – 300 ms 200 – 1200 A I – 500 ms	Ampere Rating	Catalog Number	Adjustable Ampere Settings Catalog Number
800	2-Pole	**NGS2800T33WP18**	**NGS2800T32WP18**	**NGS2800T35WP18**	**NGS2800T36WP18**	400 450 500 550	**8NES400T** **8NES450T** **8NES500T** **8NES550T**	400/500/600/800 **A8NES800T1**
						600 630 700 800	**8NES600T** **8NES630T** **8NES700T** **8NES800T**	
	3-Pole	**NGS3800T33WP18**	**NGS3800T32WP18**	**NGS3800T35WP18**	**NGS3800T36WP18**	400 450 500 550	**8NES400T** **8NES450T** **8NES500T** **8NES550T**	400/500/600/800 **A8NES800T1**
						600 630 700 800	**8NES600T** **8NES630T** **8NES700T** **8NES800T**	
	4-Pole ⑤	**NGS4800T33WP18**	**NGS4800T32WP18**	—	—	400 450 500 550	**8NES400T** **8NES450T** **8NES500T** **8NES550T**	400/500/600/800 **A8NES800T1**
						600 630 700 800	**8NES600T** **8NES630T** **8NES700T** **8NES800T**	
1200 ⑥	2-Pole	**NGS212T33WP08** ⑥	**NGS212T32WP08** ⑥	**NGS212T35WP08** ⑥	**NGS212T36WP08** ⑥	600 630 700 800	**12NES600T** **12NES630T** **12NES700T** **12NES800T**	600/800/ 1000/1200 **A12NES1200T1**
						900 1000 1200	**12NES900T** **12NES1000T** **12NES1200T**	
	3-Pole	**NGS312T33WP08** ⑥	**NGS312T32WP08** ⑥	**NGS312T35WP08** ⑥	**NGS312T36WP08** ⑥	600 630 700 800	**12NES600T** **12NES630T** **12NES700T** **12NES800T**	600/800/ 1000/1200 **A12NES1200T1**
						900 1000 1200	**12NES900T** **12NES1000T** **12NES1200T**	
	4-Pole ⑤	**NGS412T33WP08** ⑥	**NGS412T32WP08** ⑥	—	—	600 630 700 800	**12NES600T** **12NES630T** **12NES700T** **12NES800T**	600/800/ 1000/1200 **A12NES1200T1**
						900 1000 1200	**12NES900T** **12NES1000T** **12NES1200T**	

① See **Table 12-75** on **Page 12-43** for prices.
② For ac use only.
③ NG MCCBs are suitable for 40°C or 50°C applications. Order suffix V3 to eliminate standard 40°C labeling.
④ Order terminals separately.
⑤ Unprotected left pole neutral. Insert "E" for 100% neutral or "EH" for 60% neutral between "T33" or "T32" and "W" (e.g., **NGS412T32EHWP08**). Neutral is on LH side.
⑥ Non-UL listed NG 1250 with 1250 ampere trip unit is also available.

Note: NG MCCBs have metric threading on line and load conductors. Use ND MCCBs if imperial threading is required.

Table 12-75. Type NGS Standard Interrupting Capacity — U_e Max. 690 Vac, 50 kA I_{cu} at 480 Vac or 415 Vac Prices

Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
A12NES1200T1 A8NES800T1 NGS212T32WP09 NGS212T33WP09 NGS212T35WP09		NGS212T36WP09 NGS2800T32WP19 NGS2800T33WP19 NGS2800T35WP19 NGS2800T36WP19		NGS312T32WP08 NGS312T33WP08 NGS312T35WP08 NGS312T36WP08 NGS3800T32WP19		NGS3800T33WP19 NGS3800T35WP19 NGS3800T36WP19 NGS412T32WP08 NGS412T33WP08	
NGS4800T32WP19 NGS4800T33WP19 8NES400T 8NES450T 8NES500T		8NES550T 8NES600T 8NES630T 8NES700T 8NES800T		12NES1000T 12NES1200T 12NES600T 12NES630T 12NES700T		12NES800T 12NES900T — — —	

Table 12-76. Molded Case Switches ①②

Ampere Rating	U_e Maximum 690 Vac					
	3-Pole	Catalog Number	Price U.S. $	4-Pole	Catalog Number	Price U.S. $
800	MCS Only without Line and Load Terminals	NGK3800KSW		MCS Only without Line and Load Terminals	NGK4800KSW	
1200	MCS Only without Line and Load Terminals	NGK312KSW		MCS Only without Line and Load Terminals	NGK412KSW	
1250	MCS Only without Line and Load Terminals	NGK3125KSW		MCS Only without Line and Load Terminals	NGK4125KSW	

① For ac use only. Molded case switch will trip above 14,000 amperes.
② For 2-pole applications, use outer poles of 3-pole molded case switch.

Table 12-77. Type NGH High Interrupting Capacity — U_e Max. 690 Vac, 65 kA I_{cu} at 480 Vac, 70 kA I_{cu} at 415 Vac ①

Maximum Continuous Ampere Rating at 40°C ②③	Number of Poles	Circuit Breaker Frame Including Digitrip RMS 310 Electronic Trip Unit with Adjustable Rating Plugs — Catalog Number ④ L – Adjustable Long Delay Pickup (By Adjustable Rating Plug) S – Adjustable Short Delay Pickup with Fixed Short Delay Time (I^2t Response) or Adjustable Short Delay Time (Flat Response) I – Adjustable Instantaneous Pickup by Setting Short Delay Time to Instantaneous G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Delay (Flat Response)				Interchangeable Rating Plugs (Order as Individual Component)		Included with Breaker
		LS	LSI	LSG	LSIG	Fixed Rating Plug		Adjustable Rating Plug
Short Time Range Short Time Delay Ground Fault Pickup Ground Fault Delay		2 – 8 x I_n — — —	2 – 8 x I_n I – 300 ms — —	2 – 8 x I_n — 200 – 1200 A I – 500 ms	2 – 8 x I_n I – 300 ms 200 – 1200 A I – 500 ms	Ampere Rating	Catalog Number	Adjustable Ampere Settings Catalog Number
800	2-Pole	**NGH2800T33WP18**	**NGH2800T32WP18**	**NGH2800T35WP18**	**NGH2800T36WP18**	400 450 500 550	**8NES400T** **8NES450T** **8NES500T** **8NES550T**	400/500/ 600/800 **A8NES800T1**
						600 630 700 800	**8NES600T** **8NES630T** **8NES700T** **8NES800T**	
	3-Pole	**NGH3800T33WP18**	**NGH3800T32WP18**	**NGH3800T35WP18**	**NGH3800T36WP18**	400 450 500 550	**8NES400T** **8NES450T** **8NES500T** **8NES550T**	400/500/ 600/800 **A8NES800T1**
						600 630 700 800	**8NES600T** **8NES630T** **8NES700T** **8NES800T**	
	4-Pole ⑤	**NGH4800T33WP18**	**NGH4800T32WP18**	**—**	**—**	400 450 500 550	**8NES400T** **8NES450T** **8NES500T** **8NES550T**	400/500/ 600/800 **A8NES800T1**
						600 630 700 800	**8NES600T** **8NES630T** **8NES700T** **8NES800T**	
1200 ⑥	2-Pole	**NGH212T33WP08** ⑥	**NGH212T32WP08** ⑥	**NGH212T35WP08** ⑥	**NGH212T36WP08** ⑥	600 630 700 800	**12NES600T** **12NES630T** **12NES700T** **12NES800T**	600/800/ 1000/1200 **A12NES1200T1**
						900 1000 1200	**12NES900T** **12NES1000T** **12NES1200T**	
	3-Pole	**NGH312T33WP08** ⑥	**NGH312T32WP08** ⑥	**NGH312T35WP08** ⑥	**NGH312T36WP08** ⑥	600 630 700 800	**12NES600T** **12NES630T** **12NES700T** **12NES800T**	600/800/ 1000/1200 **A12NES1200T1**
						900 1000 1200	**12NES900T** **12NES1000T** **12NES1200T**	
	4-Pole ⑤	**NGH412T33WP08** ⑥	**NGH412T32WP08** ⑥	**—**	**—**	600 630 700 800	**12NES600T** **12NES630T** **12NES700T** **12NES800T**	600/800/ 1000/1200 **A12NES1200T1**
						900 1000 1200	**12NES900T** **12NES1000T** **12NES1200T**	

① See **Table 12-78** on **Page 12-45** for prices.
② For ac use only.
③ NG MCCBs are suitable for 40°C or 50°C applications. Order suffix V3 to eliminate standard 40°C labeling.
④ Order terminals separately.
⑤ Unprotected left pole neutral. Insert "E" for 100% neutral or "EH" for 60% neutral between "T33" or "T32" and "W" (e.g., **NGH412T32EHWP08**). Neutral is on LH side.
⑥ Non-UL listed NG 1250 with 1250 ampere trip unit is also available.

Note: NG MCCBs have metric threading on line and load conductors. Use ND MCCBs if imperial threading is required.

Table 12-78. Type NGS Standard Interrupting Capacity — U_e Max. 690 Vac, 50 kA I_{cu} at 480 Vac or 415 Vac Prices

Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
A12NES1200T1 A8NES800T1 NGH212T32WP08 NGH212T33WP08 NGH212T35WP08		NGH212T36WP08 NGH2800T32WP19 NGH2800T33WP19 NGH2800T35WP19 NGH2800T36WP19		NGH312T32WP08 NGH312T33WP08 NGH312T35WP08 NGH312T36WP08 NGH3800T32WP19		NGH3800T33WP19 NGH3800T35WP19 NGH3800T36WP19 NGH412T32WP08 NGH412T33WP08	
NGH4800T32WP19 NGH4800T33WP19 8NES400T 8NES450T 8NES500T		8NES550T 8NES600T 8NES630T 8NES700T 8NES800T		12NES1000T 12NES1200T 12NES600T 12NES630T 12NES700T		12NES800T 12NES900T — — —	

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Table 12-79. Type NGC Very High Capacity — U_e Max. 690 Vac, 100 kA I_{cu} at 480 Vac or 415 Vac ①

Maximum Continuous Ampere Rating at 40°C ②③	Number of Poles	Circuit Breaker Frame Including Digitrip RMS 310 Electronic Trip Unit with Adjustable Rating Plugs — Catalog Number ④ L – Adjustable Long Delay Pickup (By Adjustable Rating Plug) S – Adjustable Short Delay Pickup with Fixed Short Delay Time (I^2t Response) or Adjustable Short Delay Time (Flat Response) I – Adjustable Instantaneous Pickup by Setting Short Delay Time to Instantaneous G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Delay (Flat Response)				Interchangeable Rating Plugs (Order as Individual Component)		Included with Breaker
		LS	LSI	LSG	LSIG	Fixed Rating Plug		Adjustable Rating Plug
Short Time Range Short Time Delay Ground Fault Pickup Ground Fault Delay		2 – 8 x I_n — — —	2 – 8 x I_n I – 300 ms — —	2 – 8 x I_n — 200 – 1200 A I – 500 ms	2 – 8 x I_n I – 300 ms 200 – 1200 A I – 500 ms	Ampere Rating	Catalog Number	Adjustable Ampere Settings Catalog Number
800	2-Pole	**NGC2800T33WP18**	**NGC2800T32WP18**	**NGC2800T35WP18**	**NGC2800T36WP18**	400 450 500 550	**8NES400T** **8NES450T** **8NES500T** **8NES550T**	400/500/600/800 **A8NES800T1**
						600 630 700 800	**8NES600T** **8NES630T** **8NES700T** **8NES800T**	
	3-Pole	**NGC3800T33WP18**	**NGC3800T32WP18**	**NGC3800T35WP18**	**NGC3800T36WP18**	400 450 500 550	**8NES400T** **8NES450T** **8NES500T** **8NES550T**	400/500/600/800 **A8NES800T1**
						600 630 700 800	**8NES600T** **8NES630T** **8NES700T** **8NES800T**	
	4-Pole ⑤	**NGC4800T33WP18**	**NGC4800T32WP18**	**—**	**—**	400 450 500 550	**8NES400T** **8NES450T** **8NES500T** **8NES550T**	400/500/600/800 **A8NES800T1**
						600 630 700 800	**8NES600T** **8NES630T** **8NES700T** **8NES800T**	
1200 ⑥	2-Pole	**NGC212T33WP08** ⑥	**NGC212T32WP08** ⑥	**NGC212T35WP08** ⑥	**NGC212T36WP08** ⑥	600 630 700 800	**12NES600T** **12NES630T** **12NES700T** **12NES800T**	600/800/ 1000/1200 **A12NES1200T1**
						900 1000 1200	**12NES900T** **12NES1000T** **12NES1200T**	
	3-Pole	**NGC312T33WP08** ⑥	**NGC312T32WP08** ⑥	**NGC312T35WP08** ⑥	**NGC312T36WP08** ⑥	600 630 700 800	**12NES600T** **12NES630T** **12NES700T** **12NES800T**	600/800/ 1000/1200 **A12NES1200T1**
						900 1000 1200	**12NES900T** **12NES1000T** **12NES1200T**	
	4-Pole ⑤	**NGC412T33WP08** ⑥	**NGC412T32WP08** ⑥	**—**	**—**	600 630 700 800	**12NES600T** **12NES630T** **12NES700T** **12NES800T**	600/800/ 1000/1200 **A12NES1200T1**
						900 1000 1200	**12NES900T** **12NES1000T** **12NES1200T**	

① See **Table 12-80** on **Page 12-47** for prices.
② For ac use only.
③ NG MCCBs are suitable for 40°C or 50°C applications. Order suffix V3 to eliminate standard 40°C labeling.
④ Order terminals separately.
⑤ Unprotected left pole neutral. Insert "E" for 100% neutral or "EH" for 60% neutral between "T33" or "T32" and "W" (e.g., **NGC412T32EHWP08**). Neutral is on LH side.
⑥ Non-UL listed NG 1250 with 1250 ampere trip unit is also available.

Note: NG MCCBs have metric threading on line and load conductors. Use ND MCCBs if imperial threading is required.

Table 12-80. Type NGC Very High Capacity — U_e Max. 690 Vac, 100 kA I_{cu} at 480 Vac or 415 Vac Prices

Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
A12NES1200T1 A8NES800T1 NGC212T32WP08 NGC212T33WP08 NGC212T35WP08		NGC212T36WP08 NGC2800T32WP19 NGC2800T33WP19 NGC2800T35WP19 NGC2800T36WP19		NGC312T32WP08 NGC312T33WP08 NGC312T35WP08 NGC312T36WP08 NGC3800T32WP19		NGC3800T33WP19 NGC3800T35WP19 NGC3800T36WP19 NGC412T32WP08 NGC412T33WP08	
NGC4800T32WP19 NGC4800T33WP19 8NES400T 8NES450T 8NES500T		8NES550T 8NES600T 8NES630T 8NES700T 8NES800T		12NES1000T 12NES1200T 12NES600T 12NES630T 12NES700T		12NES800T 12NES900T — — —	

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Table 12-81. Type NGS Standard Interrupting Capacity — U_e Max. 690 Vac, 50 kA I_{cu} at 415 Vac

Maximum Continuous Ampere Rating at 40°C ①②	Number of Poles	Circuit Breaker Frame Including Digitrip RMS 310 Electronic Trip Unit and Rating Plugs L – Adjustable Long Delay Pickup (By Adjustable Rating Plug) S – Adjustable Short Delay Pickup with Fixed Short Delay Time (I^2t Response) or Adjustable Short Delay Time (Flat Response) I – Adjustable Instantaneous Pickup by Setting Short Delay Time to Instantaneous G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Delay (Flat Response)								
		LS	Price U.S. $	LSI	Price U.S. $	LSG	Price U.S. $	LSIG	Price U.S. $	Adjustable Rating Plug
Short Time Range Short Time Delay Ground Fault Pickup Ground Fault Delay		2 – 8 x I_n — — —		2 – 8 x I_n I – 300 ms — —		2 – 8 x I_n — 200 – 1200 A I – 500 ms		2 – 8 x I_n I – 300 ms 200 – 1200 A I – 500 ms		
1600 ③	3-Pole 4-Pole ④	**NGS316T33WP35** **NGS416T33WP35**		**NGS316T32WP35** **NGS416T32WP35**		**NGS316T35WP35** —		**NGS316T36WP35** —		800/ 1000/ 1250/ 1600

① For ac use only.
② NG MCCBs are suitable for 40°C or 50°C applications. Order suffix V3 to eliminate standard 40°C labeling.
③ No UL or CSA label is available for the 1600 ampere frame size.
④ Unprotected left pole neutral. Insert "1" for 100% protected neutral or "6" for 60% protected neutral before "WP" suffix (e.g., **NGS416T336WP35**).
Note: NG 1600 MCCB uses metric threading on line and load conductors. The NG 1600 is not UL or CSA listed.

Line and Load Terminals

N-Frame circuit breakers do not include terminals as standard. When copper or Cu/Al terminals are required, order by catalog number.

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Table 12-82. Line and Load Terminals

Maximum Breaker Amperes	Terminal Body Material	Wire Type	Metric Wire Range mm^2	AWG Wire Number of Conductors	Catalog Number ⑤	Price U.S. $
Optional Copper and Cu/Al Pressure Type Terminals						
1250 ⑥	Copper	Copper	95 – 185	3/0 – 400 (4)	**T1200NB3M**	

⑤ Single terminals individually packed.
⑥ Not suitable with 1600 ampere frame version.

Base Mounting Hardware

Base mounting hardware is included with a circuit breaker or molded case switch.

Table 12-83. Base Mounting Hardware ⑦

Number of Poles	Description	Catalog Number	Price U.S. $
3- and 4-pole	Imperial Hardware: .3125 – 18 x 1.25 Pan-Head Steel Screws and Lock Washers	**BMH5**	
3- and 4-pole	Metric Hardware: M8 Pan-Head Steel Screws and Lock Washers	**BMH5M**	

⑦ Metric hardware included with breaker.

Terminal Shield

Table 12-84. Terminal Shield

Description	Catalog Number	Price U.S. $
3-Pole Terminal Shield	**NTS3K**	

Conductor Extension Kit

Table 12-85. Conductor Extension Kit

Description	Catalog Number	Price U.S.
3-Pole Both Ends Metric	**5104A24G04**	
3-Pole Both Ends English	**5104A24G02**	

Keeper Nut

Not required on NG-Frame. Terminals are threaded.

Handle Extension

Included with breaker. Additional handle extensions are available.

Table 12-86. Handle Extension

Description	Catalog Number	Price U.S. $
Single Handle Extension	**HEX5**	

Interphase Barriers

The interphase barriers provide additional electrical clearance between circuit breaker poles for special termination applications. Barriers are high dielectric insulating plates that are installed in the molded slots between the terminals. (Field installation only.)

Table 12-87. Interphase Barriers

Description	Catalog Number	Price U.S. $
Interphase Barriers	**IPB5**	

Allowable Accessory Combinations

Different combinations of accessories can be supplied, depending on the types of accessories and the number of poles in the circuit breaker.

Table 12-88. Accessories

Description	Reference Page	3-Pole			4-Pole			
		Left	Center	Right	Left	Center	Right	Neu.
Internal Accessories (Only One Internal Accessory Per Pole)								
Alarm Lockout (Make/Break)	12-65	●		■	●		■	
Auxiliary Switch (1A, 1B)	12-65	●		■	●		■	
Auxiliary Switch (2A, 2B)	12-65	●		■	●		■	
Auxiliary Switch and Alarm Switch Combination	12-65	●		■	●		■	
Shunt Trip — Standard	12-65	■			■			
Undervoltage Release Mechanism	12-65	■			■			
External Accessories								
Base Mounting Hardware	12-48		●			●		
Interphase Barriers	12-48		●			●		
Non-Padlockable Handle Block	12-64		■			■		
Padlockable Handle Lock Hasp	12-64	❑		❑	❑		❑	
Key Interlock Kit	12-64	❑		❑	❑		❑	
Sliding Bar Interlock — Requires Two Breakers	12-64		●					
Electrical Operator	12-64		●			●		
Plug-in Adapters	12-66		●			●		
Rear Connecting Studs	12-64		●			●		
Handle Mechanisms	12-67		●			●		
Drawout Cassette	12-66		●			●		
Handle Extension	12-48		●			●		
Digitrip 310 Test Kit	12-268		●			●		
Modifications (Refer to Eaton)								
Moisture Fungus Treatment	12-73		●			●		
Freeze-Tested Circuit Breakers	—		●			●		
Marine/Naval Application, UL Supplement SA and SB	①		●			●		

■ Applicable in indicated pole position ❑ May be mounted on left or right pole — not both ● Accessory available/Modification available

① Contact Eaton

RG-Frame

RG-Frame Circuit Breaker

Product Description

- Cutler-Hammer RG-Frame Circuit Breakers by Eaton Corporation are available as frame (which includes trip unit), rating plug and terminals.
- All R-Frame circuit breakers are suitable for reverse feed use.

Technical Data and Specifications

Table 12-89. UL 489/CSA Interrupting Capacity Ratings ①

Circuit Breaker Type	Number of Poles	Interrupting Capacity (kA Symmetrical Amperes)			
		Volts ac (50/60 Hz)			
		240	277	480	600
RGH	3, 4	125	—	65	50
RGC	3, 4	200	—	100	65

① Utilization Category A circuit breakers.

Note: See **Page 12-164** for Trip Unit Specifications.

Table 12-90. IEC 947-2 Interrupting Capacity Ratings ②

Circuit Breaker Type	Number of Poles	Interrupting Capacity (kA Symmetrical Amperes)		
		Volts ac (50/60 Hz)		
		240	415	690
RGH	3, 4			
I_{cu}		135	70	25
I_{cs}		100	50	13
RGC	3, 4			
I_{cu}		200	100	35
I_{cs}		100	50	18

② Utilization Category A circuit breakers.

Product Selection

Table 12-91. Circuit Breaker/Frame Catalog Numbering System

RGH 3 16 T33 W A01

Type	Amperes	Number of Poles	Trip Function	Modification Suffix	Function Codes
RGH 65K **RGC 100K**	**16** = 1600 A **20** = 2000 A **25** = 2500 A	**3** = 3 Poles **4** = 4 Poles	**Digitrip 310** **T33** = LS **T32** = LSI **T35** = LSG **T36** = LSIG **Digitrip 610** **T61** = LI **T62** = LSI **T63** = LS **T64** = LIG **T65** = LSG **T66** = LSIG **Digitrip 910** **T91** = LI **T92** = LSI **T93** = LS **T94** = LIG **T95** = LSG **T96** = LSIG	**R** = Ground Fault Remote RES Trip **E** = 100% Protection (New Design 310) RES Trip Unit **P** = 100% Prot. Neut. 4P RES Trip Unit **V3** = Electronic Trip w/o Ambient Temperature Marked on Trip Unit **W** = w/o Terms **K** = Molded Case Switch	**A12-A19** = Auxiliary Switch **B01-B02** = Bell Alarm **D01** = Drawout Moving Carrier **E01-E13** = Electrical Operator **H01-H11** = Special Ratings **J01** = Moisture Fungus Proof **L01-L05** = Locks **N01** = Low Energy Shunt Trip **P01-P64** = Rating Plugs **Q01-Q02** = Terminal Block **S21-S88** = Shunt Trip **T21-T37** = UVR (DC) **U33-U58** = UVR (AC) **W01** = Walking Beam Interlock **X01-X08** = Load Termination **Y01-Y08** = Line Termination **Z01-Z08** = Line & Load Termination

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Dimensions/Weights

Table 12-92. Dimensions in Inches (mm)

Number of Poles	Width	Height	Depth
3	15.50 (393.7)	16.00 (406.4)	9.75 (247.7)
4	20.00 (508.0)	16.00 (406.4)	9.75 (247.7)

Table 12-93. Approximate Shipping Weight, Lbs. (kg)

Breaker Type	Complete Breaker	
	Number of Poles	
	3	4
1600 Amperes		
RGH, RGC	102 (46.3)	135 (61.2)
2000 Amperes		
RGH, RGC	102 (46.3)	135 (61.2)
2500 Amperes		
RGH, RGC	135 (61.2)	182 (82.6)

RG-Frame, 2500 Amperes — Selection Guide and Ordering Information

Table 12-94. Type RGH with Digitrip 310 High Interrupting Capacity — U_e Maximum 690 Vac, 70 kA I_{cu} at 415 Vac ①

Maximum Continuous Ampere Rating at 40°C ②	Number of Poles	Circuit Breaker Frame Including Digitrip RMS 310 Electronic Trip Unit with Adjustable Rating Plugs — Catalog Number ③ L – Adjustable Long Delay Pickup (By Adjustable Rating Plug) S – Adjustable Short Delay Pickup with Fixed Short Delay Time (I^2t Response) or Adjustable Short Delay Time (Flat Response) I – Adjustable Instantaneous Pickup by Setting Short Delay Time to Instantaneous G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Delay (Flat Response)				Interchangeable Rating Plugs (Order as Individual Component)		Included with Breaker
		LS	LSI	LSG ④	LSIG ④	Fixed Rating Plug		Adjustable Rating Plug ⑤
Short Time Range Short Time Delay Ground Fault Pickup Ground Fault Delay		$2 – 8 \times I_n$ — — —	$2 – 8 \times I_n$ I – 300 ms — —	$2 – 8 \times I_n$ — 200 – 1200 A I – 500 ms	$2 – 8 \times I_n$ I – 300 ms 200 – 1200 A I – 500 ms	Ampere Rating	Catalog Number	Adjustable Ampere Settings Catalog Number
1600 ②	3-Pole	**RGH316T33WP08**	**RGH316T32WP08**	**RGH316T35WP08**	**RGH316T36WP08**	800 1000 1200 1250	**16RES08T** **16RES10T** **16RES12T** **16RES125T**	800/1000/ 1200/1600 **A16RES16T1**
						1400 1500 1600	**16RES14T** **16RES15T** **16RES16T**	
2000		**RGH320T33WP16**	**RGH320T32WP16**	**RGH320T35WP16**	**RGH320T36WP16**	1000 1200 1250	**20RES10T** **20RES12T** **A20RES125T**	1000/1200/ 1600/2000 **A20RES20T1**
						1400 1600 2000	**A20RES14T** **A20RES16T** **A20RES20T**	
2500		**RGH325T33WP39**	**RGH325T32WP39**	**RGH325T35WP39**	**RGH325T36WP39**	1200 1250 1600	**25RES12T** **25RES125T** **A25RES16T**	1200/1600/ 2000/2500 **A25RES25T1**
						2000 2500	**A25RES20T** **A25RES25T**	
1600 ②	4-Pole ⑥	**RGH416T33WP08**	**RGH416T32WP08**	—	—	800 1000 1200 1250	**16RES08T** **16RES10T** **16RES12T** **16RES125T**	800/1000/ 1200/1600 **A16RES16T1**
						1400 1500 1600	**16RES14T** **16RES15T** **16RES16T**	
2000		**RGH420T33WP16**	**RGH420T32WP16**	—	—	1000 1200 1250	**20RES10T** **20RES12T** **A20RES125T**	1000/1200/ 1600/2000 **A20RES20T1**
						1400 1600 2000	**A20RES14T** **A20RES16T** **A20RES20T**	
2500		**RGH425T33WP39**	**RGH425T32WP39**	—	—	1200 1250 1600	**25RES12T** **25RES125T** **A25RES16T**	1200/1600/ 2000/2500 **A25RES25T1**
						2000 2500	**A25RES20T** **A25RES25T**	

① See **Table 12-95** on **Page 12-53** for prices.
② For SCR application, use 2000 ampere frame.
③ Order terminals separately. Mounting hardware not included.
④ Ground fault equipped trip units available with remote indicating panel. Add "R" to catalog number, e.g., "**RGH316T35RW**."
⑤ Additional IEC ratings are available on adjustable rating plugs. Contact your Eaton representative.
⑥ Unprotected left pole neutral. Add "P" to catalog number for 100% protected left pole neutral, add "E" for 60% protected, e.g., "**RGH416T33PW**", "**RGH416T33EW**."

Note: RG MCCBs have metric threading on line and load conductors. Use RD MCCBs if imperial threading is required.

Table 12-95. Type RGH with Digitrip 310 High Interrupting Capacity — U_e Maximum 690 Vac, 70 kA I_{cu} at 415 Vac Prices

Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
A16RES16T1 20RES125T 20RES14T 20RES16T 20RES20T		A20RES20T1 25RES16T 25RES20T 25RES25T A25RES25T1		RGH316T32WP09 RGH316T33WP09 RGH316T35WP09 RGH316T36WP09 RGH320T32WP17		RGH320T33WP17 RGH320T35WP17 RGH320T36WP17 RGH325T32WP40 RGH325T33WP40	
RGH325T35WP40 RGH325T36WP40 RGH416T32WP09 RGH416T33WP09 RGH420T32WP17		RGH420T33WP17 RGH425T32WP40 RGH425T33WP40 16RES08T 16RES10T		16RES125T 16RES12T 16RES14T 16RES15T 16RES16T		20RES10T 20RES12T 25RES125T 25RES12T —	

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Table 12-96. Type RGC with Digitrip 310 Very High Interrupting Capacity — U_e Maximum 690 Vac, 100 kA I_{cu} at 415 Vac Page 12-54

Maximum Continuous Ampere Rating at 40°C ②	Number of Poles	Circuit Breaker Frame Including Digitrip RMS 310 Electronic Trip Unit with Adjustable Rating Plugs — Catalog Number ③ L – Adjustable Long Delay Pickup (By Adjustable Rating Plug) S – Adjustable Short Delay Pickup with Fixed Short Delay Time (I^2t Response) or Adjustable Short Delay Time (Flat Response) I – Adjustable Instantaneous Pickup by Setting Short Delay Time to Instantaneous G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Delay (Flat Response)				Interchangeable Rating Plugs (Order as Individual Component)		Included with Breaker ③
		LS	LSI	LSG ④	LSIG ④	Fixed Rating Plug		Adjustable Rating Plug ⑤
Short Time Range Short Time Delay Ground Fault Pickup Ground Fault Delay		2 – 8 x I_n — — —	2 – 8 x I_n I – 300 ms — —	2 – 8 x I_n — 200 – 1200 A I – 500 ms	2 – 8 x I_n I – 300 ms 200 – 1200 A I – 500 ms	Ampere Rating	Catalog Number	Adjustable Ampere Settings Catalog Number
1600 ②	3-Pole	**RGC316T33WP08**	**RGC316T32WP08**	**RGC316T35WP08**	**RGC316T36WP08**	800 1000 1200 1250	**16RES08T** **16RES10T** **16RES12T** **16RES125T**	800/1000/ 1200/1600 **A16RES16T1**
						1400 1500 1600	**16RES14T** **16RES15T** **16RES16T**	
2000		**RGC320T33WP16**	**RGC320T32WP16**	**RGC320T35WP16**	**RGC320T36WP16**	1000 1200 1250	**20RES10T** **20RES12T** **A20RES125T**	1000/1200/ 1600/2000 **A20RES20T1**
						1400 1600 2000	**A20RES14T** **A20RES16T** **A20RES20T**	
2500		**RGC325T33WP40**	**RGC325T32WP40**	**RGC325T35WP40**	**RGC325T36WP40**	1200 1250 1600	**25RES12T** **25RES125T** **A25RES16T**	1200/1600/ 2000/2500 **A25RES25T1**
						2000 2500	**A25RES20T** **A25RES25T**	
1600 ②	4-Pole ⑥	**RGC416T33WP08**	**RGC416T32WP08**	**—**	**—**	800 1000 1200 1250	**16RES08T** **16RES10T** **16RES12T** **16RES125T**	800/1000/ 1200/1600 **A16RES16T1**
						1400 1500 1600	**16RES14T** **16RES15T** **16RES16T**	
2000		**RGC420T33WP16**	**RGC420T32WP16**	**—**	**—**	1000 1200 1250	**20RES10T** **20RES12T** **A20RES125T**	1000/1200/ 1600/2000 **A20RES20T1**
						1400 1600 2000	**A20RES14T** **A20RES16T** **A20RES20T**	
2500		**RGC425T33WP40**	**RGC425T32WP40**	**—**	**—**	1200 1250 1600	**25RES12T** **25RES125T** **A25RES16T**	1200/1600/ 2000/2500 **A25RES25T1**
						2000 2500	**A25RES20T** **A25RES25T**	

① See **Table 12-97** on **Page 12-55** for prices.
② For SCR application, use 2000 ampere frame.
③ Order terminals separately. Mounting hardware not included.
④ Ground fault equipped trip units available with remote indicating panel. Add "R" to catalog number, e.g., "**RGH316T35RW**."
⑤ Additional IEC ratings are available on adjustable rating plugs. Contact your Eaton representative.
⑥ Unprotected left pole neutral. Add "P" to catalog number for 100% protected left pole neutral, add "E" for 60% protected, e.g., "**RGH416T33PW**", "**RGH416T33EW**."

Note: RG MCCBs have metric threading on line and load conductors. Use RD MCCBs if imperial threading is required.

Table 12-97. Type RGH with Digitrip 310 High Interrupting Capacity — U_e Maximum 690 Vac, 70 kA I_{cu} at 415 Vac Prices

Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
A16RES16T1 **A20RES125T** **A20RES14T** **A20RES16T** **A20RES20T**		**A20RES20T1** **A25RES16T** **A25RES20T** **A25RES25T** **A25RES25T1**		**RGC316T32WP09** **RGC316T33WP09** **RGC316T35WP09** **RGC316T36WP09** **RGC320T32WP17**		**RGC320T33WP17** **RGC320T35WP17** **RGC320T36WP17** **RGC325T32WP40** **RGC325T33WP40**	
RGC325T35WP40 **RGC325T36WP40** **RGC416T32WP09** **RGC416T33WP09** **RGC420T32WP17**		**RGC420T33WP17** **RGC425T32WP40** **RGC425T33WP40** **16RES08T** **16RES10T**		**16RES125T** **16RES12T** **16RES14T** **16RES15T** **16RES16T**		**20RES10T** **20RES12T** **25RES125T** **25RES12T** **—**	

Table 12-98. Molded Case Switches ①

Ampere Rating	Number of Poles	Catalog Number	Price U.S. $
1600 2000	3-Pole	**RGK316WK** **RGK320WK**	
1600 2000	4-Pole	**RGK416WK** **RGK420WK**	

① Molded case switch will trip above 17,500 amperes.

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Table 12-99. Type RG with Digitrip 610 and 910

Maximum Continuous Ampere Rating at 40°C	Number of Poles	Circuit Breaker Frame Including Digitrip RMS 610 and 910 Electronic Trip Unit with Rating Plugs Order as Individual Component — Catalog Number ①						Digitrip RMS Interchangeable Rating Plug (Order as Individual Component)	
		L – Adjustable Long Delay Pickup (I_r) with Adjustable Long Delay Time S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I^2t or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time Delay (I^2t or Flat Response)							
		LI	LS	LSI	LIG	LSG	LSIG	Fixed Rating Plug	
Long Delay Pickup Long Delay Time Short Time Range Short Time Delay Instantaneous Ground Fault Pickup Ground Fault Delay		0.5 – 1.0 x I_n 2 – 24 Seconds 2 – 6 x I_r — 2 – 6 x M1 & M2 — —	0.5 – I.0$_n$ 2 – 24 Seconds 2 – 6 x I_r 100 – 500 ms — — —	0.5 – 1.0 x I_n 2 – 24 Seconds 2 – 6 x I_r 100 – 500 ms 2 – 6 x M1 & M2 — —	0.5 – 1.0 x I_n 2 – 24 Seconds 2 – 6 x I_r — 2 – 6 x M1 & M2 0.25 – 1.0 x In ② 100 – 500 ms	0.5 – 1.0 x I_n 2 – 24 Sec. 2 – 6 x I_r 100 – 500 ms — 0.25 – 1.0 x In ② 100 – 500 ms	0.5 – 1.0 x I_n 2 – 24 Seconds 2 – 6 x I_r 100 – 500 ms 2 – 6 x M1 & M2 0.25 – 1.0 x In ② 100 – 500 ms	Ampere Rating	Catalog Number
Type RGH with Digitrip 610 High Interrupting Capacity — U_e Max. 690 Vac, 70 kA I_{cu} at 415 Vac									
1600	3-Pole	RGH316T61WP44	RGH316T63WP44	RGH316T62WP44	RGH316T64WP44	RGH316T65WP44	RGH316T66WP44	800 1000 1200 1250 1600	RP6R16A080 RP6R16A100 RP6R16A120 RP6R16A125 RP6R16A160
		Includes 1600 A Rating Plug							
2000		RGH320T61WP49	RGH320T63WP49	RGH320T62WP49	RGH320T64WP49	RGH320T65WP49	RGH320T66WP49	1000 1200 1250 1600 2000	RP6R20A100 RP6R20A120 RP6R20A125 RP6R20A160 RP6R20A200
		Includes 2000 A Rating Plug							
2500		RGH325T61WP53	RGH325T63WP53	RGH325T62WP53	RGH325T64WP53	RGH325T65WP53	RGH325T66WP53	1600 2000 2500	RP6R25A160 RP6R25A200 RP6R25A250
Type RGC with Digitrip 610 Very High Interrupting Capacity — U_e Max. 690 Vac, 100 kA I_{cu} at 415 Vac									
1600	3-Pole	RGC316T61WP44	RGC316T63WP44	RGC316T62WP44	RGC316T64WP44	RGC316T65WP44	RGC316T66WP44	800 1000 1200 1250 1600	RP6R16A080 RP6R16A100 RP6R16A120 RP6R16A125 RP6R16A160
		Includes 1600 A Rating Plug							
2000		RGC320T61WP49	RGC320T63WP49	RGC320T62WP49	RGC320T64WP49	RGC320T65WP49	RGC320T66WP49	1000 1200 1250 1600 2000	RP6R20A100 RP6R20A120 RP6R20A125 RP6R20A160 RP6R20A200
		Includes 2000 A Rating Plug							
2500		RGC325T61WP53	RGC325T63WP53	RGC325T62WP53	RGC325T64WP53	RGC325T65WP53	RGC325T66WP53	1600 2000 2500	RP6R25A160 RP6R25A200 RP6R25A250
		Includes 2500 A Rating Plug							
Type RGH with Digitrip 910 High Interrupting Capacity — U_e Max. 690 Vac, 70 kA I_{cu} at 415 Vac									
1600	3-Pole	RGH316T91WP44	RGH316T93WP44	RGH316T92WP44	RGH316T94WP44	RGH316T95WP44	RGH316T96WP44	800 1000 1200 1250 1600	RP6R16A080 RP6R16A100 RP6R16A120 RP6R16A125 RP6R16A160
		Includes 1600 A Rating Plug							
2000		RGH320T91WP49	RGH320T93WP49	RGH320T92WP49	RGH320T94WP49	RGH320T95WP49	RGH320T96WP49	1000 1200 1250 1600 2000	RP6R20A100 RP6R20A120 RP6R20A125 RP6R20A160 RP6R20A200
		Includes 2000 A Rating Plug							
2500		RGH325T91WP53	RGH325T93WP53	RGH325T92WP53	RGH325T94WP53	RGH325T95WP53	RGH325T96WP53	1600 2000 2500	RP6R25A160 RP6R25A200 RP6R25A250
		Includes 2500 A Rating Plug							
Type RGC with Digitrip 910 Very High Interrupting Capacity — U_e Max. 690 Vac, 100 kA I_{cu} at 415 Vac									
1600	3-Pole	RGC316T91WP44	RGC316T93WP44	RGC316T92WP44	RGC316T94WP44	RGC316T95WP44	RGC316T96WP44	800 1000 1200 1250 1600	RP6R16A080 RP6R16A100 RP6R16A120 RP6R16A125 RP6R16A160
		Includes 1600 A Rating Plug							
2000		RGC320T91WP49	RGC320T93WP49	RGC320T92WP49	RGC320T94WP49	RGC320T95WP49	RGC320T96WP49	1000 1200 1250 1600 2000	RP6R20A100 RP6R20A120 RP6R20A125 RP6R20A160 RP6R20A200
		Includes 2000 A Rating Plug							
2500		RGC325T91WP53	RGC325T93WP53	RGC325T92WP53	RGC325T94WP53	RGC325T95WP53	RGC25T96WP53	1600 2000 2500	RP6R25A160 RP6R25A200 RP6R25A250
		Includes 2500 A Rating Plug							

① Order terminals separately. Mounting hardware not included.

② Not to exceed 1200 ampere ground fault pickup.

Note: RG MCCBs have metric threading on line and load conductors. Use RD MCCBs if imperial threading is required.

Table 12-100. Type RG with Digitrip 610 and 910 Prices

Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
RGC316T61WP44 RGC316T62WP44 RGC316T63WP44 RGC316T64WP44 RGC316T65WP44		RGC316T66WP44 RGC316T91WP44 RGC316T92WP44 RGC316T93WP44 RGC316T94WP44		RGC316T95WP44 RGC316T96WP44 RGC320T61WP49 RGC320T62WP49 RGC320T63WP49		RGC320T64WP49 RGC320T65WP49 RGC320T66WP49 RGC320T91WP49 RGC320T92WP49	
RGC320T93WP49 RGC320T94WP49 RGC320T95WP49 RGC320T96WP49 RGC325T61WP53		RGC325T62WP53 RGC325T63WP53 RGC325T64WP53 RGC325T65WP53 RGC325T66WP53		RGC325T91WP53 RGC325T92WP53 RGC325T93WP53 RGC325T94WP53 RGC325T95WP53		RGH316T61WP44 RGH316T62WP44 RGH316T63WP44 RGH316T64WP44 RGH316T65WP44	
RGH316T66WP44 RGH316T91WP44 RGH316T92WP44 RGH316T93WP44 RGH316T94WP44		RGH316T95WP44 RGH316T96WP44 RGH320T61WP49 RGH320T62WP49 RGH320T63WP49		RGH320T64WP49 RGH320T65WP49 RGH320T66WP49 RGH320T91WP49 RGH320T92WP49		RGH320T93WP49 RGH320T94WP49 RGH320T95WP49 RGH320T96WP49 RGH325T61WP53	
RGH325T62WP53 RGH325T63WP53 RGH325T64WP53 RGH325T65WP53 RGH325T66WP53		RGH325T91WP53 RGH325T92WP53 RGH325T93WP53 RGH325T94WP53 —		RGH325T95WP53 RGH325T96WP53 RP6R16A080 RP6R16A100 —		RP6R16A120 RP6R16A125 RP6R16A160 RP6R20A100 —	

12

Line and Load Terminals

R-Frame circuit breakers use Cu/Al terminals as standard and copper only terminals as an option. Specify if factory installation is required.

Table 12-101. Line and Load Terminals

Maximum Breaker Amperes	Terminal Body Material	Wire Type	Hardware	AWG/kcmil Wire Range/ Number of Conductors	Metric Wire Range mm^2	Catalog Number	Price U.S. $
Wire Terminals							
1600	Aluminum	Cu/Al	Metric	500 – 1000 (4)	300 – 500	**TA1600RDM** ①	
1600	Copper	Cu	Metric	1 – 600 (4)	50 – 300	**T1600RDM** ①	
2000	Aluminum	Cu/Al	Metric	2 – 600 (6)	35 – 300	**TA2000RDM** ②	
Rear Connectors							
2000	Copper	—	Metric	—	—	**B2016RDM** ①	
2000	Copper	—	Metric	—	—	**B2016RDLM** ①	
2500	Copper	—	Metric	—	—	**B2500RDM** ①	

① Order one per pole — single terminals individually packed.

② Order one TA2000RD kit per 3-poles. Catalog number includes bus connection, terminals and hardware for either line side or load side of 3-pole breaker.

Note: RG MCCBs have metric threading on line and load conductors. Use RD MCCBs if imperial threading is required.

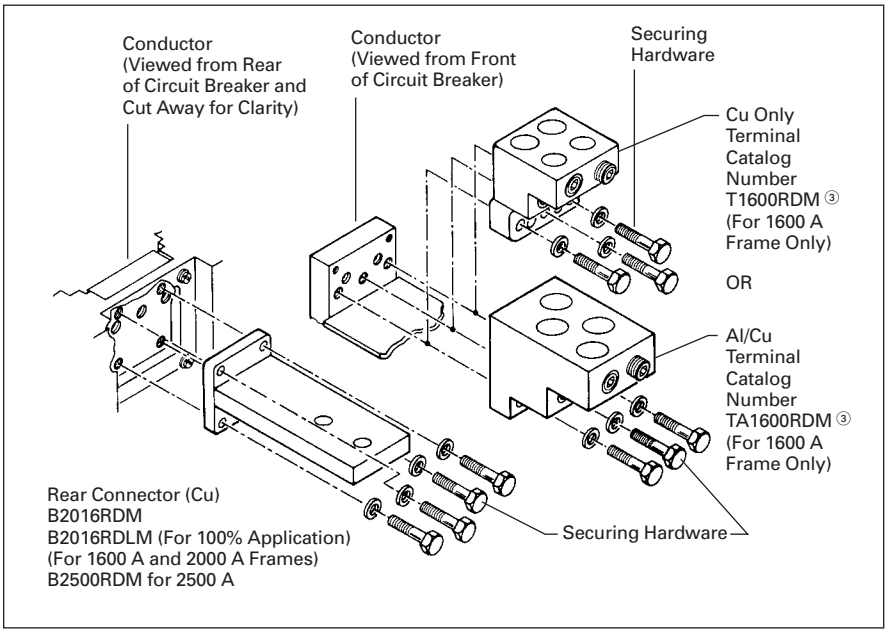

Figure 12-4. RD Rear Connector Exploded View

③ Order one per pole (or two per pole if line and load terminals are required) — single terminals individually packed.

Note: RG MCCBs have metric threading on line and load conductors. Use RD MCCBs if imperial threading is required.

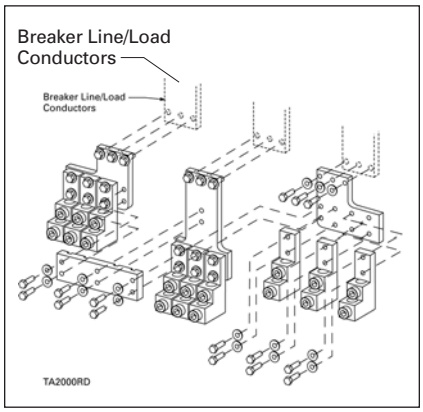

Figure 12-5. TA2000RD Wire Terminal

Note: Order one TA2000RDM kit per 3-poles. Catalog number includes bus connection, terminals and hardware for either line side or load side of 3-pole breaker.

Base Mounting Hardware

Supplied by customer.

Handle Extension

Included with breaker. Additional handle extensions are available.

Table 12-102. Handle Extension

Description	Catalog Number	Price U.S. $
Single Handle Extension	**HEX6**	

Allowable Accessory Combinations

Different combinations of accessories can be supplied, depending on the types of accessories and the number of poles in the circuit breaker.

Table 12-103. Accessories

Description	Reference Page	3-Pole			4-Pole			
		Left	Center	Right	Left	Center	Right	Neu.
Internal Accessories (Only One Internal Accessory Per Pole)								
Alarm Lockout (Make/Break)	12-65			■			■	
Auxiliary Switch (1A, 1B)	12-65			■			■	
Auxiliary Switch (2A, 2B)	12-65			■			■	
Auxiliary Switch and Alarm Switch Combination	12-65			■			■	
Shunt Trip — Standard	12-65			●			●	
Undervoltage Release Mechanism	12-65			●			●	
External Accessories								
Base Mounting Hardware	12-58		●			●		
Padlockable Handle Lock Hasp	12-64	❑		❑	❑		❑	
Key Interlock Kit	12-64	❑		❑	❑		❑	
Electrical Operator	12-64		●			●		
Handle Mechanisms	12-67		●			●		
Drawout Cassette	12-66		●			●		
Handle Extension	12-58		●			●		
Digitrip 310 Test Kit	12-268		●			●		
Modifications (Refer to Eaton)								
Moisture Fungus Treatment	12-73		●			●		
Freeze-Tested Circuit Breakers	—		●			●		
Marine/Naval Application, UL Supplement SA and SB	①		●			●		

■ Applicable in indicated pole position

❑ May be mounted on left or right pole — not both

● Accessory available/Modification available

① Contact Eaton

12

Motor Circuit 480 Vac, Protectors — Selection Guide and Ordering Information

Table 12-104. EG-Frame — 480 Vac, 600Y/347 Vac Maximum ①

Continuous Amperes	Cam Setting	Motor Full Load Current Amperes ②	MCP Trip Setting ③	MCP Catalog Number	Price U.S. $
3	A	.69 – .91	9	**HMCPE003A0C**	
	B	1.1 – 1.3	15		
	C	1.6 – 1.7	21		
	D	2.0 – 2.2	27		
	E	2.3 – 2.5	30		
	F	2.6 – 2.8	33		
7	A	1.5 – 2.0	21	**HMCPE007C0C**	
	B	2.6 – 3.1	35		
	C	3.7 – 3.9	49		
	D	4.8 – 5.2	63		
	E	5.3 – 5.7	70		
	F	5.8 – 6.1	77		
15	A	3.4 – 4.5	45	**HMCPE015E0C**	
	B	5.7 – 6.8	75		
	C	8.0 – 9.1	105		
	D	10.4 – 11.4	135		
	E	11.5 – 12.6	150		
	F	12.7 – 13.0	165		
30	A	3.9 – 9.1	90	**HMCPE030H1C**	
	B	11.5 – 13.7	150		
	C	16.1 – 18.3	210		
	D	20.7 – 22.9	270		
	E	23.0 – 25.2	300		
	F	25.3 – 26.1	330		
50	A	11.5 – 15.2	150	**HMCPE050K2C**	
	B	19.2 – 22.9	250		
	C	26.9 – 30.6	350		
	D	34.6 – 38.3	450		
	E	38.4 – 42.1	500		
	F	42.2 – 43.5	550		
70	A	16.1 – 30.6	210	**HMCPE070M2C**	
	B	26.9 – 32.2	350		
	C	37.6 – 42.9	490		
	D	48.4 – 53.7	630		
	E	53.8 – 59.1	700		
	F	59.2 – 60.9	770		
100	A	23.0 – 30.6	300	**HMCPE100R3C**	
	B	38.4 – 46.0	500		
	C	53.8 – 61.4	700		
	D	69.2 – 76.8	900		
	E	76.9 – 84.5	1000		
	F	84.6 – 87.0	1100		
100	A	38.4 – 46.0	500	**HMCPE100T3C**	
	B	57.6 – 65.2	750		
	C	76.9 – 84.5	1000		
	D	④	1250		
	E	④	1375		
	F	④	1500		

① UL listed for use with Cutler-Hammer Motor Starters.

② Motor FLA ranges are typical. The corresponding trip setting is at 13 times the minimum FLA value shown. Where a 13 times setting is required for an intermediate FLA value, alternate cam settings and/or MCP ratings should be used.

③ For dc applications, actual trip levels are approximately 40% higher than values shown.

④ Settings above 10 x I_n are for special applications. Where the ampere rating of the disconnecting means cannot be less than 115% of the motor full load ampere rating.

Table 12-105. JG-Frame — 600 Vac Maximum, 250 Vdc Maximum ⑤

Continuous Amperes	MCP Trip Range (Amperes)	MCP Catalog Number	Price U.S. $
250	500 – 1000	**HMCPJ250D5L**	
	625 – 1250	**HMCPJ250F5L**	
	750 – 1500	**HMCPJ250G5L**	
	875 – 1750	**HMCPJ250J5L**	
	1000 – 2000	**HMCPJ250K5L**	
	1125 – 2250	**HMCPJ250L5L**	
	1250 – 2500	**HMCPJ250W5L**	

⑤ UL listed for use with Cutler-Hammer Motor Starters.

Table 12-106. LG-Frame — 600 Vac Maximum, 250 Vdc Maximum ⑥⑦

Continuous Amperes	MCP Trip Range (Amperes)	MCP Catalog Number	Price U.S. $
600	1250 – 2500	**HMCPL600L6G**	
	1500 – 3000	**HMCPL600N6G**	
	1750 – 3500	**HMCPL600R6G**	
	2000 – 4000	**HMCPL600X6G**	
	2250 – 4500	**HMCPL600Y6G**	
	2500 – 5000	**HMCPL600P6G**	
	3000 – 6000	**HMCPL600M6G**	

⑥ Equipped with an electromechanical trip device.

⑦ UL listed for use with Cutler-Hammer Motor Starters.

Note: 800 and 1200 ampere, 600 Vac maximum motor circuit protectors are available as Series C HMCP product.

Series G Motor Protector Circuit Breaker (MPCB)

Product Description

- Eliminates need for separate overload relay.

Features

- IEC 60947-2.
- UL 489 rating.
- CSA C22.2
- Phase unbalance protection.
- Phase loss protection.
- Hot trip/cold trip.
- High load alarm.
- Pre-detection trip relay option.
- Class 10, 15, 20, 30 protection.

Applications

- Can be used with contactor to eliminate need for overload relay and still create manual motor control.
- Meets requirement for motor branch protection, including:
  - Disconnecting means
  - Branch circuit short circuit protection
  - Overload protection

Table 12-107. JGMPS and JGMPH Rating and Ampere Range

Maximum Rated Current (Amperes)			250	
Breaker Type			**JGMPS**	**JGMPH**
Breaker Capacity (kA rms) ac 50 – 60 Hz				
IEC 60947-2	220 – 240 Vac	I cu I cs	85 85	100 100
	380 – 415 Vac	I cu I cs	40 40	70 70
	660 – 690 Vac	I cu I cs	12 6	14 7
NEMA UL 489	240 Vac		85	100
	480 Vac		35	65
	600 Vac		25	35
Number of Poles			3	3
Ampere Range			50 – 250	50 –250

Table 12-108. LGMPS and LGMPH Rating and Ampere Range

Maximum Rated Current (Amperes)			630 ②	
Breaker Type			**LGMPS**	**LGMPH**
Breaker Capacity (kA rms) ac 50 – 60 Hz				
IEC 60947-2	220 – 240 Vac	I cu I cs	85 85	100 100
	380 – 415 Vac	I cu I cs	50 50	70 70
	660 – 690 Vac	I cu I cs	20 10	25 13
NEMA UL 489	240 Vac		85	100
	480 Vac		50	65
	600 Vac		25	35
Number of Poles			3	3
Ampere Range			250 – 630 ①	250 –630 ①

① 630 amperes is not a UL listed rating. 600 amperes is the maximum UL or CSA for LG breaker.

Table 12-109. JGMP Catalog Numbers

Continuous Amperes	35 kAIC		65 kAIC	
	Catalog Number	**Price U.S. $**	**Catalog Number**	**Price U.S. $**
50	**JGMPS050G**		**JGMPH050G**	
100	**JGMPS100G**		**JGMPH100G**	
160	**JGMPS160G**		**JGMPH160G**	
250	**JGMPS250G**		**JGMPH250G**	

Table 12-110. LGMP Catalog Numbers

Continuous Amperes	50 kAIC		65 kAIC	
	Catalog Number	**Price U.S. $**	**Catalog Number**	**Price U.S. $**
250	**LGMPS250G**		**LGMPH250G**	
400	**LGMPS400G**		**LGMPH400G**	
600	**LGMPS600G**		**LGMPH600G**	
630 ②	**LGMPS630G**		**LGMPH630G**	

② 630 amperes is not a UL listed rating. 600 amperes is the maximum UL or CSA for LG breaker.

Note: For pre-trip alarm option, order Style Number 5721B31G02.

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30 mA Ground Fault (Earth Leakage) Modules

Clockwise from Left: JG, LG MCCBs Shown with Ground Fault (Earth Leakage) Modules

Product Description

Eaton offers a 3- and 4-pole 30 mA ground fault (earth leakage) protection module for JG and LG breakers. The module does not restrict the use of other breaker accessories. UL-listed modules are available for JG and LG MCCBs. The JG and LG modules are both bottom mounted for circuits up to 160 and 250 amperes (JG), or 400 and 630 amperes for the LG.

The module is completely self-contained since the current sensor, relay and power supply are located inside the product. Current pickup settings are selectable from 0.03 – 10 amperes for all IEC-rated modules and JG UL-listed module, and 0.03 – 30 amperes for the LG UL-listed modules. Time delays are also selectable from Instantaneous – 1.0 seconds for 0.10 ampere settings and above. A current pickup setting of 0.03 amperes defaults to an Instantaneous time setting regardless of the time dial's position. Two alarm contacts come as standard: a 50% pre-trip and a 100% after trip, both based only on earth leakage current levels.

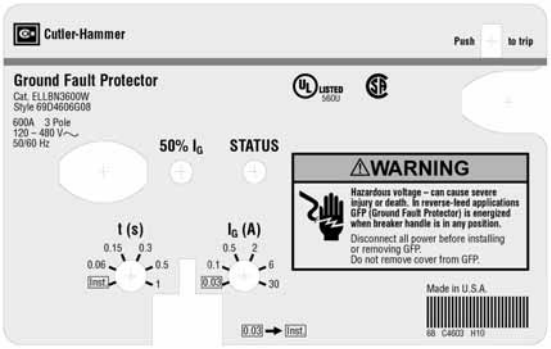


Figure 12-6. UL-Rated LG-Frame Earth Leakage Module Faceplate

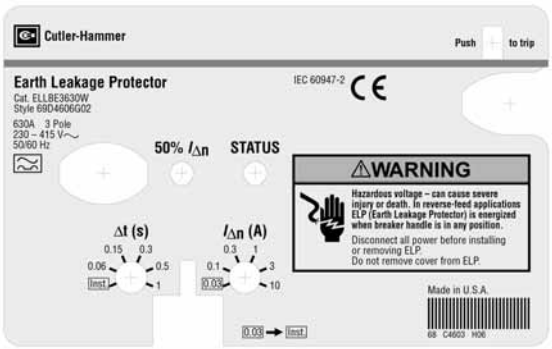


Figure 12-7. IEC-Rated LG-Frame Earth Leakage Module Faceplate

Product Selection

Table 12-111. JG-Frame Ground Fault Modules, UL-Rated (Bottom Mounted, 120 – 480 Vac, 50/60 Hz)

Amperes	Poles	Catalog Number	Price U.S. $
150	3	ELJBN3150W	
150	4	ELJBN4150W	
250	3	ELJBN3250W	
250	4	ELJBN4250W	

Table 12-112. JG-Frame Earth Leakage Modules, IEC (Bottom Mounted, 230 – 415 Vac, 50/60 Hz)

Amperes	Poles	Catalog Number	Price U.S. $
160	3	ELJBE3160W	
160	4	ELJBE4160W	
250	3	ELJBE3250W	
250	4	ELJBE4250W	

Table 12-113. LG-Frame Ground Fault Modules, UL-Rated (Bottom Mounted, 120 – 480 Vac, 50/60 Hz)

Amperes	Poles	Catalog Number	Price U.S. $
400	3	ELLBN3400W	
400	4	ELLBN4400W	
600	3	ELLBN3600W	
600	4	ELLBN4600W	

Table 12-114. LG-Frame Earth Leakage Modules, IEC (Bottom Mounted, 230 – 415 Vac, 50/60 Hz)

Amperes	Poles	Catalog Number	Price U.S. $
400	3	ELLBE3400W	
400	4	ELLBE4400W	
630	3	ELLBE3630W	
630	4	ELLBE4630W	

Table 12-115. Dimensions for Assembled Breaker and Earth Leakage Module in Inches (mm)

Frame	Height	Width	Depth
3-Pole			
JG	11.25 (285.8)	4.13 (104.9)	3.57 (90.7)
LG	15.38 (390.7)	5.48 (139.2)	4.06 (103.1)
4-Pole			
JG	11.25 (285.8)	5.50 (139.7)	3.57 (90.7)
LG	15.38 (390.7)	7.23 (183.6)	4.06 (103.1)

Discount Symbol **CB-2**

Special Features and Accessories

Internal Accessories

Alarm Lockout

The alarm switches operate when the circuit breaker is tripped by a short circuit or overcurrent, but also when it is tripped by a shunt trip or undervoltage release.

Auxiliary Switches

Auxiliary switches are used for signaling and control purposes. The various functions of the auxiliary switches (changeover) are shown in **Figure 12-9**.

Shunt Trips

The shunt trip is used for remote tripping.

The coil of the shunt trip is rated only for short-time operation.

It is not permissible with the circuit breaker open to apply a continuous opening command to the shunt trip in order to prevent the breaker from closing. This means that interlocking circuits with continuous commands may not be set up with shunt trips.

Undervoltage Releases

The circuit breaker cannot be closed until the undervoltage release is energized. If the release is not energized, the circuit breaker can only perform an idle switching operation.

Frequent idle switching actions should be avoided as they shorten the endurance of the circuit breaker.

Accessory Configurations for EG – RG Circuit Breakers

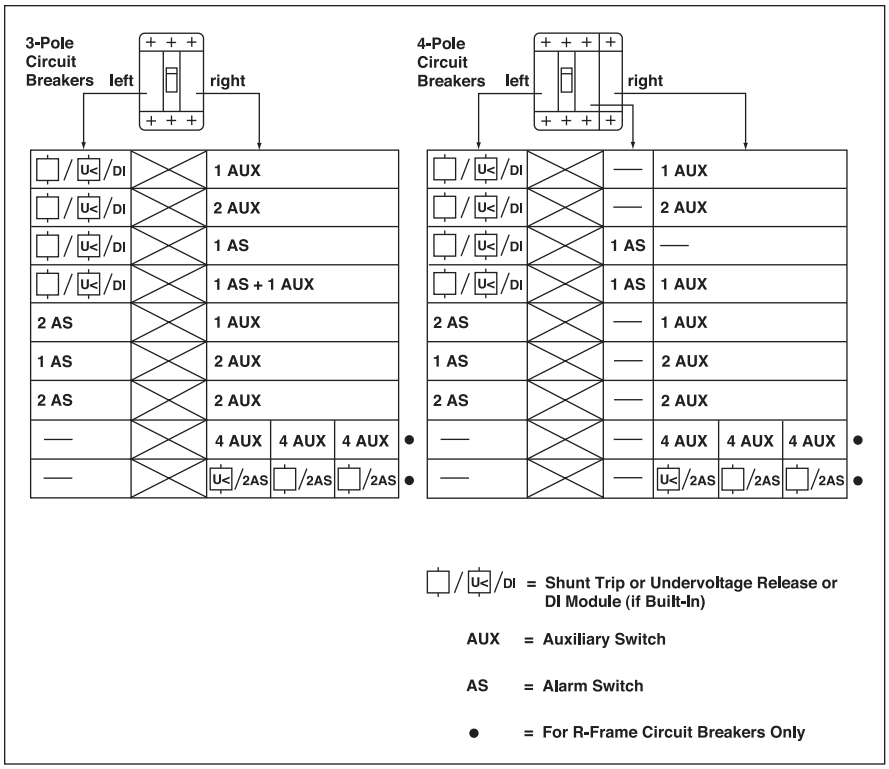


Figure 12-8. Internal Accessory Configurations

Position of the Toggle Handle Drive (Equivalently Applicable for Rotary Drives)	Position of the Auxiliary Switch	Position of the Alarm Switch
OFF RESET		
ON		
Tripped		

Figure 12-9. Contact Making by the Auxiliary and Alarm Switches as a Function of the Switching Position of the Circuit Breaker

12

Special Calibration

Special non-UL listed calibrations are available for certain ambient temperatures other than 40°C and for frequencies other than 50/60 Hz or dc. Reduced interrupting ratings will apply for 400 Hz applications.

50°C Calibration

Note: Breakers equipped with electronic trip units can operate reliably in ambient temperatures of 50°C. Add suffix "V3" to NG MCCBs to remove standard 40°C labeling.

Add suffix "V" to catalog number for complete thermal magnetic breaker when ordering listed ampere ratings for breakers to be used in 50°C ambients. 50°C ambient MCCBs are not UL listed.

Contact Eaton for availability.

Moisture-Fungus Treatment

All Cutler-Hammer Circuit Breaker cases are molded from glass-polyester which does not support the growth of fungus. Any parts which are susceptible to the growth of fungus will require special treatment.

Order by description.

Table 12-116. Calibrations and Treatment

Description	Frame									
	EG	Price U.S. $	JG	Price U.S. $	LG	Price U.S. $	NG	Price U.S. $	RG	Price U.S. $
Special Calibration	✓		✓		✓		✓		✓	
Moisture-Fungus Treatment	✓		✓		✓		✓		✓	

Table 12-117. External Accessories and Test Kit

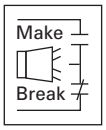
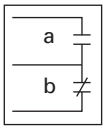
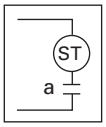
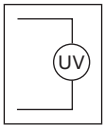
12

Description	Fit Type	Frame									
		EG	Price U.S. $	JG	Price U.S. $	LG	Price U.S. $	NG	Price U.S. $	RG	Price U.S. $
External Accessories											
Non-Padlockable Handle Block	Field	**EFHB**		**—**		**—**		**LKD4**		**—**	
Padlockable Handle Block	Field	**EFPHB**		**—**		**—**		**—**		**—**	
Padlockable Handle Block Off-Only	Field	**EFPHBOFF**		**FJPHBOFF**		**LBHPOFF**		**—**		**—**	
Padlockable Handle Lock Hasp	Field	**EFPHL**		**FJPHL**		**LPHL**		**PLK5**		**HLK6**	
Padlockable Handle Lock Hasp Off-Only	Field	**EFPHLOFF**		**FJPHLOFF**		**LPHLOFF**		**PLK55OFF**		**HLK6OFF**	
Kirk Key Interlock Kit ①②	Field	**—**		**KYKJG**		**KYKLG**		**KYK4**		**KYK6**	
Castell Key Interlock Kit ②③	Field	**—**		**CTKJG**		**CTKLG**		**CTK4**		**CTK6**	
Slide Bar Interlock ④	Field	**EFSBI**		**FJSBI**		**LGSBI**		**SBK5**		**—**	
Walking Beam Interlock ④	3-Pole	**EG3WBI**		**JG3WBI**		**LG3WBI**		**WBL5**		**WBL6**	
	4-Pole	**EG4WBI**		**JG4WBI**		**LG4WBI**		**WBL5**		**—**	
Electrical Operator ⑤	120 Vac	**MOPEG240C**		**EOPFJ240C**		**EOPLG240C**		**EOP5T07**		**EOP6T08K**	
	240 Vac	**MOPEG240C**		**EOPFJ240C**		**EOPLG240C**		**EOP5T11**		**EOP6T11K**	
	24 Vdc	**MOPEG48D**		**EOPFJ24D**		**EOPLG24D**		**EOP5T21**		**—**	
	48 Vdc	**MOPEG48D**		**EOPFJ48D**		**EOPLG48D**		**EOP5T22**		**EOP6T21K**	
	125 Vdc	**MOPEG240C**		**EOPFJ240C**		**EOPLG240C**		**EOP5T26**		**—**	
Plug-In Adapters	3-Pole	**PAD3E**		**PAD3J**		**PAD3L**		**PAD53**		**—**	
	4-Pole	**PAD4E**		**PAD4J**		**PAD4L**		**—**		**—**	
Rear Connecting Studs	Field	**EFRCSDL** **EFRCSDS** **EFRCSWL** **EFRCSWS**		**FJRCSDL** **FJRCSDS** **FJRCSWL** **FJRCSWS**		**3P–LRCS3WK** **4P–LRCS4WK** **—** **—**		**—**		**—** **—** **—** **—**	
Test Kit											
Electronic Portable Test Kit	120 V 230 V	**N/A** **N/A**		**MTST120V** **MTST230V**		**MTST120V** **MTST230V**		**STK2** **—**		**STK2** **—**	

① Provision only.
② See **Page 12-253** for bolt projection dimensions.
③ Castell bolt mounting hole must be 10 mm.
④ Requires two breakers.
⑤ Contact Eaton for availability of operators for EG- and NG-Frames before December 2004.

Discount Symbol **CB-2**

Table 12-118. Accessories

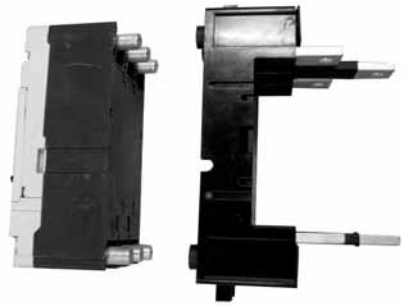
Description		Pole Location	Frame EG, JG & LG	Price U.S. $	NG	Price U.S. $	RG ①	Price U.S. $
Field Fit Kit Catalog Numbers								
Alarm Lockout 	Make/Break	Left	—		A1L5LPK		—	
		Right	ALM1M1BEPK ②		A1L5RPK		A1L6RPK	
	2 Make/2 Break	Left	—		A2L5LPK		—	
		Right	ALM2M2BEPK ③		A2L5RPK		A2L6RPK	
Auxiliary Switch 	1A, 1B	Left	—		A1X5PK		—	
		Right	AUX1A1BPK		A1X5PK		—	
	2A, 2B	Left	—		A2X5PK		—	
		Right	AUX2A2BPK		A2X5PK		A2X6RPK	
	3A, 3B	Left	—		A3X5LPK		—	
		Right	—		A3X5RPK		—	
	4A, 4B	Left	—		—		—	
		Right	—		—		A4X6RPK	
Auxiliary Switch / Alarm Lockout		Left	—		AA115LPK		—	
		Right	AUXALRMEPK ④		AA115RPK		—	
Shunt Trip — Standard 	120 Vac	Left	SNT120CPK ⑤		SNT5LP11K		—	
		Right	—		—		SNT6P11K	
	240 Vac	Left	SNT120CPK ⑤		SNT5LP11K		—	
		Right	—		—		SNT6P11K	
	12 Vdc	Left	SNT012CPK		—		—	
		Right	—		—		—	
	24 Vdc	Left	SNT060CPK		SNT5LP03K		—	
		Right	—		—		SNT6P03K	
	48 Vdc	Left	SNT060CPK		SNT5LP23K		—	
		Right	—		—		SNT6P23K	
	380 – 600 Vac	Left	SNT480CPK ⑥		—		—	
		Right	—		—		—	
	220 – 250 Vdc or 380 – 440 Vac		—		SNT5LP14K		SNT6P14K	
	480 – 600 Vac		—		SNT5LP18K		SNT6P18K	
Shunt Trip — Low Energy		Left	—		LST5LPK		—	
		Right	—		—		LST6RPK	
Undervoltage Release Mechanism 	110 – 127 Vac	Left	UVR120APK		UVH5LP08K		—	
		Right	—		—		UVH6RP08K	
	208 – 240 Vac	Left	UVR240APK		UVH5LP11K		—	
		Right	—		—		UVH6RP11K	
	24 Vdc, Vac	Left	UVR024CPK		UVH5LP21K ⑦		—	
		Right	—		—		UVH6RP21K ⑦	
	48 – 60 Vdc	Left	UVR048DPK		UVH5LP23K		—	
		Right	—		—		UVH6RP23K	
	12 Vdc, Vac	Left	UVR012CPK		—		—	
		Right	—		—		—	
	48 – 60 Vac	Left	UVR048APK		UVH5LP05K		—	
		Right	—		—		UVH6RP05K	
	120 Vdc	Left	UVR125DPK		UVH5LP26K		—	
		Right	—		—		UVH6RP26K	
	220 – 250 Vdc	Left	UVR250DPK		UVH5LP28K		—	
		Right	—		—		UVH6RP28K	
	380 – 500 Vac	Left	UVR480APK		UVH5LP29K		—	
		Right	—		—		UVH6RP29K	
	525 – 600 Vac	Left	UVR600APK		—		—	
		Right	—		—		—	
	12 Vdc	Left	—		UVH5LP20K		—	
		Right	—		—		UVH6RP20K	
	12 Vac	Left	—		UVH5LP02K		—	
		Right	—		—		UVH6RP02K	

① All accessories mount in the RH cavity which will accept one each of shunt trip, UVR, auxiliary switch and alarm switch.
② Part number for JG and LG is ALM1M1BJPK.
③ Part number for JG and LG is ALM2M2BJPK.
④ Part number for JG and LG is AUXALRMJPK.
⑤ 110 – 125 Vdc, 50/60 Hz.
⑥ 380 – 600 Vdc, 50/60 Hz.
⑦ 24 Vdc only use UVH5LP03K (NG) UVH6RP03K (RG) for 24 Vac.

Discount Symbol **CB-2**

Plug-in Blocks

Plug-in adapters simplify installation and front removal of circuit breakers. Plug-ins are available for rear connection applications on 3- and 4-pole circuit breakers. Trip on drawout interlock kits are included. Stabs for EG, JG and LG plug-ins rotate 90° for flexible installation. Use terminal shields for IP30 protection.



LG Breaker with Plug-in Block

Product Selection

Table 12-119. Plug-in Blocks

Breaker Frame	Poles	Catalog Number	Price U.S. $
EG-, JG- and LG-Frame Plug-in Blocks			
EG EG	3 4	**PAD3E** **PAD4E**	
JG JG	3 4	**PAD3J** **PAD4J**	
LG LG	3 4	**PAD3L** **PAD4L**	
Trip-on Drawout Interlock Kit ①			
EG JG LG	3, 4 3, 4 3, 4	**PIILEG** **PIILJG** **PIILLG**	
Terminal Shields IP30			
EG EG	3 4	**EFTS3K** **EFTS4K**	
JG JG	3 4	**FJTS3K** **FJTS4K**	
LG LG	3 4	**LTS3K** **LTS4K**	
Position Switch			
EG	3, 4	**PADILE**	
JG	3, 4	**PADILJ**	
LG	3, 4	**PADILL**	

① Included with plug-in block. Trips the breaker when breaker is removed from plug-in block.

Drawout Cassette

Drawout Cassette

JG and LG Drawout Cassettes

The Drawout Cassette is available for use with JG, LG and NG, 3- and 4-pole breakers. Also available are drawout cassettes for use with the standard 3-pole 65 and 100 kA/480 Vac, 1600 ampere and 2000 ampere RG circuit breakers. The cassettes consist of two separate components: the movable mechanism, which attaches to the breaker, and the stationary mechanism, which houses in the cassette. The stationary mechanism is shipped separately for the RG frame breakers. For the JG, LG and NG drawout cassettes, all necessary parts for installation are included in the one catalog number.

Features of the drawout cassettes for the JG, LG and NG include:

- Trip on drawout — Breaker will trip if it is in the ON position when withdrawn from the cassette.
- Secondary Terminal Block — The drawout cassettes include a secondary terminal block for easier access when wiring low voltage accessories, including shunts and undervoltage releases.

The drawout mechanism has three primary positions:

- Connected — The breaker is fully connected to the primary stabs and secondary contacts.
- Disconnected — Both the primary stabs and the secondary contacts are disconnected.
- Withdraw — The breaker can be removed from the cassette.

Table 12-120. RG Drawout Cassette

Description	Catalog Number	Price U.S. $
65 kA/480 Vac Version		
Movable Mechanism	**RD20DOM** ②	
Stationary Mechanism	**RD20DOS** ③ **RD20DOSS** ④	
100 kA/480 Vac Version		
Movable Mechanism	**RDC20DOM** ②	
Stationary Mechanism	**RDC20DOS** ③ **RDC20DOSS** ④	

② List price included in price of the stationary mechanism.
③ Without shutters.
④ With shutters.

Movable mechanism must be ordered with RG circuit breaker and is shipped mounted to circuit breaker frame. Stationary mechanism is ordered separately.

Table 12-121. JG, LG and NG Drawout Cassettes

Breaker Frame	Poles	Catalog Number	Price U.S. $
JG	3	**JG3DOM**	
	4	**JG4DOM**	
LG	3	**LG3DOM**	
	4	**LG4DOM**	
NG	3	**NG3DOM**	
	4	**NG4DOM**	

Discount Symbol **CB-2**

Handle Mechanisms Overview

Handle mechanisms are used to operate molded case circuit breakers, molded case switches and motor circuit protectors. They are available in three basic configurations — Flange Mounted, Through-the-Door and Direct (Close-Coupled) — providing safe, dependable operation and ease of installation.

Flange Mounted

- Flex Shaft

Through-the-Door

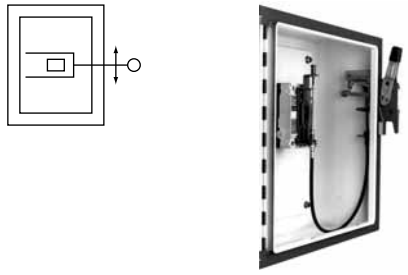
- Universal Rotary

Direct (Close Coupled)

- Universal Direct
- Euro IEC

Handle mechanisms are typically used on enclosed circuit breakers, control panels and motor control centers in many different applications. Eaton Electrical has a handle mechanism for virtually any need.

Flange Mounted Handle Mechanisms



The Flex Shaft™

Flange Mounted handle mechanisms mount on the flange of an enclosure door. The Flex Shaft is an extra heavy-duty mechanism that includes a flexible shaft in various lengths, 3 feet (0.9 m) through 10 feet (3 m) for use with various size enclosures.

The Flex Shaft handle will accept up to three padlock shackles, each with a maximum diameter of 3/8 inch (9.5 mm). Can be used with NEMA 12 fabricated enclosures. An optional handle is available for Flex Shaft that is suitable for use with NEMA 4 environments.

Flex Shaft comes preset from the factory, requiring only minor field adjustments on installation, which takes about 10 minutes — a significant time savings compared to installation of other types of flange handle mechanisms. The Flex Shaft mechanism also takes up less interior enclosure space than competitive designs and the handle fits standard flange cutouts. Flex Shaft handle can be remotely mounted from breaker, where an operator can use it by "funneling" the cable through conduit.

Flex Shaft is UL listed under File E64893 and meets CSA requirements.

Note: NEMA 4X handle mechanisms are available. Add Suffix X to the complete Catalog Number.

Note: When selecting the length of shaft, ensure minimum bending radius of 4 inches (101.6 mm) is maintained to operate properly.

The standard method of shipment includes the mechanism preset at the factory; however, minor field adjustments may be required.

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Flex Shaft Ordering Information

Table 12-122. Flex Shaft Ordering Information

Breaker Frame	Flexible Shaft Length in Feet (m)									
	2 (0.61)		3 (.9)		4 (1.2)		5 (1.3)		6 (1.8)	
	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
EG JG	**EHMFS02 N/A**		**EHMFS03 JHMFS03**		**EHMFS04 JHMFS04**		**EHMFS05 JHMFS05**		**EHMFS06 JHMFS06**	
LG NG RG	**N/A N/A N/A**		**— N/A N/A**		**LHMFS04 F5S04CI F6S04**		**— F5S05CI F6S05**		**— F5S06CI F6S06**	

Breaker Frame	Flexible Shaft Length in Feet (m)							
	7 (2.1)		8 (2.4)		9 (2.7)		10 (3.1)	
	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
EG JG	**EHMFS07 JHMFS07**		**EHMFS08 JHMFS08**		**EHMFS09 JHMFS09**		**EHMFS10 JHMFS10**	
LG NG RG	**LHMFS07 N/A N/A**		**— N/A N/A**		**— N/A N/A**		**LHMFS10 F5S10CI N/A**	

Note: Add Suffix L to the complete Catalog Number for 6-inch (152.4 mm) handle.
Note: 3-Pole only for EG, 3 and 4 Pole for JG and LG.
Note: EG and LG can be left or right-hand mounted.

Flex Shaft Accessories (E- through R-Frame)

Table 12-123. NEMA 12 Safety Door Hardware for Flex Shaft ①

Handle Length in Inches (mm)	Catalog Number ②	Price U.S. $
4.00 (101.6) 6.00 (152.4) Roller Latch ③	**C361KJ4 C361KJ6 C361KR**	

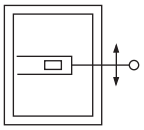
① Customer: Consult with box manufacturer for correct door hardware and any adapters required for assembly.
② The 1/4-inch x 1/2-inch (6.35 x 12.7 mm) standard mill rectangular locking bar is not supplied with these kits.
③ Third roller latch for use with 4- or 6-inch (101.6 or 152.4 mm) handle when 3 point latching is required.

Table 12-124. NEMA — IP Crossover

NEMA Type	IP Type
1 3R 12 4/4X	IP20 IP55 IP54 IP66

Discount Symbol **CB-2**

Through-the-Door Handle Mechanisms



Universal Rotary

The Cutler-Hammer Universal Rotary is suitable for use with NEMA 12 enclosure types. An optional NEMA 4/4X handle mechanism is also available. All rotary handle mechanisms include a handle "Lock Off," to prevent turning the breaker ON while in the OFF position. All Rotary handles indicate ON/OFF/Tripped/Reset positions, however, Universal Rotary has the added feature of international markings for ON (I) and OFF (O). The Universal Rotary is made of molded material. Inside handle is lockable.

The Universal Rotary mechanisms for EG, JG and LG MCCBs can be operated by hand with the door open or "locked off" to prevent operation with the door open.

For the NG-Frame MCCBs, a Cutler-Hammer Rotary with a metal handle (**Table 12-126**) is also available.

4/4X Handle Mechanism

EG-Frame

JG & LG-Frames (JG Shown)

Table 12-125. Universal Rotary Ordering Information

Shaft Length in Inches (mm)	Handle Color	NEMA Rating	Complete Catalog Number ①	Price U.S. $
EG-Frame				
6.00 (152.4)	Black	1, 12	**EHMVD06B**	
12.00 (304.8)	Black	1, 12	**EHMVD12B**	
24.00 (609.6)	Black	1, 12	**EHMVD24B**	
6.00 (152.4)	Red	1, 12	**EHMVD06R**	
12.00 (304.8)	Red	1, 12	**EHMVD12R**	
24.00 (609.6)	Red	1, 12	**EHMVD24R**	
6.00 (152.4)	Black	4, 4X, 3R	**EHMVD06BX**	
12.00 (304.8)	Black	4, 4X, 3R	**EHMVD12BX**	
24.00 (609.6)	Black	4, 4X, 3R	**EHMVD24BX**	
6.00 (152.4)	Red	4, 4X, 3R	**EHMVD06RX**	
12.00 (304.8)	Red	4, 4X, 3R	**EHMVD12RX**	
24.00 (609.6)	Red	4, 4X, 3R	**EHMVD24RX**	
JG-Frame				
6.00 (152.4)	Black	1, 12	**FJHMVD06B**	
12.00 (304.8)	Black	1, 12	**FJHMVD12B**	
24.00 (609.6)	Black	1, 12	**FJHMVD24B**	
6.00 (152.4)	Red	1, 12	**FJHMVD06R**	
12.00 (304.8)	Red	1, 12	**FJHMVD12R**	
24.00 (609.6)	Red	1, 12	**FJHMVD24R**	
6.00 (152.4)	Black	4, 4X, 3R	**FJHMVD06BX**	
12.00 (304.8)	Black	4, 4X, 3R	**FJHMVD12BX**	
24.00 (609.6)	Black	4, 4X, 3R	**FJHMVD24BX**	
6.00 (152.4)	Red	4, 4X, 3R	**FJHMVD06RX**	
12.00 (304.8)	Red	4, 4X, 3R	**FJHMVD12RX**	
24.00 (609.6)	Red	4, 4X, 3R	**FJHMVD24RX**	
LG-Frame				
6.00 (152.4)	Black	1, 12	**KLHMVD06B**	
12.00 (304.8)	Black	1, 12	**KLHMVD12B**	
24.00 (609.6)	Black	1, 12	**KLHMVD24B**	
6.00 (152.4)	Red	1, 12	**KLHMVD06R**	
12.00 (304.8)	Red	1, 12	**KLHMVD12R**	
24.00 (609.6)	Red	1, 12	**KLHMVD24R**	
6.00 (152.4)	Black	4, 4X, 3R	**KLHMVD06BX**	
12.00 (304.8)	Black	4, 4X, 3R	**KLHMVD12BX**	
24.00 (609.6)	Black	4, 4X, 3R	**KLHMVD24BX**	
6.00 (152.4)	Red	4, 4X, 3R	**KLHMVD06RX**	
12.00 (304.8)	Red	4, 4X, 3R	**KLHMVD12RX**	
24.00 (609.6)	Red	4, 4X, 3R	**KLHMVD24RX**	
NG-Frame				
6.00 (152.4)	Black	1	**HMVD5B**	
6.00 (152.4)	Black	1	**HMVD5BT** ②	
6.00 (152.4)	Black	4, 4X, 3R	**WHM5R06X**	
12.00 (304.8)	Black	4, 4X, 3R	**WHM5R12X**	
16.00 (406.4)	Black	4, 4X, 3R	**WHM5R16X**	
24.00 (609.6)	Black	4, 4X, 3R	**WHM5R24X**	
RG-Frame				
9.00 (235.0)	Black	1	**HMVD6B**	

① Complete catalog number includes handle, mechanism, shaft and mounting hardware.
② Same as HMVD5B, except uses R-Frame T handle.

Table 12-126. Cutler-Hammer Rotary Ordering Information — NG-Frame

Shaft Length in Inches (mm)	Handle Color	Complete Catalog Number ③			
		NEMA 1, 3R, 12	Price U.S. $	NEMA 4/4X	Price U.S. $
6.00 (152.4)	Black	**WHM5R06**		**WHM5R06X**	
12.00 (304.8)	Black	**WHM5R12**		**WHM5R12X**	
16.00 (406.4)	Black	**WHM5R16**		**WHM5R16X**	
24.00 (609.6)	Black	**WHM5R24**		**WHM5R24X**	

③ Complete catalog number includes handle, mechanism, shaft and mounting hardware.

Discount Symbol **CB-2**

Direct (Close-Coupled) Handle Mechanisms

Universal Direct (EG – LG)

Direct (Close-Coupled) Handle Mechanisms mount directly to the circuit breaker. They are used in shallow enclosures where the standard variable depth Through-the-Door type mechanism is not practical or cannot be used. They are typically for applications where high volume, standardized enclosures are being fabricated.

NEMA Ratings

Rated NEMA 1 and NEMA 12.

The Universal Direct handle mechanism is designed exclusively for the new Cutler-Hammer EG, JG and LG circuit breakers. It is available as standard with a door interlock to prevent opening the enclosure while the circuit breaker is in the ON position. It is also available without a door interlock.

The Universal Direct handle mechanism is UL 489 listed, IEC 60947-1/2 and meets CSA requirements.

The Euro IEC Direct handle mechanism is designed for NG and RG MCCBs. The Euro IEC Direct handle mechanism is 60947-112.

Table 12-127. Universal Direct Ordering Information

Frame	Black Handle Color				Red Handle Color	
	with Interlock	Price U.S. $	without Interlock	Price U.S. $	without Interlock	Price U.S. $
	Catalog Number		Catalog Number		Catalog Number	
EG	**EHMCCBI**		**EHMCCB**		**EHMCCR**	
JG	—		**JHMCCB**		**JHMCCR**	
LG	—		**LHMCCB**		**LHMCCR**	

Table 12-128. Euro IEC Direct Ordering Information

Frame	Catalog Number	Price U.S. $
	Black Handle	
NG	**HMVD5B**	
RG	**HMVD6B**	

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Dimensions

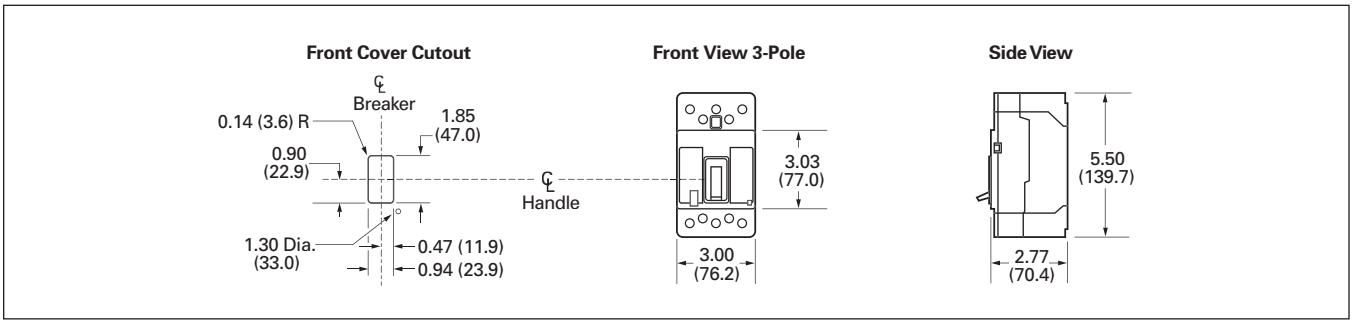

Figure 12-10. EG-Frame — Dimensions in Inches (mm)

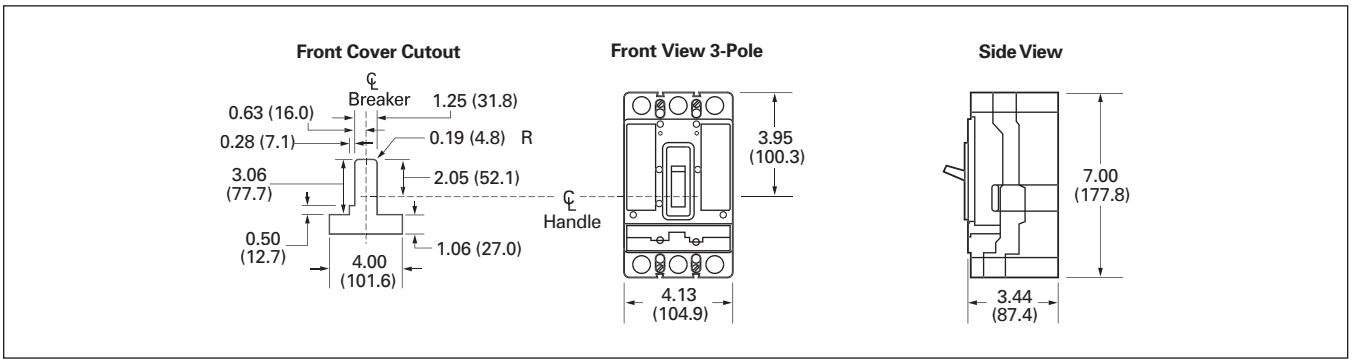

Figure 12-11. JG-Frame — Dimensions in Inches (mm)

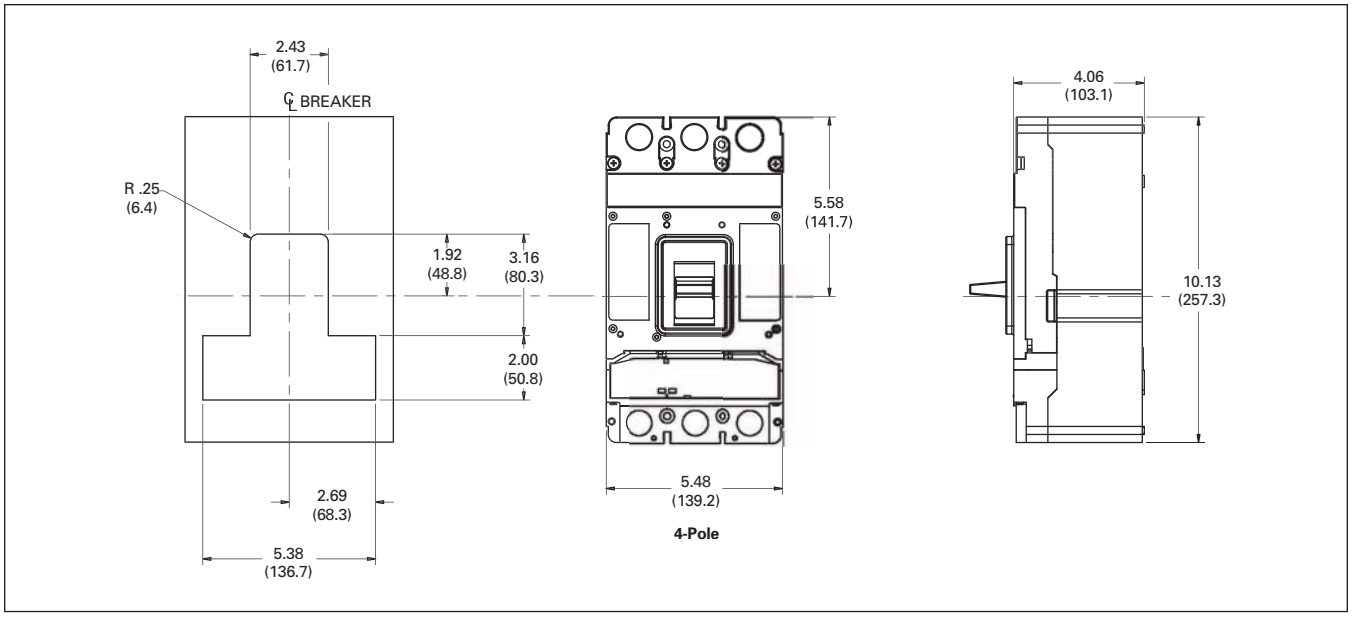

Figure 12-12. LG-Frame — Dimensions in Inches (mm)

Note: TA63IL, T63IL, T632L, TA632L terminals add 1.19 inches (30.2 mm) to line or load side of LG. LTS3K or LTS4K terminal covers add 2.13 inches (54.1 mm) to line or load side of LG.

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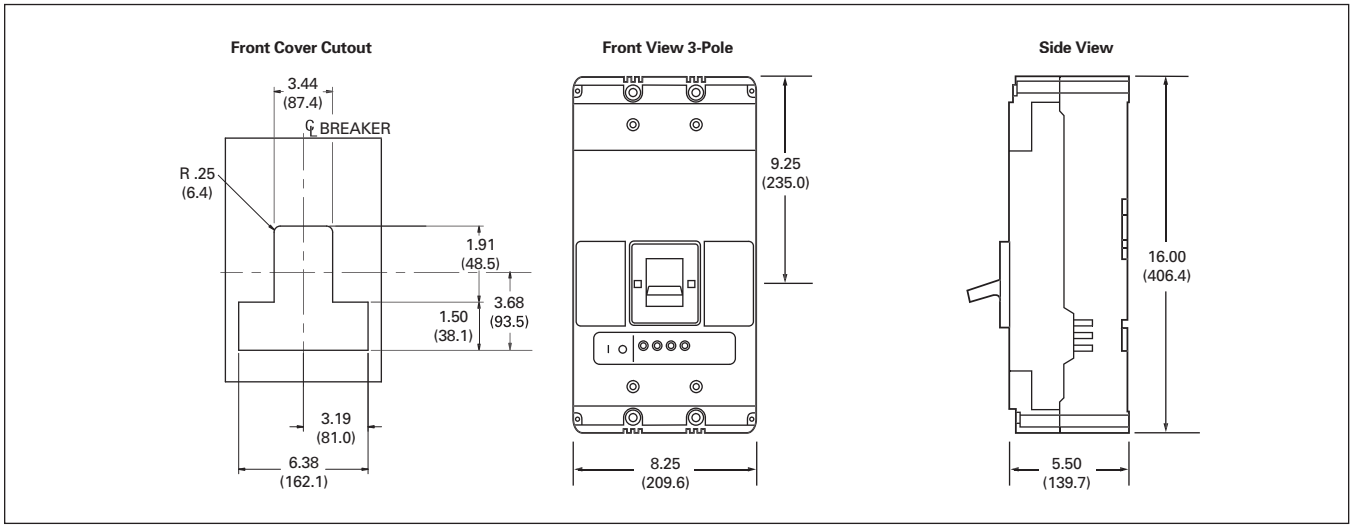

Figure 12-13. NG-Frame — Dimensions in Inches (mm)

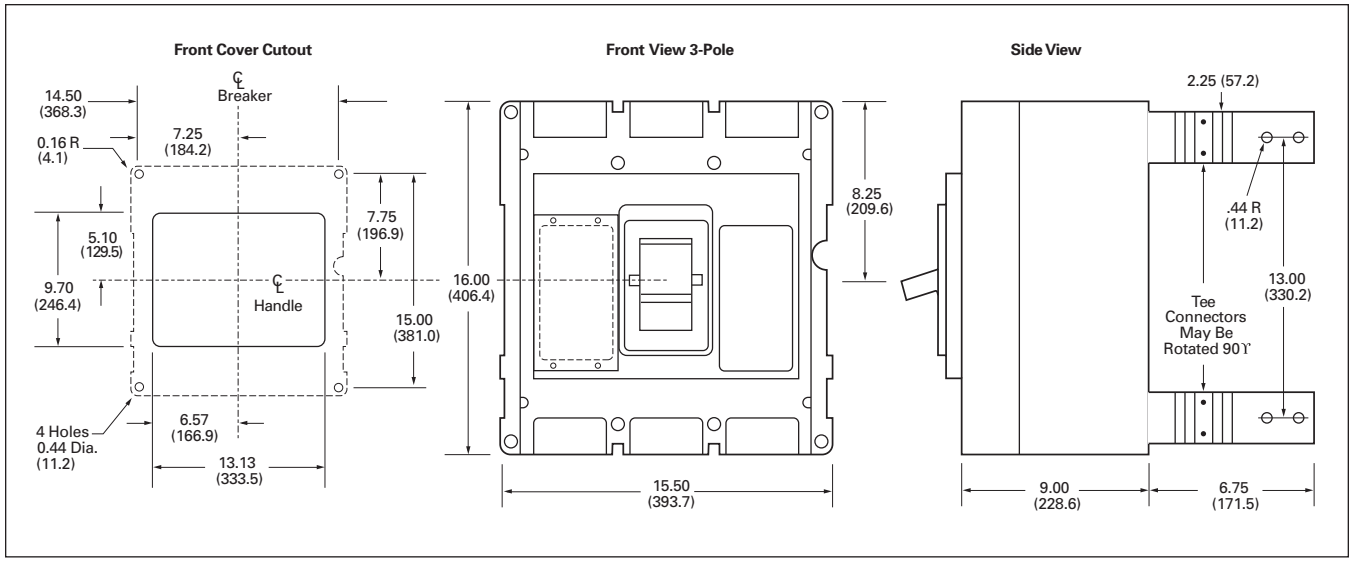

Figure 12-14. RG-Frame — Dimensions in Inches (mm)

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Product Line Description

Molded Case Circuit Breaker Product Family

Cutler-Hammer Molded Case Circuit Breakers by Eaton Corporation are designed to provide circuit protection for low voltage distribution systems. They are described by NEMA as, ". . . a device for closing and interrupting a circuit between separable contacts under both normal and abnormal conditions," and furthermore as, ". . . a breaker assembled as an integral unit in a supporting and enclosing housing of insulating material." The National Electrical Code (NEC®) describes them as, "A device designed to open and close a circuit by non-automatic means, and to open the circuit automatically on a predetermined overload of current, without injury to itself when properly applied within its rating."

So designed, Cutler-Hammer circuit breakers protect conductors against overloads and conductors and connected apparatus, such as motors and motor starters, against short circuits.

In low voltage distribution systems, there are many varied applications of molded case circuit breakers. Eaton offers the most comprehensive family of molded case circuit breakers in the industry.

This section of circuit breakers includes:

- Thermal-Magnetic Trip Breakers.
- Electronic rms Trip Breakers.
- Molded Case Switches.
- Motor Circuit Protectors.
- Current Limiting Breakers.
- Special Application Breakers.

Modified Breakers

Cutler-Hammer breakers can be ordered with internal accessories installed. These modified breakers will be subject to an addition charge.

Modified Breakers	$75 List Adder

Special Calibration

Special non-UL-listed calibrations are available for certain ambient temperatures other than 40°C and for frequencies other than 50/60 Hz or dc. Reduced interrupting ratings will apply for 400 Hz applications.

Suffix **H01** 400 Hz	20% Adder

50°C Calibration

Add suffix **V** to Catalog Number for complete breaker, listed above, when ordering listed ampere ratings for breakers to be used in 50°C ambients. (No price adder.) (No UL label.)

Moisture-Fungus Treatment

All circuit breaker cases are molded from glass-polyester which does not support the growth of fungus. Any parts which are susceptible to the growth of fungus will require special treatment.

Suffix **J01** Fungus Treated	$375 + 20% Adder

Freeze-Tested Circuit Breakers

The circuit breakers may be ordered with freeze testing. This option uses special lubrication and mechanical operation is verified at -40°C.

Suffix **F01** Freeze Tested	20% Adder

Marine Applications

F- to R-Framed circuit breakers can be supplied to meet the following marine specifications:

- U.S. Coast Guard CFR 46 ABS — American Bureau of Shipping IEEE 45.

These specifications generally require molded case circuit breakers to be supplied with special nameplating, and plug-in adapter kits. When plug-in adapter kits are used, no terminals need be supplied.

Circuit breakers can also be supplied to meet UL 489 Supplement SA (Marine Use) and UL 489 Supplement SB (Naval Use).

UL 489 Supplement SA applies to vessels over 65 feet (19.8 m) in length. Requirements include 40°C ambient calibration, special labeling, and no use of aluminum conductors or terminals. (No 50ºC available.)

Suffix **H08** "Marine"	10% Adder

UL 489 Supplement SB requires 50°C ambient calibration, vibration testing, special nameplating and no use of aluminum conductors or terminals. ("Naval" labeled per UL but no "UL" mark due to 50°C label.)

Suffix **H09** "Naval"	10% Adder

Standards and Certifications

Molded case circuit breakers are designed to conform with the following standards:

- Underwriters Laboratories Inc., Standard UL 489, Molded Case Circuit Breakers and Circuit Breaker Enclosures.
- National Electrical Manufacturers Association (NEMA) Standards Publication No. AB1-1993, Molded Case Circuit Breakers.
- Australian Standard AS 2184, Molded Case Circuit Breakers.
- British Standards Institution Standard BS 4752: Part 1, Switchgear and Control Gear Part 1: Circuit Breakers.
- Canadian Standards Association (CSA) Standard C22.2 No. 5, Service Entrance and Branch Circuit Breakers.
- International Electrotechnical Commission Recommendations IEC 60947-2, Circuit Breakers.
- Japanese T-Mark Standard Molded Case Circuit Breakers.
- South African Bureau of Standards, Standard SABS 156, Standard Specification for Molded Case Circuit Breakers.
- Swiss Electro-Technical Association Standard SEV 157-1, Safety Regulations for Circuit Breakers.
- Union Technique de l'Electricite Standard NF C 63-120, Low Voltage Switchgear and Control Gear Circuit Breaker Requirements.
- Verband Deutscher Elektrotechniker (Association of German Electrical Engineers) Standard VDE 0660, Low Voltage Switchgear and Control Gear, Circuit Breakers.

Conformance with these standards satisfies most local and international codes, assuming user acceptability and simplified application.

Molded case circuit breakers equal or exceed Federal Specification Classification W-C-375b requirements for the particular class associated with the circuit breaker frame being considered.

Open breakers do not have service entrance ratings. Service entrance rating is part of the enclosure.

Quick Reference

Table 12-129. Industrial Circuit Breakers

Circuit Breaker Type	Continuous Ampere Rating at 40°C	No. Poles	Volts		Type of Trip ①	Federal Specification W-C-375b	UL Listed Interrupting Ratings (rms Symmetrical Amperes)								Page Number
							ac (kV)						dc (kV) ②		
			ac	dc			120	120/240	240	277	480	600	125	250	
G-Frame															
GHB	15 – 100	1	120	125	N.I.T.U.	11a	65	—	—	—	—	—	14	—	**12-80**
GHB	15 – 100	2, 3	240	125/250		10b, 11b,	—	—	65	—	—	—	—	14	**12-80**
GHB	15 – 100	1	277	125		12b, 14b,	—	—	—	14	—	—	14	—	**12-80**
GHB	15 – 100	2, 3	480Y/277	125/250		15b	—	—	—	14	14	—	—	14	**12-80**
HGHB	15 – 30	1	277	125		12c, 13a, 13b	65	—	—	25	—	—	14	—	**12-80**
GHQ	15 – 20	1	277	—			65	—	—	14	—	—	—	—	**12-80**
GHBS	15 – 30	1, 2	480Y/277	—	—	—	65	65	—	14	—	—	—	—	**11-19**
GBHS	15 – 20	1, 2	600Y/347	—	N.I.T.U.	—	—	—	—	—	—	10	—	—	**11-19**
GD	15 – 50	2	480	125/250	N.I.T.U.	13b	—	—	65	—	14	—	—	10	**12-79**
GD	15 – 100	3	480	250		13b	—	—	65	—	22	—	—	10	**12-79**
GHC	15 – 100	1	120	125	N.I.T.U.	12c, 13a	65	—	—	—	—	—	14	—	**12-82**
GHC	15 – 100	2, 3	240	125/250		13b	—	—	65	—	—	—	—	14	**12-82**
GHC	15 – 100	1	277	125		12c, 13a	—	—	—	14	—	—	14	—	**12-82**
GHC	15 – 100	2, 3	480Y/277	125/250		13b	—	—	—	14	14	—	—	14	**12-82**
HGHC	15 – 30	1	277	125			65	—	—	25	—	—	14	—	**12-82**
F-Frame															
EDB	100 – 225	2, 3	240	125	N.I.T.U.	—	—	—	22	—	—	—	10	—	**12-85**
EDS	100 – 225	2, 3	240	125		—	—	—	42	—	—	—	10	—	**12-85**
ED	15 – 225	2, 3	240	125	N.I.T.U.	12b	—	—	65	—	—	—	10	—	**12-85**
EDH	100 – 225	2, 3	240	125		14b	—	—	100	—	—	—	10	—	**12-85**
EDC	100 – 225	2, 3	240	125		1	—	—	200	—	—	—	10	—	**12-85**
EHD	15 – 100	1	277	125	N.I.T.U.	13a	—	—	—	14	—	—	10	—	**12-85**
EHD	15 – 100	2, 3	480	250		13b	—	—	18	—	14	—	—	10	**12-85**
FDB	15 – 150	2, 3	600	250	N.I.T.U.	18a	—	—	18	—	14	14	—	10	**12-85**
FDB	15 – 150	4	600	250		③	—	—	18	—	14	14	—	10	**12-85**
FD	15 – 150	1	277	125	N.I.T.U.	13a	—	—	—	35	—	—	10	—	**12-85**
FD	15 – 225	2, 3	600	250		22a	—	—	65	—	35	18	—	10	**12-85**
FD	15 – 225	4	600	250		③	—	—	65	—	35	18	—	10	**12-85**
FDE	15 – 225	3	600	—	N.I.T.	—	—	—	65	—	35	18	—	—	**12-85**
HFD	15 – 150	1	277	125	N.I.T.U.	13a	—	—	—	65	—	—	10	—	**12-85**
HFD	15 – 225	2,3	600	250		22a	—	—	100	—	65	25	—	22	**12-85**
HFD	15 – 225	4	600	250		③	—	—	100	—	65	25	—	22	**12-85**
HFDE	15 – 225	3	600	—	N.I.T.	—	—	—	100		65	25	—	—	**12-85**
FDC ④	15 – 225	2, 3	600	250	N.I.T.U.	24a	—	—	200	—	100	35	—	22	**12-85**
FDC ④	15 – 225	4	600	250		③	—	—	200	—	100	35	—	22	**12-85**
FDCE ④⑤	15 – 225	3	600	—	N.I.T.	—	—	—	200	—	100	25	—	—	**12-85**

① N.I.T.U. is non-interchangeable trip unit and I.T.U. is interchangeable trip unit.
② 2-pole circuit breaker, or two poles of 3-pole circuit breaker at 250 Vdc.
③ Not defined in W-C-375b.
④ Current limiting.
⑤ Check with Eaton for availability.

Table 12-129. Industrial Circuit Breakers (Continued)

Circuit Breaker Type	Continuous Ampere Rating at 40°C	No. Poles	Volts		Type of Trip ①	Federal Specification W-C-375b	UL Listed Interrupting Ratings (rms Symmetrical Amperes)								Page Number
			ac	dc			ac (kV)						dc (kV) ②		
							120	120/240	240	277	480	600	125	250	
J-Frame															
JDB	70 – 250	2, 3	600	250	N.I.T.U.	22a	—	—	65	—	35	18	—	10	**12-96**
JD	70 – 250	2, 3, 4	600	250	I.T.U.	22a	—	—	65	—	35	18	—	10	**12-95**
HJD	70 – 250	2, 3, 4	600	250	I.T.U.	22a	—	—	100	—	65	25	—	22	**12-95**
JDC ③	70 – 250	2, 3, 4	600	250	I.T.U.	22a	—	—	200	—	100	35	—	22	**12-95**
K-Frame															
DK	250 – 400	2, 3	240	250	N.I.T.U.	14b	—	—	65	—	—	—	—	10	**12-107**
KDB	100 – 400	2, 3	600	250	N.I.T.U.	23a	—	—	65	—	35	25	—	10	**12-107**
KD	100 – 400	2, 3, 4	600	250	I.T.U.	23a	—	—	65	—	35	25	—	10	**12-103, 12-104, 12-109, 12-110**
CKD	100 – 400	2, 3, 4	600	250	I.T.U.	23a	—	—	65	—	35	25	—	—	**12-108, 12-111, 12-112**
HKD	100 – 400	2, 3, 4	600	250	I.T.U.	23a	—	—	100	—	65	35	—	22	**12-103, 12-104, 12-109, 12-110**
CHKD	100 – 400	2, 3, 4	600	250	I.T.U.	23a	—	—	100	—	65	35	—	—	**12-108, 12-111, 12-112**
KDC ③	100 – 400	2, 3, 4	600	250	I.T.U.	23a	—	—	200	—	100	65	—	22	**12-103, 12-104, 12-109, 12-110**
L-Frame															
LDB	300 – 600	2, 3	600	250	N.I.T.U.	23a	—	—	65	—	35	25	—	22	**12-123**
LD	300 – 600	2, 3, 4	600	250	I.T.U.	23a	—	—	65	—	35	25	—	22	**12-119, 12-120, 12-126**
CLD	300 – 600	2, 3, 4	600	250	I.T.U.	23a	—	—	65	—	35	25	—	—	**12-122, 12-130**
HLD	300 – 600	2, 3, 4	600	250	I.T.U.	23a	—	—	100	—	65	35	—	25	**12-119, 12-120, 12-126**
CHLD	300 – 600	2, 3, 4	600	250	I.T.U.	23a	—	—	100	—	65	35	—	—	**12-122, 12-130**
LDC ③	300 – 600	2, 3, 4	600	250	I.T.U.	23a	—	—	200	—	100	50	—	30	**12-119, 12-120, 12-127**
CLDC ③	300 – 600	2, 3, 4	600	250	I.T.U.	23a	—	—	200	—	100	50	—	30	**12-122, 12-131**
M-Frame															
MDL	300 – 800	2, 3	600	250	I.T.U.	23a	—	—	65	—	50	25	—	22	**12-137, 12-138**
CMDL	300 – 800	2, 3	600	250	I.T.U.	23a	—	—	65	—	50	25	—	—	**12-139**
HMDL	300 – 800	2, 3	600	250	I.T.U.	23a	—	—	100	—	65	35	—	25	**12-137, 12-138**
CHMDL	300 – 800	2, 3	600	250	I.T.U.	23a	—	—	100	—	65	35	—	—	**12-139**
N-Frame															
ND	600 – 1200	3, 4	600	—	N.I.T.U.	23A	—	—	65	—	50	25	—	—	**12-145, 12-158**
CND	600 – 1200	3, 4	600	—	N.I.T.U.	23A	—	—	65	—	50	25	—	—	**12-152, 12-160**
HND	600 – 1200	3, 4	600	—	N.I.T.U.	23A	—	—	100	—	65	35	—	—	**12-147, 12-158**
CHND	600 – 1200	3, 4	600	—	N.I.T.U.	23A	—	—	100	—	65	35	—	—	**12-154, 12-160**
NDC	600 – 1200	3, 4	600	—	N.I.T.U.	23A	—	—	200	—	100	65	—	—	**12-149, 12-158**
CNDC	600 – 1200	3, 4	600	—	N.I.T.U.	23A	—	—	200	—	100	65	—	—	**12-156, 12-160**
NDU	600 – 1200	3	600	—	N.I.T.	—	—	—	300	—	150	75	—	—	**—**

① N.I.T.U. is non-interchangeable trip unit and I.T.U. is interchangeable trip unit.
② 2-pole circuit breaker, or two poles of 3-pole circuit breaker at 250 Vdc.
③ Current limiting.

Table 12-129. Industrial Circuit Breakers (Continued)

Circuit Breaker Type	Continuous Ampere Rating at 40°C	No. Poles	Volts		Type of Trip ①	Federal Specification W-C-375b	UL Listed Interrupting Ratings (rms Symmetrical Amperes)								Page Number
			ac	dc			ac (kV)						dc (kV) ②		
							120	120/240	240	277	480	600	125	250	
R-Frame															
RD 1600	800 – 1600	3, 4	600	—	N.I.T.U.	24a	—	—	125	—	65	50	—	—	**12-167**
CRD 1600	800 – 1600	3, 4	600	—	N.I.T.U.	24a	—	—	125	—	65	50	—	—	**12-170**
RD 2000	1000 – 2000	3, 4	600	—	N.I.T.U.	24a	—	—	125	—	65	50	—	—	**12-167**
RD 2500	1000 – 2500	3, 4	600	—	N.I.T.U.	24a	—	—	125	—	65	50	—	—	**12-167**
CRD 2000	1000 – 2000	3, 4	600	—	N.I.T.U.	24a	—	—	125	—	65	50	—	—	**12-170**
RDC 1600	800 – 1600	3, 4	600	—	N.I.T.U.	25a	—	—	200	—	100	65	—	—	**12-169**
CRDC 1600	800 – 1600	3, 4	600	—	N.I.T.U.	25a	—	—	200	—	100	65	—	—	**12-170**
RDC 2000	1000 – 2000	3, 4	600	—	N.I.T.U.	25a	—	—	200	—	100	65	—	—	**12-169**
RDC 2500	1000 – 2500	3, 4	600	—	N.I.T.U.	25a	—	—	200	—	100	65	—	—	**12-169**
CRDC 2000	1000 – 2000	3, 4	600	—	N.I.T.U.	25a	—	—	200	—	100	65	—	—	**12-170**

① N.I.T.U. is non-interchangeable trip unit and I.T.U. is interchangeable trip unit.
② 2-pole circuit breaker, or two poles of 3-pole circuit breaker at 250 Vdc.

Product Description

- All two- and three-pole circuit breakers are of the common trip type. On all 3-phase Delta (240 V) Grounded B phase applications, refer to Eaton.
- Single-pole circuit breakers, 15 and 20 amperes. Switching duty rated (SWD) for fluorescent lighting applications.
- All G-Frame circuit breakers are suitable for reverse feed use.
- HACR rated.

Technical Data and Specifications

Interrupting Capacity Ratings

Table 12-130. UL 489 Interrupting Capacity Ratings

Circuit Breaker Type	Number of Poles	Interrupting Capacity (kA Symmetrical Amperes)				
		Volts ac (50/60 Hz)				
		120	240	277	480	250 ①②
GD	2 3	— —	65 65	— —	14 22	10 10

① Time constant is 8 milliseconds minimum.
② Two poles of 3-pole circuit breaker.

Table 12-130. UL 489 Interrupting Capacity Ratings (Continued)

Circuit Breaker Type	Number of Poles	Interrupting Capacity (kA Symmetrical Amperes)				
		Volts ac (50/60 Hz)				Volts dc
		120	240	277	480Y/277	125
GHQ	—	65	—	14	—	—
GHB	1 2, 3	65 —	— 65	14 —	— 14	14 ③ 14
HGHB	1	65	—	25	—	14
GHC	1 2, 3	65 —	— 65	14 —	— 14	14 ③ 14
HGHC	1	65	—	25	—	14

③ 15 through 70 A breakers only.

Terminal Types

For line and load-side. Terminals are UL listed as suitable for wire type and size given below.

Table 12-131. Terminal Types

Circuit Breaker Amperes	Terminal Type Material	Screw Head Type	Wire Type	AWG Wire Range	Metric Wire ④ Range (mm^2)
Standard					
15 – 20 25 – 100	Clamp (Plated Steel) Pressure (Aluminum Body)	Slotted Slotted	Cu/Al Cu/Al	14 – 10 10 – 1/0	2.5 – 4 4 – 50
Optional — GD Only					
15 – 100	Pressure (Steel Body)	Slotted	Cu	14 – 3	—

④ Not UL listed sizes.

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Product Selection

This information is presented only as an aid to understanding Catalog Numbers. It is not to be used to build Catalog Numbers for circuit breakers or trip units.

Table 12-132. Circuit Breaker/Frame Catalog Numbering System

GD 3 100 K

Circuit Breaker Type	Number of Poles	Trip Amperes	Suffix
GD	**1** = 1 Pole	**015**	**K** = Molded Case Switch
GHB	**2** = 2 Poles	**020**	**D** = Ring Type Terminals
GHC	**3** = 3 Poles	**024**	**C** = Steel Collars
GHQ		**030**	**V** = 50°C
HGHB		**035**	**J01** = Fungus Proofed
HGHC		**040**	**R01** = Shock Tested
GHBGFEP		**045**	**F01** = Freeze Tester
GHCGFEP		**050**	**HID** = High Intensity Discharge ①
		060	
		070	
		080	
		090	
		100	

① HID suffix only applies to the GHB and GHC 1 pole, 15 – 20 ampere circuit breakers.

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Type GD Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units

Typical G-Frame Circuit Breaker

Standards and Certifications

- UL/CSA.

Product Description

- Cable in, cable out.
- Includes mounting hardware and BMHE.

Product Selection

Table 12-133. Type GD Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units

Maximum Continuous Ampere Rating at 40°C	480 Vac Maximum, 250 Vdc				Includes Binding Head Screws and Clamps 10 – 32 x .312	
	14 kAIC at 480 Vac		22 kAIC at 480 Vac			
	Includes Line and Load Terminals					
	2-Pole		3-Pole		3-Pole	
	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
15	GD2015		GD3015		GD3015D	
20	GD2020		GD3020		GD3020D	
25	GD2025		GD3025		GD3025D	
30	GD2030		GD3030		GD3030D	
35	GD2035		GD3035		GD3035D	
40	GD2040		GD3040		GD3040D	
45	GD2045		GD3045		GD3045D	
50	GD2050		GD3050		GD3050D	
60	—		GD3060		GD3060D	
70	—		GD3070		GD3070D	
80	—		GD3080		GD3080D	
90	—		GD3090		GD3090D	
100	—		GD3100		GD3100D	

Table 12-134. Type GDB Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units

Maximum Continuous Ampere Rating at 40°C	480 Vac Maximum, 250 Vdc			
	14 kAIC at 480 Vac		22 kAIC at 480 Vac	
	Includes Line and Load Terminals			
	2-Pole		3-Pole	
	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
15	GDB2015		GDB3015	
20	GDB2020		GDB3020	
25	GDB2025		GDB3025	
30	GDB2030		GDB3030	
35	GDB2035		GDB3035	
40	GDB2040		GDB3040	
45	GDB2045		GDB3045	
50	GDB2050		GDB3050	
60	—		GDB3060	
70	—		GDB3070	
80	—		GDB3080	
90	—		GDB3090	
100	—		GDB3100	

Type GD Molded Case Switches

Product Selection

Table 12-135. Type GD Molded Case Switches

Maximum Continuous Ampere Rating at 40°C	480 Vac Maximum, 250 Vdc	
	Catalog Number (Includes Line and Load Terminals)	Price U.S. $
3-Pole		
60 100	GD3060K GD3100K	
60 100	GD3060KC ① GD3100K ①	

① Includes line and load steel terminals.

Note: Molded Case Switches may open above 1300 amperes.

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Types GHB and HGHB Bolt-On Panelboard Circuit Breakers

Typical GHB

Standards and Certifications

These breakers meet the requirements of Federal Specification W-C-375b as follows:

- Type GHB, 120 and 240 V:
  - 1 Pole: Class 11a
  - 2, 3 Poles: Classes 10b, 11b, 12b, 14b, 15b
  - UL/CSA
- Type GHB, 277 and 480Y/277 V:
  - 1 Pole: Classes 12c, 13a
  - 2, 3 Poles: Class 13b
  - Type HGHB 277 V
  - Type GHQ 277 V

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Product Selection

Table 12-136. Type GHB Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units ①

Continuous Ampere Rating at 40°C	277/480 Vac Maximum, 125 Vdc Maximum ②		277/480 Vac Maximum, 125/250 Vdc Maximum		277/480 Vac Maximum, 125/250 Vdc Maximum ③	
	1-Pole		2-Pole		3-Pole	
	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
15	GHB1015 ④⑤		GHB2015 ④		GHB3015 ④	
20	GHB1020 ④⑤		GHB2020 ④		GHB3020 ④	
25	GHB1025		GHB2025		GHB3025	
30	GHB1030		GHB2030		GHB3030	
35	GHB1035		GHB2035		GHB3035	
40	GHB1040		GHB2040		GHB3040	
45	GHB1045		GHB2045		GHB3045	
50	GHB1050		GHB2050		GHB3050	
60	GHB1060		GHB2060		GHB3060	
70	GHB1070		GHB2070		GHB3070	
80	GHB1080		GHB2080		GHB3080	
90	GHB1090		GHB2090		GHB3090	
100	GHB1100		GHB2100		GHB3100	

① 480Y/277 V, circuit breakers (Type GHB) not suitable for 3-phase Delta (480 V).
② 15 through 70 ampere circuit breakers only.
③ Use (2) outside poles.
④ Uses .190 (4.83) -32 screw type clamp terminals.
⑤ Add suffix HID for High Intensity Discharge (HID) applications. 15 and 20 ampere, 1-pole are SWD rated.

Table 12-137. Type HGHB Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units

Continuous Ampere Rating at 40°C	277 Vac Maximum, 125 Vdc Maximum	
	1-Pole	
	Catalog Number	Price U.S. $
15	HGHB1015 ⑥	
20	HGHB1020 ⑥	
25	HGHB1025	
30	HGHB1030	

⑥ 15 and 20 ampere, 1-pole are SWD rated.

Table 12-138. Type GHQ Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units

Continuous Ampere Rating at 40°C	277 Vac Maximum 14 kAIC, No dc Rating (HID & SWD)	
	1-Pole	
	Catalog Number	Price U.S. $
15	GHQ1015 ⑦	
20	GHQ1020 ⑦	

⑦ Includes 4A33462H01 load clip.

Discount Symbol **CB-2**

Type GHBGFEP Bolt-On Panelboard 30 mA Industrial Ground Fault Circuit Protectors

Single-Phase (Requires 2 Poles)

Product Description

- 15 – 60 amperes, 277 V, 50/60 Hz.
- Operational voltage 240 V to 305 V.

Standards and Certifications

These circuit breakers meet the requirements of UL 489 and UL 1053.

Technical Data

Table 12-139. Interrupting Capacity Ratings

Circuit Breaker Type	Number of Poles	Interrupting Capacity (Symmetrical Amperes)
		277 Vac (50/60 Hz)
GHBGFEP	1	14,000

Product Selection

Table 12-140. Type GHBGFEP Bolt-On Panelboard 30 mA Industrial Ground Fault Circuit Protectors with Non-Interchangeable Trip Units

Continuous Ampere Rating at 40°C	Single-Phase (Requires 2 Poles) 277 Vac, 30 mA	
	Catalog Number	Price U.S. $
15	**GHBGFEP1015**	
20	**GHBGFEP1020**	
30	**GHBGFEP1030**	
40	**GHBGFEP1040**	
50	**GHBGFEP1050**	
60	**GHBGFEP1060**	

Types GHC and HGHC Circuit Breakers

Typical GHC

Product Description

- 15 – 100 amperes.
- 120, 240, 277, 480Y/277 V, 50/60 Hz, 125, 125/250 Vdc.
- 1, 2 and 3 poles.
- Cable in, cable out.
- Does not include mounting hardware.

Standards and Certifications

These breakers meet the requirements of Federal Specification W-C-37b as follows:

- Type GHC, 277 and 480Y/277 V:
  - 1 Pole: Classes 12c, 13a
  - 2, 3 Poles: Class 13b
  - UL/CSA

Product Selection

Table 12-141. Type GHC Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units

Continuous Ampere Rating at 40°C	277 Vac Maximum, 125 Vdc Maximum ①		480Y/277 Vac Maximum, 125/250 Vdc Maximum		480Y/277 Vac Maximum, 125/250 Vdc Maximum ②	
	1-Pole		2-Pole		3-Pole	
	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
15	GHC1015 ③④		GHC2015 ③		GHC3015 ③	
20	GHC1020 ③④		GHC2020 ③		GHC3020 ③	
25	GHC1025		GHC2025		GHC3025	
30	GHC1030		GHC2030		GHC3030	
35	GHC1035		GHC2035		GHC3035	
40	GHC1040		GHC2040		GHC3040	
45	GHC1045		GHC2045		GHC3045	
50	GHC1050		GHC2050		GHC3050	
60	GHC1060		GHC2060		GHC3060	
70	GHC1070		GHC2070		GHC3070	
80	GHC1080		GHC2080		GHC3080	
90	GHC1090		GHC2090		GHC3090	
100	GHC1100		GHC2100		GHC3100	

① 15 through 70 ampere circuit breakers only.
② Use (2) outside poles.
③ Uses .190-32 screw type clamp terminals.
④ Add suffix HID for High Intensity Discharge (HID) applications. 15 and 20 ampere, 1-pole are SWD rated.

Table 12-142. Type HGHC Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units

Continuous Ampere Rating at 40°C	277 Vac Maximum, 125 Vdc Maximum	
	1-Pole	
	Catalog Number	Price U.S. $
15	HGHC1015 ⑤	
20	HGHC1020 ⑤	
25	HGHC1025	
30	HGHC1030	

⑤ 15 and 20 ampere, 1-pole are SWD rated.

Type GHCGFEP Cable-In/ Cable-Out 30 mA Industrial Ground Fault Circuit Protectors

Single-Phase
(Requires 2 Pole Spaces)

Product Description

- 15 – 60 amperes, 277 V, 50/60 Hz.
- Operational voltage 240 V to 305 V.

Standards and Certifications

These circuit breakers meet the requirements of UL 489 and UL 1053.

Technical Data and Specifications

Table 12-143. Interrupting Capacity Ratings

Circuit Breaker Type	Number of Poles	Interrupting Capacity (Symmetrical Amperes)
		277 Vac (50/60 Hz)
GHCGFEP	1	14,000

Product Selection

Table 12-144. Type GHCGFEP 30 mA Industrial Ground Fault Circuit Protectors with Non-Interchangeable Trip Units

Continuous Ampere Rating at 40°C	Single-Phase (Requires 2 Poles) 277 V, 30 mA	
	Catalog Number	Price U.S. $
15	**GHCGFEP1015**	
20	**GHCGFEP1020**	
30	**GHCGFEP1030**	
40	**GHCGFEP1040**	
50	**GHCGFEP1050**	
60	**GHCGFEP1060**	

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Special Purpose GHC Circuit Breakers

Product Description

Eaton's Cutler-Hammer Type GHC circuit breakers have binding head screw-type terminals on line and load side. These circuit breakers with screw-type terminals (.190-32) will be marked "Special purpose breaker not for general use." To order this special breaker, use the Catalog Number from **Tables 12-145** and **12-146**.

Product Selection

Table 12-145. Type GHC Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units

Continuous Ampere Rating at 40°C	277 Vac Maximum, 125 Vdc Maximum		480Y/277 Vac Maximum, 125/250 Vdc Maximum		480Y/277 Vac Maximum, 125/250 Vdc Maximum ①	
	1-Pole		2-Pole		3-Pole	
	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
25	**GHC1025D**		**GHC2025D**		**GHC3025D**	
30	**GHC1030D**		**GHC2030D**		**GHC3030D**	
35	**GHC1035D**		**GHC2035D**		**GHC3035D**	
40	**GHC1040D**		**GHC2040D**		**GHC3040D**	
45	**GHC1045D**		**GHC2045D**		**GHC3045D**	
50	**GHC1050D**		**GHC2050D**		**GHC3050D**	
60	**GHC1060D**		**GHC2060D**		**GHC3060D**	
70	**GHC1070D**		**GHC2070D**		**GHC3070D**	
80	**GHC1080D**		**GHC2080D**		**GHC3080D**	
90	**GHC1090D**		**GHC2090D**		**GHC3090D**	
100	**GHC1100D**		**GHC2100D**		**GHC3100D**	

① Use (2) outside poles.

Table 12-146. Type GHB and GHC Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units for HID Lighting Applications

Type	Continuous Ampere Rating at 40°C	277 Vac Maximum	
		1-Pole	
		Catalog Number	Price U.S. $
Cable-in	15	**GHC1015HID**	
	20	**GHC1020HID**	
Bolt-on	15	**GHB1015HID**	
	20	**GHB1020HID**	

Discount Symbol **CB-2**

F-Frame

Typical F-Frame Breaker

F-Frame Breaker with Electronic Trip Unit

Product Description

- All Eaton's Cutler-Hammer F-Frame Circuit Breakers by are HACR rated.
- All circuit breakers 10 through 30 amperes are suitable for HID (high intensity discharge) use.
- All F-Frame circuit breakers are suitable for reverse feed use

Technical Data and Specifications

Table 12-147. UL 489 Interrupting Capacity Ratings

Circuit Breaker Type	Number of Poles	Interrupting Capacity (kA Symmetrical Amperes)					
		Volts ac (50/60 Hz)				Volts dc ①	
		240	277	480	600	125	250 ②③
EDB	2, 3	22	—	—	—	10	—
EDS	2, 3	42	—	—	—	10	—
ED	2, 3	65	—	—	—	10	—
EDH	2, 3	100	—	—	—	10	—
EDC	2, 3	200	—	—	—	10	—
EHD	1	—	4	—	—	10	—
	2, 3	18	—	14	—	—	10
FDB	2, 3, 4	18	—	14	14	—	10
FD, FDE ④	1	—	35	—	—	10	—
	2, 3, 4	65	—	35	18	—	10
HFD, HFDE ④	1	—	65	—	—	10	—
	2, 3, 4	100	—	65	25	—	22
FDC ⑤, FDCE ④⑤⑥	2, 3, 4	200	—	100	25	—	22

① dc ratings apply to substantially non-inductive circuits.
② 2-pole circuit breaker, or two poles of 3-pole circuit breaker.
③ Time constant is 3 milliseconds minimum at 10 kA and 8 milliseconds minimum at 22 kA.
④ Electronics available on 3-pole only, no dc rating for FDE, HFDE, FDCE.
⑤ Current limiting.
⑥ Check with Eaton for availability.

Table 12-148. IEC 157-1 (P1) Interrupting Capacity Ratings (P1)

Circuit Breaker Type	Number of Poles	Interrupting Capacity (kA Symmetrical Amperes)					
		Volts ac (50/60 Hz)				Volts dc ⑦	
		220, 240	380, 415	440	500	125	250 ⑧⑨
EDB	2, 3	22	—	—	—	10	—
EDS	2, 3	42	—	—	—	10	—
ED	2, 3	65	—	—	—	10	—
EDH	2, 3	100	—	—	—	10	—
EDC	2, 3	200	—	—	—	10	—
EHD	1	—	14	—	—	10	—
	2, 3	18	—	14	—	—	10
FDB	2, 3, 4	18	14	14	14	—	10
FD	1	35	—	—	—	10	—
	2, 3, 4	65	35	35	18	—	10
HFD	1	65	—	—	—	10	—
	2, 3, 4	100	65	65	25	—	22
FDC	2, 3, 4	200	100	100	35	—	22

⑦ dc ratings apply to substantially non-inductive circuits.
⑧ 2-pole circuit breaker, or two poles of 3-pole circuit breaker.
⑨ Time constant is 3 milliseconds minimum at 10 kA and 8 milliseconds minimum at 22 kA.

Table 12-149. Digitrip Electronic Trip Units

Circuit Breaker Type	Frame	Ratings
FDE, HFDE, FDCE	225	100, 110, 125, 150, 160, 175, 200, 225
FDE, HFDE, FDCE	160	60, 70, 80, 90, 100, 125, 150, 160
FDE, HFDE, FDCE	80	15, 20, 30, 40, 50, 60, 70, 80

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Table 12-150. F-Frame Digitrip Specifications

Trip Unit Type	Digitrip RMS 310+	
rms Sensing	Yes	
Breaker Type		
Frame Ampere Range Interrupting Rating at 480 V	FDE 15 – 225 A 35, 65, 100 (kA)	
Protection		
Ordering Options	LS LSG	LSI LSIG
Fixed Rated Plug (I_n) Overtemperature Trip	No Yes	
Long Delay Protection (L)		
Adjustable Rating Plug (I_n) Long Delay Pickup Long Delay Time I^2t	No 40 – 100% Frame 2 – 24 Seconds	
Long Delay Time I^4t Long Delay Thermal Memory High Load Alarm	No Yes Yes	
Short Delay Protection (S)		
Short Delay Pickup	200 – 1000% x (I_r)	
Short Delay Time I^2t Short Delay Time Flat	Yes No	No Inst – 300 ms
Short Delay Time Z.S.I.	Yes ①	
Instantaneous Protection (I)		
Instantaneous Pickup Discriminator Instantaneous Override	No No Yes	
Ground Fault Protection (G)		
Ground Fault Alarm Ground Fault Pickup Ground Fault Delay I^2t	No 20 – 100% Frame No	
Ground Fault Delay Flat Ground Fault Z.S.I. Ground Fault Thermal Memory	Inst – 300 ms Yes ① Yes	
System Diagnostics		
Cause of Trip LEDs Magnitude of Trip Information Remote Signal Contacts	No No No	
System Monitoring		
Digital Display Current Voltage	No No No	
Power and Energy Power Quality Harmonics Power Factor	No No No	
Communications		
PowerNet	No	
Testing		
Testing Method	Test Kit	

① ZSI (Zone Selective Interlocking) is optional. Must order with ZSI. Standard 310+ does not come with ZSI.

Legend: I_n = Rating Plug
I_r = Long Delay Pickup Setting x I_n

Dimensions/Weights

Table 12-151. Dimensions in Inches (mm)

Number of Poles	Width	Height	Depth
1 2	1.38 (35.1) 2.75 (70.0)	6.00 (152.4) 6.00 (152.4)	3.38 (86.0) 3.38 (86.0)
3 4	4.13 (105.0) 5.50 (139.7)	6.00 (152.4) 6.00 (152.4)	3.38 (86.0) 3.38 (86.0)

Table 12-152. Approximate Shipping Weight, Lbs. (kg)

Breaker Type	Number of Poles			
	1	2	3	4
ED, EDB, EDS, EDH, EDC	—	3 (1.4)	4.5 (2.0)	—
EHD, FDB, FD, HFD, FDC	2 (.9)	3 (1.4)	4.5 (2.0)	6 (2.7)
FDE, HFDE, FDCE	—	—	4.5 (2.0)	—

Product Selection

This information is presented only as an aid to understanding Catalog Numbers. It is not to be used to build Catalog Numbers for circuit breakers or trip units.

Table 12-153. Circuit Breaker Catalog Numbering System

FDC 3 100 L

Circuit Breaker Type	Number of Poles	Trip Amperes	Suffix
EHD **FDB** **FD** **HFD** **FDC**	**1** = 1 Pole **2** = 2 Poles **3** = 3 Poles **4** = 4 Poles	**010** **015** **020** **025** **030** **035** **040** **045** **050** **060** **070** **080** **090** **100** **110** **125** **150** **175** (FD, HFD, FDC, 2-, 3-, 4-Pole Only) **200** (FD, HFD, FDC, 2-, 3-, 4-Pole Only) **225** (FD, HFD, FDC, 2-, 3-, 4-Pole Only)	**E** = 100% Protected (4-Pole only) Neutral Pole **EH** = 50% Protected (4-Pole only) **K** = High Magnetic Molded Case Switch **L** = Line and Load Terminals **S** = Stainless Steel Terminals **V** = 50°C Calibration **W** = Without Terminals **Y** = Line Terminals Only **Z** = Aluminum Terminals (≤ 100 Amperes)

EDC 3 200 L

Circuit Breaker Type	Number of Poles	Trip Amperes	Suffix
EDB **EDS** **ED** **EDH** **EDC**	**2** = 2 Poles **3** = 3 Poles	**100** **125** **150** **175** **200** **225**	**L** = Line and Load Terminals **W** = Without Terminals **Y** = Line Terminals Only **Z** = Aluminum Terminals (100 Amperes)

FDE 3 225 32 _ W

Circuit Breaker Type	Number of Poles	Trip Amperes	Trip Unit	Suffix	Suffix
FDE **HFDE** **FDCE**	**3** = 3 Poles	**80** **160** **225**	**33** = LS **32** = LSI **35** = LSG **36** = LSIG	**ZG** = Zone Selective Interlocking	**W** = Without Terminals **L** = Line and Load Terminals **—** = Load Side Terminals only

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Product Selection

Table 12-154. Types ED, EDH and EDC Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units Suitable for Reverse Feed

Maximum Continuous Ampere Rating at 40°C	240 Vac Maximum, 125 Vdc (Includes Terminals on Load End Only)											
	65 kAIC at 240 Vac				100 kAIC at 240 Vac				200 kAIC at 240 Vac			
	Type ED				Type EDH				Type EDC Current Limiting			
	2-Pole		3-Pole		2-Pole		3-Pole		2-Pole		3-Pole	
	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
15	ED2015		ED3015		—		—		—		—	
20	ED2020		ED3020		—		—		—		—	
25	ED2025		ED3025		—		—		—		—	
30	ED2030		ED3030		—		—		—		—	
35	ED2035		ED3035		—		—		—		—	
40	ED2040		ED3040		—		—		—		—	
50	ED2050		ED3050		—		—		—		—	
60	ED2060		ED3060		—		—		—		—	
100	ED2100		ED3100		EDH2100		EDH3100		EDC2100		EDC3100	
125	ED2125		ED3125		EDH2125		EDH3125		EDC2125		EDC3125	
150	ED2150		ED3150		EDH2150		EDH3150		EDC2150		EDC3150	
175	ED2175		ED3175		EDH2175		EDH3175		EDC2175		EDC3175	
200	ED2200		ED3200		EDH2200		EDH3200		EDC2200		EDC3200	
225	ED2225		ED3225		EDH2225		EDH3225		EDC2225		EDC3225	

Table 12-155. Types EDB and EDS Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units Suitable for Reverse Feed

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Maximum Continuous Ampere Rating at 40°C	240 Vac Maximum, 125 Vdc (Includes Terminals on Load End Only)							
	22 kAIC at 240 Vac				42 kAIC at 240 Vac			
	Type EDB				Type EDS			
	2-Pole		3-Pole		2-Pole		3-Pole	
	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
100	EDB2100		EDB3100		EDS2100		EDS3100	
110	EDB2110		EDB3110		EDS2110		EDS3110	
125	EDB2125		EDB3125		EDS2125		EDS3125	
150	EDB2150		EDB3150		EDS2150		EDS3150	
175	EDB2175		EDB3175		EDS2175		EDS3175	
200	EDB2200		EDB3200		EDS2200		EDS3200	
225	EDB2225		EDB3225		EDS2225		EDS3225	

Table 12-156. Type EHD Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units

Maximum Continuous Ampere Rating at 40°C	277 Vac Maximum, 125 Vdc		480 Vac Maximum, 250 Vdc			
	14 kAIC at 277 Vac		14 kAIC at 480 Vac			
	Type EHD (Includes Terminals on Load End Only)					
	1-Pole		2-Pole		3-Pole	
	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
10 ①	EHD1010		EHD2010		EHD3010	
15	EHD1015 ②		EHD2015		EHD3015	
20	EHD1020 ②		EHD2020		EHD3020	
25	EHD1025		EHD2025		EHD3025	
30	EHD1030		EHD2030		EHD3030	
35	EHD1035		EHD2035		EHD3035	
40	EHD1040		EHD2040		EHD3040	
45	EHD1045		EHD2045		EHD3045	
50	EHD1050		EHD2050		EHD3050	
60	EHD1060		EHD2060		EHD3060	
70	EHD1070		EHD2070		EHD3070	
80	EHD1080		EHD2080		EHD3080	
90	EHD1090		EHD2090		EHD3090	
100	EHD1100		EHD2100		EHD3100	

① Not UL listed. 5 kAIC interrupting rating.
② UL listed for SWD applications, see NEC Article 240-83(d).

Table 12-157. Type FD Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units

Max. Cont. Ampere Rating at 40°C	600 Vac Maximum, 250 Vdc						277 Vac Maximum, 125 Vdc		600 Vac Maximum, 250 Vdc					
	14 kAIC at 600 Vac						35 kAIC at 277 Vac		35 kAIC at 480 Vac					
	Type FDB (Includes Terminals on Load End Only)						Type FD (Includes Terminals on Load End Only)							
	2-Pole		3-Pole		4-Pole		1-Pole		2-Pole		3-Pole		4-Pole	
	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
10 ①	FDB2010		FDB3010		FDB4010		FD1010		—		—		—	
15	FDB2015		FDB3015		FDB4015		FD1015 ②		FD2015		FD3015		FD4015	
20	FDB2020		FDB3020		FDB4020		FD1020 ②		FD2020		FD3020		FD4020	
25	FDB2025		FDB3025		FDB4025		FD1025		FD2025		FD3025		FD4025	
30	FDB2030		FDB3030		FDB4030		FD1030		FD2030		FD3030		FD4030	
35	FDB2035		FDB3035		FDB4035		FD1035		FD2035		FD3035		FD4035	
40	FDB2040		FDB3040		FDB4040		FD1040		FD2040		FD3040		FD4040	
45	FDB2045		FDB3045		FDB4045		FD1045		FD2045		FD3045		FD4045	
50	FDB2050		FDB3050		FDB4050		FD1050		FD2050		FD3050		FD4050	
60	FDB2060		FDB3060		FDB4060		FD1060		FD2060		FD3060		FD4060	
70	FDB2070		FDB3070		FDB4070		FD1070		FD2070		FD3070		FD4070	
80	FDB2080		FDB3080		FDB4080		FD1080		FD2080		FD3080		FD4080	
90	FDB2090		FDB3090		FDB4090		FD1090		FD2090		FD3090		FD4090	
100	FDB2100		FDB3100		FDB4100		FD1100		FD2100		FD3100		FD4100	
110	FDB2110		FDB3110		FDB4110		FD1110		FD2110		FD3110		FD4110	
125	FDB2125		FDB3125		FDB4125		FD1125		FD2125		FD3125		FD4125	
150	FDB2150		FDB3150		FDB4150		FD1150		FD2150		FD3150		FD4150	
175	—		—		—		—		FD2175		FD3175		FD4175	
200	—		—		—		—		FD2200		FD3200		FD4200	
225	—		—		—		—		FD2225		FD3225		FD4225	

① Not UL listed. 5 kAIC interrupting rating.
② UL listed for SWD applications, see NEC Article 240-83(d).

Table 12-158. Types HFD and FDC Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units

Max. Cont. Ampere Rating at 40°C	277 Vac Maximum, 125 Vdc		600 Vac Maximum, 250 Vdc						600 Vac Maximum, 250 Vdc					
	65 kAIC at 277 Vac		65 kAIC at 480 Vac						100 kAIC at 480 Vac					
	Type HFD (Includes Terminals on Load End Only)								Type FDC Current Limiting (Includes Terminals on Load End Only)					
	1-Pole		2-Pole		3-Pole		4-Pole		2-Pole		3-Pole		4-Pole	
	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
15	HFD1015 ③		HFD2015		HFD3015		HFD4015		FDC2015		FDC3015		FDC4015	
20	HFD1020 ③		HFD2020		HFD3020		HFD4020		FDC2020		FDC3020		FDC4020	
25	HFD1025		HFD2025		HFD3025		HFD4025		FDC2025		FDC3025		FDC4025	
30	HFD1030		HFD2030		HFD3030		HFD4030		FDC2030		FDC3030		FDC4030	
35	HFD1035		HFD2035		HFD3035		HFD4035		FDC2035		FDC3035		FDC4035	
40	HFD1040		HFD2040		HFD3040		HFD4040		FDC2040		FDC3040		FDC4040	
45	HFD1045		HFD2045		HFD3045		HFD4045		FDC2045		FDC3045		FDC4045	
50	HFD1050		HFD2050		HFD3050		HFD4050		FDC2050		FDC3050		FDC4050	
60	HFD1060		HFD2060		HFD3060		HFD4060		FDC2060		FDC3060		FDC4060	
70	HFD1070		HFD2070		HFD3070		HFD4070		FDC2070		FDC3070		FDC4070	
80	HFD1080		HFD2080		HFD3080		HFD4080		FDC2080		FDC3080		FDC4080	
90	HFD1090		HFD2090		HFD3090		HFD4090		FDC2090		FDC3090		FDC4090	
100	HFD1100		HFD2100		HFD3100		HFD4100		FDC2100		FDC3100		FDC4100	
110	HFD1110		HFD2110		HFD3110		HFD4110		FDC2110		FDC3110		FDC4110	
125	HFD1125		HFD2125		HFD3125		HFD4125		FDC2125		FDC3125		FDC4125	
150	HFD1150		HFD2150		HFD3150		HFD4150		FDC2150		FDC3150		FDC4150	
175	—		HFD2175		HFD3175		HFD4175		FDC2175		FDC3175		FDC4175	
200	—		HFD2200		HFD3200		HFD4200		FDC2200		FDC3200		FDC4200	
225	—		HFD2225		HFD3225		HFD4225		FDC2225		FDC3225		FDC4225	

③ UL listed for SWD applications, see NEC Article 240-83(d).

Discount Symbol **CB-2**

Table 12-159. Types FDE, HFDE and FDCE Electronic Circuit Breakers with Non-Interchangeable Trip Units

Maximum Ampere Rating	Neutral CT for LSG and LSIG	LS		LSI		LSG		LSIG	
		Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
IC Rating 35 kAIC at 480 Vac									
80	CTF080	**FDE308033**		**FDE308032**		**FDE308035**		**FDE308036**	
160	CTF160	**FDE316033**		**FDE316032**		**FDE316035**		**FDE316036**	
225	CTF225	**FDE322533**		**FDE322532**		**FDE322535**		**FDE322536**	
IC Rating 65 kAIC at 480 Vac									
80	CTF080	**HFDE308033**		**HFDE308032**		**HFDE308035**		**HFDE308036**	
160	CTF160	**HFDE316033**		**HFDE316032**		**HFDE316035**		**HFDE316036**	
225	CTF225	**HFDE322533**		**HFDE322532**		**HFDE322535**		**HFDE322536**	
IC Rating 100 kAIC at 480 Vac ①									
80	CTF080	**FDCE308033**		**FDCE308032**		**FDCE308035**		**FDCE308036**	
160	CTF160	**FDCE316033**		**FDCE316032**		**FDCE316035**		**FDCE316036**	
225	CTF225	**FDCE322533**		**FDCE322532**		**FDCE322535**		**FDCE322536**	

① Check with Eaton for availability.

Molded Case Switches

Eaton's Cutler-Hammer molded case switches are used as compact switches in applications requiring high current switching capabilities. Molded case switches are constructed of circuit breaker components and are of the high instantaneous automatic type. Molded case switches are listed in accordance with Underwriters Laboratories Inc., Standard UL 1087.

Line and Load Terminals

Line and load terminals provide wire connecting capabilities for specific ranges of continuous current ratings and wire types. Except as noted, terminals comply with Underwriters Laboratories Inc., Standards UL 486A and UL 486B. Unless otherwise specified, F-Frame circuit breakers are factory equipped with load terminals only.

Ordering Information

F-Frame circuit breakers and molded case switches have load terminals only as standard equipment. When standard line-end terminals (same as standard load-end terminals) are required, add Suffix **L** to the circuit breaker Catalog Number. When non-standard or optional line and/or load terminals are required, order by style number. Specify if factory installation is required.

Table 12-160. FDE Electronic Breaker with Zone Selective Interlocking

Ampere Rating	Catalog Number			
	LSI w/ZSI	Price U.S. $	LSIG w/ZSI	Price U.S. $
35 kAIC at 480 Vac				
80	**FDE308032ZG**		**FDE308036ZG**	
160	**FDE316032ZG**		**FDE316036ZG**	
225	**FDE322532ZG**		**FDE322536ZG**	
65 kAIC at 480 Vac				
80	**HFDE308032ZG**		**HFDE308036ZG**	
160	**HFDE316032ZG**		**HFDE316036ZG**	
225	**HFDE322532ZG**		**HFDE322536ZG**	

Table 12-161. Molded Case Switches

Maximum Continuous Ampere Rating at 40°C	Complete Circuit Breaker with Load Side Terminals Only					
	480 Vac Maximum, 250 Vdc		600 Vac Maximum, 250 Vdc			
	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
2-Pole						
100	**EHD2100K**		**FD2100K**		**HFD2100K**	
150	—		**FD2150K**		**HFD2150K**	
225	—		**FD2225K**		**HFD2225K**	
3-Pole						
100	**EHD3100K**		**FD3100K**		**HFD3100K**	
150	—		**FD3150K**		**HFD3150K**	
225	—		**FD3225K**		**HFD3225K**	
4-Pole						
100	—		**FD4100K**		**HFD4100K**	
150	—		**FD4150K**		**HFD4150K**	
225	—		**FD4225K**		**HFD4225K**	

Note: Molded Case Switches will open above 1800 amperes.

Table 12-162. Breaker Mount Ammeter

Description	Catalog Number	Price U.S. $
Breaker Mount Ammeter	**DIGIVIEW**	

Note: Use on FDE, HFDE and FDCE electronic trip only.

Ammeter

Discount Symbol **CB-2**

Line and Load Terminals (Continued)

Table 12-163. Line and Load Terminals

Maximum Breaker Amperes	Terminal Body Material	Wire Type	AWG Wire Range	Metric Wire Range mm^2	Package of 3 Terminals	
					Catalog Number	Price U.S. $
Standard Pressure Type Terminals						
20 (EHD)	Steel	Cu/Al	14 – 10	2.5 – 4	**3T20FB** ①	
100	Steel	Cu/Al	14 – 1/0	2.5 – 50	**3T100FB**	
225	Aluminum	Cu/Al	4 – 4/0	25 – 95	**3TA225FD**	
Optional Pressure Terminals						
50	Aluminum	Cu/Al	14 – 4	2.5 – 25	**3TA50FB** ①	
100	Aluminum	Cu/Al	14 – 1/0	2.5 – 50	**3TA100FD**	
200	Stainless Steel	Cu	4 – 4/0	25 – 95	**3T150FB**	
225	Aluminum	Cu/Al	6 – 300 kcmil	16 – 150	**3TA225FDK** ②	

① Not for use with ED, EDH, EDC breakers.
② Includes terminal shield kit. Adds approximately 3 inches (76.2) to breaker height. Available for use on 3-pole breaker only.

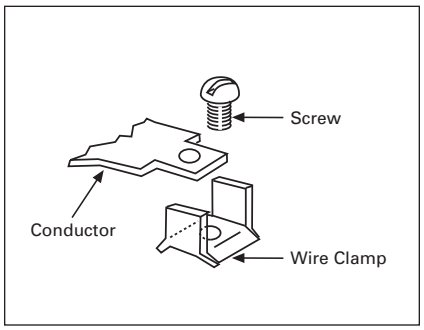

Figure 12-15. 3T20FB
Assemble wire clamp to bottom of conductor as shown.

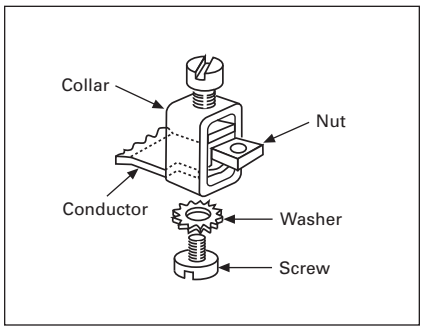

Figure 12-16. 3T100FB, 3T150FB
Insert collar enclosing conductor as shown. Locate nut on top of conductor and tighten securely with screw and washer. **Caution:** Collar must surround conductor.

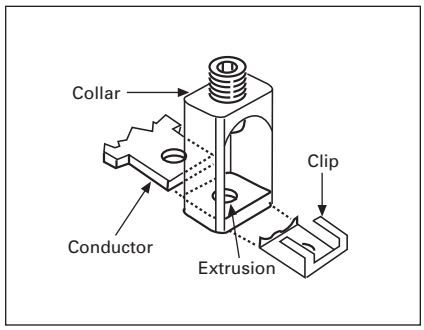

Figure 12-17. 3TA225FD
Insert collar enclosing conductor and center on extrusion on collar. Install clip with legs on top of conductor and snap end around bottom of collar.

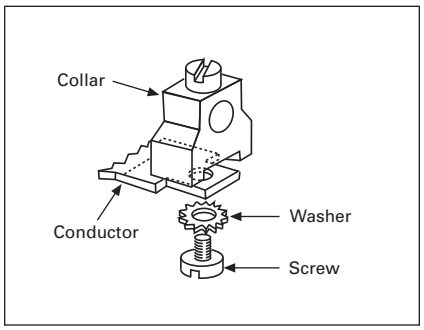

Figure 12-18. 3TA50FB
Assemble collar on top of conductor as shown. Tighten securely with screw and washer.

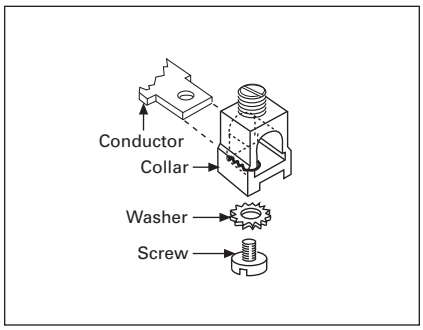

Figure 12-19. 3TA100FD
Collar slides onto conductor and is held in position by a screw and lockwasher.

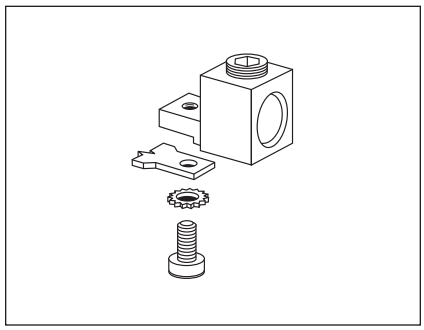

Figure 12-20. 3TA225FDK (Up to 150 mm^2)
Assemble collar on top of conductor as shown. Tighten securely with screw and washer. Terminal shield must be used with this collar.

Note: For 185 mm^2, use **3TA225FDK1**.

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Allowable Accessory Combinations

Different combinations of accessories can be supplied, depending on the types of accessories and the number of poles in the circuit breaker.

Table 12-164. Accessories

Description	Reference Page	1-Pole	2-Pole		3-Pole			4-Pole			
		Center	Left	Right	Left	Center	Right	Left	Center	Right	Neutral
Internal Accessories (Only one internal accessory per pole)											
Alarm Lockout Switch (Make Only)	12-217	■									
Alarm Lockout (Make/Break)	12-217			■	❑		❑	■			
Alarm Lockout (2Make/2Break)	12-217			■	❑		❑	■			
Auxiliary Switch (1A, 1B)	12-220			■	■		■	■			■
Auxiliary Switch (2A, 2B)	12-220			■	■		■	■			■
Auxiliary Switch and Alarm Switch Combination	12-223			■	❑		❑	■			
Shunt Trip — Standard	12-226			■	■		■	■			■
Shunt Trip — Low Energy	12-231			■	■		■	■			
Undervoltage Release Mechanism	12-232			■	■		■	■			
External Accessories											
End Cap Kit	12-243		●		●			●			
Keeper Nut	12-243	●	●		●			●			
Control Wire Terminal Kit	12-244	●	●		●			●			
Multiwire Connectors	12-245	●	●		●			●			
Base Mounting Hardware	12-246	●	●		●			●			
Terminal Shields	12-248	●	●		●			●			
Terminal End Covers	12-249				●						
Interphase Barriers	12-249		●		●			●			
Non-Padlockable Handle Block	12-251	■	■			■			■		
Snap-on Padlockable Handle Lock Hasp	12-251	■	■			■			■		
Padlockable Handle Lock Hasp	12-252			■	❑		❑	❑		❑	
Cylinder Lock	12-252				■						
Key Interlock Kit	12-253			■	❑		❑	❑		❑	
Sliding Bar Interlock — Requires Two Breakers	12-254				●						
Walking Beam Interlock — Requires Two Breakers	12-254				●			●			
Electrical (Solenoid and Motor) Operators	12-255				●			●			
Plug-in Adapters	12-257		●		●			●			
Rear Connecting Studs	12-258	●	●		●			●			
Panelboard Connecting Straps	12-261	●	●		●			●			
Handle Mechanisms	12-262				●						
LFD Current Limiter	12-268				●						
IQ Energy Sentinel	12-268		●		●						
Modifications (Refer to Eaton)											
Special Calibration	—	●	●		●			●			
Moisture Fungus Treatment	12-73	●	●		●			●			
Freeze-Tested Circuit Breakers	—	●	●		●			●			
Marine Application	—	●	●		●			●			

■ Applicable in indicated pole position ❑ May be mounted on left or right pole — not both ● Accessory available/Modification available

J-Frame

Typical J-Frame Circuit Breaker

Product Description

- All Eaton's Cutler-Hammer J-Frame Circuit Breakers are HACR rated.
- J-Frame circuit breakers are available as individual components (Frame, Trip Unit, Terminals), or factory assembled complete breakers.
- J-Frame circuit breakers with non-interchangeable trip units are suitable for reverse feed use

Technical Data and Specifications

Table 12-165. UL 489 Interrupting Capacity Ratings

Circuit Breaker Type	Number of Poles	Interrupting Capacity (kA Symmetrical Amperes)				
		Volts ac (50/60 Hz)				Volts dc
		240	480	600	125	250 ①②
JDB	2, 3	65	35	18	—	10
JD	2, 3, 4	65	35	18	—	10
HJD	2, 3, 4	100	65	25	—	22
JDC ③	2, 3, 4	200	100	35	—	22

① 2-pole circuit breaker or two outside poles of 3-pole circuit breaker.
② Time constant is 3 milliseconds minimum at 10 kA and 8 milliseconds minimum at 22 kA.
③ Current limiting.

Table 12-166. IEC 157-1 (P1) Interrupting Capacity Ratings

Circuit Breaker Type	Number of Poles	Interrupting Capacity (kA Symmetrical Amperes)					
		Volts ac (50/60 Hz)					Volts dc
		240	380	415	600	125	250 ④⑤
JD	2, 3, 4	65	35	35	—	—	10
HJD	2, 3, 4	100	65	65	—	—	22
JDC	2, 3, 4	200	100	100	—	—	22

④ 2-pole circuit breaker or two outside poles of 3-pole circuit breaker.
⑤ Time constant is 3 milliseconds minimum at 10 kA and 8 milliseconds minimum at 22 kA.

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Dimensions/Weights

Table 12-167. Dimensions in Inches (mm)

Number of Poles	Width	Height	Depth
2, 3	4.13 (105.0)	10.00 (254.0)	4.06 (104.1)
4	5.50 (139.7)	10.00 (254.0)	4.06 (104.1)

Table 12-168. Approximate Shipping Weight in Lbs. (kg)

Breaker Type	Complete Breaker			Frame Only			Trip Unit		
	Number of Poles								
	2	3	4	2	3	4	2	3	4
JDB	11.25 (5.1)	12.50 (5.7)	—	—	—	—	—	—	—
JD	11.25 (5.1)	12.50 (5.7)	13.25 (6.0)	9.00 (4.1)	10.00 (4.5)	10.50 (4.8)	2.00 (.9)	2.00 (.9)	2.25 (1.0)
HJD	11.25 (5.1)	12.50 (5.7)	13.25 (6.0)	9.00 (4.1)	10.00 (4.5)	10.50 (4.8)	2.00 (.9)	2.00 (.9)	2.25 (1.0)
JDC	12.25 (5.6)	13.50 (6.1)	14.25 (6.5)	10.00 (4.5)	11.00 (5.0)	11.50 (5.2)	2.00 (.9)	2.00 (.9)	2.25 (1.0)

Product Selection

This information is presented only as an aid to understanding Catalog Numbers. It is not to be used to build Catalog Numbers for circuit breakers or trip units.

Table 12-169. Circuit Breaker/Frame Catalog Numbering System

JD 3 250 F

Circuit Breaker/ Frame Type	Number of Poles	Circuit Breaker/ Frame Ampere Rating	Suffix
JDB **JD** **HJD** **JDC**	**2** = 2 Poles **3** = 3 Poles **4** = 4 Poles	**070** **090** **100** **125** **150** **175** **200** **225** **250**	**C** = Non-Aluminum Terminals **F** = Frame Only **K** = High Magnetic Molded Case Switch **V** = 50°C Calibration **W** = Without Terminals **X** = Load Side Terminals Only **Y** = Line Side Terminals Only

Table 12-170. Trip Unit Catalog Numbering System

JT 3 250 T

Trip Unit Type	Number of Poles	Trip Unit Rating/ Plug Ampere Rating	Suffix
JT = Thermal-Magnetic	**2** = 2 Poles **3** = 3 Poles **4** = 4 Poles	**070** **090** **100** **125** **150** **175** **200** **225** **250**	**T** = Trip Unit Thermal-Magnetic Fixed Thermal Adj. Magnetic **V** = 50°C Calibration (Thermal-Magnetic Trip Units Only)

Product Selection

Table 12-171. Types JD, HJD and JDC Thermal-Magnetic Circuit Breakers with Interchangeable Trip Units

Max. Cont. Amp Rating at 40°C	Standard Interrupting Capacity 600 Vac Rated 35 kAIC at 480 Vac		High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac		Ultra High Interrupting Capacity Current Limiting 600 Vac Rated 100 kAIC at 480 Vac		Thermal-Magnetic Trip Unit Only ① For Use with Standard or High or Ultra High Interrupting Frames		Standard Terminals Only See Page 12-97 for Optional Terminals	
	Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals ①		Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals ①		Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals ①					
	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
2-Pole										
70	JD2070		HJD2070		JDC2070		JT2070T		TA250KB ②	
90	JD2090		HJD2090		JDC2090		JT2090T			
100	JD2100		HJD2100		JDC2100		JT2100T			
125	JD2125		HJD2125		JDC2125		JT2125T			
150	JD2150		HJD2150		JDC2150		JT2150T			
175	JD2175		HJD2175		JDC2175		JT2175T			
200	JD2200		HJD2200		JDC2200		JT2200T			
225	JD2225		HJD2225		JDC2225		JT2225T			
250	JD2250		HJD2250		JDC2250		JT2250T			
3-Pole										
70	JD3070		HJD3070		JDC3070		JT3070T		TA250KB ②	
90	JD3090		HJD3090		JDC3090		JT3090T			
100	JD3100		HJD3100		JDC3100		JT3100T			
125	JD3125		HJD3125		JDC3125		JT3125T			
150	JD3150		HJD3150		JDC3150		JT3150T			
175	JD3175		HJD3175		JDC3175		JT3175T			
200	JD3200		HJD3200		JDC3200		JT3200T			
225	JD3225		HJD3225		JDC3225		JT3225T			
250	JD3250		HJD3250		JDC3250		JT3250T			
4-Pole ③④										
125	JD4125		HJD4125		JDC4125		JT3125T		TA250KB ②	
150	JD4150		HJD4150		JDC4150		JT3150T			
175	JD4175		HJD4175		JDC4175		JT3175T			
200	JD4200		HJD4200		JDC4200		JT3200T			
225	JD4225		HJD4225		JDC4225		JT3225T			
250	JD4250		HJD4250		JDC4250		JT3250T			

① Magnetic trip adjustable 5 – 10 times continuous ampere rating.
② Individually packed.
③ Fully rated neutral pole with no protection.
④ Neutral is in right pole.

Table 12-172. Types JD, HJD and JDC Thermal-Magnetic Circuit Breakers — Frame Only

Standard Interrupting Capacity 600 Vac Rated 35 kAIC at 480 Vac		High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac		Ultra High Interrupting Capacity Current Limiting 600 Vac Rated 100 kAIC at 480 Vac	
Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
2-Pole					
JD2250F		HJD2250F		JDC2250F	
3-Pole					
JD3250F		HJD3250F		JDC3250F	
4-Pole					
JD4250F		HJD4250F		JDC4250F	

Discount Symbol **CB-2**

Table 12-173. Type JDB Thermal-Magnetic Circuit Breakers with Non-Interchangeable Thermal-Magnetic Trip Units Suitable for Reverse Feed Application

Maximum Continuous Ampere Rating at 40°C	600 Vac Rated, 250 Vdc			
	Complete Circuit Breaker			
	Without Line and Load Terminals		With Standard Line and Load Terminals Only	
	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
2-Pole				
70	JDB2070W		JDB2070	
90	JDB2090W		JDB2090	
100	JDB2100W		JDB2100	
125	JDB2125W		JDB2125	
150	JDB2150W		JDB2150	
175	JDB2175W		JDB2175	
200	JDB2200W		JDB2200	
225	JDB2225W		JDB2225	
250	JDB2250W		JDB2250	
3-Pole				
70	JDB3070W		JDB3070	
90	JDB3090W		JDB3090	
100	JDB3100W		JDB3100	
125	JDB3125W		JDB3125	
150	JDB3150W		JDB3150	
175	JDB3175W		JDB3175	
200	JDB3200W		JDB3200	
225	JDB3225W		JDB3225	
250	JDB3250W		JDB3250	

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Molded Case Switches

Eaton's Cutler-Hammer molded case switches are used as compact switches in applications requiring high current switching capabilities. Molded case switches are constructed of circuit breaker components and are of the high instantaneous automatic type. Molded case switches are listed in accordance with Underwriters Laboratories Standard UL 1087.

Table 12-174. Molded Case Switches

Maximum Continuous Ampere Rating at 40°C	600 Vac Maximum, 250 Vdc				Standard Terminals Only See Page 12-97 for Optional Terminals	
	Complete Circuit Breaker Only without Line and Load Terminals					
	—		Suitable for Reverse Feed Use			
	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
2-Pole						
250	JD2250KW HJD2250KW		JDB2250KW HJDB2250KW		TA250KB ① —	
3-Pole						
250	JD3250KW HJD3250KW		JDB3250KW HJDB3250KW		TA250KB ① —	
4-Pole						
250	JD4250KW HJD4250KW		JDB4250KW HJDB4250KW		TA250KB ① —	

① Individually packed.

Note: Molded case switches may open above 2500 amperes.

Line and Load Terminals

Eaton's Cutler-Hammer line and load terminals provide wire connecting capabilities for specific ranges of continuous current ratings and wire types. All terminals comply with Underwriters Laboratories Standards UL 486A and UL 486B and CSA Standard C22.2 No. 65, or Electrical Bulletin 1165. Unless otherwise specified, J-Frame circuit breaker line and load terminals are shipped separately for field installation.

The bottom of the standard TA250KB terminal contains a recess which is positioned over the J-Frame circuit breaker terminal conductor.

Ordering Information

J-Frame circuit breakers use Cu/Al terminals as standard. When optional copper-only terminals are required, order by Catalog Number. Specify if factory installation is required.

Table 12-175. Line and Load Terminals

Maximum Breaker Amperes	Terminal Body Material	Wire Type	AWG Wire Range/ No. Conductors	Metric Wire Range mm^2	Catalog Number	Price U.S. $
Standard Cu/Al Pressure Terminals						
250	Aluminum	Cu/Al	4 – 350 kcmil	25 – 185	**TA250KB**	
Optional Cu Pressure Terminals						
250	Stainless Steel	Cu	4 – 350 kcmil	25 – 185	**T250KB**	

Note: No dual lugs. See multiwire lugs **Page 12-245**.

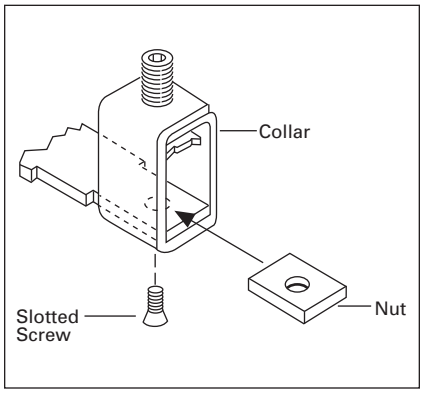

Figure 12-21. T250KB Terminal

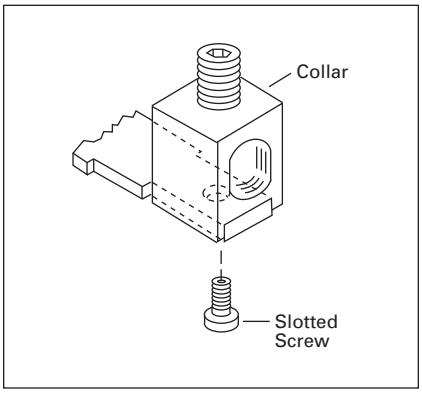

Figure 12-22. TA250KB Terminal (Standard)

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Allowable Accessory Combinations

Different combinations of accessories can be supplied, depending on the types of accessories and the number of poles in the circuit breaker.

Table 12-176. Accessories

Description	Reference Page	2-, 3-Pole			4-Pole			
		Left	Center	Right	Left	Center	Right	Neu.
Internal Accessories (Only One Internal Accessory Per Pole)								
Alarm Lockout (Make/Break)	12-217	❑		❑	❑		❑	
Auxiliary Switch (1A, 1B)	12-220	■		■	■		■	
Auxiliary Switch (2A, 2B)	12-220	■		■	■		■	
Auxiliary Switch and Alarm Switch Combination	12-223	❑		❑	❑		❑	
Shunt Trip — Standard	12-226	■		■	■		■	
Shunt Trip — Low Energy	12-231	■		■	■		■	
Undervoltage Release Mechanism	12-232	■		■	■		■	
External Accessories								
End Cap Kit	12-243		●			●		
Plug Nut	12-244		●			●		
Control Wire Terminal Kit	12-244		●			●		
Multiwire Connectors	12-245		●			●		
Base Mounting Hardware	12-246		●			●		
Terminal Shields	12-248		●			●		
Interphase Barriers	12-249		●			●		
Non-Padlockable Handle Block	12-251		■			■		
Padlockable Handle Block	12-251		■			■		
Padlockable Handle Lock Hasp	12-252	❑		❑	❑		❑	
Cylinder Lock	12-252	❑		❑				
Key Interlock Kit	12-253	❑		❑	❑		❑	
Sliding Bar Interlock — Requires Two Breakers	12-254		●					
Electrical (Solenoid) Operator	12-255		●			●		
Plug-in Adapters	12-257		●			●		
Rear Connecting Studs	12-258		●			●		
Panelboard Connecting Straps	12-261		●			●		
Handle Mechanisms	12-262		●			●		
Handle Extension	12-267		●			●		
IQ Energy Sentinel	12-268		●					
Modifications (Refer to Eaton)								
Special Calibration	—		●			●		
Moisture Fungus Treatment	12-73		●			●		
Freeze-Tested Circuit Breakers	—		●			●		
Marine/Naval Application	—		●			●		

■ Applicable in indicated pole position ❑ May be mounted on left or right pole — not both ● Accessory available/Modification available

K-Frame

Typical K-Frame Circuit Breaker

Product Description

- All Cutler-Hammer K-Frame Circuit Breakers by Eaton Corporation are HACR rated.
- K-Frame circuit breakers are available as individual components (Frame, Trip Unit, Terminals), or factory assembled complete breakers.
- K-Frame circuit breakers with non-interchangeable trip units are suitable for reverse feed use.

Technical Data and Specifications

Table 12-177. NEMA/UL 489/CSA Interrupting Capacity Ratings

Circuit Breaker Type	Number of Poles	Interrupting Capacity (kA Symmetrical Amperes)				
		Volts ac (50/60 Hz)				Volts dc
		240	277	480	600	250 ①②
DK	2, 3	65	—	—	—	10
KDB	2, 3, 4	65	—	35	25	10
KD	2, 3, 4	65	—	35	25	10
HKD, HKDB	2, 3, 4	100	—	65	35	22
KDC ③	2, 3, 4	200	—	100	65	22
CKD	3	65	—	35	25	—
CHKD	3	100	—	65	35	—

① 2-pole circuit breaker or two outside poles of 3-pole circuit breaker.
② Time constant is 3 milliseconds minimum at 10 kA and 8 milliseconds minimum at 22 kA.
③ Current limiting.

Table 12-178. IEC 157-1 (P1) Interrupting Capacity Ratings

Circuit Breaker Type	Number of Poles	Interrupting Capacity (kA Symmetrical Amperes)						
		Volts ac (50/60 Hz)						Volts dc
		240	380	415	440	500	600	250 ④⑤
DK	2, 3	65	—	—	—	—	—	10
KDB	2, 3, 4	65	40	40	—	—	—	10
KD	2, 3, 4	65	40	40	—	—	—	10
HKD, HKDB	2, 3, 4	100	65	65	—	—	—	22
KDC	2, 3, 4	200	100	100	—	—	—	22

④ 2-pole circuit breaker or two outside poles of 3-pole circuit breaker.
⑤ Time constant is 3 milliseconds minimum at 10 kA and 8 milliseconds minimum at 22 kA.

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K-Frame Digitrip Specifications

Table 12-179. Specifications

Trip Unit Type	Digitrip RMS 310		Digitrip OPTIM 550	Digitrip OPTIM 1050
rms Sensing	Yes		Yes	Yes
Breaker Type				
Frame	K		K	K
Ampere Range	125 – 400A		125 – 400A	125 – 400A
Interrupting Rating at 480 Volts	35, 65, 100 (kA)		35, 65, 100 (kA)	35, 65, 100 (kA)
Protection				
Ordering Options	LS, LSG	LSI, LSIG	LSI, LSI(A), LSIG	LSI(A), LSIG
Fixed Rated Plug (I_n)	Yes	Yes	Yes	Yes
Overtemperature Trip	Yes	Yes	Yes	Yes
Long Delay Protection (L)				
Adjustable Rating Plug (I_n)	Yes	Yes	No	No
Long Delay Pickup	0.5 – 1.0 (I_n) ①	0.5 – 1.0 (I_n) ①	0.4 – 1.0 x (I_n)	0.4 – 1.0 x (I_n)
Long Delay Time I^2t	12 Seconds	12 Seconds	2 – 24 Seconds	2 – 24 Seconds
Long Delay Time I^4t	No	No	1 – 5 Seconds	1 – 5 Seconds
Long Delay Thermal Memory	Yes	Yes	Yes	Yes
High Load Alarm	No	No	0.5 – 1.0 x I_r	0.5 – 1.0 x I_r
Short Delay Protection (S)				
Short Delay Pickup	200 – 800% x (I_n)	200 – 800% x (I_n)	150 – 800% x (I_r)	150 – 800% x (I_r)
Short Delay Time I^2t	100 ms	No	100 – 500 ms	100 – 500 ms
Short Delay Time Flat	No	Inst – 300 ms	100 – 500 ms	100 – 500 ms
Short Delay Time Zone Selective Interlocking	No	No	Yes ②	Yes
Instantaneous Protection (I)				
Instantaneous Pickup	No	200 – 800% x (I_n)	200 – 800% x (I_n)	200 – 800% x (I_n)
Discriminator	No	No	Yes	Yes
Instantaneous Override	Yes	Yes	Yes	Yes
Ground Fault Protection (G)				
Ground Fault Alarm	No	No	20 – 100% x (I_s)	20 – 100% x (I_s)
Ground Fault Pickup	Varies by Frame ⑥	Varies by Frame ⑥	20 – 100% x (I_s)	20 – 100% x (I_s)
Ground Fault Delay I^2t	No	No	100 – 500 ms	100 – 500 ms
Ground Fault Delay Flat	Inst – 500 ms	Inst – 500 ms	100 – 500 ms	100 – 500 ms
Ground Fault Zone Selective Interlocking	No	No	Yes ②	Yes
Ground Fault Thermal Memory	Yes	Yes	Yes	Yes
System Diagnostics				
Status LEDs	Yes	Yes	Yes	Yes
Cause of Trip LEDs	No	No	Yes	Yes
Magnitude of Trip Information	No	No	Yes	Yes
Remote Signal Contact — Ground Alarm	Yes ③	Yes ③	Yes ②	Yes
Local Auxiliary and Bell Alarm Contact	Optional	Optional	Optional	Included
System Monitoring				
Digital Display	No	No	Yes ④	Yes ④
Current	No	No	Yes	Yes
Power and Energy	No	No	No	Yes
Power Quality — Harmonics	No	No	No	Yes
Power Factor	No	No	No	Yes
Communications				
Cutler-Hammer PowerNet	No	No	Yes ⑤	Yes
Testing				
Testing Method	Test Set		OPTIMizer, BIM, Cutler-Hammer PowerNet	

① Adjust by rating plug.
② Zone interlock kit.
③ With separate ground fault alarm unit (GFAU).
④ By OPTIMizer/BIM.
⑤ Eaton's Cutler-Hammer PowerNet kit.
⑥ 400 ampere frame 1 – 5 x I_g (80 A).
250 ampere frame 1 – 5 x I_g (50 A).
125 ampere frame 1 – 5 x I_g (25 A).

Legend: BIM = Breaker Interface Module
(A) = GF Alarm
I_s = Sensor Rating
I_n = Rating Plug
I_r = Long Delay Pickup Setting

Dimensions/Weights

Table 12-180. Dimensions in Inches (mm)

Number of Poles	Width	Height	Depth
2, 3	5.50 (149.7)	10.13 (257.3)	4.10 (104.1)
4	7.22 (183.4)	10.13 (257.3)	4.10 (104.1)

Table 12-181. Approximate Shipping Weight, Lbs. (kg)

Breaker Type	Complete Breaker		Frame Only		Trip Unit ①	
	Number of Poles					
	2	3	2	3	2	3
DK	10.0 (4.5)	11.5 (5.2)	—	—	—	—
KDB	10.0 (4.5)	11.5 (5.2)	—	—	—	—
KD	10.0 (4.5)	11.5 (5.2)	7.5 (3.4)	8.5 (3.9)	1.5 (.7)	1.5 (.7)
HKD, HKDB	10.0 (4.5)	11.5 (5.2)	7.5 (3.4)	8.5 (3.9)	1.5 (.7)	1.5 (.7)
KDC	10.0 (4.5)	11.5 (5.2)	7.5 (3.4)	8.5 (3.9)	1.5 (.7)	1.5 (.7)

① Weights shown are for thermal-magnetic trip units. 3-pole electronic trip units weigh 2.5 lbs. (1.1 kg).

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Product Selection

This information is presented only as an aid to understanding Catalog Numbers. It is not to be used to build Catalog Numbers for circuit breakers or trip units.

Table 12-182. Circuit Breaker/Frame Catalog Numbering System

KD 3 400 F

Circuit Breaker/ Frame Type	Number of Poles	Circuit Breaker/ Frame Ampere Rating	Suffix
DK **KD** **KDB** **HKD** **HKDB** **KDC** **CKD** **CHKD**	**2** = 2 Poles **3** = 3 Poles **4** = 4 Poles	**100** **125** **150** **175** **200** **225** **250** **300** **350** **400**	**C** = Copper Terminals **E** = 50% Protected Neutral Pole (4-Pole Electronic Trip Circuit Breaker Only) **F** = Frame Only **K** = High Magnetic Molded Case Switch **V** = 50°C Calibration (Thermal-Magnetic Trip Units Only) **W** = Without Terminals **X** = Load Side Terminals Only **Y** = Line Side Terminals Only No Suffix Number Indicates Standard Load and Lineside Terminals

Table 12-183. Trip Unit Catalog Numbering System

KT 3 400 T

Trip Unit Type	Number of Poles	Trip Unit Rating/ Plug Ampere Rating	Suffix
KT = Thermal-Magnetic **KES** = Electronic	**2** = 2-Poles **3** = 3 Poles **4** = 4 Poles	**070** ① **090** ① **100** **125** **150** **175** **200** **225** **250** **300** **350** **400**	**LS** = Electronic Trip Unit Adjustable Short Time Delay with I^2t Short Delay Ramp **LSI** = Electronic Trip Unit Independently Adjustable Short Time Pickup and Delay **LSG** = Electronic Trip Unit Adjustable Short Time Pickup with I^2t Short Delay and Ground Fault Protection **LSIG** = Electronic Trip Unit Independently Adjustable Short Time Pickup and Delay and Ground Fault Protection **V** = 50°C Calibration (Thermal-Magnetic Trip Units Only) **E** = 50% Protected Neutral Pole (4-Pole Electronic Trip Unit Only) Terminals Only **T** = Trip Unit Only

① Ampere rating available with electronic trip unit only.

Table 12-184. OPTIM Circuit Breaker/Frame Catalog Numbering System

KD 3 125 T5 7 W

Circuit Breaker/ Frame Type	Number of Poles	Circuit Breaker/Frame Ampere Rating	Trip Model	Trip Type	Suffix
KD **HKD** **KDC** **CKD** **CHKD**	**3** = 3 Poles	**125** **250** **400**	**T5** = Model 550 **T10** = Model 1050	**2** = LSI **6** = LSIG **7** = LSIA	**W** = Without Terminals

Product Selection

Table 12-185. Types KD, HKD and KDC Thermal-Magnetic Circuit Breakers with Interchangeable Trip Units

Maximum Continuous Ampere Rating at 40°C	Standard Interrupting Capacity 600 Vac Rated 35 kAIC at 480 Vac		High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac		Ultra High Interrupting Capacity Current Limiting 600 Vac Rated 100 kAIC at 480 Vac		Thermal-Magnetic Trip Unit Only ① For Use with Standard or High or Ultra High Interrupting Frames		Standard Terminals Only See Page 12-113 for Optional Terminals	
	Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals ①		Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals ①		Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals ①					
	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
2-Pole										
100	KD2100		HKD2100		KDC2100		KT2100T		TA300K ②	
125	KD2125		HKD2125		KDC2125		KT2125T		TA300K ②	
150	KD2150		HKD2150		KDC2150		KT2150T		TA300K ②	
175	KD2175		HKD2175		KDC2175		KT2175T		TA300K ②	
200	KD2200		HKD2200		KDC2200		KT2200T		TA300K ②	
225	KD2225		HKD2225		KDC2225		KT2225T		TA300K ②	
250	KD2250		HKD2250		KDC2250		KT2250T		TA350K ②	
300	KD2300		HKD2300		KDC2300		KT2300T		TA350K ②	
350	KD2350		HKD2350		KDC2350		KT2350T		TA350K ②	
400	KD2400		HKD2400		KDC2400		KT2400T		2TA400K ③	
3-Pole										
100	KD3100		HKD3100		KDC3100		KT3100T		TA300K ②	
125	KD3125		HKD3125		KDC3125		KT3125T		TA300K ②	
150	KD3150		HKD3150		KDC3150		KT3150T		TA300K ②	
175	KD3175		HKD3175		KDC3175		KT3175T		TA300K ②	
200	KD3200		HKD3200		KDC3200		KT3200T		TA300K ②	
225	KD3225		HKD3225		KDC3225		KT3225T		TA300K ②	
250	KD3250		HKD3250		KDC3250		KT3250T		TA350K ②	
300	KD3300		HKD3300		KDC3300		KT3300T		TA350K ②	
350	KD3350		HKD3350		KDC3350		KT3350T		TA350K ②	
400	KD3400		HKD3400		KDC3400		KT3400T		3TA400K ③	
4-Pole										
100	KD4100		HKD4100		KDC4100		KT3100T		TA300K ②	
125	KD4125		HKD4125		KDC4125		KT3125T		TA300K ②	
150	KD4150		HKD4150		KDC4150		KT3150T		TA300K ②	
175	KD4175		HKD4175		KDC4175		KT3175T		TA300K ②	
200	KD4200		HKD4200		KDC4200		KT3200T		TA300K ②	
225	KD4225		HKD4225		KDC4225		KT3225T		TA300K ②	
250	KD4250		HKD4250		KDC4250		KT3250T		TA350K ②	
300	KD4300		HKD4300		KDC4300		KT3300T		TA350K ②	
350	KD4350		HKD4350		KDC4350		KT3350T		TA350K ②	
400	KD4400		HKD4400		KDC4400		KT3400T		4TA400K ③	

① Magnetic trip adjustable 5 – 10 times continuous ampere rating.
② Individually packed.
③ 2TA400K, 3TA400K and 4TA400K terminal kits contain one terminal for each pole and one terminal cover.

Table 12-186. Types KD, HKD and KDC Thermal-Magnetic Circuit Breakers — Frame Only

Standard Interrupting Capacity 600 Vac Rated 35 kAIC at 480 Vac		High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac		Ultra High Interrupting Capacity Current Limiting 600 Vac Rated 100 kAIC at 480 Vac	
Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
2-Pole					
KD2400F		HKD2400F		KDC2400F	
3-Pole					
KD3400F		HKD3400F		KDC3400F	
4-Pole					
KD4400F		HKD4400F		KDC4400F	

Discount Symbol **CB-2**

Types KD, HKD and KDC Electronic Circuit Breakers with Interchangeable Trip Units

Order as individual components: Breaker Frame, Trip Unit, Rating Plug, Terminals.

Table 12-187. Types KD, HKD and KDC Electronic Circuit Breakers with Interchangeable Trip Units ①

Max. Cont. Ampere Rating at 40°C ②	Circuit Breaker Frame Only			Digitrip RMS 310 Trip Unit Only ③				Digitrip 310 Rating Plug Only			Standard Terminals Only See Page 12-113 for Optional Terminals
	Standard Interrupting Capacity 600 Vac Rated 35 kAIC at 480 Vac	High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac	Ultra High Interrupting Capacity Current Limiting 600 Vac Rated 100 kAIC at 480 Vac	Standard	Options			Ampere Rating	Fixed Rating Plug	Adjustable Rating Plug Ampere Rating	
				Adjustable Short Time Pickup with I^2t Short Delay Ramp	Independently Adjustable Short Time Pickup and Delay	Adjustable Short Time Pickup with I^2t Short Delay and Ground Fault Protection	Independently Adjustable Short Time Pickup and Delay and Ground Fault Protection				
	Catalog Number								Catalog Number		
3-Pole ④											
125	**KD3400F**	**HKD3400F**	**KDC3400F**	**KES3125LS**	**KES3125LSI**	**KES3125LSG**	**KES3125LSIG**	70 90 100 110 125	**1KES070T** **1KES090T** **1KES100T** **1KES110T** **1KES125T**	70/90/100/125 **A1KES125T1**	**TA300K** ⑤ **TA300K** ⑤ **TA300K** ⑤ **TA300K** ⑤ **TA300K** ⑤
250	**KD3400F**	**HKD3400F**	**KDC3400F**	**KES3250LS**	**KES3250LSI**	**KES3250LSG**	**KES3250LSIG**	70 100 125 150 160 175 200 225 250	**2KES070T** **2KES100T** **2KES125T** **2KES150T** **2KES160T** **2KES175T** **2KES200T** **2KES225T** **2KES250T**	125/150/200/250 **A2KES250T1**	 **TA300K** ⑤ **TA300K** ⑤ **TA300K** ⑤ **TA300K** ⑤ **TA300K** ⑤ **TA300K** ⑤ **TA350K** ⑤
400	**KD3400F**	**HKD3400F**	**KDC3400F**	**KES3400LS**	**KES3400LSI**	**KES3400LSG**	**KES3400LSIG**	200 225 250 300 350 400	**4KES200T** **4KES225T** **4KES250T** **4KES300T** **4KES350T** **4KES400T**	200/250/300/400 **A4KES400T1** 200/240/260/280 **A4KES200T5** 320/340/360/380 **A4KES300T5**	**TA300K** ⑤ **TA300K** ⑤ **TA300K** ⑤ **TA300K** ⑤ **TA350K** ⑤ **3TA400K** ⑥
4-Pole ⑦⑧											
125	**KD4400F**	**HKD4400F**	**KDC4400F**	**KES4125LS**	**KES4125LSI**	—	—	70 90 100 110 125	**1KES070T** **1KES090T** **1KES100T** **1KES110T** **1KES125T**	70/90/100/125 **A1KES125T1**	**TA300K** ⑤ **TA300K** ⑤ **TA300K** ⑤ **TA300K** ⑤ **TA300K** ⑤
250	**KD4400F**	**HKD4400F**	**KDC4400F**	**KES4250LS**	**KES4250LSI**	—	—	70 100 125 150 160 175 200 225 250	**2KES070T** **2KES100T** **2KES125T** **2KES150T** **2KES160T** **2KES175T** **2KES200T** **2KES225T** **2KES250T**	125/150/200/250 **A2KES250T1**	**TA300K** ⑤ **TA300K** ⑤ **TA300K** ⑤ **TA300K** ⑤ **TA300K** ⑤ **TA300K** ⑤ **TA300K** ⑤ **TA300K** ⑤ **TA350K** ⑤
400	**KD4400F**	**HKD4400F**	**KDC4400F**	**KES4400LS**	**KES4400LSI**	—	—	200 225 250 300 350 400	**4KES200T** **4KES225T** **4KES250T** **4KES300T** **4KES350T** **4KES400T**	200/250/300/400 **A4KES400T1** 200/240/260/280 **A4KES200T5** 320/340/360/380 **A4KES300T5**	**TA300K** ⑤ **TA300K** ⑤ **TA350K** ⑤ **TA350K** ⑤ **TA350K** ⑤ **4TA400K** ⑥

① See **Table 12-188** on **Page 12-105** for prices.
② Ampere rating is established by rating plug.
③ For ac use only.
④ 3-pole KES Trip Units are for use in 3-pole frames only.
⑤ Individually packed.
⑥ 3TA400K and 4TA400K terminal kits contain one terminal for each pole and one terminal cover.
⑦ Trip unit includes protected neutral pole. Use corresponding 3-pole trip unit if protected neutral pole is not required.
⑧ Fully rated neutral pole protection is standard. For 50% rated protection on neutral pole, add Suffix **E** to 4-pole trip unit Catalog Number.

Product Selection

Table 12-188. Types KD, HKD and KDC Electronic Circuit Breakers with Interchangeable Trip Unit Prices

Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
A1KES125T1 A2KES250T1 A4KES400T1 HKD3400F HKD4400F		KES3250LSI KES3250LSIG KES3400LS KES3400LSG KES3400LSI		1KES090T 1KES100T 1KES110T 1KES125T 2KES070T		4KES225T 4KES250T 4KES300T 4KES350T 4KES400T	
KDC3400F KDC4400F KD3400F KD4400F		KES3400LSIG KES4125LS KES4125LSI KES4250LS		2KES100T 2KES125T 2KES150T 2KES160T		4TA400K A4KES200T5 A4KES300T5 —	
KES3125LS KES3125LSG KES3125LSI KES3125LSIG KES3250LS KES3250LSG		KES4250LSI KES4400LS KES4400LSI TA300K TA350K 1KES070T		2KES175T 2KES200T 2KES225T 2KES250T 3TA400K 4KES200T		— — — — — —	

Table 12-189. Types KDB and HKDB with Non-Interchangeable Trip Unit Suitable for Reverse Feed ①

Maximum Continuous Ampere Rating at 40°C	Number of Poles	Circuit Breaker Frame Including Digitrip RMS 310 Electronic Tip Unit Less Terminals and Rating Plug				Digitrip RMS 310 Rating Plug (Order as Separate Items)	
		L – Adjustable Long Delay Pickup (By Adjustable Rating Plug) S – Adjustable Short Delay Pickup with Fixed Short Delay Time (I^2t Response) or Adjustable Short Time (Flat Response) I – Adjustable Instantaneous Pickup by Setting Short Time Delay Time to Instantaneous G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Delay (Flat Response)				Fixed	Adjustable
		LS	LSI	LSG	LSIG		
		Catalog Number				Catalog Number	
Short Time Range		2 – 8 x I_n	2 – 8 x I_n	2 – 8 x I_n	2 – 8 x I_n		
Short Time Delay		—	0 – 300 ms	—	0 – 300 ms		
Ground Fault Pickup		—	—	Varies by Frame	Varies by Frame		
Ground Fault Delay		—	—	0 – 500 ms	0 – 500 ms		
Type KDB with Digitrip 310 Non-Interchangeable Trip Unit Suitable for Reverse Feed							
125	3	KDB3125FT33W	KDB3125FT32W	KDB3125FT35W	KDB3125FT36W	1KES070T 1KES090T 1KES100T 1KES125T	70/90/100/125 A1KES125T1
250	3	KDB3250FT33W	KDB3250FT32W	KDB3250FT35W	KDB3250FT36W	2KES070T 2KES090T 2KES100T 2KES125T 2KES150T 2KES160T 2KES175T 2KES200T 2KES225T 2KES250T	125/150/200/250 A2KES250T1
400	3	KDB3400FT33W	KDB3400FT32W	KDB3400FT35W	KDB3400FT36W	4KES200T 4KES225T	200/250/300/400 A4KES400T1
						4KES250T 4KES300T 4KES350T 4KES400T	200/240/260/280 A4KES200T5
							320/340/360/380 A4KES300T5

① See **Table 12-190** on **Page 12-106** for prices.

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Discount Symbol **CB-2**

Table 12-189. Types KDB and HKDB with Non-Interchangeable Trip Unit Suitable for Reverse Feed (Continued)

Maximum Continuous Ampere Rating at 40°C	Number of Poles	Circuit Breaker Frame Including Digitrip RMS 310 Electronic Tip Unit Less Terminals and Rating Plug				Digitrip RMS 310 Rating plug (Order as Separate Items)	
		L – Adjustable Long Delay Pickup (By Adjustable Rating Plug) S – Adjustable Short Delay Pickup with Fixed Short Delay Time (I^2t Response) or Adjustable Short Time (Flat Response) I – Adjustable Instantaneous Pickup by Setting Short Time Delay Time to Instantaneous G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Delay (Flat Response)				Fixed	Adjustable
		LS	LSI	LSG	LSIG		
		Catalog Number				Catalog Number	
		Short Time Range Short Time Delay Ground Fault Pickup Ground Fault Delay					
		2 – 8 x I_n — — —	2 – 8 x I_n 0 – 300 ms — —	2 – 8 x I_n — Varies by Frame 0 – 500 ms	2 – 8 x I_n 0 – 300 ms Varies by Frame 0 – 500 ms		
Type HKDB with Digitrip 310 Non-Interchangeable Trip Unit Suitable for Reverse Feed							
125	3	**HKDB3125FT33W**	**HKDB3125FT32W**	**HKDB3125FT35W**	**HKDB3125FT36W**	**1KES070T** **1KES090T** **1KES100T** **1KES125T**	70/90/100/125 **A1KES125T1**
250	3	**HKDB3250FT33W**	**HKDB3250FT32W**	**HKDB3250FT35W**	**HKDB3250FT36W**	**2KES070T** **2KES090T** **2KES100T** **2KES125T** **2KES150T** **2KES160T** **2KES175T** **2KES200T** **2KES225T** **2KES250T**	125/150/200/250 **A2KES250T1**
400	3	**HKDB3400FT33W**	**HKDB3400FT32W**	**HKDB3400FT35W**	**HKDB3400FT36W**	**4KES200T** **4KES225T** **4KES250T** **4KES300T** **4KES350T** **4KES400T**	125/150/200/250 **A4KES250T1** 200/240/260/280 **A4KES200T5** **320/340/360/380** **A4KES300T5**

① See **Table 12-190** below for prices.

Table 12-190. Types KDB and HKDB with Non-Interchangeable Trip Unit Suitable for Reverse Feed Prices

Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
A1KES125T1 **A1KES125T1** **A2KES250T1** **A4KES200T5** **A4KES300T5**		**A4KES400T1** **HKDB3125FT32W** **HKDB3125FT33W** **HKDB3125FT35W** **HKDB3125FT36W**		**HKDB3250FT32W** **HKDB3250FT33W** **HKDB3250FT35W** **HKDB3250FT36W** **HKDB3400FT32W**		**HKDB3400FT33W** **HKDB3400FT35W** **HKDB3400FT36W** **KDB3125FT32W** **KDB3125FT33W**	
KDB3125FT35W **KDB3125FT36W** **KDB3250FT32W** **KDB3250FT33W** **KDB3250FT35W**		**KDB3250FT36W** **KDB3400FT32W** **KDB3400FT33W** **KDB3400FT35W** **KDB3400FT36W**		**1KES070T** **1KES090T** **1KES100T** **1KES125T** **2KES070T**		**2KES090T** **2KES100T** **2KES125T** **2KES150T** **2KES160T**	
2KES175T **2KES200T** **2KES225T**		**2KES250T** **4KES200T** **4KES225T**		**4KES250T** **4KES300T** **4KES350T**		**4KES400T** — —	

Discount Symbol **CB-2**

Types DK and KDB Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units

Suitable for reverse feed application.

Table 12-191. Types DK and KDB Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units

Maximum Continuous Ampere Rating at 40°C	240 Vac Rated, 250 Vdc						600 Vac Rated, 250 Vdc			
	Complete Circuit Breaker						Complete Circuit Breaker			
	Without Line and Load Terminals		With Line Terminals Only		With Standard Line and Load Terminals Only		Without Line and Load Terminals		With Standard Line and Load Terminals	
	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
2-Pole										
100	—		—		—		KDB2100W		KDB2100	
125	—		—		—		KDB2125W		KDB2125	
150	—		—		—		KDB2150W		KDB2150	
175	—		—		—		KDB2175W		KDB2175	
200	—		—		—		KDB2200W		KDB2200	
225	—		—		—		KDB2225W		KDB2225	
250	DK2250W		DK2250Y		DK2250		KDB2250W		KDB2250	
300	DK2300W		DK2300Y		DK2300		KDB2300W		KDB2300	
350	DK2350W		DK2350Y		DK2350		KDB2350W		KDB2350	
400	DK2400W		DK2400Y		DK2400		KDB2400W		KDB2400	
3-Pole										
100	—		—		—		KDB3100W		KDB3100	
125	—		—		—		KDB3125W		KDB3125	
150	—		—		—		KDB3150W		KDB3150	
175	—		—		—		KDB3175W		KDB3175	
200	—		—		—		KDB3200W		KDB3200	
225	—		—		—		KDB3225W		KDB3225	
250	DK3250W		DK3250Y		DK3250		KDB3250W		KDB3250	
300	DK3300W		DK3300Y		DK3300		KDB3300W		KDB3300	
350	DK3350W		DK3350Y		DK3350		KDB3350W		KDB3350	
400	DK3400W		DK3400Y		DK3400		KDB3400W		KDB3400	

Molded Case Switches

Eaton's Cutler-Hammer molded case switches are used as compact switches in applications requiring high current switching capabilities. Molded case switches are constructed of circuit breaker components and are of the high instantaneous automatic type. Molded case switches are listed in accordance with Underwriters Laboratories Standard UL 1087.

Table 12-192. Molded Case Switches

Maximum Continuous Ampere Rating at 40°C	240 Vac Maximum, 250 Vdc		600 Vac Maximum, 250 Vdc		600 Vac Maximum, 250 Vdc	
	Complete Circuit Breaker with Standard Line and Load Terminals		Complete Circuit Breaker with Standard Line and Load Terminals		Complete Circuit Breaker with Standard Line and Load Terminals. Suitable for Reverse Feed Use	
	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
2-Pole						
400	DK2400K —		KD2400K HKD2400K		KDB2400K HKDB2400K	
3-Pole						
400	DK3400K —		KD3400K HKD3400K		KDB3400K HKDB3400K	
4-Pole						
400	— —		KD4400K HKD4400K		KDB4400K HKDB4400K	

Note: Molded case switches may open above 4000 amperes.

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100% Rated Types CKD and CHKD Electronic Circuit Breakers

The NEC allows the breaker to be rated at 100% of its frame size in an assembly, provided that 90°C wire is applied at the 75°C ampacity. All 100% rated circuit breakers have electronic trip units.

Table 12-193. 100% Rated Types CKD and CHKD Electronic Circuit Breakers ①

Maximum Continuous Ampere Rating at 40°C	Circuit Breaker Frame Only		Digitrip RMS 310 Trip Unit Only				Digitrip 310 Rating Plug Only			Standard Terminals Only See Page 12-113 for Optional Terminals
	Standard Interrupting Capacity 35 kAIC at 480 Vac	High Interrupting Capacity 65 kAIC at 480 Vac	Standard	Options			Ampere Rating	Fixed Rating Plug	Adjustable Rating Plug Ampere Rating	
			Adjustable Short Time Pickup with I^2t Short Delay Ramp	Independently Adjustable Short Time Pickup and Delay	Adjustable Short Time Pickup with I^2t Short Delay and Ground Fault Protection	Independently Adjustable Short Time Pickup and Delay and Ground Fault Protection				
	Catalog Number							Catalog Number		
3-Pole										
125	**CKD3400F**	**CHKD3400F**	**KES3125LS**	**KES3125LSI**	**KES3125LSG**	**KES3125LSIG**	70 90 100 110 125	**1KES070T** **1KES090T** **1KES100T** **1KES110T** **1KES125T**	70/90/100/125 **A1KES125T1**	**TA300K** ② **TA300K** ② **TA300K** ② **TA300K** ② **TA300K** ②
250	**CKD3400F**	**CHKD3400F**	**KES3250LS**	**KES3250LSI**	**KES3250LSG**	**KES3250LSIG**	70 100 125 150 160 175 200 225 250	**2KES070T** **2KES100T** **2KES125T** **2KES150T** **2KES160T** **2KES175T** **2KES200T** **2KES225T** **2KES250T**	125/150/200/225 **A2KES250T1**	 **TA300K** ② **TA300K** ② **TA300K** ② **TA300K** ② **TA300K** ② **TA300K** ② **TA300K** ② **TA350K** ②
400	**CKD3400F**	**CHKD3400F**	**KES3400LS**	**KES3400LSI**	**KES3400LSG**	**KES3400LSIG**	200 225 250 300 350 400	**4KES200T** **4KES225T** **4KES250T** **4KES300T** **4KES350T** **4KES400T**	200/250/300/400 **A4KES400T1** 220/240/260/280 **A4KES200T5** 320/340/360/380 **A4KES300T5**	**TA300K** ② **TA300K** ② **TA350K** ② **TA350K** ② **TA350K** ② **3TA400K** ③

① See **Table 12-194** below for prices.
② Individually packed.
③ 3TA400K terminal kit contains one terminal for each pole and one terminal cover.

Table 12-194. 100% Rated Types CKD and CHKD Electronic Circuit Breakers Prices

Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
A1KES125T1 **A2KES250T1** **A4KES400T1** **A4KES200T5** **A4KES300T5**		**KES3250LSG** **KES3250LSI** **KES3250LSIG** **KES3400LS** **KES3400LSG**		**1KES070T** **1KES090T** **1KES100T** **1KES110T** **1KES125T**		**2KES200T** **2KES225T** **2KES250T** **3TA400K** —	
CHKD3400F **CKD3400F** **KES3125LS** **KES3125LSG** **KES3125LSI** **KES3125LSIG** **KES3250LS**		**KES3400LSI** **KES3400LSIG** **TA300K** **TA350K** — — —		**2KES070T** **2KES100T** **2KES125T** **2KES150T** **2KES160T** **2KES175T** —		**4KES200T** **4KES225T** **4KES250T** **4KES300T** **4KES350T** **4KES400T** —	

Digitrip OPTIM 550 Electronic Circuit Breakers with Interchangeable Rating Plug

Order as individual components: Breaker Frame (which includes Trip Unit), Rating Plug, Terminals.

Table 12-195. Digitrip OPTIM 550 Electronic Circuit Breakers with Interchangeable Rating Plug

Maximum Continuous Ampere Rating at 40°C	Circuit Breaker Frame Only						Digitrip OPTIM Rating Plug Only		
	L – Adjustable Long Delay Pickup (I_r) with Adjustable Long Delay Time (I^2t or I^4t Response) ① S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I^2t or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time (I^2t or Flat Response) A – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time (I^2t or Flat Response)						Ampere Rating	Fixed Rating Plug	
	OPTIM 550 ②								
	LSI		LSIG		LSIA				
	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $		Catalog Number	Price U.S. $
3-Pole Standard Interrupting Capacity 600 Vac Rated 35 kAIC at 480 Vac									
125	**KD3125T52W**		**KD3125T56W**		**KD3125T57W**		70 90 100 110 125	**ORPK125A70** **ORPK125A90** **ORPK125A100** **ORPK125A110** **ORPK125A125**	
250	**KD3250T52W**		**KD3250T56W**		**KD3250T57W**		125 150 175 200 225 250	**ORPK025A125** **ORPK025A150** **ORPK025A175** **ORPK025A200** **ORPK025A225** **ORPK025A250**	
400	**KD3400T52W**		**KD3400T56W**		**KD3400T57W**		200 225 250 300 350 400	**ORPK40A200** **ORPK40A225** **ORPK40A250** **ORPK40A300** **ORPK40A350** **ORPK40A400**	
3-Pole High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac									
125	**HKD3125T52W**		**HKD3125T56W**		**HKD3125T57W**		70 90 100 110 125	**ORPK125A70** **ORPK125A90** **ORPK125A100** **ORPK125A110** **ORPK125A125**	
250	**HKD3250T52W**		**HKD3250T56W**		**HKD3250T57W**		125 150 175 200 225 250	**ORPK025A125** **ORPK025A150** **ORPK025A175** **ORPK025A200** **ORPK025A225** **ORPK025A250**	
400	**HKD3400T52W**		**HKD3400T56W**		**HKD3400T57W**		200 225 250 300 350 400	**ORPK40A200** **ORPK40A225** **ORPK40A250** **ORPK40A300** **ORPK40A350** **ORPK40A400**	
3-Pole Ultra High Interrupting Capacity Current Limiting 600 Vac Rated 100 kAIC at 480 Vac									
125	**KDC3125T52W**		**KDC3125T56W**		**KDC3125T57W**		70 90 100 110 125	**ORPK125A70** **ORPK125A90** **ORPK125A100** **ORPK125A110** **ORPK125A125**	
250	**KDC3250T52W**		**KDC3250T56W**		**KDC3250T57W**		125 150 175 200 225 250	**ORPK025A125** **ORPK025A150** **ORPK025A175** **ORPK025A200** **ORPK025A225** **ORPK025A250**	
400	**KDC3400T52W**		**KDC3400T56W**		**KDC3400T57W**		200 225 250 300 350 400	**ORPK40A200** **ORPK40A225** **ORPK40A250** **ORPK40A300** **ORPK40A350** **ORPK40A400**	

① Long delay I^4t response selection limits short delay time to flat response.

② Zone Interlocking, PowerNet, or both features can be added at the factory by adding Suffixes **ZG**, **PN** or **ZGP** respectively to above Catalog Number (refer to **Page 12-242** and take list price Adder x 1.25).

Discount Symbol **CB-2**

Digitrip OPTIM 1050 Electronic Circuit Breakers with Interchangeable Rating Plug

Order as individual components: Breaker Frame (which includes Trip Unit), Rating Plug, Terminals.

Table 12-196. Digitrip OPTIM 1050 Electronic Circuit Breakers with Interchangeable Rating Plug

Maximum Continuous Ampere Rating at 40°C	Circuit Breaker Frame Only				Digitrip OPTIM Rating Plug Only		
	L – Adjustable Long Delay Pickup (I_r) with Adjustable Long Delay Time (I^2t or I^4t Response) ① S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I^2t or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time (I^2t or Flat Response) A – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time (I^2t or Flat Response)				Ampere Rating	Fixed Rating Plug	
	OPTIM 1050 ②						
	LSIG		LSIA				
	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $		Catalog Number	Price U.S. $
3-Pole Standard Interrupting Capacity 600 Vac Rated 35 kAIC at 480 Vac							
125	KD3125T106W		KD3125T107W		70 90 100 110 125	ORPK125A70 ORPK125A90 ORPK125A100 ORPK125A110 ORPK125A125	
250	KD3250T106W		KD3250T107W		125 150 175 200 225 250	ORPK025A125 ORPK025A150 ORPK025A175 ORPK025A200 ORPK025A225 ORPK025A250	
400	KD3400T106W		KD3400T107W		200 225 250 300 350 400	ORPK40A200 ORPK40A225 ORPK40A250 ORPK40A300 ORPK40A350 ORPK40A400	
3-Pole High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac							
125	HKD3125T106W		HKD3125T107W		70 90 100 110 125	ORPK125A70 ORPK125A90 ORPK125A100 ORPK125A110 ORPK125A125	
250	HKD3250T106W		HKD3250T107W		125 150 175 200 225 250	ORPK025A125 ORPK025A150 ORPK025A175 ORPK025A200 ORPK025A225 ORPK025A250	
400	HKD3400T106W		HKD3400T107W		200 225 250 300 350 400	ORPK40A200 ORPK40A225 ORPK40A250 ORPK40A300 ORPK40A350 ORPK40A400	
3-Pole Ultra High Interrupting Capacity Current Limiting 600 Vac Rated 100 kAIC at 480 Vac							
125	KDC3125T106W		KDC3125T107W		70 90 100 110 125	ORPK125A70 ORPK125A90 ORPK125A100 ORPK125A110 ORPK125A125	
250	KDC3250T106W		KDC3250T107W		125 150 175 200 225 250	ORPK025A125 ORPK025A150 ORPK025A175 ORPK025A200 ORPK025A225 ORPK025A250	
400	KDC3400T106W		KDC3400T107W		200 225 250 300 350 400	ORPK40A200 ORPK40A225 ORPK40A250 ORPK40A300 ORPK40A350 ORPK40A400	

① Long delay I^4t response selection limits short delay time to flat response.
② Factory sealed.

100% Rated Digitrip OPTIM 550 Electronic Circuit Breakers with Interchangeable Rating Plug

Order as individual components: Breaker Frame (which includes Trip Unit), Rating Plug, Terminals.

Table 12-197. 100% Rated Digitrip OPTIM 550 Electronic Circuit Breakers with Interchangeable Rating Plug

Maximum Continuous Ampere Rating at 40°C	Circuit Breaker Frame Only						Digitrip OPTIM Rating Plug Only		
	L – Adjustable Long Delay Pickup (I_r) with Adjustable Long Delay Time (I^2t or I^4t Response) ① S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I^2t or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time (I^2t or Flat Response) A – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time (I^2t or Flat Response)						Ampere Rating	Fixed Rating Plug	
	OPTIM 550 ②								
	LSI		LSIG		LSIA				
	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $		Catalog Number	Price U.S. $
3-Pole Standard Interrupting Capacity 600 Vac Rated 35 kAIC at 480 Vac									
125	**CKD3125T52W**		**CKD3125T56W**		**CKD3125T57W**		70 90 100 110 125	**ORPK125A70** **ORPK125A90** **ORPK125A100** **ORPK125A110** **ORPK125A125**	
250	**CKD3250T52W**		**CKD3250T56W**		**CKD3250T57W**		125 150 175 200 225 250	**ORPK025A125** **ORPK025A150** **ORPK025A175** **ORPK025A200** **ORPK025A225** **ORPK025A250**	
400	**CKD3400T52W**		**CKD3400T56W**		**CKD3400T57W**		200 225 250 300 350 400	**ORPK40A200** **ORPK40A225** **ORPK40A250** **ORPK40A300** **ORPK40A350** **ORPK40A400**	
3-Pole High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac									
125	**CHKD3125T52W**		**CHKD3125T56W**		**CHKD3125T57W**		70 90 100 110 125	**ORPK125A70** **ORPK125A90** **ORPK125A100** **ORPK125A110** **ORPK125A125**	
250	**CHKD3250T52W**		**CHKD3250T56W**		**CHKD3250T57W**		125 150 175 200 225 250	**ORPK025A125** **ORPK025A150** **ORPK025A175** **ORPK025A200** **ORPK025A225** **ORPK025A250**	
400	**CHKD3400T52W**		**CHKD3400T56W**		**CHKD3400T57W**		200 225 250 300 350 400	**ORPK40A200** **ORPK40A225** **ORPK40A250** **ORPK40A300** **ORPK40A350** **ORPK40A400**	

① Long delay I^4t response selection limits short delay time to flat response.

② Zone Interlocking, PowerNet, or both features can be added at the factory by adding Suffixes **ZG**, **PN** or **ZGP** respectively to above Catalog Number (refer to **Page 12-242** and take list price Adder x 1.25).

Discount Symbol **CB-2**

100% Rated Digitrip OPTIM 1050 Electronic Circuit Breakers with Interchangeable Rating Plug

Order as individual components: Breaker Frame (which includes Trip Unit), Rating Plug, Terminals.

Table 12-198. 100% Rated Digitrip OPTIM 1050 Electronic Circuit Breakers with Interchangeable Rating Plug

Maximum Continuous Ampere Rating at 40°C	Circuit Breaker Frame Only				Digitrip OPTIM Rating Plug Only		
	L – Adjustable Long Delay Pickup (I_r) with Adjustable Long Delay Time (I^2t or I^4t Response) ① S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I^2t or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time (I^2t or Flat Response) A – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time (I^2t or Flat Response)				Ampere Rating	Fixed Rating Plug	
	OPTIM 1050 ②						
	LSIG		LSIA				
	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $		Catalog Number	Price U.S. $
3-Pole Standard Interrupting Capacity 600 Vac Rated 35 kAIC at 480 Vac							
125	**CKD3125T106W**		**CKD3125T107W**		70 90 100 110 125	**ORPK125A70** **ORPK125A90** **ORPK125A100** **ORPK125A110** **ORPK125A125**	
250	**CKD3250T106W**		**CKD3250T107W**		125 150 175 200 225 250	**ORPK025A125** **ORPK025A150** **ORPK025A175** **ORPK025A200** **ORPK025A225** **ORPK025A250**	
400	**CKD3400T106W**		**CKD3400T107W**		200 225 250 300 350 400	**ORPK40A200** **ORPK40A225** **ORPK40A250** **ORPK40A300** **ORPK40A350** **ORPK40A400**	
3-Pole High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac							
125	**CHKD3125T106W**		**CHKD3125T107W**		70 90 100 110 125	**ORPK125A70** **ORPK125A90** **ORPK125A100** **ORPK125A110** **ORPK125A125**	
250	**CHKD3250T106W**		**CHKD3250T107W**		125 150 175 200 225 250	**ORPK025A125** **ORPK025A150** **ORPK025A175** **ORPK025A200** **ORPK025A225** **ORPK025A250**	
400	**CHKD3400T106W**		**CHKD3400T107W**		200 225 250 300 350 400	**ORPK40A200** **ORPK40A225** **ORPK40A250** **ORPK40A300** **ORPK40A350** **ORPK40A400**	

① Long delay I^4t response selection limits short delay time to flat response.
② Factory sealed.

Line and Load Terminals

Eaton's Cutler-Hammer line and load terminals provide wire connecting capabilities for specific ranges of continuous current ratings and wire types. All terminals comply with Underwriters Laboratories Standards UL 486A and UL 486B and CSA Standard C22.2 No. 65, or Electrical Bulletin 1165. Unless otherwise specified, K-Frame circuit breaker line and load terminals are shipped separately for field installation.

Ordering Information

K-Frame circuit breakers use Cu/Al terminals as standard. When optional copper or Cu/Al terminals are required, order by Catalog Number. Specify if factory installation is required.

Table 12-199. Line and Load Terminals

Maximum Breaker Amperes	Terminal Body Material	Wire Type	AWG Wire Range/No. Conductors	Metric Wire Range mm²	Terminal		Figure	Terminals with Control Wire Termination		Figure
					Catalog Number	Price U.S. $		Catalog Number	Price U.S. $	
Standard Cu/Al Pressure Terminals										
225	Aluminum	Cu/Al	3 – 350/(1)	35 – 185	**TA300K** ①		**12-26**	—		—
350	Aluminum	Cu/Al	250 – 500/(1)	120 – 240	**TA350K** ①		**12-25**	—		—
400	Aluminum	Cu/Al	3/0 – 250/(2)	95 – 120	**2TA400K** ②③		**12-24**	**2TA400KCW** ②③		**12-27**
					3TA400K ②④		**12-24**	**3TA400KCW** ②④		**12-27**
					4TA400K ⑤⑥		**12-24**	**4TA400KCW** ⑤⑥		**12-27**
Optional Copper and Cu/Al Pressure Type Terminals										
225	Copper	Cu	3 – 350/(1)	35 – 185	**T300K**①		**12-26**	—		—
350	Copper	Cu	250 – 500/(1)	120 – 240	**T350K** ①		**12-25**	—		—
400	Copper	Cu	3/0 – 250/(2)	95 – 120	**2T400K** ③		**12-24**	**2T400KCW** ②③		**12-27**
					3T400K ④		**12-24**	**3T400KCW** ②④		**12-27**
					4T400K ⑤		**12-24**	**4T400KCW** ⑤⑥		**12-27**
400	Aluminum	Cu/Al	2/0 – 250/(2)	70 – 120	**2TA401K** ②③		**12-23**	**2TA401KCW** ②③		**12-27**
			or	70 – 240	**3TA401K** ②④		**12-23**	**3TA401KCW** ②④		**12-27**
			2/0 – 500/(1)	70 – 240	**4TA401K** ⑤⑥		**12-23**	**4TA401KCW** ⑤⑥		**12-27**
400	Aluminum	Cu/Al	500 – 750/(1)	300 – 400	**2TA402K** ②③		**12-28**	—		—
					3TA402K ②④		**12-28**	—		—
					4TA402K ⑤⑥		**12-28**	—		—
400	Copper	Cu	500 – 750/(1)	—	**2T402K** ②③		**12-28**	—		—
					3T402K ②④		**12-28**	—		—
					4T402K ⑤⑥		**12-28**	—		—

① Individually packed.
② Terminal kits contain one terminal for each pole and one terminal cover.
③ 2-pole kit.
④ 3-pole kit.
⑤ 4-pole kit.
⑥ Terminal kits contain one terminal for each pole and three interphase barriers.

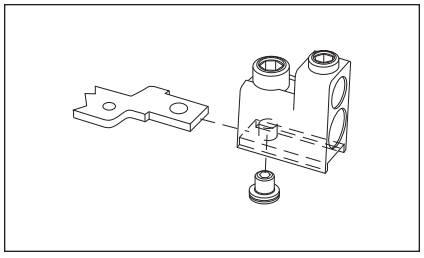

Figure 12-23. TA401K

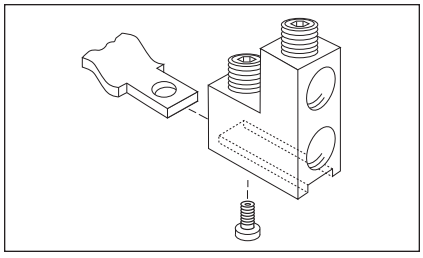

Figure 12-24. TA400K, T400K

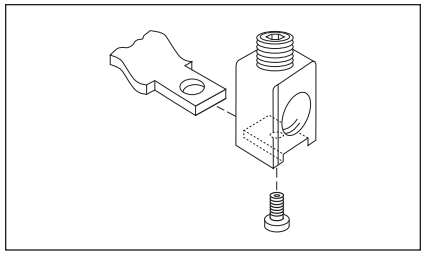

Figure 12-25. TA350K, T350K

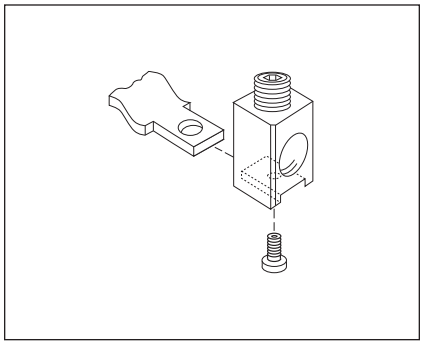

Figure 12-26. TA300K, T300K

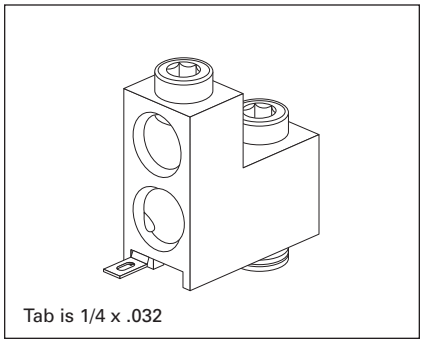

Figure 12-27. T400KCW, TA400KCW, TA401KCW

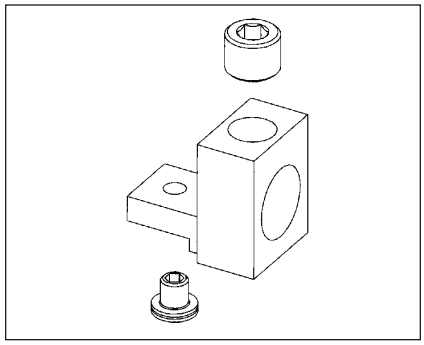

Figure 12-28. TA402K, T402K

Discount Symbol **CB-2**

Allowable Accessory Combinations

Different combinations of accessories can be supplied, depending on the types of accessories and the number of poles in the circuit breaker.

Table 12-200. Accessories

Description	Reference Page	2-Pole ①		3-Pole			4-Pole			
		Left	Right	Left	Center	Right	Left	Center	Right	Neu.
Internal Accessories (Only One Internal Accessory Per Pole)										
Alarm Lockout (Make/Break)	12-217		■	❑		❑	■			
Alarm Lockout (2Make/2Break)	12-217			❑		❑	■			
Auxiliary Switch (1A, 1B)	12-220		■	■		■	■		■	
Auxiliary Switch (2A, 2B)	12-220			■		■	■		■	
Auxiliary Switch (3A, 3B)	12-220			■		■	■		■	
Auxiliary Switch and Alarm Switch Combination	12-223			❑		❑	❑		❑	
Shunt Trip — Standard ②	12-226		■	■		■	■		■	
Shunt Trip — Low Energy ②	12-231			■		■	■			
Undervoltage Release Mechanism ②	12-232		■	■		■	■			
PowerNet or Zone Interlock Kit (OPTIM 550)	12-242					■				
External Accessories										
End Cap Kit	12-243	●		●			●			
Keeper Nut	12-243	●		●			●			
Control Wire Terminal Kit	12-244	●		●			●			
Terminal Adapter	12-244	●		●			●			
Multiwire Connectors	12-245	●		●			●			
Base Mounting Hardware	12-246	●		●			●			
Terminal Shields	12-248	●		●			●			
Interphase Barriers	12-249	●		●			●			
Non-Padlockable Handle Block	12-251	■			■			■		
Padlockable Handle Block	12-251				■					
Padlockable Handle Lock Hasp	12-252		■	❑		❑	❑		❑	
Cylinder Lock	12-252	❑	❑	❑		❑				
Key Interlock Kit	12-253	■	❑	❑		❑	❑		❑	
Sliding Bar Interlock — Requires Two Breakers	12-254				●					
Walking Beam Interlock — Requires Two Breakers	12-254				●			●		
Electrical (Solenoid) Operator	12-255				●			●		
Plug-in Adapters	12-257	●		●			●			
Rear Connecting Studs	12-258	●		●			●			
Panelboard Connecting Straps	12-261	●		●			●			
Handle Mechanisms	12-262	●		●			●			
Handle Extension	12-267	●		●			●			
IQ Energy Sentinel	12-268			●			●			
Solid-State (Electronic) Portable Test Kit	12-268	●		●			●			
OPTIM System Components 3-Poles										
Breaker Interface Module (BIM)	12-269									
Digitrip OPTIMizer	12-269									
Auxiliary Power Module	12-269									
Modifications (Refer to Eaton)										
Special Calibration	—	●		●			●			
Moisture Fungus Treatment	12-73	●		●			●			
Freeze-Tested Circuit Breakers	—	●		●			●			
Marine Application	—	●		●			●			

■ Applicable in indicated pole position. ❑ May be mounted on left or right pole — not both. ● Accessory available/Modification available.

① 2-pole breaker supplied in 3-pole frame. Current carrying parts omitted from center pole.
② Shunt trip and UVR cannot be mounted in right poles on LES or OPTIM trip units.

L-Frame

Typical L-Frame Circuit Breaker

Product Description

- All Cutler-Hammer L-Frame Circuit Breakers by Eaton Corporation are HACR rated.
- L-Frame circuit breakers are available as individual components (Frame, Trip Unit, Terminals), or factory assembled complete breakers.
- L-Frame circuit breakers with non-interchangeable trip units are suitable for reverse feed use.
- CE marked.

Technical Data and Specifications

Table 12-201. UL 489 Interrupting Capacity Ratings ①

Circuit Breaker Type	Number of Poles	Interrupting Capacity (kA rms Symmetrical Amperes)					
		Volts ac (50/60 Hz)				Volts dc	
		240	277	480	600	125	250 ②③
LDB	2, 3	65	—	35	25	—	22
LD	2, 3, 4	65	—	35	25	—	22
CLD ④	2, 3, 4	65	—	35	25	—	—
HLD, HLDB	2, 3, 4	100	—	65	35	—	25
CHLD ④	2, 3, 4	100	—	65	35	—	—
LDC, LDCB ⑤	2, 3, 4	200	—	100	50	—	30
CLDC ④⑤	2, 3, 4	200	—	100	50	—	—

① Utilization category A circuit breakers.
② L/R = 8 milliseconds minimum.
③ 2-pole circuit breaker or two poles of 3-pole circuit breaker. Incorporating Thermal-Magnetic trip unit only.
④ 100% rated breakers.
⑤ Current limiting.

Table 12-202. IEC 947-2 Interrupting Capacity Ratings ⑥

Circuit Breaker Type	Number of Poles	Interrupting Capacity (kA Symmetrical Amperes)							
		Volts ac (50/60 Hz)						Volts dc	
		240		415		690		250 ⑦⑧	
		I_{cu}	I_{cs}	I_{cu}	I_{cs}	I_{cu}	I_{cs}	I_{cu}	I_{cs}
LDB	2, 3	85	85	45	45	20	10	20	10
LD	2, 3, 4	85	85	45	45	20	10	20	10
CLD ⑨	2, 3, 4	85	85	45	45	20	10	—	—
HLD, HLDB	2, 3, 4	100	100	70	70	25	13	20	10
CHLD ⑨	2, 3, 4	100	100	70	70	25	13	—	—
LDC, LDCB	2, 3, 4	200	100	100	75	35	18	20	10
CLDC ⑨	2, 3, 4	200	100	100	75	35	18	—	—

⑥ Utilization category A circuit breakers.
⑦ L/R = 8 milliseconds minimum.
⑧ 2-pole circuit breaker or two poles of 3-pole circuit breaker. Incorporating Thermal-Magnetic trip unit only.
⑨ 100% rated breakers.

L-Frame Digitrip Specifications

Table 12-203. Specifications

Trip Unit Type	Digitrip RMS 310		Digitrip OPTIM 550	Digitrip OPTIM 1050
rms Sensing	Yes		Yes	Yes
Breaker Type				
Frame	L		L	L
Ampere Range	300 – 600 A		200 – 600 A	200 – 600 A
Interrupting Rating at 480 Volts	35, 65, 100 (kA)		35, 65, 100 (kA)	35, 65, 100 (kA)
Protection				
Ordering Options	LS, LSG	LSI, LSIG	LSI, LSI(A), LSIG	LSI(A), LSIG
Fixed Rated Plug (I_n)	Yes	Yes	Yes	Yes
Overtemperature Trip	Yes	Yes	Yes	Yes
Long Delay Protection (L)				
Adjustable Rating Plug (I_n)	Yes	Yes	No	No
Long Delay Pickup	0.5 – 1.0 (I_n) ①	0.5 – 1.0 (I_n) ①	0.4 – 1.0 x (I_n)	0.4 – 1.0 x (I_n)
Long Delay Time I^2t	12 Seconds	12 Seconds	2 – 24 Seconds	2 – 24 Seconds
Long Delay Time I^4t	No	No	1 – 5 Seconds	1 – 5 Seconds
Long Delay Thermal Memory	Yes	Yes	Yes	Yes
High Load Alarm	No	No	0.5 – 1.0 x I_r	0.5 – 1.0 x I_r
Short Delay Protection (S)				
Short Delay Pickup	200 – 800% x (I_n)	200 – 800% x (I_n)	150 – 800% x (I_r)	150 – 800% x (I_r)
Short Delay Time I^2t	100 ms	No	100 – 500 ms	100 – 500 ms
Short Delay Time Flat	No	Inst – 300 ms	100 – 500 ms	100 – 500 ms
Short Delay Time Zone Selective Interlocking	No	No	Yes ④	Yes
Instantaneous Protection (I)				
Instantaneous Pickup	No	200 – 800% x (I_n)	200 – 800% x (I_n)	200 – 800% x (I_n)
Discriminator	No	No	Yes	Yes
Instantaneous Override	Yes	Yes	Yes	Yes
Ground Fault Protection (G)				
Ground Fault Alarm	No	No	20 – 100% x (I_s)	20 – 100% x (I_s)
Ground Fault Pickup	1 – 5 x I_g (120 A)	1 – 5 x I_g (120 A)	20 – 100% x (I_s)	20 – 100% x (I_s)
Ground Fault Delay I^2t	No	No	100 – 500 ms	100 – 500 ms
Ground Fault Delay Flat	Inst – 500 ms	Inst – 500 ms	100 – 500 ms	100 – 500 ms
Ground Fault Zone Selective Interlocking	No	No	Yes ④	Yes
Ground Fault Thermal Memory	Yes	Yes	Yes	Yes
System Diagnostics				
Status LEDs	Yes	Yes	Yes	Yes
Cause of Trip LEDs	No	No	Yes	Yes
Magnitude of Trip Information	No	No	Yes	Yes
Remote Signal Contact — Ground Alarm	Yes ⑤	Yes ⑤	Yes ④	Yes
Local Auxiliary and Bell Alarm Contact	Optional	Optional	Optional	Included
System Monitoring				
Digital Display	No	No	Yes ②	Yes ②
Current	No	No	Yes	Yes
Power and Energy	No	No	No	Yes
Power Quality — Harmonics	No	No	No	Yes
Power Factor	No	No	No	Yes
Communications				
Cutler-Hammer PowerNet	No	No	Yes ③	Yes
Testing				
Testing Method	Test Set		OPTIMizer, BIM, Cutler-Hammer PowerNet	

① Adjust by rating plug.
② By OPTIMizer/BIM.
③ Eaton's Cutler-Hammer PowerNet kit.
④ Zone interlock kit.
⑤ With separate ground fault alarm unit (GFAU).

Legend: BIM = Breaker Interface Module
(A) = GF Alarm
I_s = Sensor Rating
I_n = Rating Plug
I_r = Long Delay Pickup Setting

Dimensions/Weights

Table 12-204. Dimensions in Inches (mm)

Number of Poles	Width	Height	Depth
2, 3	8.25 (209.6)	10.75 (273.1)	4.06 (103.1)
4	11.00 (279.4)	10.75 (273.1)	4.06 (103.1)

Table 12-205. Approximate Shipping Weight, Lbs. (kg)

Breaker Type	Complete Breaker			Frame Only			Trip Unit		
	Number of Poles								
	2	3	4	2	3	4	2	3	4
LD, HLD, LDC	18 (8.2)	20 (9.1)	25 (11.3)	14 (6.4)	15 (6.8)	20 (9.1)	3 (1.4)	4 (1.8)	5 (2.3)
LDB	18 (8.2)	20 (9.1)	25 (11.3)	—	—	—	—	—	—

Product Selection

This information is presented only as an aid to understanding catalog numbers. It is not to be used to build catalog numbers for circuit breakers or trip units.

Table 12-206. Circuit Breaker/Frame Catalog Numbering System

LD 3 600 F

Circuit Breaker/ Frame Type	Number of Poles	Circuit Breaker/ Frame Ampere Rating	Suffix
LDB **LD** **HLD** **LDC** **CLD** **CHLD** **CLDC**	**2** = 2 Poles **3** = 3 Poles **4** = 4 Poles	**300** **350** **400** **450** **500** **600**	**C** = Copper Terminals **F** = Frame Only **K** = High Magnetic Molded Case Switch **V** = 50°C (Thermal-Magnetic Trip Units Only) **W** = Without Terminals **X** = Load Side Terminals Only **Y** = Line Side Terminals Only

Table 12-207. Thermal-Magnetic Trip Unit Catalog Numbering System

LT 3 400 T

Trip Unit Type	Number of Poles	Trip Unit Rating/ Plug Ampere Rating	Suffix
LT = Thermal Magnetic	**2** = 2 Poles **3** = 3 Poles **4** = 4 Poles	**300** **350** **400** **450** **500** **600**	**T** = Trip Unit Thermal-Magnetic Fixed Thermal Adjustable Magnetic **V** = 50°C Calibration (Thermal-Magnetic Trip Units Only)

Table 12-208. OPTIM Circuit Breaker/Frame Catalog Numbering System

LD 3 125 T5 7 W

Circuit Breaker/ Frame Type	Number of Poles	Circuit Breaker/ Frame Ampere Rating	Trip Type	Suffix
LD **HLD** **LDC** **CLD** **CHLD** **CLDC**	**3** = 3 Poles	**125** = (Available on Model 1050 Only) **250** = (Available on Model 1050 Only) **400** **600**	**2** = LSI (550 Only) **6** = LSIG **7** = LSIA	**W** = Without Terminals

Trip Model
T5 = Model 550 **T10** = Model 1050

Table 12-209. Digitrip RMS 310 Trip Unit Catalog Numbering System

LES 3 600 LS P

Trip Unit Type	Number of Poles	Trip Unit Ampere Rating	Suffix	Suffix
LES = Electronic	**3** = 3 Poles **4** = 4 Poles	**600**	**LS** **LSI** **LSG** **LSIG**	**P** = 100% Protected Neutral on 4-Pole Trip Unit

Product Selection

Table 12-210. Types LD, HLD and LDC Thermal-Magnetic Circuit Breakers with Interchangeable Trip Units

Maximum Continuous Ampere Rating at 40°C ①	Standard Interrupting Capacity 600 Vac Rated 35 kAIC at 480 Vac		High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac		Ultra High Interrupting Capacity Current Limiting 600 Vac Rated 100 kAIC at 480 Vac		Thermal-Magnetic Trip Unit Only For Use with Standard or High or Ultra High Interrupting Frames		Standard Terminals Only See Page 12-132 for Optional Terminals	
	Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals		Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals		Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals					
	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
2-Pole										
300	LD2300		HLD2300		LDC2300		LT2300T		TA602LD ②	
350	LD2350		HLD2350		LDC2350		LT2350T		TA602LD ②	
400	LD2400		HLD2400		LDC2400		LT2400T		TA602LD ②	
450	LD2450		HLD2450		LDC2450		LT2450T		TA602LD ②	
500	LD2500		HLD2500		LDC2500		LT2500T		TA602LD ②	
600	LD2600		HLD2600		LDC2600		LT2600T		2TA603LDK ③	
3-Pole										
300	LD3300		HLD3300		LDC3300		LT3300T		TA602LD ②	
350	LD3350		HLD3350		LDC3350		LT3350T		TA602LD ②	
400	LD3400		HLD3400		LDC3400		LT3400T		TA602LD ②	
450	LD3450		HLD3450		LDC3450		LT3450T		TA602LD ②	
500	LD3500		HLD3500		LDC3500		LT3500T		TA602LD ②	
600	LD3600		HLD3600		LDC3600		LT3600T		3TA603LDK ③	
4-Pole ④										
300	LD4300		HLD4300		LDC4300		LT4300T		TA602LD ②	
350	LD4350		HLD4350		LDC4350		LT4350T		TA602LD ②	
400	LD4400		HLD4400		LDC4400		LT4400T		TA602LD ②	
450	LD4450		HLD4450		LDC4450		LT4450T		TA602LD ②	
500	LD4500		HLD4500		LDC4500		LT4500T		TA602LD ②	
600	LD4600		HLD4600		LDC4600		LT4600T		4TA603LDK ③	

① Magnetic trip range 5 – 10 times continuous ampere rating.
② Individually packed.
③ Terminal kits contain one terminal for each pole and one terminal cover.
④ Neutral is in right pole.

Table 12-211. Types LD, HLD and LDC Thermal-Magnetic Circuit Breakers — Frame Only

Standard Interrupting Capacity 600 Vac Rated 35 kAIC at 480 Vac		High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac		Ultra High Interrupting Capacity Current Limiting 600 Vac Rated 100 kAIC at 480 Vac	
Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
2-Pole					
LD2600F		HLD2600F		LDC2600F	
3-Pole					
LD3600F		HLD3600F		LDC3600F	
4-Pole					
LD4600F		HLD4600F		LDC4600F	

12

Types LD, HLD and LDC Electronic Circuit Breakers with Interchangeable Trip Units

Order as individual components: Breaker Frame, Trip Unit, Rating Plug, Terminals.

Table 12-212. Types LD, HLD and LDC Electronic Circuit Breakers with Interchangeable Trip Units ①

Maximum Continuous Ampere Rating at 40°C ②	Circuit Breaker Frame Only			Digitrip RMS 310 Trip Unit Only ③				Digitrip RMS 310 Rating Plug Only			Standard Terminals Only See Page 12-132 for Optional Terminals
	Standard Interrupting Capacity 600 Vac Rated 35 kAIC at 480 Vac	High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac	Ultra High Interrupting Capacity Current Limiting 600 Vac Rated 100 kAIC at 480 Vac	L – Adjustable Long Delay Pickup (By Adjustable Rating Plug) S – Adjustable Short Delay Pickup with Fixed Short Delay Time (I^2t Response) or Adjustable Short Delay Time (Flat Response) I – Adjustable Instantaneous Pickup by Setting Short Delay Time to Instantaneous G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Delay (Flat Response)				Ampere Rating	Fixed Rating Plug	Adjustable Rating Plug Ampere Rating	
	Catalog Number			Catalog Number					Catalog Number		
3-Pole ④											
600	**LD3600F**	**HLD3600F**	**LDC3600F**	**LES3600LS**	**LES3600LSI**	**LES3600LSG**	**LES3600LSIG**	300 350 400 450 500 600	**6LES300T** **6LES350T** **6LES400T** **6LES450T** **6LES500T** **6LES600T**	300/400/500/600 **A6LES600T1** 420/440/460/480 **A6LES400T5** 520/540/560/580 **A6LES500T5**	**TA602LD** ② **TA602LD** ② **TA602LD** ② **TA602LD** ② **3TA603LDK** ⑤
4-Pole ④											
600	**LD4600F**	**HLD4600F**	**LDC4600F**	**LES4600LS**	**LES4600LSI**	—	—	300 350 400 450 500 600	**6LES300T** **6LES350T** **6LES400T** **6LES450T** **6LES500T** **6LES600T**	300/400/500/600 **A6LES600T1** 420/440/460/480 **A6LES400T5** 520/540/560/580 **A6LES500T5**	**TA602LD** ③ **TA602LD** ③ **TA602LD** ③ **TA602LD** ③ **4TA603LDK** ⑤

① See **Table 12-213** below for prices.
② Individually packed.
③ For ac use only.
④ Neutral is in right pole.
⑤ Terminal kits contain one terminal for each pole and one terminal cover.

Table 12-213. Types LD, HLD and LDC Electronic Circuit Breakers with Interchangeable Trip Units Prices

Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
A6LES600T1		**LD3600F**		**LES3600LSIG**		**4TA603LDK**		**6LES600T**	
HLD3600F		**LD4600F**		**LES4600LS**		**6LES300T**		—	
HLD4600F		**LES3600LS**		**LES4600LSI**		**6LES350T**		—	
LDC3600F		**LES3600LSG**		**TA602LD**		**6LES400T**		**A6LES400T5**	
LDC4600F		**LES3600LSI**		**3TA603LDK**		**6LES450T**		**A6LES500T5**	
—		—		—		**6LES500T**		—	

Table 12-214. Types LDB, HLDB and LDCB Electronic Circuit Breakers with Non-Interchangeable Electronic Trip Units Suitable for Reverse Feed
Page 12-121

Maximum Continuous Ampere Rating at 40°C ②	Number of Poles	Circuit Breaker Frame Including DigiTrip RMS 310 Electronic Tip Unit Less Terminals and Rating Plug				Digitrip RMS 310 Rating Plug (Order as Separate Items)	
		L – Adjustable Long Delay Pickup (By Adjustable Rating Plug) S – Adjustable Short Delay Pickup with Fixed Short Delay Time (I^2t Response) or Adjustable Short Time (Flat Response) I – Adjustable Instantaneous Pickup by Setting Short Time Delay Time to Instantaneous G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Delay (Flat Response)				Fixed	Adjustable
		Catalog Number					
		LS	LSI	LSG	LSIG	Catalog Number	
Short Time Range Short Time Delay Ground Fault Pickup Ground Fault Delay		2 – 8 x I_n — — —	2 – 8 x I_n 0 – 300 ms — —	2 – 8 x I_n — Varies by Frame 0 – 500 ms	2 – 8 x I_n 0 – 300 ms Varies by Frame 0 – 500 ms		
Type LDB, HLDB and LDCB with Digitrip 310 Non-Interchangeable Trip Unit							
600	3	**LDB3600FT33W**	**LDB3600FT32W**	**LDB3600FT35W**	**LDB3600FT35W**	**6LES300T 6LES350T 6LES400T 6LES450T 6LES500T 6LES600T**	300/400/500/600 **A6LES600T1** 420/440/460/480 **A6LES400T5** 520/540/560/580 **A6LES500T5**
600	3	**HLDB3600FT33W**	**HLDB3600FT32W**	**HLDB3600FT35W**	**HLDB3600FT36W**	**6LES300T 6LES350T 6LES400T 6LES450T 6LES500T 6LES600T**	300/400/500/600 **A6LES600T1** 420/440/460/480 **A6LES400T5** 520/540/560/580 **A6LES500T5**
600	3	**LDCB3600FT33W**	**LDCB3600FT32W**	**LDCB3600FT35W**	**LDCB3600FT36W**	**6LES300T 6LES350T 6LES400T 6LES450T 6LES500T 6LES600T**	300/400/500/600 **A6LES600T1** 420/440/460/480 **A6LES400T5** 520/540/560/580 **A6LES500T5**

① See **Table 12-215** on **Page 12-121** for prices.
② For ac use only.

Table 12-215. Type NGC Very High Capacity — U_e Max. 690 Vac, 100 kA I_{cu} at 480 Vac or 415 Vac Prices

Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
A6LES400T5 A6LES500T5 A6LES600T1		**HLDB3600FT32W HLDB3600FT33W HLDB3600FT35W**		**HLDB3600FT36W LDB3600FT32W LDB3600FT33W**		**LDB3600FT35W LDB3600FT36W LDCB3600FT32W**	
LDCB3600FT33W LDCB3600FT35W LDCB3600FT36W		**6LES300T 6LES350T —**		**6LES400T 6LES450T —**		**6LES500T 6LES600T —**	

Discount Symbol **CB-2**

100% Rated Types CLD, CHLD, and CLDC Electronic Circuit Breakers with Interchangeable Trip Units

The NEC allows the breaker to be rated at 100% of its frame size in an assembly, provided that 90°C wire is applied at the 75°C ampacity. All 100% rated circuit breakers have electronic trip units. Order as individual components: Breaker Frame, Trip Unit, Rating Plug and Terminals.

Table 12-216. 100% Rated Types CLD, CHLD, and CLDC Electronic Circuit Breakers with Interchangeable Trip Units ①

Maximum Continuous Ampere Rating at 40°C ②	Circuit Breaker Frame Only			Digitrip RMS 310 Trip Unit Only				Digitrip RMS 310 Rating Plug Only			Standard Terminals Only See Page 12-132 for Optional Terminals
	Standard Interrupting Capacity 600 Vac Rated 35 kAIC at 480 Vac	High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac	Ultra High Interrupting Capacity Current Limiting 600 Vac Rated 100 kAIC at 480 Vac	Standard	Options			Ampere Rating	Fixed Rating Plug	Adjustable Rating Plug	
				Adjustable Short Time Pickup with I^2t Short Delay Ramp	Independently Adjustable Short Time Pickup and Delay Ground Fault Protection	Adjustable Short Time Pickup with I^2t Short Delay and Ground Fault Protection	Independently Adjustable Short Time Pickup and Delay and Ground Fault Protection			Ampere Rating	
	Catalog Number								Catalog Number		
3-Pole											
600	**CLD3600F**	**CHLD3600F**	**CLDC3600F**	**LES3600LS**	**LES3600LSI**	**LES3600LSG**	**LES3600LSIG**	300 350 400 450 500 600	**6LES300T** **6LES350T** **6LES400T** **6LES450T** **6LES500T** **6LES600T**	300/400/500/600 **A6LES600T1** 420/440/460/480 **A6LES400T5** 520/540/560/580 **A6LES500T5**	**TA602LD** ③ **TA602LD** ③ **TA602LD** ③ **TA602LD** ③ **3TA603LDK** ④

① See **Table 12-217** below for prices.
② Ampere rating is established by rating plug.
③ Individually packed.
④ 3TA603LDK terminal kit contains one terminal for each pole and one terminal cover.

Table 12-217. 100% Rated Types CLD, CHLD and CLDC Electronic Circuit Breakers with Interchangeable Trip Units Prices

Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
A6LES600T1 **CHLD3600F** **CLDC3600F** **CLD3600F** **LES3600LS** **—**		**LES3600LSG** **LES3600LSI** **LES3600LSIG** **TA602LD** **3TA603LDK** **—**		**6LES300T** **6LES350T** **6LES400T** **6LES450T** **6LES500T** **6LES600T**	

Table 12-218. Type LDB Thermal-Magnetic Circuit Breakers with Non-interchangeable Trip Units ①

Maximum Continuous Ampere Rating	600 Vac Rated, 250 Vdc			
	Complete Circuit Breaker			
	Without Line and Load Terminals		With Standard Line and Load Terminals Only	
	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
2-Pole				
300 350 400	**LDB2300W LDB2350W LDB2400W**		**LDB2300 LDB2350 LDB2400**	
450 500 600	**LDB2450W LDB2500W LDB2600W**		**LDB2450 LDB2500 LDB2600**	
3-Pole				
300 350 400	**LDB3300W LDB3350W LDB3400W**		**LDB3300 LDB3350 LDB3400**	
450 500 600	**LDB3450W LDB3500W LDB3600W**		**LDB3450 LDB3500 LDB3600**	

① Factory sealed — suitable for reverse feed application.

Molded Case Switches

Eaton's Cutler-Hammer molded case switches are used as compact switches in applications requiring high current switching capabilities. Molded case switches are constructed of circuit breaker components and are of the high instantaneous automatic type. Molded case switches are listed in accordance with Underwriters Laboratories Standard UL 489.

Table 12-219. Molded Case Switches

Maximum Continuous Ampere Rating at 40°C	600 Vac Maximum, 250 Vdc		Standard Terminals Only See Page 12-132 for Optional Terminals	
	Circuit Breaker Only without Line and Load Terminals			
	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
2-Pole				
600 600 600	**LD2600WK LDB2600WK** ② **HLD2600WK**		**2TA603LDK 2TA603LDK 2TA603LDK**	
3-Pole				
600 600 600	**LD3600WK LDB3600WK** ② **HLD3600WK**		**3TA603LDK 3TA603LDK 3TA603LDK**	
4-Pole				
600 600 600	**LD4600WK LDB4600WK** ② **HLD4600WK**		**4TA603LDK 4TA603LDK 4TA603LDK**	

② Factory sealed — suitable for reverse feed application.

Note: Molded case switch will trip above 6000 amperes.

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Discount Symbol **CB-2**

Digitrip OPTIM Electronic Circuit Breaker with Interchangeable Rating Plug

Order as individual components: Breaker Frame (which includes Trip Unit), Rating Plug, Terminals.

Table 12-220. Digitrip OPTIM 550 Electronic Circuit Breaker with Interchangeable Rating Plug

Maximum Continuous Ampere Rating at 40°C	Circuit Breaker Frame Only						Digitrip OPTIM Rating Plug Only		
	L – Adjustable Long Delay Pickup (I_r) with Adjustable Long Delay Time (I^2t or I^4t Response) ① S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I^2t or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time (I^2t or Flat Response) A – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time (I^2t or Flat Response)						Ampere Rating	Fixed Rating Plug	
	OPTIM 550 ②								
	LSI		LSIG		LSIA				
	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $		Catalog Number	Price U.S. $
3-Pole Standard Interrupting Capacity 600 Vac Rated 35 kAIC at 480 Vac									
125	**LD3125T52W**		**LD3125T56W**		**LD3125T57W**		— — — — —	**ORPL125A070** **ORPL125A090** **ORPL125A100** **ORPL125A110** **ORPL125A125**	
250	**LD3250T52W**		**LD3250T56W**		**LD3250T57W**		— — — — — —	**ORPL025A125** **ORPL025A150** **ORPL025A175** **ORPL025A200** **ORPL025A225** **ORPL025A250**	
400	**LD3400T52W**		**LD3400T56W**		**LD3400T57W**		200 225 250 300 350 400	**ORPL40A200** **ORPL40A225** **ORPL40A250** **ORPL40A300** **ORPL40A350** **ORPL40A400**	
600	**LD3600T52W**		**LD3600T56W**		**LD3600T57W**		300 350 400 500 600	**ORPL60A300** **ORPL60A350** **ORPL60A400** **ORPL60A500** **ORPL60A600**	
3-Pole High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac									
125	**HLD3125T52W**		**HLD3125T56W**		**HLD3125T57W**		70 90 100 110 125	**ORPL125A070** **ORPL125A090** **ORPL125A100** **ORPL125A110** **ORPL125A125**	
250	**HLD3250T52W**		**HLD3250T56W**		**HLD3250T57W**		125 150 175 200 225 250	**ORPL025A125** **ORPL025A150** **ORPL025A175** **ORPL025A200** **ORPL025A225** **ORPL025A250**	
400	**HLD3400T52W**		**HLD3400T56W**		**HLD3400T57W**		200 225 250 300 350 400	**ORPL40A200** **ORPL40A225** **ORPL40A250** **ORPL40A300** **ORPL40A350** **ORPL40A400**	
600	**HLD3600T52W**		**HLD3600T56W**		**HLD3600T57W**		300 350 400 500 600	**ORPL60A300** **ORPL60A350** **ORPL60A400** **ORPL60A500** **ORPL60A600**	

① Long delay I^4t response selection limits short delay time to flat response.

② Zone Interlocking, PowerNet, or both features can be added at the factory by adding Suffixes **ZG**, **PN** or **ZGP** respectively to above Catalog Number (refer to **Page 12-242** and take list price Adder x 1.25).

Discount Symbol **CB-2**

Table 12-220. Digitrip OPTIM 550 Electronic Circuit Breaker with Interchangeable Rating Plug (Continued)

Maximum Continuous Ampere Rating at 40°C	Circuit Breaker Frame Only						Digitrip OPTIM Rating Plug Only		
	L – Adjustable Long Delay Pickup (I_r) with Adjustable Long Delay Time (I^2t or I^4t Response) ① S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I^2t or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time (I^2t or Flat Response) A – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time (I^2t or Flat Response)						Ampere Rating	Fixed Rating Plug	
	OPTIM 550 ③								
	LSI		LSIG		LSIA				
	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $		Catalog Number	Price U.S. $
3-Pole Ultra High Interrupting Capacity Current Limiting 600 Vac Rated 100 kAIC at 480 Vac									
125	**LDC3125T52W**		**LDC3125T56W**		**LDC3125T57W**		— — — — —	**ORPL125A070** **ORPL125A090** **ORPL125A100** **ORPL125A110** **ORPL125A125**	
250	**LDC3250T52W**		**LDC3250T56W**		**LDC3250T57W**		— — — — — —	**ORPL025A125** **ORPL025A150** **ORPL025A175** **ORPL025A200** **ORPL025A225** **ORPL025A250**	
400	**LDC3400T52W**		**LDC3400T56W**		**LDC3400T57W**		200 225 250 300 350 400	**ORPL40A200** **ORPL40A225** **ORPL40A250** **ORPL40A300** **ORPL40A350** **ORPL40A400**	
600	**LDC3600T52W**		**LDC3600T56W**		**LDC3600T57W**		300 350 400 500 600	**ORPL60A300** **ORPL60A350** **ORPL60A400** **ORPL60A500** **ORPL60A600**	

③ Zone Interlocking, PowerNet, or both features can be added at the factory by adding Suffixes **ZG**, **PN** or **ZGP** respectively to above Catalog Number (refer to **Page 12-242** and take list price Adder x 1.25).

Digitrip OPTIM Electronic Circuit Breaker with Interchangeable Rating Plug

Order as individual components: Breaker Frame (which includes Trip Unit), Rating Plug, Terminals.

Table 12-221. Digitrip OPTIM 1050 Electronic Circuit Breaker with Interchangeable Rating Plug

Maximum Continuous Ampere Rating at 40°C	Circuit Breaker Frame Only				Digitrip OPTIM Rating Plug Only		
	L – Adjustable Long Delay Pickup (I_r) with Adjustable Long Delay Time (I^2t or I^4t Response) ① S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I^2t or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time (I^2t or Flat Response) A – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time (I^2t or Flat Response)				Ampere Rating	Fixed Rating Plug	
	OPTIM 1050 ②③						
	LSIG		LSIA				
	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $		Catalog Number	Price U.S. $
3-Pole Standard Interrupting Capacity 600 Vac Rated 35 kAIC at 480 Vac							
125	**LD3125T106W**		**LD3125T107W**		70 90 100 110 125	**ORPL125A070** **ORPL125A090** **ORPL125A100** **ORPL125A110** **ORPL125A125**	
250	**LD3250T106W**		**LD3250T107W**		125 150 175 200 225 250	**ORPL025A125** **ORPL025A150** **ORPL025A175** **ORPL025A200** **ORPL025A225** **ORPL025A250**	
400	**LD3400T106W**		**LD3400T107W**		200 225 250 300 350 400	**ORPL40A200** **ORPL40A225** **ORPL40A250** **ORPL40A300** **ORPL40A350** **ORPL40A400**	
600	**LD3600T106W**		**LD3600T107W**		300 350 400 500 600	**ORPL60A300** **ORPL60A350** **ORPL60A400** **ORPL60A500** **ORPL60A600**	
3-Pole High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac							
125	**HLD3125T106W**		**HLD3125T107W**		70 90 100 110 125	**ORPL125A070** **ORPL125A090** **ORPL125A100** **ORPL125A110** **ORPL125A125**	
250	**HLD3250T106W**		**HLD3250T107W**		125 150 175 200 225 250	**ORPL025A125** **ORPL025A150** **ORPL025A175** **ORPL025A200** **ORPL025A225** **ORPL025A250**	
400	**HLD3400T106W**		**HLD3400T107W**		200 225 250 300 350 400	**ORPL40A200** **ORPL40A225** **ORPL40A250** **ORPL40A300** **ORPL40A350** **ORPL40A400**	
600	**HLD3600T106W**		**HLD3600T107W**		300 350 400 500 600	**ORPL60A300** **ORPL60A350** **ORPL60A400** **ORPL60A500** **ORPL60A600**	

① Long delay I^4t response selection limits short delay time to flat response.
② One Form C auxiliary switch and one Form C bell alarm switch supplied with breaker as standard.
③ Factory sealed.

Table 12-221. Digitrip OPTIM 1050 Electronic Circuit Breaker with Interchangeable Rating Plug (Continued)

Maximum Continuous Ampere Rating at 40°C	Circuit Breaker Frame Only				Digitrip OPTIM Rating Plug Only		
	L – Adjustable Long Delay Pickup (I_r) with Adjustable Long Delay Time (I^2t or I^4t Response) ① S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I^2t or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time (I^2t or Flat Response) A – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time (I^2t or Flat Response)				Ampere Rating	Fixed Rating Plug	
	OPTIM 1050 ②③						
	LSIG		LSIA				
	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $		Catalog Number	Price U.S. $
3-Pole Ultra High Interrupting Capacity Current Limiting 600 Vac Rated 100 kAIC at 480 Vac							
125	**LDC3125T106W**		**LDC3125T107W**		70 90 100 110 125	**ORPL125A070** **ORPL125A090** **ORPL125A100** **ORPL125A110** **ORPL125A125**	
250	**LDC3250T106W**		**LDC3250T107W**		125 150 175 200 225 250	**ORPL025A125** **ORPL025A150** **ORPL025A175** **ORPL025A200** **ORPL025A225** **ORPL025A250**	
400	**LDC3400T106W**		**LDC3400T107W**		200 225 250 300 350 400	**ORPL40A200** **ORPL40A225** **ORPL40A250** **ORPL40A300** **ORPL40A350** **ORPL40A400**	
600	**LDC3600T106W**		**LDC3600T107W**		300 350 400 500 600	**ORPL60A300** **ORPL60A350** **ORPL60A400** **ORPL60A500** **ORPL60A600**	

① Long delay I^4t response selection limits short delay time to flat response.
② One Form C auxiliary switch and one Form C bell alarm switch supplied with breaker as standard.
③ Factory sealed.

100% Rated Digitrip OPTIM Circuit Breakers with Interchangeable Rating Plug

Order as individual components: Breaker Frame (which includes Trip Unit), Rating Plug, Terminals.

Table 12-222. 100% Rated Digitrip OPTIM 550 Circuit Breakers with Interchangeable Rating Plug

Maximum Continuous Ampere Rating at 40°C	Circuit Breaker Frame Only						Digitrip OPTIM Rating Plug Only		
	L – Adjustable Long Delay Pickup (I_r) with Adjustable Long Delay Time (I^2t or I^4t Response) ① S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I^2t or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time (I^2t or Flat Response) A – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time (I^2t or Flat Response)						Ampere Rating	Fixed Rating Plug	
	OPTIM 550 ②								
	LSI		LSIG		LSIA				
	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $		Catalog Number	Price U.S. $
3-Pole Standard Interrupting Capacity 600 Vac Rated 35 kAIC at 480 Vac									
125	**CLD3125T52W**		**CLD3125T56W**		**CLD3125T57W**		70 90 100 110 125	**ORPL125A070** **ORPL125A090** **ORPL125A100** **ORPL125A110** **ORPL125A125**	
250	**CLD3250T52W**		**CLD3250T56W**		**CLD3125T57W**		125 150 175 200 225 250	**ORPL025A125** **ORPL025A150** **ORPL025A175** **ORPL025A200** **ORPL025A225** **ORPL025A250**	
400	**CLD3400T52W**		**CLD3400T56W**		**CLD3400T57W**		200 225 250 300 350 400	**ORPL40A200** **ORPL40A225** **ORPL40A250** **ORPL40A300** **ORPL40A350** **ORPL40A400**	
600	**CLD3600T52W**		**CLD3600T56W**		**CLD3600T57W**		300 350 400 500 600	**ORPL60A300** **ORPL60A350** **ORPL60A400** **ORPL60A500** **ORPL60A600**	
3-Pole High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac									
125	**CHLD3125T52W**		**CHLD3125T56W**		**CHLD3125T57W**		70 90 100 110 125	**ORPL125A070** **ORPL125A090** **ORPL125A100** **ORPL125A110** **ORPL125A125**	
250	**CHLD3250T52W**		**CHLD3250T56W**		**CHLD3125T57W**		125 150 175 200 225 250	**ORPL025A125** **ORPL025A150** **ORPL025A175** **ORPL025A200** **ORPL025A225** **ORPL025A250**	
400	**CHLD3400T52W**		**CHLD3400T56W**		**CHLD3400T57W**		200 225 250 300 350 400	**ORPL40A200** **ORPL40A225** **ORPL40A250** **ORPL40A300** **ORPL40A350** **ORPL40A400**	
600	**CHLD3600T52W**		**CHLD3600T56W**		**CHLD3600T57W**		300 350 400 500 600	**ORPL60A300** **ORPL60A350** **ORPL60A400** **ORPL60A500** **ORPL60A600**	

① Long delay I^4t response selection limits short delay time to flat response.

② Zone Interlocking, PowerNet, or both features can be added at the factory by adding Suffixes **ZG**, **PN** or **ZGP** respectively to above Catalog Number (refer to **Page 12-242** and take list price Adder x 1.25).

Table 12-222. 100% Rated Digitrip OPTIM 550 Circuit Breakers with Interchangeable Rating Plug (Continued)

Maximum Continuous Ampere Rating at 40°C	Circuit Breaker Frame Only						Digitrip OPTIM Rating Plug Only		
	L – Adjustable Long Delay Pickup (I_r) with Adjustable Long Delay Time (I^2t or I^4t Response) ① S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I^2t or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time (I^2t or Flat Response) A – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time (I^2t or Flat Response)						Ampere Rating	Fixed Rating Plug	
	OPTIM 550 ②								
	LSI		LSIG		LSIA				
	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $		Catalog Number	Price U.S. $
3-Pole Ultra High Interrupting Capacity Current Limiting 600 Vac Rated 100 kAIC at 480 Vac									
125	**CLDC3125T52W**		**CLDC3125T56W**		**CLDC3125T57W**		70 90 100 110 125	**ORPL125A070** **ORPL125A090** **ORPL125A100** **ORPL125A110** **ORPL125A125**	
250	**CLDC3250T52W**		**CLDC3250T56W**		**CLDC3125T57W**		125 150 175 200 225 250	**ORPL025A125** **ORPL025A150** **ORPL025A175** **ORPL025A200** **ORPL025A225** **ORPL025A250**	
400	**CLDC3400T52W**		**CLDC3400T56W**		**CLDC3400T57W**		200 225 250 300 350 400	**ORPL40A200** **ORPL40A225** **ORPL40A250** **ORPL40A300** **ORPL40A350** **ORPL40A400**	
600	**CLDC3600T52W**		**CLDC3600T56W**		**CLDC3600T57W**		300 350 400 500 600	**ORPL60A300** **ORPL60A350** **ORPL60A400** **ORPL60A500** **ORPL60A600**	

① Long delay I^4t response selection limits short delay time to flat response.

② Zone Interlocking, PowerNet, or both features can be added at the factory by adding Suffixes **ZG**, **PN** or **ZGP** respectively to above Catalog Number (refer to **Page 12-242** and take list price Adder x 1.25).

Discount Symbol **CB-2**

Table 12-223. 100% Rated Digitrip OPTIM 1050 Circuit Breakers with Interchangeable Rating Plug

Maximum Continuous Ampere Rating at 40°C	Circuit Breaker Frame Only				Digitrip OPTIM Rating Plug Only		
	L – Adjustable Long Delay Pickup (I_r) with Adjustable Long Delay Time (I^2t or I^4t Response) ① S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I^2t or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time (I^2t or Flat Response) A – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time (I^2t or Flat Response)				Ampere Rating	Fixed Rating Plug	
	OPTIM 1050 ②③						
	LSIG		LSIA				
	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $		Catalog Number	Price U.S. $
3-Pole Standard Interrupting Capacity 600 Vac Rated 35 kAIC at 480 Vac							
125	**CLD3125T106W**		**CLD3125T107W**		70 90 100 110 125	**ORPL125A070** **ORPL125A090** **ORPL125A100** **ORPL125A110** **ORPL125A125**	
250	**CLD3250T106W**		**CLD3250T107W**		125 150 175 200 225 250	**ORPL025A125** **ORPL025A150** **ORPL025A175** **ORPL025A200** **ORPL025A225** **ORPL025A250**	
400	**CLD3400T106W**		**CLD3400T107W**		200 225 250 300 350 400	**ORPL40A200** **ORPL40A225** **ORPL40A250** **ORPL40A300** **ORPL40A350** **ORPL40A400**	
600	**CLD3600T106W**		**CLD3600T107W**		300 350 400 500 600	**ORPL60A300** **ORPL60A350** **ORPL60A400** **ORPL60A500** **ORPL60A600**	
3-Pole High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac							
125	**CHLD3125T106W**		**CHLD3125T107W**		70 90 100 110 125	**ORPL125A070** **ORPL125A090** **ORPL125A100** **ORPL125A110** **ORPL125A125**	
250	**CHLD3250T106W**		**CHLD3250T107W**		125 150 175 200 225 250	**ORPL025A125** **ORPL025A150** **ORPL025A175** **ORPL025A200** **ORPL025A225** **ORPL025A250**	
400	**CHLD3400T106W**		**CHLD3400T107W**		200 225 250 300 350 400	**ORPL40A200** **ORPL40A225** **ORPL40A250** **ORPL40A300** **ORPL40A350** **ORPL40A400**	
600	**CHLD3600T106W**		**CHLD3600T107W**		300 350 400 500 600	**ORPL60A300** **ORPL60A350** **ORPL60A400** **ORPL60A500** **ORPL60A600**	

① Long delay I^4t response selection limits short delay time to flat response.
② One Form C auxiliary switch and one Form C bell alarm switch supplied with breaker as standard.
③ Factory sealed.

Discount Symbol **CB-2**

Table 12-223. 100% Rated Digitrip OPTIM 1050 Electronic Circuit Breaker with Interchangeable Rating Plug (Continued)

Maximum Continuous Ampere Rating at 40°C	Circuit Breaker Frame Only				Digitrip OPTIM Rating Plug Only		
	L – Adjustable Long Delay Pickup (I_r) with Adjustable Long Delay Time (I^2t or I^4t Response) ① S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I^2t or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time (I^2t or Flat Response) A – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time (I^2t or Flat Response)				Ampere Rating	Fixed Rating Plug	
	OPTIM 1050 ②③						
	LSIG		LSIA				
	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $		Catalog Number	Price U.S. $
3-Pole Ultra High Interrupting Capacity Current Limiting 600 Vac Rated 100 kAIC at 480 Vac							
125	**CLDC3125T106W**		**CLDC3125T107W**		70 90 100 110 125	**ORPL125A070** **ORPL125A090** **ORPL125A100** **ORPL125A110** **ORPL125A125**	
250	**CLDC3250T106W**		**CLDC3250T107W**		125 150 175 200 225 250	**ORPL025A125** **ORPL025A150** **ORPL025A175** **ORPL025A200** **ORPL025A225** **ORPL025A250**	
400	**CLDC3400T106W**		**CLDC3400T107W**		200 225 250 300 350 400	**ORPL40A200** **ORPL40A225** **ORPL40A250** **ORPL40A300** **ORPL40A350** **ORPL40A400**	
600	**CLDC3600T106W**		**CLDC3600T107W**		300 350 400 500 600	**ORPL60A300** **ORPL60A350** **ORPL60A400** **ORPL60A500** **ORPL60A600**	

① Long delay I^4t response selection limits short delay time to flat response.
② One Form C auxiliary switch and one Form C bell alarm switch supplied with breaker as standard.
③ Factory sealed.

Line and Load Terminals

Eaton's Cutler-Hammer line and load terminals provide wire connecting capabilities for specific ranges of continuous current ratings and wire types. All terminals comply with Underwriters Laboratories Standards UL 486A and UL 486B and CSA Standard C22.2 No. 65M. Unless otherwise specified, L-Frame circuit breaker line and load terminals are shipped separately for field installation.

The wire connecting terminal is secured with two pan-head, slotted screws and lockwashers which can be checked for the correct torque loading or retightened from the front of the circuit breaker before installation of the conductors. (Applies to all styles.) The circuit breaker line/load terminal conductors are positioned in the conducting holes in the wire connecting terminal and are secured with recessed socket screws which are tightened to the correct torque loading from the front of the circuit breaker.

Ordering Information

L-Frame circuit breakers use Cu/Al terminals as standard. When optional copper terminals are required, order by Catalog Number. Specify if factory installation is required.

Table 12-224. Line and Load Terminals

Maximum Breaker Amperes	Terminal Body Material	Wire Type	AWG Wire Range/Number of Conductors	Metric Wire Range mm^2	Terminal			Terminals with Control Wire Termination	
					Poles	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
Standard Cu/Al Pressure Terminals									
400	Aluminum	Cu/Al	4/0 – 600 (1)	120 – 300	2-Pole Kit ① 3-Pole Kit ① 4-Pole Kit ①	**2TA401LDK** **3TA401LDK** **4TA401LDK**		— — —	
450 500 600	Aluminum Aluminum Aluminum	Cu/Al Cu/Al Cu/Al	4 – 4/0 (2) 3/0 – 350 (2) 400 – 500 (2)	25 – 95 95 – 150 185 – 240	② ② 2-Pole Kit ① 3-Pole Kit ① 4-Pole Kit ①	**TA450LD** **TA602LD** **2TA603LDK** **3TA603LDK** **4TA603LDK**		— **TA602LDCW** **2TA603LDKCW** **3TA603LDKCW** **4TA603LDKCW**	
Optional Copper and Cu/Al Pressure Type Terminals									
600	Copper	Cu	250 – 350 (2)	120 – 250	②	**T602LD**		**T602LDCW**	

① Terminal kits contain one terminal for each pole and one terminal cover.
② Individually packed.

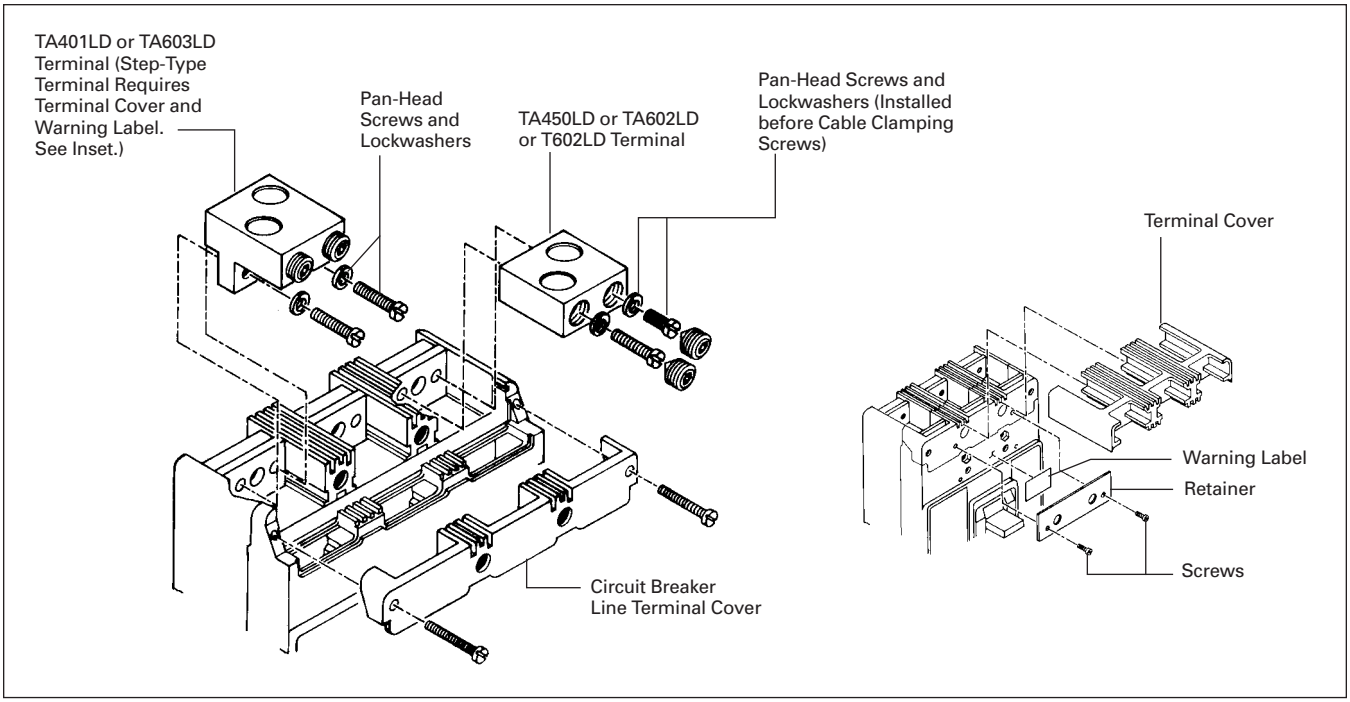

Figure 12-29. Terminals

Allowable Accessory Combinations

Different combinations of accessories can be supplied, depending on the types of accessories and the number of poles in the circuit breaker.

Table 12-225. Accessories

Description	Reference Page	2-Pole ①, 3-Pole			4-Pole			
		Left	Center	Right	Left	Center	Right	Neu. ②
Internal Accessories (Only One Internal Accessory Per Pole) ③								
Alarm Lockout (Make/Break)	12-217	■		■	■		■	
Alarm Lockout (2Make/2Break)	12-217	■		■	■		■	
Auxiliary Switch (1A, 1B)	12-220	■		■	■		■	
Auxiliary Switch (2A, 2B)	12-220	■		■	■		■	
Auxiliary Switch (3A, 3B)	12-220	■		■	■		■	
Auxiliary Switch (1A, 1B) and Alarm Switch Combination	12-223	■		■	■		■	
Auxiliary Switch (2A, 2B) and Alarm Switch Combination	12-223	■		■	■		■	
Shunt Trip — Standard ④	12-226	■		■	■		■	
Shunt Trip — Low Energy ④	12-231	■		■	■		■	
Undervoltage Release Mechanism ④	12-232	■		■	■		■	
Cutler-Hammer PowerNet Communications Kit (OPTIM 550)	12-242			■				
External Accessories								
End Cap Kit	12-243		●			●		
Control Wire Terminal Kit	12-244		●			●		
Base Mounting Hardware	12-246		●			●		
Terminal Shields	12-248		●			●		
Interphase Barriers	12-249		●			●		
Non-Padlockable Handle Block	12-251		■			■		
Padlockable Handle Lock Hasp	12-252	❑		❑	❑		❑	
Key Interlock Kit	12-253	❑		❑	❑		❑	
Sliding Bar Interlock — Requires Two Breakers	12-254		●					
Walking Beam Interlock — Requires Two Breakers	12-254		●			●		
Electrical (Motor) Operator	12-255		●			●		
Plug-in Adapters	12-257		●			●		
Rear Connecting Studs	12-258		●			●		
Panelboard Connecting Straps	12-261		●			●		
Handle Mechanisms	12-262		●			●		
Handle Extension	12-267		●			●		
Solid-State (Electronic) Portable Test Kit	12-268		●			●		
OPTIM System Components 3-Poles								
Ground Fault Alarm Unit	12-268							
Potential Transformer Module	12-268							
Breaker Interface Module (BIM)	12-269							
Digitrip OPTIMizer	12-269							
Auxiliary Power Module	12-269							
Modifications (Refer to Eaton)								
Special Calibration	—		●			●		
Moisture Fungus Treatment	12-73		●			●		
Freeze-Tested Circuit Breakers	—		●			●		
Marine Application	—		●			●		

■ Applicable in indicated pole position ❑ May be mounted on left or right pole — not both ● Accessory available/Modification available

① 2-pole breaker supplied in 3-pole frame. Current carrying parts omitted from center pole.
② Refer to Eaton for appropriate neutral pole accessory combinations.
③ OPTIM model 1050 is factory sealed and does not have the right pole space available for accessories.
④ Shunt trip and UVR cannot be mounted in right poles on LES or OPTIM trip units.

M-Frame

Typical M-Frame Circuit Breaker

Product Description

- All Cutler-Hammer M-Frame Circuit Breakers by Eaton Corporation are HACR rated.
- MDL-Frame circuit breakers are available as individual components (Frame, Trip Unit, Terminals), or factory assembled complete breakers.
- MDLB, HMDLB-Frame circuit breakers with non-interchangeable trip units are suitable for reverse feed use.
- CE marked.

12

Technical Data and Specifications

Table 12-226. UL 489/CSA Interrupting Capacity Ratings ①

Circuit Breaker Type	Number of Poles	Interrupting Capacity (kA Symmetrical Amperes)			
		Volts ac (50/60 Hz)			Volts dc ②③
		240	480	600	250
MDL, MDLB	2, 3	65	50	25	22
CMDL	2, 3	65	50	25	—
HMDL, HMDLB	2, 3	100	65	35	25
CHMDL	2, 3	100	65	35	—

① Utilization category A circuit breakers.
② 2-pole or two poles of 3-pole circuit breaker. Thermal-magnetic trip units only, MDL, HMDL breakers with electronic trip unit are not dc rated.
③ Time constant is 3 milliseconds minimum at 10 kA and 8 milliseconds at 22 kA.

Table 12-227. IEC 947-2 Interrupting Capacity Ratings ④

Circuit Breaker Type	Number of Poles	Interrupting Capacity rms (kA Symmetrical Amperes) $I_{CU} = I_{CS}$			
		Volts ac (50/60 Hz)			Volts dc ⑤⑥
		240	415	690	250
MDL, MDLB	2, 3	65/65	50/50	20/10	20/10
CMDL	2, 3	65/65	50/50	20/10	—
HMDL, HMDLB	2, 3	100/100	70/50	25/13	20/10
CHMDL	2, 3	100/100	70/50	25/13	—

④ Utilization category A circuit breakers.
⑤ 2-pole or two poles of 3-pole circuit breaker. Thermal-magnetic trip units only, MDL, HMDL breakers with electronic trip unit are not dc rated.
⑥ Time constant is 3 milliseconds minimum at 10 kA and 8 milliseconds at 20 kA.

MDL-Frame Digitrip Specifications

Table 12-228. Specifications

Trip Unit Type	Digitrip RMS 310	
rms Sensing	Yes	
Breaker Type		
Frame	MDL, MDLB, CMDL, HMDL, HMDLB, CHMDL	
Ampere Range	400 – 800 A	
Interrupting Rating at 480 Volts	50, 65 (kA)	
Protection		
Ordering Options	LS, LSG	LSI, LSIG
Fixed Rated Plug (I_n)	Yes	Yes
Overtemperature Trip	Yes	Yes
Long Delay Protection (L)		
Adjustable Rating Plug (I_n)	Yes	Yes
Long Delay Pickup	0.5 – 1.0 (I_n) ①	0.5 – 1.0 (I_n) ①
Long Delay Time I^2t	12 Seconds	12 Seconds
Long Delay Time I^4t	No	No
Long Delay Thermal Memory	Yes	Yes
High Load Alarm	No	No
Short Delay Protection (S)		
Short Delay Pickup	200 – 800% x (I_n)	200 – 800% x (I_n)
Short Delay Time I^2t	100 ms	No
Short Delay Time Flat	No	Inst – 300 ms
Short Delay Time Zone Selective Interlocking	No	No
Instantaneous Protection (I)		
Instantaneous Pickup	No	200 – 800% x (I_n)
Discriminator	No	No
Instantaneous Override	Yes	Yes
Ground Fault Protection (G)		
Ground Fault Alarm	No	No
Ground Fault Pickup	1 – 5 x I_g (160 A)	1 – 5 x I_g (160 A)
Ground Fault Delay I^2t	No	No
Ground Fault Delay Flat	Inst – 500 ms	Inst – 500 ms
Ground Fault Zone Selective Interlocking	No	No
Ground Fault Thermal Memory	Yes	Yes
System Diagnostics		
Status LEDs	Yes	Yes
Cause of Trip LEDs	No	No
Magnitude of Trip Information	No	No
Remote Signal Contacts — Ground Alarm	Yes ②	Yes ②
System Monitoring		
Digital Display	No	No
Current	No	No
Power and Energy	No	No
Power Quality — Harmonics	No	No
Power Factor	No	No
Communications		
Eaton's Cutler-Hammer PowerNet	No	No
Testing		
Testing Method	Test Set	

① Adjust by rating plug.
② With separate ground fault alarm unit (GFAU).

Legend: I_n = Rating Plug

Dimensions/Weights

Table 12-229. Dimensions in Inches (mm)

Number of Poles	Width	Height	Depth
2, 3	8.25 (209.6)	16.00 (406.4)	4.06 (103.1)

Table 12-230. Approximate Shipping Weight in Lbs. (kg)

Breaker Type	Complete Breaker		Frame Only		Trip Unit ①	
	Number of Poles					
	2	3	2	3	2	3
MDL, HMDL (T/M T.U.)	26.5 (12.0)	29.0 (13.2)	24.5 (11.1)	26.0 (11.8)	2.5 (1.1)	3.0 (1.4)
MDL, HMDL (Elec. T.U.)	—	30.0 (13.6)	—	26.0 (11.8)	—	4.0 (1.8)

① Thermal-magnetic only.

Product Selection

This information is presented only as an aid to understanding Catalog Numbers. It is not to be used to build Catalog Numbers for circuit breakers or trip units.

Table 12-231. Circuit Breaker/Frame Catalog Numbering System

MDL 3 800 F

Circuit Breaker/ Frame Type	Number of Poles	Circuit Breaker/ Frame Ampere Rating	Suffix
MDL, MDLB **HMDL, HMDLB**	**2** = 2 Poles **3** = 3 Poles	**300** ② **350** ② **400** **450** **500** **600** **700** **800**	**F** = Frame Only **K** = High Magnetic Molded Case Switch **V** = 50°C (Thermal-Magnetic Trip Units Only) **W** = Without Terminals **X** = Load Side Terminals Only **Y** = Line Side Terminals Only

② Thermal-magnetic only.

Table 12-232. Thermal-Magnetic Trip Unit Catalog Numbering System

MT 3 800 T

Trip Unit Type	Number of Poles	Trip Unit Rating/ Plug Ampere Rating	Suffix
MT **MES**	**2** = 2 Poles **3** = 3 Poles	**300** ③ **350** ③ **400** **450** **500** **600** **700** **800**	**T** = Thermal-Magnetic **V** = 50°C (Thermal-Magnetic Trip Units Only) **LS** = Digitrip RMS 310 **LSI** = Digitrip RMS 310 **LSG** = Digitrip RMS 310 **LSIG** = Digitrip RMS 310

③ Thermal-magnetic only.

Product Selection

Table 12-233. Types MDL and HMDL Thermal-Magnetic Circuit Breakers with Interchangeable Trip Units

Maximum Continuous Ampere Rating at 40°C	Standard Interrupting Capacity 600 Vac Rated 50 kAIC at 480 Vac				High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac				Thermal-Magnetic Trip Unit Only For Use with Standard or High or Ultra High Interrupting Frames Magnetic Trip Range is 5 – 10 up through 600 A; 4 – 8 on 700 and 800 A x Continuous Ampere Rating		Standard Terminals Only ① See Page 12-140 for Optional Terminals	
	Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals		Frame Only		Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals		Frame Only					
	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S.$	Catalog Number	Price U.S.$
2-Pole												
300	MDL2300		MDL2800F		HMDL2300		HMDL2800F		MT2300T		TA700MA1	
350	MDL2350				HMDL2350				MT2350T		TA700MA1	
400	MDL2400				HMDL2400				MT2400T		TA700MA1	
450	MDL2450				HMDL2450				MT2450T		TA700MA1	
500	MDL2500				HMDL2500				MT2500T		TA700MA1	
600	MDL2600				HMDL2600				MT2600T		TA700MA1	
700	MDL2700				HMDL2700				MT2700T		TA700MA1	
800	MDL2800				HMDL2800				MT2800T		TA800MA2	
3-Pole												
300	MDL3300		MDL3800F		HMDL3300		HMDL3800F		MT3300T		TA700MA1	
350	MDL3350				HMDL3350				MT3350T		TA700MA1	
400	MDL3400				HMDL3400				MT3400T		TA700MA1	
450	MDL3450				HMDL3450				MT3450T		TA700MA1	
500	MDL3500				HMDL3500				MT3500T		TA700MA1	
600	MDL3600				HMDL3600				MT3600T		TA700MA1	
700	MDL3700				HMDL3700				MT3700T		TA700MA1	
800	MDL3800				HMDL3800				MT3800T		TA800MA2	

① Two terminals are required per pole.

Table 12-234. Types MDLB and HMDLB Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units ②

Maximum Continuous Ampere Rating at 40°C	Standard Interrupting Capacity 600 Vac Rated 50 kAIC at 480 Vac		High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac		Standard Terminals Only ③ See Page 12-140 for Optional Terminals	
	Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals		Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals			
	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
2-Pole						
300	MDLB2300		HMDLB2300		TA700MA1	
350	MDLB2350		HMDLB2350		TA700MA1	
400	MDLB2400		HMDLB2400		TA700MA1	
450	MDLB2450		HMDLB2450		TA700MA1	
500	MDLB2500		HMDLB2500		TA700MA1	
600	MDLB2600		HMDLB2600		TA700MA1	
700	MDLB2700		HMDLB2700		TA700MA1	
800	MDLB2800		HMDLB2800		TA800MA2	
3-Pole						
300	MDLB3300		HMDLB3300		TA700MA1	
350	MDLB3350		HMDLB3350		TA700MA1	
400	MDLB3400		HMDLB3400		TA700MA1	
450	MDLB3450		HMDLB3450		TA700MA1	
500	MDLB3500		HMDLB3500		TA700MA1	
600	MDLB3600		HMDLB3600		TA700MA1	
700	MDLB3700		HMDLB3700		TA700MA1	
800	MDLB3800		HMDLB3800		TA800MA2	

② Factory sealed for reverse feed application.
③ Two terminals are required per pole.

Discount Symbol **CB-2**

Types MDL and HMDL Electronic Circuit Breakers with Interchangeable Trip Units

Order as Individual Components: Breaker Frame, Trip Unit, Rating Plug, Terminals.

Table 12-235. Types MDL and HMDL Electronic Circuit Breakers with Interchangeable Trip Units

Maximum Continuous Ampere Rating at 40°C ①	Circuit Breaker Frame Only				Digitrip RMS 310 Trip Unit Only ②		Digitrip RMS 310 Rating Plug Only					Terminals
	Standard Interrupting Capacity 600 Vac Rated 50 kAIC at 480 Vac		High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac		L – Adjustable Long Delay Pickup (by Adjustable Rating Plug) S – Adjustable Short Delay Pickup with Fixed Short Delay Time (I^2t Response) or Adjustable Short Delay Time (Flat Response) I – Adjustable Instantaneous Pickup by Setting Short Delay Time to Instantaneous G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Delay (Flat Response)		Ampere Rating	Fixed Rating Plug		Adjustable Rating Plugs		
										Ampere Rating		
	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $		Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	
3-Pole												
800	**MDL3800F**		**HMDL3800F**		**MES3800LS** **MES3800LSI** **MES3800LSG** **MES3800LSIG** **—**		400 500 600 700 800	**8MES400T** **8MES500T** **8MES600T** **8MES700T** **8MES800T**		400/500/600/800 **A8MES800T** 620/640/660/680 **A8MES600T5** 720/740/760/780 **A8MES700T5**		See **Page 12-140** for Standard and Optional Terminals

① Ampere rating is established by rating plug.
② For ac use only.

Table 12-236. Types MDLB and HMDLB Electronic Circuit Breakers with Non-Interchangeable Trip Units ①

Maximum Continuous Ampere Rating at 40°C ②	Factory Assembled Circuit Breaker Consisting of Frame and Trip Unit							
	LS		LSI		LSG		LSIG	
	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
3-Pole Standard Interrupting Capacity 600 Vac Rated 50 kAIC at 480 Vac								
800	**MDLB3800T33W**		**MDLB3800T32W**		**MDLB3800T35W**		**MDLB3800T36W**	
3-Pole High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac								
800	**HMDLB3800T33W**		**HMDLB3800T32W**		**HMDLB3800T35W**		**HMDLB3800T36W**	

① Factory sealed, suitable for reverse feed application. CMDLB and CHMDLB are also available.
② Ampere rating is established by rating plug.

100% Rated Types CMDL and CHMDL Electronic Circuit Breakers with Non-Interchangeable Trip Units

The NEC allows the breaker to be rated at 100% of its frame size in an assembly, provided that 90°C wire is applied at the 75°C ampacity. All 100% rated circuit breakers have electronic trip units. Order as individual components: breaker frame, trip unit, rating plug and terminals.

Table 12-237. 100% Rated Types CMDL and CHMDL Electronic Circuit Breakers with Interchangeable Trip Units ③

Maximum Continuous Ampere Rating at 40°C ④	Circuit Breaker Frame Only		Digitrip RMS 310 Trip Unit Only ⑤				Digitrip RMS 310 Trip Unit Only			Terminals
	Standard Interrupting Capacity 50 kAIC at 480 Vac	High Interrupting Capacity 65 kAIC at 480 Vac	Standard	Options			Ampere Rating	Fixed Rating Plug	Adjustable Rating Plug	
			Adjustable Short Time Pickup with I^2t Short Delay Ramp	Independently Adjustable Short Time Pickup and Delay Ground Fault Protection	Adjustable Short Time Pickup with I^2t Short Delay and Ground Fault Protection	Independently Adjustable Short Time Pickup and Ground Fault Protection			Ampere Rating	
	Catalog Number							Catalog Number		
3-Pole										
800	**CMDL3800F**	**CHMDL3800F**	**MES3800LS**	**MES3800LSI**	**MES3800LSG**	**MES3800LSIG**	400 500 600 700 800	**8MES400T** **8MES500T** **8MES600T** **8MES700T** **8MES800T**	400/500/ 600/800 **A8MES800T** 620/640/ 660/680 **A8MES600T5** 720/740/ 760/780 **A8MES700T5**	See **Page 12-140** for Standard and Optional Terminals

③ See **Table 12-238** below for prices.
④ Ampere rating is established by rating plug.
⑤ For ac use only.

Table 12-238. 100% Rated Types CMDL and CHMDL Electronic Circuit Breakers with Non-Interchangeable Trip Units Prices

Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
A8MES800T **A8MES600T5** **A8MES700T5** **CHMDL3800F** **CMDL3800F**		**MES3800LS** **MES3800LSG** **MES3800LSI** **MES3800LSIG** **8MES400T**		**8MES500T** **8MES600T** **8MES700T** **8MES800T** —	

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Molded Case Switches

Eaton's Cutler-Hammer molded case switches are used as compact switches in applications requiring high current switching capabilities. Molded case switches are constructed of circuit breaker components and are of the high instantaneous automatic type. Molded case switches are listed in accordance with Underwriters Laboratories Standard UL 489.

Table 12-239. Molded Case Switches

Maximum Continuous Ampere Rating at 40°C	600 Vac Maximum, 250 Vdc	
	Circuit Breaker Only without Line and Load Terminals	
	Catalog Number	Price U.S. $
2-Pole		
800	**MDL2800WK** **MDLB2800WK** ① **HMDL2800WK**	
3-Pole		
800	**MDL3800WK** **MDLB3800WK** ① **HMDL3800WK**	

① MDLB and HMDLB are suitable for reverse-feed applications.

Note: Molded case switch may trip above 6000 amperes.

Line and Load Terminals

M-Frame circuit breakers use Cu/Al terminals as standard. When optional copper or Cu/Al terminals are required, order by Catalog Number. Specify if factory installation is required.

Table 12-240. Line and Load Terminals

Maximum Breaker Amperes	Terminal Body Material	Wire Type	AWG Wire Range/No. Conductors	Terminal		Terminals with Control Wire Termination	
				Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
Standard Cu/Al Pressure Terminals							
600	Aluminum	Cu/Al	(2) 1 – 500 kcmil	**TA700MA1**		**TA700MA1CWT**	
800 std.	Aluminum	Cu/Al	(3) 3/0 – 400 kcmil	**TA800MA2**		**TA800MA2CWT**	
800	Aluminum	Cu/Al	(2) 500 – 750 kcmil	**TA801MA**		**TA801MACWT**	
Optional Copper and Cu/Al Pressure Type Terminals							
600	Copper	Cu	(2) 2/0 – 500 kcmil	**T600MA1**		—	
800	Copper	Cu	(3) 3/0 – 300 kcmil	**T800MA1**		—	

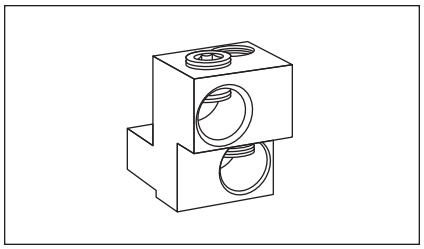

Figure 12-30. TA700MA1

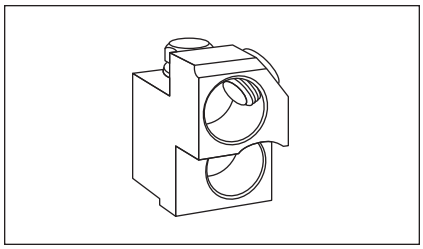

Figure 12-32. TA801MA

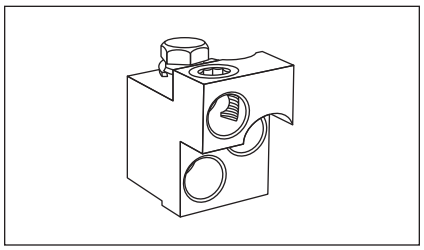

Figure 12-31. TA800MA2

Allowable Accessory Combinations

Different combinations of accessories can be supplied, depending on the types of accessories and the number of poles in the circuit breaker.

Table 12-241. Accessories

Description	Reference Page	2-Pole ①		3-Pole		
		Left	Right	Left	Center	Right
Internal Accessories (Only One Internal Accessory Per Pole)						
Alarm Lockout (Make/Break)	12-217	■		■		■
Alarm Lockout (2Make/2Break)	12-217	■		■		■
Auxiliary Switch (1A, 1B)	12-220	■		■		■
Auxiliary Switch (2A, 2B)	12-220	■		■		■
Auxiliary Switch (3A, 3B)	12-220	■		■		■
Auxiliary Switch (1A, 1B) and Alarm Switch Combination	12-223	■		■		■
Auxiliary Switch (2A, 2B) and Alarm Switch Combination	12-223	■		■		■
Shunt Trip — Standard ②	12-226	■		■		■
Shunt Trip — Low Energy ②	12-231	■		■		■
Undervoltage Release Mechanism ②	12-232	■		■		■
External Accessories						
Base Mounting Hardware	12-246				●	
Terminal Shields	12-248				●	
Interphase Barriers	12-249				●	
Non-Padlockable Handle Block	12-251				■	
Padlockable Handle Lock Hasp	12-252	❑		❑		❑
Key Interlock Kit	12-253	❑		❑		❑
Sliding Bar Interlock — Requires Two Breakers	12-254	●		●		
Walking Beam Interlock — Requires Two Breakers	12-254	●		●		
Electrical (Motor) Operator	12-255	●		●		
Plug-in Adapters	12-257	●		●		
Rear Connecting Studs	12-258	●		●		
Panelboard Connecting Straps	12-261	●		●		
Handle Mechanisms	12-262	●		●		
Handle Extension	12-267				●	
Solid-State (Electronic) Portable Test Kit	12-268	●		●		
Modifications (Refer to Eaton)						
Special Calibration	—	●		●		
Moisture Fungus Treatment	12-73	●		●		
Freeze-Tested Circuit Breakers	—	●		●		
Marine Application	—	●		●		

■ Applicable in indicated pole position
❑ May be mounted on left or right pole — not both
● Accessory available/Modification available

① 2-pole breaker supplied in 3-pole frame. Current carrying parts omitted from center pole.
② Shunt trip and UVR cannot be mounted in right poles on MES trip units.

N-Frame

Typical N-Frame Circuit Breaker

Product Description

- All Cutler-Hammer N-Frame Circuit Breakers by Eaton Corporation are suitable for reverse feed use.
- All N-Frame circuit breakers are HACR rated.

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Technical Data and Specifications

Table 12-242. UL 489 Interrupting Capacity Ratings ①

Circuit Breaker Type	Number of Poles	Interrupting Capacity (kA Symmetrical Amperes) Volts ac (50/60 Hz) 240	277	480	600
ND	2, 3, 4	65	—	50	25
CND ②	2, 3, 4	65	—	50	25
HND	2, 3, 4	100	—	65	35
CHND ②	2, 3, 4	100	—	65	35
NDC	2, 3, 4	200	—	100	65
CNDC ②	2, 3, 4	200	—	100	65
NDU ③	3	300 ④	—	150	75 ⑤

① Utilization Category A circuit breakers.
② 100% rated breakers.
③ 800 amperes maximum rating.
④ Successfully tested at 300 kAIC, although UL recognizes maximum of 200 kAIC at 240 Vac.
⑤ Successfully tested at 75 kAIC, although UL recognizes maximum of 65 kAIC at 600 Vac.

Table 12-243. IEC 947-2 Interrupting Capacity Ratings ⑥

Circuit Breaker Type	Number of Poles	Interrupting Capacity (kA Symmetrical Amperes) Volts ac (50/60 Hz) 240	415	690
ND	2, 3, 4			
I_{cu}		85	50	20
I_{cs}		85	50	10
CND ⑦	2, 3, 4			
I_{cu}		85	50	20
I_{cs}		85	50	10
HND	2, 3, 4			
I_{cu}		100	70	25
I_{cs}		100	50	13
CHND ⑦	2, 3, 4			
I_{cu}		100	70	25
I_{cs}		100	50	13
NDC	2, 3, 4			
I_{cu}		200	100	35
I_{cs}		100	50	18
CNDC ⑦	2, 3, 4			
I_{cu}		200	100	35
I_{cs}		100	50	18

⑥ Utilization Category A circuit breakers.
⑦ 100% rated breakers.

N-Frame Digitrip Specifications

Table 12-244. Specifications

Trip Unit Type	Digitrip RMS 310		Digitrip OPTIM 550	Digitrip OPTIM 1050
rms Sensing	Yes		Yes	Yes
Breaker Type				
Frame	N		N	N
Ampere Range	400 A – 1200 A		400 A – 1200 A	400 A – 1200 A
Interrupting Rating at 480 Volts	50, 65, 100 (kA)		50, 65, 100 (kA)	50, 65, 100 (kA)
Protection				
Ordering Options	LS, LSG	LSI, LSIG	LSI, LSIG, LSI(A)	LSI(A), LISG
Fixed Rated Plug (I_n)	Yes	Yes	Yes	Yes
Overtemperature Trip	Yes	Yes	Yes	Yes
Long Delay Protection (L)				
Adjustable Rating Plug (I_n)	Yes	Yes	No	No
Long Delay Pickup	0.5 – 1.0 (I_n) ①	0.5 – 1.0 (I_n) ①	0.4 – 1.0 x (I_n)	0.4 – 1.0 x (I_n)
Long Delay Time I^2t	12 Seconds	12 Seconds	2 – 24 Seconds	2 – 24 Seconds
Long Delay Time I^4t	No	No	1 – 5 Seconds	1 – 5 Seconds
Long Delay Thermal Memory	Yes	Yes	Yes	Yes
High Load Alarm	No	No	No	0.5 – 1.0 x I_r
Short Delay Protection (S)				
Short Delay Pickup	200 – 800% x (I_n)	200 – 800% x (I_n)	150 – 800% x (I_r)	150 – 800% x (I_r)
Short Delay Time I^2t	100 ms	No	100 – 500 ms	100 – 500 ms
Short Delay Time Flat	No	Inst – 300 ms	100 – 500 ms	100 – 500 ms
Short Delay Time Zone Selective Interlocking	No	No	Yes	Yes
Instantaneous Protection (I)				
Instantaneous Pickup	No	200 – 800% x (I_n)	200 – 800% x (I_n)	200 – 800% x (I_n)
Discriminator	No	No	Yes	Yes
Instantaneous Override	Yes	Yes	Yes	Yes
Ground Fault Protection (G)				
Ground Fault Alarm	No	No	20 – 100% x (I_s)	20 – 100% x (I_s)
Ground Fault Pickup	Varies by Frame ②	Varies by Frame ②	20 – 100% x (I_s)	20 – 100% x (I_s)
Ground Fault Delay I^2t	No	No	100 – 500 ms	100 – 500 ms
Ground Fault Delay Flat	Inst – 500 ms	Inst – 500 ms	100 – 500 ms	100 – 500 ms
Ground Fault Zone Selective Interlocking	No	No	Yes ③	Yes
Ground Fault Thermal Memory	Yes	Yes	Yes	Yes
System Diagnostics				
Status LEDs	Yes	Yes	Yes	Yes
Cause of Trip LEDs	No	No	Yes	Yes
Magnitude of Trip Information	No	No	Yes	Yes
Remote Signal Contact — Ground Alarm	Yes ④	Yes ④	Yes ③	Yes
Local Auxiliary and Bell Alarm Contact	Optional	Optional	Optional	Included
System Monitoring				
Digital Display	No	No	Yes ②	Yes ②
Current	No	No	Yes	Yes
Power and Energy	No	No	No	Yes
Power Quality — Harmonics	No	No	No	Yes
Power Factor	No	No	No	Yes
Communications				
Cutler-Hammer PowerNet	No	No	No ⑤	Yes
Testing				
Testing Method	Test Set		OPTIMizer, BIM, Cutler-Hammer PowerNet	OPTIMizer, BIM, Cutler-Hammer PowerNet

① Adjust by rating plug.
② By OPTIMizer/BIM.
③ Zone interlock kit.
④ With separate ground fault alarm unit (GFAU).
⑤ Eaton's Cutler-Hammer PowerNet kit.

Legend: BIM = Breaker Interface Module
(A) = GF Alarm
I_s = Sensor Rating
I_n = Rating Plug
I_r = Long Delay Pickup Setting

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Dimensions/Weights

Table 12-245. Dimensions in Inches (mm)

Number of Poles	Width	Height	Depth
2, 3	8.25 (209.6)	16.00 (406.4)	5.50 (139.7)
4	11.13 (282.6)	16.00 (406.4)	5.50 (139.7)

Table 12-246. Approximate Shipping Weight in Lbs. (kg)

Breaker Type	Complete Breaker		
	Number of Poles		
	2	3	4
ND, HND, NDC, NDU	37 (16.8)	45 (20.4)	58 (26.3)

Product Selection

This information is presented only as an aid to understanding Catalog Numbers. It is not to be used to build Catalog Numbers for circuit breakers or trip units.

Table 12-247. Circuit Breaker/Frame Catalog Numbering System

ND 3 12 T3 2 W

Circuit Breaker/ Frame Type	Number of Poles	Circuit Breaker/Frame Ampere Rating	Trip Model	Trip Type	Suffix
ND **HND** **NDC** **NDU** **CND** **CHND** **CNDC**	**2** = 2 Poles **3** = 3 Poles **4** = 4 Poles	**800** = 800 Amperes **12** = 1200 Amperes	**T3** = Model 310 **T5** = Model 550 **T7** = Model 750 **T10** = Model 1050	**2** = LSI **3** = LS **5** = LSG **6** = LSIG **7** = LSIA	**E** = 100% R.P. protected (4-Pole) **EH** = 50% R.P. protected (4-Pole) **K** = High Magnetic Molded Case Switch **W** = Without Terminals **X** = Load Only Terminals **Y** = Line Only Terminals

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Product Selection

Type ND Electronic Circuit Breakers with Non-Interchangeable Trip Units

Order as individual components: Breaker Frame, Rating Plug, Terminals.

Table 12-248. Type ND Electronic Circuit Breakers with Non-Interchangeable Trip Units ①

Maximum Continuous Ampere Rating at 40°C	Digitrip RMS 310 Circuit Breaker Frame Only				Digitrip RMS 310 Rating Plug Only			Standard Terminals Only ② See Page 12-162 for Optional Terminals
	Standard Interrupting Capacity 600 Vac Rated 50 kAIC at 480 Vac				Ampere Rating	Fixed Rating Plugs	Adjustable Rating Plug	
	Standard	Options					Adjustable Ampere Ratings	
	Adjustable Short Time Pickup with I^2t Short Delay Ramp	Independently Adjustable Short Time Pickup and Delay	Adjustable Short Time Pickup with I^2t Short Delay and Ground Fault Protection	Independently Adjustable Short Time Pickup and Delay and Ground Fault Protection				
	Catalog Number					Catalog Number		
2-Pole								
800	**ND2800T33W**	**ND2800T32W**	**ND2800T35W**	**ND2800T36W**	400 450 500 600 700 800	**8NES400T** **8NES450T** **8NES500T** **8NES600T** **8NES700T** **8NES800T**	Adjustable Settings are: 400, 500, 600, 800 **A8NES800T1**	**TA700NB1** **TA700NB1** **TA700NB1** **TA700NB1** **TA700NB1** **TA1000NB1**
3-Pole								
800	**ND3800T33W** or **ND4800T33EW** (100% Neutral)	**ND3800T32W**	**ND3800T35W**	**ND3800T36W**	400 450 500 600 700 800	**8NES400T** **8NES450T** **8NES500T** **8NES600T** **8NES700T** **8NES800T**	Adjustable Settings are: 400, 500, 600, 800 **A8NES800T1**	**TA700NB1** **TA700NB1** **TA700NB1** **TA700NB1** **TA700NB1** **TA1000NB1**
4-Pole ③								
800	**ND4800T33W**	**ND4800T32W**	—	—	400 450 500 600 700 800	**8NES400T** **8NES450T** **8NES500T** **8NES600T** **8NES700T** **8NES800T**	Adjustable Settings are: 400, 500, 600, 800 **A8NES800T1**	**TA700NB1** **TA700NB1** **TA700NB1** **TA700NB1** **TA700NB1** **TA1000NB1**
2-Pole								
1200	**ND212T33W**	**ND212T32W**	**ND212T35W**	**ND212T36W**	600 700 800 900 1000 1200	**12NES600T** **12NES700T** **12NES800T** **12NES900T** **12NES1000T** **12NES1200T**	Adjustable Settings are: 600, 800, 1000, 1200 **A12NES1200T1**	**TA700NB1** **TA700NB1** **TA1000NB1** **TA1000NB1** **TA1000NB1** **TA1200NB1**
3-Pole								
1200	**ND312T33W**	**ND312T32W**	**ND312T35W**	**ND312T36W**	600 700 800 900 1000 1200	**12NES600T** **12NES700T** **12NES800T** **12NES900T** **12NES1000T** **12NES1200T**	Adjustable Settings are: 600, 800, 1000, 1200 **A12NES1200T1**	**TA700NB1** **TA700NB1** **TA1000NB1** **TA1000NB1** **TA1000NB1** **TA1200NB1**
4-Pole ③								
1200	**ND412T33W**	**ND412T32W**	—	—	600 700 800 900 1000 1200	**12NES600T** **12NES700T** **12NES800T** **12NES900T** **12NES1000T** **12NES1200T**	Adjustable Settings are: 600, 800, 1000, 1200 **A12NES1200T1**	**TA700NB1** **TA700NB1** **TA1000NB1** **TA1000NB1** **TA1000NB1** **TA1200NB1**

① See **Table 12-249** on **Page 12-146** for prices.
② Two terminals are required per pole.
③ Neutral is in right pole.

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Table 12-249. Type ND Electronic Circuit Breakers with Non-Interchangeable Trip Unit Prices

Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
A12NES1200T1		ND312T32W		ND4800T32W		12NES800T	
A8NES800T1		ND312T33W		ND4800T33W		12NES900T	
ND212T32W		ND312T35W		ND4800T33EW		8NES400T	
ND212T33W		ND312T36W		TA1000NB1		8NES450T	
ND212T35W		ND3800T32W		TA1200NB1		8NES500T	
ND212T36W		ND3800T33W		TA700NB1		8NES600T	
ND2800T32W		ND3800T35W		12NES1000T		8NES700T	
ND2800T33W		ND3800T36W		12NES1200T		8NES800T	
ND2800T35W		ND412T32W		12NES600T		—	
ND2800T36W		ND412T33W		12NES700T		—	

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Discount Symbol **CB-2**

Type HND Electronic Circuit Breakers with Non-Interchangeable Trip Units

Order as individual components: Breaker Frame, Rating Plug, Terminals.

Table 12-250. Type HND Electronic Circuit Breakers with Non-Interchangeable Trip Units ①

Maximum Continuous Ampere Rating at 40°C	Digitrip RMS 310 Circuit Breaker Frame Only				Digitrip RMS 310 Rating Plug Only			Standard Terminals Only ② See Page 12-162 for Optional Terminals
	High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac				Ampere Rating	Fixed Rating Plugs	Adjustable Rating Plug	
	Standard	Options					Adjustable Ampere Ratings	
	Adjustable Short Time Pickup with I^2t Short Delay Ramp	Independently Adjustable Short Time Pickup and Delay	Adjustable Short Time Pickup with I^2t Short Delay and Ground Fault Protection	Independently Adjustable Short Time Pickup and Delay and Ground Fault Protection				
	Catalog Number					Catalog Number		
2-Pole								
800	**HND2800T33W**	**HND2800T32W**	**HND2800T35W**	**HND2800T36W**	400 450 500 600 700 800	**8NES400T** **8NES450T** **8NES500T** **8NES600T** **8NES700T** **8NES800T**	Adjustable Settings are: 400, 500, 600, 800 **A8NES800T1**	**TA700NB1** **TA700NB1** **TA700NB1** **TA700NB1** **TA700NB1** **TA1000NB1**
3-Pole								
800	**HND3800T33W**	**HND3800T32W**	**HND3800T35W**	**HND3800T36W**	400 450 500 600 700 800	**8NES400T** **8NES450T** **8NES500T** **8NES600T** **8NES700T** **8NES800T**	Adjustable Settings are: 400, 500, 600, 800 **A8NES800T1**	**TA700NB1** **TA700NB1** **TA700NB1** **TA700NB1** **TA700NB1** **TA1000NB1**
4-Pole ③								
800	**HND4800T33W**	**HND4800T32W**	—	—	400 450 500 600 700 800	**8NES400T** **8NES450T** **8NES500T** **8NES600T** **8NES700T** **8NES800T**	Adjustable Settings are: 400, 500, 600, 800 **A8NES800T1**	**TA700NB1** **TA700NB1** **TA700NB1** **TA700NB1** **TA700NB1** **TA1000NB1**
2-Pole								
1200	**HND212T33W**	**HND212T32W**	**HND212T35W**	**HND212T36W**	600 700 800 900 1000 1200	**12NES600T** **12NES700T** **12NES800T** **12NES900T** **12NES1000T** **12NES1200T**	Adjustable Settings are: 600, 800, 1000, 1200 **A12NES1200T1**	**TA700NB1** **TA700NB1** **TA1000NB1** **TA1000NB1** **TA1000NB1** **TA1200NB1**
3-Pole								
1200	**HND312T33W**	**HND312T32W**	**HND312T35W**	**HND312T36W**	600 700 800 900 1000 1200	**12NES600T** **12NES700T** **12NES800T** **12NES900T** **12NES1000T** **12NES1200T**	Adjustable Settings are: 600, 800, 1000, 1200 **A12NES1200T1**	**TA700NB1** **TA700NB1** **TA1000NB1** **TA1000NB1** **TA1000NB1** **TA1200NB1**
4-Pole ③								
1200	**HND412T33W**	**HND412T32W**	—	—	600 700 800 900 1000 1200	**12NES600T** **12NES700T** **12NES800T** **12NES900T** **12NES1000T** **12NES1200T**	Adjustable Settings are: 600, 800, 1000, 1200 **A12NES1200T1**	**TA700NB1** **TA700NB1** **TA1000NB1** **TA1000NB1** **TA1000NB1** **TA1200NB1**

① See **Table 12-251** on **Page 12-148** for prices.
② Two terminals are required per pole.
③ Neutral is in right pole.

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Table 12-251. Type HND Electronic Circuit Breakers with Non-Interchangeable Trip Unit Prices

Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
A12NES1200T1 A8NES800T1 HND212T32W HND212T33W HND212T35W		HND312T32W HND312T33W HND312T35W HND312T36W HND3800T32W		HND4800T32W HND4800T33W TA1000NB1 TA1200NB1 TA700NB1		12NES900T 8NES400T 8NES450T 8NES500T 8NES600T	
HND212T36W HND2800T32W HND2800T33W HND2800T35W HND2800T36W		HND3800T33W HND3800T35W HND3800T36W HND412T32W HND412T33W		12NES1000T 12NES1200T 12NES600T 12NES700T 12NES800T		8NES700T 8NES800T — — —	

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Discount Symbol **CB-2**

Type NDC Electronic Circuit Breakers with Non-Interchangeable Trip Units

Order as individual components: Breaker Frame, Rating Plug, Terminals.

Table 12-252. Type NDC Electronic Circuit Breakers with Non-Interchangeable Trip Units ①

Maximum Continuous Ampere Rating at 40°C	Digitrip RMS 310 Circuit Breaker Frame Only				Digitrip RMS 310 Rating Plug Only			Standard Terminals Only ② See Page 12-162 for Optional Terminals
	Ultra High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac				Ampere Rating	Fixed Rating Plugs	Adjustable Rating Plug	
	Standard	Options					Adjustable Ampere Ratings	
	Adjustable Short Time Pickup with I^2t Short Delay Ramp	Independently Adjustable Short Time Pickup and Delay	Adjustable Short Time Pickup with I^2t Short Delay and Ground Fault Protection	Independently Adjustable Short Time Pickup and Delay and Ground Fault Protection				
	Catalog Number					Catalog Number		
2-Pole								
800	**NDC2800T33W**	**NDC2800T32W**	**NDC2800T35W**	**NDC2800T36W**	400 450 500 600 700 800	**8NES400T** **8NES450T** **8NES500T** **8NES600T** **8NES700T** **8NES800T**	Adjustable Settings are: 400, 500, 600, 800 **A8NES800T1**	**TA700NB1** **TA700NB1** **TA700NB1** **TA700NB1** **TA700NB1** **TA1000NB1**
3-Pole								
800	**NDC3800T33W**	**NDC3800T32W**	**NDC3800T35W**	**NDC3800T36W**	400 450 500 600 700 800	**8NES400T** **8NES450T** **8NES500T** **8NES600T** **8NES700T** **8NES800T**	Adjustable Settings are: 400, 500, 600, 800 **A8NES800T1**	**TA700NB1** **TA700NB1** **TA700NB1** **TA700NB1** **TA700NB1** **TA1000NB1**
4-Pole ③								
800	**NDC4800T33W**	**NDC4800T32W**	—	—	400 450 500 600 700 800	**8NES400T** **8NES450T** **8NES500T** **8NES600T** **8NES700T** **8NES800T**	Adjustable Settings are: 400, 500, 600, 800 **A8NES800T1**	**TA700NB1** **TA700NB1** **TA700NB1** **TA700NB1** **TA700NB1** **TA1000NB1**
2-Pole								
1200	**NDC212T33W**	**NDC212T32W**	**NDC212T35W**	**NDC212T36W**	600 700 800 900 1000 1200	**12NES600T** **12NES700T** **12NES800T** **12NES900T** **12NES1000T** **12NES1200T**	Adjustable Settings are: 600, 800, 1000, 1200 **A12NES1200T1**	**TA700NB1** **TA700NB1** **TA1000NB1** **TA1000NB1** **TA1000NB1** **TA1200NB1**
3-Pole								
1200	**NDC312T33W**	**NDC312T32W**	**NDC312T35W**	**NDC312T36W**	600 700 800 900 1000 1200	**12NES600T** **12NES700T** **12NES800T** **12NES900T** **12NES1000T** **12NES1200T**	Adjustable Settings are: 600, 800, 1000, 1200 **A12NES1200T1**	**TA700NB1** **TA700NB1** **TA1000NB1** **TA1000NB1** **TA1000NB1** **TA1200NB1**
4-Pole ③								
1200	**NDC412T33W**	**NDC412T32W**	—	—	600 700 800 900 1000 1200	**12NES600T** **12NES700T** **12NES800T** **12NES900T** **12NES1000T** **12NES1200T**	Adjustable Settings are: 600, 800, 1000, 1200 **A12NES1200T1**	**TA700NB1** **TA700NB1** **TA1000NB1** **TA1000NB1** **TA1000NB1** **TA1200NB1**

① See **Table 12-253** on **Page 12-150** for prices.
② Two terminals are required per pole.
③ Neutral is in right pole.

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Table 12-253. Type NDC Electronic Circuit Breakers with Non-Interchangeable Trip Unit Prices

Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
A12NES1200T1 A8NES800T1 NDC212T32W NDC212T33W NDC212T35W		NDC312T32W NDC312T33W NDC312T35W NDC312T36W NDC3800T32W		NDC4800T32W NDC4800T33W TA1000NB1 TA1200NB1 TA700NB1		12NES900T 8NES400T 8NES450T 8NES500T 8NES600T	
NDC212T36W NDC2800T32W NDC2800T33W NDC2800T35W NDC2800T36W		NDC3800T33W NDC3800T35W NDC3800T36W NDC412T32W NDC412T33W		12NES1000T 12NES1200T 12NES600T 12NES700T 12NES800T		8NES700T 8NES800T — — —	

Type ND, 1200 Amperes 150 kA at 480 Vac

Table 12-254. Type NDU Ultra High Capacity — U_e Max. 600 Vac, 150 kA I_{cu} at 480 Vac

Maximum Continuous Ampere Rating at 40°C ①②	Number of Poles	Circuit Breaker Frame Including Digitrip RMS 310 Electronic Trip Unit with Adjustable Rating Plugs — Catalog Number ③ L – Adjustable Long Delay Pickup (By Adjustable Rating Plug) S – Adjustable Short Delay Pickup with Fixed Short Delay Time (I^2t Response) or Adjustable Short Delay Time (Flat Response) I – Adjustable Instantaneous Pickup by Setting Short Delay Time to Instantaneous G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Delay (Flat Response)								Interchangeable Rating Plugs (Order as Individual Component)		Included with Breaker
		LS		LSI		LSG		LSIG		Fixed Rating Plug		Adjustable Rating Plug
Short Time Range Short Time Delay Ground Fault Pickup Ground Fault Delay		2 – 8 x I_n — — —		2 – 8 x I_n I – 300 ms — —		2 – 8 x I_n — 200 – 1200 A I – 500 ms		2 – 8 x I_n I – 300 ms 200 – 1200 A I – 500 ms		Ampere Rating	Catalog Number	Adjustable Ampere Setting Catalog Number
		Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $			
800	3-Pole	**NDU3800T33W**		**NDU3800T32W**		**NDU3800T35W**		**NDU3800T36W**		400 450 500 550	**8NES400T** **8NES450T** **8NES500T** **8NES550T**	400/500/ 600/800 **A8NES800T1**
										600 630 700 800	**8NES600T** **8NES630T** **8NES700T** **8NES800T**	
	4-Pole ④	**NDU4800T33W**		**NDU4800T32W**		**—**		**—**		400 450 500 550	**8NES400T** **8NES450T** **8NES500T** **8NES550T**	400/500/ 600/800 **A8NES800T1**
										600 630 700 800	**8NES600T** **8NES630T** **8NES700T** **8NES800T**	

① For ac use only.
② ND MCCBs are suitable for 40°C or 50°C applications. Order suffix V3 to eliminate standard 40°C labeling.
③ Order terminals separately.
④ Unprotected left pole neutral. Insert "E" for 100% neutral or "EH" for 60% neutral between "W" and "P" (e.g., **NDS412T32EHP08**). Neutral is on LH side.
⑤ Check with Eaton for availability.

Note: Non-UL listed ND 1250 with 1250 ampere trip unit is also available.

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Discount Symbol **CB-2**

100% Rated Type CND Electronic Circuit Breakers with Non-Interchangeable Trip Units

The NEC allows the breaker to be rated at 100% of its frame size in an assembly, provided that 90°C wire is applied at the 75°C ampacity. Order as individual components: Breaker Frame, Rating Plug, Terminals.

Table 12-255. 100% Rated Type CND Electronic Circuit Breakers with Non-Interchangeable Trip Units ①

Maximum Continuous Ampere Rating at 40°C	Digitrip RMS 310 Circuit Breaker Frame Only				Digitrip RMS 310 Rating Plug Only			Standard Terminals Only ② See Page 12-162 for Optional Terminals
	Standard Interrupting Capacity 600 Vac Rated 50 kAIC at 480 Vac				Ampere Rating	Fixed Rating Plugs	Adjustable Rating Plug	
	Standard	Options					Adjustable Ampere Ratings	
	Adjustable Short Time Pickup with I^2t Short Delay Ramp	Independently Adjustable Short Time Pickup and Delay	Adjustable Short Time Pickup with I^2t Short Delay and Ground Fault Protection	Independently Adjustable Short Time Pickup and Delay and Ground Fault Protection				
	Catalog Number					Catalog Number		
2-Pole								
800	**CND2800T33W**	**CND2800T32W**	**CND2800T35W**	**CND2800T36W**	400 450 500 600 700 800	**8NES400T** **8NES450T** **8NES500T** **8NES600T** **8NES700T** **8NES800T**	Adjustable Settings are: 400, 500, 600, 800 **A8NES800T1**	**TA700NB1** **TA700NB1** **TA700NB1** **TA700NB1** **TA700NB1** **TA1000NB1**
3-Pole								
800	**CND3800T33W**	**CND3800T32W**	**CND3800T35W**	**CND3800T36W**	400 450 500 600 700 800	**8NES400T** **8NES450T** **8NES500T** **8NES600T** **8NES700T** **8NES800T**	Adjustable Settings are: 400, 500, 600, 800 **A8NES800T1**	**TA700NB1** **TA700NB1** **TA700NB1** **TA700NB1** **TA700NB1** **TA1000NB1**
4-Pole ③								
800	**CND4800T33W**	**CND4800T32W**	—	—	400 450 500 600 700 800	**8NES400T** **8NES450T** **8NES500T** **8NES600T** **8NES700T** **8NES800T**	Adjustable Settings are: 400, 500, 600, 800 **A8NES800T1**	**TA700NB1** **TA700NB1** **TA700NB1** **TA700NB1** **TA700NB1** **TA1000NB1**
2-Pole ④								
1200	**CND212T33W**	**CND212T32W**	**CND212T35W**	**CND212T36W**	600 700 800 900 1000 1200	**12NES600T** **12NES700T** **12NES800T** **12NES900T** **12NES1000T** **12NES1200T**	Adjustable Settings are: 600, 800, 1000, 1200 **A12NES1200T1**	**TA700NB1** **TA700NB1** **TA1000NB1** **TA1000NB1** **TA1000NB1** **TA1200NB1**
3-Pole ④								
1200	**CND312T33W**	**CND312T32W**	**CND312T35W**	**CND312T36W**	600 700 800 900 1000 1200	**12NES600T** **12NES700T** **12NES800T** **12NES900T** **12NES1000T** **12NES1200T**	Adjustable Settings are: 600, 800, 1000, 1200 **A12NES1200T1**	**TA700NB1** **TA700NB1** **TA1000NB1** **TA1000NB1** **TA1000NB1** **TA1200NB1**
4-Pole ③④								
1200	**CND412T33W**	**CND412T32W**	—	—	600 700 800 900 1000 1200	**12NES600T** **12NES700T** **12NES800T** **12NES900T** **12NES1000T** **12NES1200T**	Adjustable Settings are: 600, 800, 1000, 1200 **A12NES1200T1**	**TA700NB1** **TA700NB1** **TA1000NB1** **TA1000NB1** **TA1000NB1** **TA1200NB1**

① See **Table 12-256** on **Page 12-153** for prices.
② Two terminals are required per pole.
③ Neutral is in right pole.
④ Includes conductor extension kit which increase breaker length 3.75 on each end. Terminal ordered separate.

Table 12-256. 100% Rated Type CND Electronic Circuit Breakers with Non-Interchangeable Trip Unit Prices

Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
A12NES1200T1 A8NES800T1 CND212T32W CND212T33W CND212T35W		CND312T32W CND312T33W CND312T35W CND312T36W CND3800T32W		CND4800T32W CND4800T33W TA1000NB1 TA1200NB1 TA700NB1		12NES900T 8NES400T 8NES450T 8NES500T 8NES600T	
CND212T36W CND2800T32W CND2800T33W CND2800T35W CND2800T36W		CND3800T33W CND3800T35W CND3800T36W CND412T32W CND412T33W		12NES1000T 12NES1200T 12NES600T 12NES700T 12NES800T		8NES700T 8NES800T — — —	

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100% Rated Type CHND Electronic Circuit Breakers with Non-Interchangeable Trip Units

The NEC allows the breaker to be rated at 100% of its frame size in an assembly, provided that 90°C wire is applied at the 75°C ampacity. Order as individual components: Breaker Frame, Rating Plug, Terminals.

Table 12-257. 100% Rated Type CHND Electronic Circuit Breakers with Non-Interchangeable Trip Units ①

Maximum Continuous Ampere Rating at 40°C	Digitrip RMS 310 Circuit Breaker Frame Only				Digitrip RMS 310 Rating Plug Only			Standard Terminals Only ② See Page 12-162 for Optional Terminals
	High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac				Ampere Rating	Fixed Rating Plugs	Adjustable Rating Plug	
	Standard	Options					Adjustable Ampere Ratings	
	Adjustable Short Time Pickup with I^2t Short Delay Ramp	Independently Adjustable Short Time Pickup and Delay	Adjustable Short Time Pickup with I^2t Short Delay and Ground Fault Protection	Independently Adjustable Short Time Pickup and Delay and Ground Fault Protection				
	Catalog Number					Catalog Number		
2-Pole								
800	**CHND2800T33W**	**CHND2800T32W**	**CHND2800T35W**	**CHND2800T36W**	400 450 500 600 700 800	**8NES400T** **8NES450T** **8NES500T** **8NES600T** **8NES700T** **8NES800T**	Adjustable Settings are: 400, 500, 600, 800 **A8NES800T1**	**TA700NB1** **TA700NB1** **TA700NB1** **TA700NB1** **TA700NB1** **TA1000NB1**
3-Pole								
800	**CHND3800T33W**	**CHND3800T32W**	**CHND3800T35W**	**CHND3800T36W**	400 450 500 600 700 800	**8NES400T** **8NES450T** **8NES500T** **8NES600T** **8NES700T** **8NES800T**	Adjustable Settings are: 400, 500, 600, 800 **A8NES800T1**	**TA700NB1** **TA700NB1** **TA700NB1** **TA700NB1** **TA700NB1** **TA1000NB1**
4-Pole ③								
800	**CHND4800T33W**	**CHND4800T32W**	—	—	400 450 500 600 700 800	**8NES400T** **8NES450T** **8NES500T** **8NES600T** **8NES700T** **8NES800T**	Adjustable Settings are: 400, 500, 600, 800 **A8NES800T1**	**TA700NB1** **TA700NB1** **TA700NB1** **TA700NB1** **TA700NB1** **TA1000NB1**
2-Pole ④								
1200	**CHND212T33W**	**CHND212T32W**	**CHND212T35W**	**CHND212T36W**	600 700 800 900 1000 1200	**12NES600T** **12NES700T** **12NES800T** **12NES900T** **12NES1000T** **12NES1200T**	Adjustable Settings are: 600, 800, 1000, 1200 **A12NES1200T1**	**TA700NB1** **TA700NB1** **TA1000NB1** **TA1000NB1** **TA1000NB1** **TA1200NB1**
3-Pole ④								
1200	**CHND312T33W**	**CHND312T32W**	**CHND312T35W**	**CHND312T36W**	600 700 800 900 1000 1200	**12NES600T** **12NES700T** **12NES800T** **12NES900T** **12NES1000T** **12NES1200T**	Adjustable Settings are: 600, 800, 1000, 1200 **A12NES1200T1**	**TA700NB1** **TA700NB1** **TA1000NB1** **TA1000NB1** **TA1000NB1** **TA1200NB1**
4-Pole ③④								
1200	**CHND412T33W**	**CHND412T32W**	—	—	600 700 800 900 1000 1200	**12NES600T** **12NES700T** **12NES800T** **12NES900T** **12NES1000T** **12NES1200T**	Adjustable Settings are: 600, 800, 1000, 1200 **A12NES1200T1**	**TA700NB1** **TA700NB1** **TA1000NB1** **TA1000NB1** **TA1000NB1** **TA1200NB1**

① See **Table 12-258** on **Page 12-155** for prices.
② Two terminals are required per pole.
③ Neutral is in right pole.
④ Includes conductor extension kit which increase breaker length 3.75 on each end. Terminal ordered separate.

Table 12-258. 100% Rated Type CHND Electronic Circuit Breakers with Non-Interchangeable Trip Unit Prices

Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
A12NES1200T1 A8NES800T1 CHND212T32W CHND212T33W CHND212T35W		CHND312T32W CHND312T33W CHND312T35W CHND312T36W CHND3800T32W		CHND4800T32W CHND4800T33W TA1000NB1 TA1200NB1 TA700NB1		12NES900T 8NES400T 8NES450T 8NES500T 8NES600T	
CHND212T36W CHND2800T32W CHND2800T33W CHND2800T35W CHND2800T36W		CHND3800T33W CHND3800T35W CHND3800T36W CHND412T32W CHND412T33W		12NES1000T 12NES1200T 12NES600T 12NES700T 12NES800T		8NES700T 8NES800T — — —	

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100% Rated Type CNDC Electronic Circuit Breakers with Non-Interchangeable Trip Units

The NEC allows the breaker to be rated at 100% of its frame size in an assembly, provided that 90°C wire is applied at the 75°C ampacity. Order as individual components: Breaker Frame, Rating Plug, Terminals.

Table 12-259. 100% Rated Type CNDC Electronic Circuit Breakers with Non-Interchangeable Trip Units ①

Maximum Continuous Ampere Rating at 40°C	Digitrip RMS 310 Circuit Breaker Frame Only				Digitrip RMS 310 Rating Plug Only			Standard Terminals Only ② See Page 12-162 for Optional Terminals
	Ultra High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac				Ampere Rating	Fixed Rating Plugs	Adjustable Rating Plug	
	Standard	Options					Adjustable Ampere Ratings	
	Adjustable Short Time Pickup with I^2t Short Delay Ramp	Independently Adjustable Short Time Pickup and Delay	Adjustable Short Time Pickup with I^2t Short Delay and Ground Fault Protection	Independently Adjustable Short Time Pickup and Delay and Ground Fault Protection				
	Catalog Number					Catalog Number		
2-Pole								
800	**CNDC2800T33W**	**CNDC2800T32W**	**CNDC2800T35W**	**CNDC2800T36W**	400 450 500 600 700 800	**8NES400T** **8NES450T** **8NES500T** **8NES600T** **8NES700T** **8NES800T**	Adjustable Settings are: 400, 500, 600, 800 **A8NES800T1**	**TA700NB1** **TA700NB1** **TA700NB1** **TA700NB1** **TA700NB1** **TA1000NB1**
3-Pole								
800	**CNDC3800T33W**	**CNDC3800T32W**	**CNDC3800T35W**	**CNDC3800T36W**	400 450 500 600 700 800	**8NES400T** **8NES450T** **8NES500T** **8NES600T** **8NES700T** **8NES800T**	Adjustable Settings are: 400, 500, 600, 800 **A8NES800T1**	**TA700NB1** **TA700NB1** **TA700NB1** **TA700NB1** **TA700NB1** **TA1000NB1**
4-Pole ③								
800	**CNDC4800T33W**	**CNDC4800T32W**	—	—	400 450 500 600 700 800	**8NES400T** **8NES450T** **8NES500T** **8NES600T** **8NES700T** **8NES800T**	Adjustable Settings are: 400, 500, 600, 800 **A8NES800T1**	**TA700NB1** **TA700NB1** **TA700NB1** **TA700NB1** **TA700NB1** **TA1000NB1**
2-Pole ④								
1200	**CNDC212T33W**	**CNDC212T32W**	**CNDC212T35W**	**CNDC212T36W**	600 700 800 900 1000 1200	**12NES600T** **12NES700T** **12NES800T** **12NES900T** **12NES1000T** **12NES1200T**	Adjustable Settings are: 600, 800, 1000, 1200 **A12NES1200T1**	**TA700NB1** **TA700NB1** **TA1000NB1** **TA1000NB1** **TA1000NB1** **TA1200NB1**
3-Pole ④								
1200	**CNDC312T33W**	**CNDC312T32W**	**CNDC312T35W**	**CNDC312T36W**	600 700 800 900 1000 1200	**12NES600T** **12NES700T** **12NES800T** **12NES900T** **12NES1000T** **12NES1200T**	Adjustable Settings are: 600, 800, 1000, 1200 **A12NES1200T1**	**TA700NB1** **TA700NB1** **TA1000NB1** **TA1000NB1** **TA1000NB1** **TA1200NB1**
4-Pole ③④								
1200	**CNDC412T33W**	**CNDC412T32W**	—	—	600 700 800 900 1000 1200	**12NES600T** **12NES700T** **12NES800T** **12NES900T** **12NES1000T** **12NES1200T**	Adjustable Settings are: 600, 800, 1000, 1200 **A12NES1200T1**	**TA700NB1** **TA700NB1** **TA1000NB1** **TA1000NB1** **TA1000NB1** **TA1200NB1**

① See **Table 12-260** on **Page 12-157** for prices.
② Two terminals are required per pole.
③ Neutral is in right pole.
④ Includes conductor extension kit which increases breaker length 3.75 on each end. Terminal ordered separate.

Table 12-260. 100% Rated Type CNDC Electronic Circuit Breakers with Non-Interchangeable Trip Unit Prices

Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
A12NES1200T1 A8NES800T1 CNDC212T32W CNDC212T33W CNDC212T35W		CNDC312T32W CNDC312T33W CNDC312T35W CNDC312T36W CNDC3800T32W		CNDC4800T32W CNDC4800T33W TA1000NB1 TA1200NB1 TA700NB1		12NES900T 8NES400T 8NES450T 8NES500T 8NES600T	
CNDC212T36W CNDC2800T32W CNDC2800T33W CNDC2800T35W CNDC2800T36W		CNDC3800T33W CNDC3800T35W CNDC3800T36W CNDC412T32W CNDC412T33W		12NES1000T 12NES1200T 12NES600T 12NES700T 12NES800T		8NES700T 8NES800T — — —	

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Digitrip OPTIM Electronic Circuit Breakers with Interchangeable Rating Plugs

Order as individual components: Breaker Frame (which includes Trip Unit), Rating Plug, Terminals.

Table 12-261. Digitrip OPTIM 550 Electronic Circuit Breakers with Interchangeable Rating Plugs

Maximum Continuous Ampere Rating at 40°C	Circuit Breaker Frame Only						Digitrip OPTIM Rating Plug Only		
	L – Adjustable Long Delay Pickup (I_r) with Adjustable Long Delay Time (I^2t or I^4t Response) ① S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I^2t or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time Delay (I^2t or Flat Response) A – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time Delay (I^2t or Flat Response)						Ampere Rating	Fixed Rating Plug	
	OPTIM 550 ②								
	LSI		LSIG		LSIA				
	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $		Catalog Number	Price U.S. $
3-Pole Standard Interrupting Capacity 600 Vac Rated 50 kAIC at 480 Vac									
800	**ND3800T52W**		**ND3800T56W**		**ND3800T57W**		400 450 500 550 600 700 800	**ORPN80A400** **ORPN80A450** **ORPN80A500** **ORPN80A550** **ORPN80A600** **ORPN80A700** **ORPN80A800**	
1200	**ND312T52W**		**ND312T56W**		**ND312T57W**		600 700 800 1000 1200	**ORPN12A600** **ORPN12A700** **ORPN12A800** **ORPN12A100** **ORPN12A120**	
3-Pole High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac									
800	**HND3800T52W**		**HND3800T56W**		**HND3800T57W**		400 450 500 550 600 700 800	**ORPN80A400** **ORPN80A450** **ORPN80A500** **ORPN80A550** **ORPN80A600** **ORPN80A700** **ORPN80A800**	
1200	**HND312T52W**		**HND312T56W**		**HND312T57W**		600 700 800 1000 1200	**ORPN12A600** **ORPN12A700** **ORPN12A800** **ORPN12A100** **ORPN12A120**	
3-Pole Ultra High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac									
800	**NDC3800T52W**		**NDC3800T56W**		**NDC3800T57W**		400 450 500 550 600 700 800	**ORPN80A400** **ORPN80A450** **ORPN80A500** **ORPN80A550** **ORPN80A600** **ORPN80A700** **ORPN80A800**	
1200	**NDC312T52W**		**NDC312T56W**		**NDC312T57W**		600 700 800 1000 1200	**ORPN12A600** **ORPN12A700** **ORPN12A800** **ORPN12A100** **ORPN12A120**	

① Long delay I^4t response selection limits short delay time to flat response.

② Zone Interlocking, PowerNet, or both features can be added at the factory by adding Suffixes **ZG**, **PN** or **ZGP** respectively to above Catalog Number (refer to **Page 12-242** and take list price Adder x 1.25).

Table 12-262. Digitrip OPTIM 1050 Electronic Circuit Breakers with Interchangeable Rating Plugs

Maximum Continuous Ampere Rating at 40°C	Circuit Breaker Frame Only				Digitrip OPTIM Rating Plug Only		
	L – Adjustable Long Delay Pickup (I_r) with Adjustable Long Delay Time (I^2t or I^4t Response) ① S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I^2t or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time Delay (I^2t or Flat Response) A – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time Delay (I^2t or Flat Response)				Ampere Rating	Fixed Rating Plug	
	OPTIM 1050 ②③						
	LSIG		LSIA				
	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $		Catalog Number	Price U.S. $
3-Pole Standard Interrupting Capacity 600 Vac Rated 50 kAIC at 480 Vac							
800	**ND3800T106W**		**ND3800T107W**		400 450 500 550 600 700 800	**ORPN80A400** **ORPN80A450** **ORPN80A500** **ORPN80A550** **ORPN80A600** **ORPN80A700** **ORPN80A800**	
1200	**ND312T106W**		**ND312T107W**		600 700 800 1000 1200	**ORPN12A600** **ORPN12A700** **ORPN12A800** **ORPN12A100** **ORPN12A120**	
3-Pole High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac							
800	**HND3800T106W**		**HND3800T107W**		400 450 500 550 600 700 800	**ORPN80A400** **ORPN80A450** **ORPN80A500** **ORPN80A550** **ORPN80A600** **ORPN80A700** **ORPN80A800**	
1200	**HND312T106W**		**HND312T107W**		600 700 800 1000 1200	**ORPN12A600** **ORPN12A700** **ORPN12A800** **ORPN12A100** **ORPN12A120**	
3-Pole Ultra High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac							
800	**NDC3800T106W**		**NDC3800T107W**		400 450 500 550 600 700 800	**ORPN80A400** **ORPN80A450** **ORPN80A500** **ORPN80A550** **ORPN80A600** **ORPN80A700** **ORPN80A800**	
1200	**NDC312T106W**		**NDC312T107W**		600 700 800 1000 1200	**ORPN12A600** **ORPN12A700** **ORPN12A800** **ORPN12A100** **ORPN12A120**	

① Long delay I^4t response selection limits short delay time to flat response.
② One Form C auxiliary switch and one Form C bell (trip) alarm switch supplied with breaker as standard.
③ Factory sealed.

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Discount Symbol **CB-2**

100% Rated Digitrip OPTIM Circuit Breakers with Interchangeable Rating Plugs

Order as individual components: Breaker Frame (which includes Trip Unit), Rating Plug, Terminals.

Table 12-263. 100% Rated Digitrip OPTIM 550 Circuit Breakers with Interchangeable Rating Plugs

Maximum Continuous Ampere Rating at 40°C	Circuit Breaker Frame Only						Digitrip OPTIM Rating Plug Only		
	L – Adjustable Long Delay Pickup (I_r) with Adjustable Long Delay Time (I^2t or I^4t Response) ① S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I^2t or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time Delay (I^2t or Flat Response) A – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time Delay (I^2t or Flat Response)						Ampere Rating	Fixed Rating Plug	
	OPTIM 550 ②								
	LSI		LSIG		LSIA				
	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $		Catalog Number	Price U.S. $
3-Pole Standard Interrupting Capacity 600 Vac Rated 50 kAIC at 480 Vac									
800	**CND3800T52W**		**CND3800T56W**		**CND3800T57W**		400 450 500 550 600 700 800	**ORPN80A400** **ORPN80A450** **ORPN80A500** **ORPN80A550** **ORPN80A600** **ORPN80A700** **ORPN80A800**	
1200 ③	**CND312T52W**		**CND312T56W**		**CND312T57W**		600 700 800 1000 1200	**ORPN12A600** **ORPN12A700** **ORPN12A800** **ORPN12A100** **ORPN12A120**	
3-Pole High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac									
800	**CHND3800T52W**		**CHND3800T56W**		**CHND3800T57W**		400 450 500 550 600 700 800	**ORPN80A400** **ORPN80A450** **ORPN80A500** **ORPN80A550** **ORPN80A600** **ORPN80A700** **ORPN80A800**	
1200 ③	**CHND312T52W**		**CHND312T56W**		**CHND312T57W**		600 700 800 1000 1200	**ORPN12A600** **ORPN12A700** **ORPN12A800** **ORPN12A100** **ORPN12A120**	
3-Pole Ultra High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac									
800	**CNDC3800T52W**		**CNDC3800T56W**		**CNDC3800T57W**		400 450 500 550 600 700 800	**ORPN80A400** **ORPN80A450** **ORPN80A500** **ORPN80A550** **ORPN80A600** **ORPN80A700** **ORPN80A800**	
1200 ③	**CNDC312T52W**		**CNDC312T56W**		**CNDC312T57W**		600 700 800 1000 1200	**ORPN12A600** **ORPN12A700** **ORPN12A800** **ORPN12A100** **ORPN12A120**	

① Long delay I^4t response selection limits short delay time to flat response.

② Zone Interlocking, PowerNet, or both features can be added at the factory by adding Suffixes **ZG**, **PN** or **ZGP** respectively to above Catalog Number (refer to **Page 12-242** and take list price Adder x 1.25).

③ Includes conductor extension kit which increases breaker length 3.75 on each end. Terminal ordered separate.

Table 12-264. 100% Rated Digitrip OPTIM 1050 Circuit Breakers with Interchangeable Rating Plugs

Maximum Continuous Ampere Rating at 40°C	Circuit Breaker Frame Only				Digitrip OPTIM Rating Plug Only		
	L – Adjustable Long Delay Pickup (I_r) with Adjustable Long Delay Time (I^2t or I^4t Response) ① S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I^2t or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time Delay (I^2t or Flat Response) A – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time Delay (I^2t or Flat Response)				Ampere Rating	Fixed Rating Plug	
	OPTIM 1050 ②③						
	LSIG		LSIA				
	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $		Catalog Number	Price U.S. $
3-Pole Standard Interrupting Capacity 600 Vac Rated 50 kAIC at 480 Vac							
800	**CND3800T106W**		**CND3800T107W**		400 450 500 550 600 700 800	**ORPN80A400** **ORPN80A450** **ORPN80A500** **ORPN80A550** **ORPN80A600** **ORPN80A700** **ORPN80A800**	
1200	**CND312T106W**		**CND312T107W**		600 700 800 1000 1200	**ORPN12A600** **ORPN12A700** **ORPN12A800** **ORPN12A100** **ORPN12A120**	
3-Pole High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac							
800	**CHND3800T106W**		**CHND3800T107W**		400 450 500 550 600 700 800	**ORPN80A400** **ORPN80A450** **ORPN80A500** **ORPN80A550** **ORPN80A600** **ORPN80A700** **ORPN80A800**	
1200	**CHND312T106W**		**CHND312T107W**		600 700 800 1000 1200	**ORPN12A600** **ORPN12A700** **ORPN12A800** **ORPN12A100** **ORPN12A120**	
3-Pole Ultra High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac							
800	**CNDC3800T106W**		**CNDC3800T107W**		400 450 500 550 600 700 800	**ORPN80A400** **ORPN80A450** **ORPN80A500** **ORPN80A550** **ORPN80A600** **ORPN80A700** **ORPN80A800**	
1200	**CNDC312T106W** ④		**CNDC312T107W**		600 700 800 1000 1200	**ORPN12A600** **ORPN12A700** **ORPN12A800** **ORPN12A100** **ORPN12A120**	

① Long delay I^4t response selection limits short delay time to flat response.
② One Form C auxiliary switch one Form C bell (trip) alarm switch supplied with breaker as standard.
③ Factory sealed.
④ Includes conductor extension kit which increases breaker length 3.75 on each end. Terminal ordered separate.

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Discount Symbol **CB-2**

Type ND Molded Case Switches

Table 12-265. Type ND Molded Case Switches

Continuous Ampere Rating at 40°C	3-Pole		4-Pole ①	
	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
Type ND – High Instantaneous (K)				
800	**ND3800WK** **HND3800WK**		**ND4800WK** **HND4800WK**	
Type ND – High Instantaneous (K)				
1200	**ND312WK** **HND312WK**		**ND412WK** **HND412WK**	

① Neutral is in right pole.

Note: Molded case switch will trip above 14,000 amperes.

Note: For UL listed, series tested molded case switch application data, refer to Eaton.

Line and Load Terminals

Ordering Information

N-Frame circuit breakers use Cu/Al terminals as standard. When optional copper or Cu/Al terminals are required, order by Catalog Number. Specify if factory installation is required.

Table 12-266. Line and Load Terminals

Maximum Breaker Amperes	Terminal Body Material	Wire Type	AWG Wire Range/ No. Conductors	Metric Wire Range mm^2	Catalog Number	Price U.S. $
Standard Cu/Al Pressure Terminals						
700	Aluminum	Cu/Al	(2) 1 – 500 kcmil	50 – 240	**TA700NB1**	
1000	Aluminum	Cu/Al	(3) 3/0 – 400 kcmil	95 – 185	**TA1000NB1** ②	
1200	Aluminum	Cu/Al	(4) 4/0 – 500 kcmil	120 – 240	**TA1200NB1** ②	
1200	Aluminum	Cu/Al	(3) 500 – 750 kcmil	300 – 400	**TA1201NB1** ③	
Optional Copper and Cu/Al Pressure Type Terminals						
700	Copper	Cu	(2) 2/0 – 500 kcmil	70 – 240	**T700NB1**	
1000	Copper	Cu	(3) 3/0 – 500 kcmil	95 – 240	**T1000NB1**	
1200	Copper	Cu	(4) 3/0 – 400 kcmil	95 – 185	**T1200NB3**	

② Terminal rating is AL9CU.

③ Terminal rating is AL7CU.

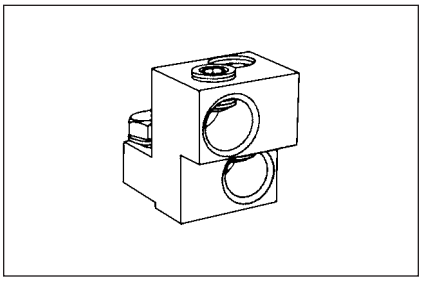

Figure 12-33. TA700NB1

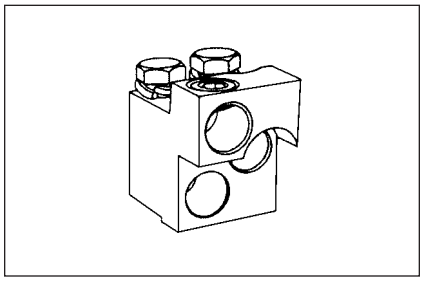

Figure 12-34. TA1000NB1

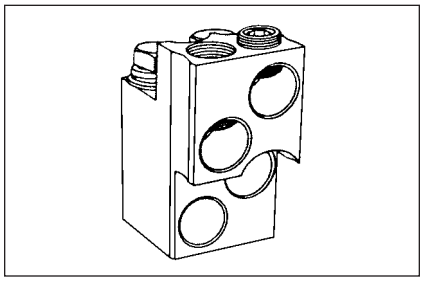

Figure 12-35. TA1200NB1

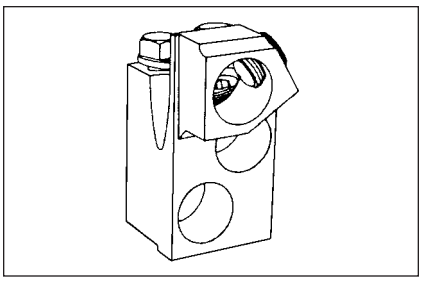

Figure 12-36. TA1201NB1

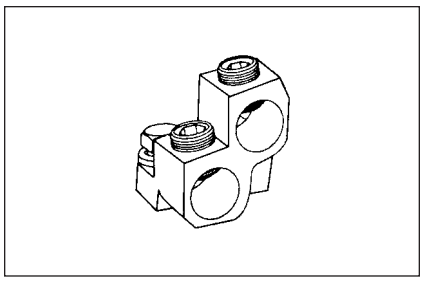

Figure 12-37. T700NB1

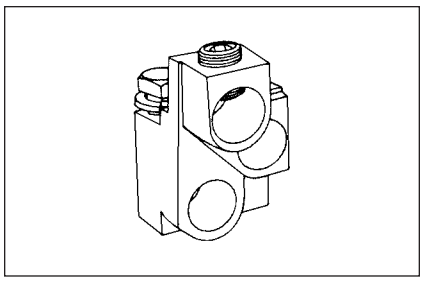

Figure 12-38. T1000NB1

Allowable Accessory Combinations

Different combinations of accessories can be supplied, depending on the types of accessories and the number of poles in the circuit breaker.

Table 12-267. Accessories

Description	Reference Page	3-Pole			4-Pole			
		Left	Center	Right	Left	Center	Right	Neu.
Internal Accessories (Only One Internal Accessory Per Pole) ①								
Alarm Lockout (Make/Break)	12-217	■		■	■		■	
Alarm Lockout (2Make/2Break)	12-217	■		■	■		■	
Auxiliary Switch (1A, 1B)	12-220	■		■	■		■	
Auxiliary Switch (2A, 2B)	12-220	■		■	■		■	
Auxiliary Switch (3A, 3B)	12-220	■		■	■		■	
Auxiliary Switch (1A, 1B) and Alarm Switch Combination	12-223	■		■	■		■	
Auxiliary Switch (2A, 2B) and Alarm Switch Combination	12-223	■		■	■		■	
Shunt Trip — Standard	12-226	■			■			
Shunt Trip — Low Energy	12-231	■			■			
Undervoltage Release Mechanism	12-232	■			■			
Cutler-Hammer PowerNet Communications Kit (OPTIM 550)	12-242			■				
External Accessories								
Base Mounting Hardware	12-246		●			●		
Interphase Barriers	12-249		●			●		
Non-Padlockable Handle Block	12-251		■			■		
Padlockable Handle Lock Hasp	12-252	❑		❑	❑		❑	
Key Interlock Kit	12-253	❑		❑	❑		❑	
Sliding Bar Interlock — Requires Two Breakers	12-254		●					
Walking Beam Interlock — Requires Two Breakers	12-254		●			●		
Electrical (Motor) Operator	12-255		●			●		
Plug-in Adapters	12-257		●			●		
Rear Connecting Studs	12-258		●			●		
Panelboard Connecting Straps	12-261		●			●		
Handle Mechanisms	12-262		●			●		
Handle Extension	12-267		●			●		
Solid-State (Electronic) Portable Test Kit	12-268		●			●		
OPTIM System Components 3-Poles								
Ground Fault Alarm Unit	12-268							
Potential Transformer Module	12-268							
Breaker Interface Module (BIM)	12-269							
Digitrip OPTIMizer	12-269							
Auxiliary Power Module	12-269							
Modifications (Refer to Eaton)								
Special Calibration	—		●			●		
Moisture Fungus Treatment	12-73		●			●		
Freeze-Tested Circuit Breakers	—		●			●		
Marine Application	—		●			●		

■ Applicable in indicated pole position ❑ May be mounted on left or right pole — not both ● Accessory available/Modification available

① OPTIM 550 and 1050 are factory sealed and do not have the right pole available for accessories.

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R-Frame

Typical R-Frame Circuit Breaker

Product Description

- Cutler-Hammer R-Frame Circuit Breakers by Eaton Corporation are available as frame (which includes trip unit), rating plug and terminals.
- All R-Frame circuit breakers are suitable for reverse feed use.

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Technical Data and Specifications

Table 12-268. UL 489/CSA Interrupting Capacity Ratings ①

Circuit Breaker Type	Number of Poles	Interrupting Capacity (kA Symmetrical Amperes)			
		Volts ac (50/60 Hz)			
		240	277	480	600
RD	3, 4	125	—	65	50
CRD ②	3, 4	125	—	65	50
RDC	3, 4	200	—	100	65
CRDC ②	3, 4	200	—	100	65

① Utilization Category A circuit breakers.
② 100% rated breakers.

Note: See **Page 12-165** for Trip Unit Specifications.

Table 12-269. IEC 947-2 Interrupting Capacity Ratings ③

Circuit Breaker Type	Number of Poles	Interrupting Capacity (kA Symmetrical Amperes)		
		Volts ac (50/60 Hz)		
		240	415	690
RD	3, 4			
I_{cu}		135	70	25
I_{cs}		100	50	13
RDC	3, 4			
I_{cu}		200	100	35
I_{cs}		100	50	18

③ Utilization Category A circuit breakers.

R-Frame Digitrip Specifications

Table 12-270. Specifications

Trip Unit Type	Digitrip RMS 310		Digitrip RMS 510	Digitrip RMS 610	Digitrip RMS 810	Digitrip RMS 910	Digitrip OPTIM 1050
rms Sensing	Yes		Yes	Yes	Yes	Yes	Yes
Breaker Type							
Frame	R		R	R	R	R	R
Ampere Range	800 A – 2500 A		800 A – 2500 A	800 A – 2500 A	800 A – 2500 A	800 A – 2500 A	800 A – 2500 A
Interrupting Rating at 480 Volts	65, 100 (kA)		65, 100 (kA)	65, 100 (kA)	65, 100 (kA)	65, 100 (kA)	65, 100 (kA)
Protection							
Ordering Options	LS, LSG	LSI, LSIG	LI, LS, LSI, LIG, LSG, LSIG	LI, LS, LSI, LIG, LSG, LSIG	LI, LS, LSI, LIG, LSG, LSIG	LI, LS, LSI, LIG, LSG, LSIG	LSI(A), LISG
Fixed Rated Plug (I_n)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Overtemperature Trip	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Long Delay Protection (L)							
Adjustable Rating Plug (I_n)	Yes	Yes	No	No	No	No	No
Long Delay Pickup	0.5 – 1.0 (I_n) ①	0.5 – 1.0 (I_n) ①	0.5 – 1.0 x (I_n)	0.5 – 1.0 x (I_n)	0.5 – 1.0 x (I_n)	0.5 – 1.0 x (I_n)	0.4 – 1.0 x (I_n)
Long Delay Time I^2t	12 Seconds	12 Seconds	2 – 24 Seconds	2 – 24 Seconds	2 – 24 Seconds	2 – 24 Seconds	2 – 24 Seconds
Long Delay Time I^4t	No	No	No	No	No	No	1 – 5 Seconds
Long Delay Thermal Memory	Yes	Yes	Yes	Yes	Yes	Yes	Yes
High Load Alarm	No	No	No	0.85 x I_r	0.85 x I_r	0.85 x I_r	0.5-1.0 x I_r
Short Delay Protection (S)							
Short Delay Pickup	200 – 800% x (I_n) ②	200 – 800% x (I_n) ②	200 – 600% S1&S2 x (I_r)	200 – 600% S1&S2 x (I_r)	200 – 600% S1&S2 x (I_r)	200 – 600% S1&S2 x (I_r)	150-800% x (I_r) ②③
Short Delay Time I^2t	100 ms	No	100 – 500 ms	100 – 500 ms	100 – 500 ms	100 – 500 ms	100 – 500 ms
Short Delay Time Flat	No	Inst – 300 ms	100 – 500 ms	100 – 500 ms	100 – 500 ms	100 – 500 ms	100 – 500 ms
Short Delay Time Zone Selective Interlocking	No	No	Yes	Yes	Yes	Yes	Yes
Instantaneous Protection (I)							
Instantaneous Pickup	No	200 – 800% x (I_n)	200 – 600% M1&M2 x (I_n)	200 – 600% M1&M2 x (I_n)	200 – 600% M1&M2 x (I_n)	200 – 600% M1&M2 x (I_n)	200 – 800% x (I_n) ③
Discriminator	No	No	Yes ④	Yes ④	Yes ④	Yes ④	Yes
Instantaneous Override	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ground Fault Protection (G)							
Ground Fault Alarm ⑤	No	No	No	No	No	No	25 – 100% x (I_n)
Ground Fault Pickup ⑤	200 – 1200 A	200 – 1200 A	25 – 100% x (I_s)	25-100% x (I_s)	25 – 100% x (I_s)	25 – 100% x (I_s)	25 – 100% x (I_n)
Ground Fault Delay I^2t	No	No	100 – 500 ms	100 – 500 ms	100 – 500 ms	100 – 500 ms	100 – 500 ms
Ground Fault Delay Flat	Inst – 500 ms	Inst – 500 ms	100 – 500 ms	100 – 500 ms	100 – 500 ms	100 – 500 ms	100 – 500 ms
Ground Fault Zone Selective Interlocking	No	No	Yes	Yes	Yes	Yes	Yes
Ground Fault Thermal Memory	Yes	Yes	Yes	Yes	Yes	Yes	Yes
System Diagnostics							
Status LEDs	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cause of Trip LEDs	No	No	Yes	Yes	Yes	Yes	Yes
Magnitude of Trip Information	No	No	No	Yes	Yes	Yes	Yes
Remote Signal Contacts	Yes ⑦	Yes ⑦	No	Yes	Yes	Yes	Yes
System Monitoring							
Digital Display	No	No	No	Yes	Yes	Yes	Yes ⑥
Current	No	No	No	Yes	Yes	Yes	Yes
Voltage	No	No	No	No	No	Yes	No
Power and Energy	No	No	No	No	Yes	Yes	Yes
Power Quality — Harmonics	No	No	No	No	No	Yes	Yes
Power Factor	No	No	No	No	Yes (Over Cutler-Hammer PowerNet Only)	Yes	Yes
Communications							
Cutler-Hammer PowerNet	No	No	No	No	Yes	Yes	Yes
Testing							
Testing Method	Test Set		Integral	Integral	Integral	Integral	OPTIMizer, BIM, Cutler-Hammer PowerNet

① Adjust by rating plug.
② Except 2500 ampere frame is 200 – 600%.
③ Varies by frame.
④ LS/LSG only.
⑤ Not to exceed 1200 amperes.
⑥ By OPTIMizer/BIM.
⑦ Optional. Add suffix "R" to Catalog Number.

Legend: BIM= Breaker Interface Module
(A)= GF Alarm
I_s= Sensor Rating
I_n= Rating Plug
I_r= Long Delay Pickup Setting x I_n

Dimensions/Weights

Table 12-271. Dimensions in Inches (mm)

Number of Poles	Width	Height	Depth
3	15.50 (393.7)	16.00 (406.4)	9.75 (247.7)
4	20.00 (508.0)	16.00 (406.4)	9.75 (247.7)

Table 12-272. Approximate Shipping Weight, Lbs. (kg)

Breaker Type	Complete Breaker	
	Number of Poles	
	3	4
1600 Amperes		
RD, CRD, RDC, CRDC	102 (46.3)	135 (61.2)
2000 Amperes		
RD, RDC	102 (46.3)	135 (61.2)
CRD, CRDC	130 (59.0)	175 (79.4)
2500 Amperes		
RD, RDC	135 (61.2)	182 (82.6)

Product Selection

This information is presented only as an aid to understanding catalog numbers.
It is not to be used to build catalog numbers for circuit breakers or trip units.

Table 12-273. Circuit Breaker/Frame Catalog Numbering System

RD 3 16 T32 W

Circuit Breaker/ Frame Type
- **RD**
- **RDC**
- **CRD**
- **CRDC**

Number of Poles
- **3** = 3 Poles
- **4** = 4 Poles

Circuit Breaker/ Frame Ampere Rating
- **16** = 1600 Amperes
- **20** = 2000 Amperes
- **25** = 2500 Amperes

Trip Type ①
- **T32** = Digitrip RMS 310 LSI
- **T53** = Digitrip RMS 510 LS
- **T65** = Digitrip RMS 610 LSG
- **T86** = Digitrip RMS 810 LSIG
- **T96** = Digitrip RMS 910 LSIG
- **T106** = Digitrip OPTIM 1050 LSIG
- **T107** = Digitrip OPTIM 1050 LSIA

Suffix
- **W** = Without Terminals
- **P** = 100% Protected Neutral Pole
- **R** = Ground Fault Remote (310 Only)
- **K** = Molded Case Switch

① For complete list of available trip types refer to **Pages 12-167** – **12-180**.

Product Selection

Digitrip RMS 310 Electronic Circuit Breakers with Interchangeable Rating Plugs

Order as individual components: Breaker Frame (which includes Trip Unit) and Rating Plug.

Table 12-274. Digitrip RMS 310 Electronic Circuit Breakers with Interchangeable Rating Plugs ①

Maximum Continuous Ampere Rating at 40°C	Circuit Breaker Frame Only				Digitrip RMS 310 Rating Plug Only		
	L – Adjustable Long Delay Pickup (By Adjustable Rating Plug) S – Adjustable Short Delay Pickup with Fixed Short Delay Time (I^2t Response) or Adjustable Short Delay Time (Flat Response) I – Adjustable Instantaneous Pickup by Setting Short Delay Time to Instantaneous G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time (Flat Response)				Ampere Rating	Fixed Rating Plug	Adjustable Rating Plug Adjustable Ampere Ratings
	LS	LSI	LSG ②	LSIG ②			
	Catalog Number					Catalog Number	
3-Pole Standard Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac							
1600 ③	**RD316T33W**	**RD316T32W**	**RD316T35W**	**RD316T36W**	800 1000 1200 1250 1400 1500 1600	**16RES08T** **16RES10T** **16RES12T** **16RES125T** **16RES14T** **16RES15T** **16RES16T**	Adjustable Settings are: 800, 1000, 1200, 1600 **A16RES16T1**
2000	**RD320T33W**	**RD320T32W**	**RD320T35W**	**RD320T36W**	1000 1200 1250 1400 1600 2000	**20RES10T** **20RES12T** **20RES125T** **20RES14T** **20RES16T** **20RES20T**	Adjustable Settings are: 1000, 1200, 1600, 2000 **A20RES20T1**
2500	**RD325T33W**	**RD325T32W**	**RD325T35W**	**RD325T36W**	1200 1250 1600 2000 2500	**25RES12T** **25RES125T** **25RES16T** **25RES20T** **25RES25T**	Adjustable Settings are: 1200, 1600, 2000, 2500 **A25RES25T1**
4-Pole ④ Standard Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac							
1600 ③	**RD416T33W**	**RD416T32W**	—	—	800 1000 1200 1250 1400 1500 1600	**16RES08T** **16RES10T** **16RES12T** **16RES125T** **16RES14T** **16RES15T** **16RES16T**	Adjustable Settings are: 800, 1000, 1200, 1600 **A16RES16T1**
2000	**RD420T33W**	**RD420T32W**	—	—	1000 1200 1250 1400 1600 2000	**20RES10T** **20RES12T** **20RES125T** **20RES14T** **20RES16T** **20RES20T**	Adjustable Settings are: 1000, 1200, 1600, 2000 **A20RES20T1**
2500	**RD425T33W**	**RD425T32W**	—	—	1200 1250 1600 2000 2500	**25RES12T** **25RES125T** **25RES16T** **25RES20T** **25RES25T**	Adjustable Settings are: 1200, 1600, 2000, 2500 **A25RES25T1**

① See **Table 12-275** on **Page 12-168** for prices.
② Add **R** to Catalog Number for ground fault remote indication compatibility, i.e., RD316T35**R**W.
③ For SCR application use 2000 ampere frame.
④ Unprotected right pole neutral. Add **P** to Catalog Number for 100% protected right pole neutral, i.e., RD416T33**P**W.

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Table 12-275. Digitrip RMS 310 Electronic Circuit Breakers with Interchangeable Rating Plugs Prices

Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
A16RES16T1 A20RES20T1 A25RES25T1 RD316T32W RD316T33W		RD320T36W RD325T32W RD325T33W RD325T35W RD325T36W		RD425T33W 16RES08T 16RES10T 16RES12T 16RES125T		20RES125T 20RES14T 20RES16T 20RES19T 20RES20T	
RD316T35W RD316T36W RD320T32W RD320T33W RD320T35W		RD416T32W RD416T33W RD420T32W RD420T33W RD425T32W		16RES14T 16RES15T 16RES16T 20RES10T 20RES12T		25RES12T 25RES125T 25RES16T 25RES20T 25RES25T	

Discount Symbol **CB-2**

Digitrip RMS 310 Electronic Circuit Breakers with Interchangeable Rating Plugs

Order as individual components: Breaker Frame (which includes Trip Unit) and Rating Plug.

Table 12-276. Digitrip RMS 310 Electronic Circuit Breakers with Interchangeable Rating Plugs ①

Maximum Continuous Ampere Rating at 40°C	Circuit Breaker Frame Only				Digitrip RMS 310 Rating Plug Only		
	L – Adjustable Long Delay Pickup (By Adjustable Rating Plug) S – Adjustable Short Delay Pickup with Fixed Short Delay Time (I^2t Response) or Adjustable Short Delay Time (Flat Response) I – Adjustable Instantaneous Pickup by Setting Short Delay Time to Instantaneous G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time (Flat Response)				Ampere Rating	Fixed Rating Plug	Adjustable Rating Plug Adjustable Ampere Ratings
	LS	LSI	LSG ②	LSIG ②			
	Catalog Number					Catalog Number	
3-Pole High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac							
1600 ③	**RDC316T33W**	**RDC316T32W**	**RDC316T35W**	**RDC316T36W**	800 1000 1200 1250 1400 1500 1600	**16RES08T** **16RES10T** **16RES12T** **16RES125T** **16RES14T** **16RES15T** **16RES16T**	Adjustable Settings are: 800, 1000, 1200, 1600 **A16RES16T1**
2000	**RDC320T33W**	**RDC320T32W**	**RDC320T35W**	**RDC320T36W**	1000 1200 1250 1400 1600 2000	**20RES10T** **20RES12T** **20RES125T** **20RES14T** **20RES16T** **20RES20T**	Adjustable Settings are: 1000, 1200, 1600, 2000 **A20RES20T1**
2500	**RDC325T33W**	**RDC325T32W**	**RDC325T35W**	**RDC325T36W**	1200 1250 1600 2000 2500	**25RES12T** **25RES125T** **25RES16T** **25RES20T** **25RES25T**	Adjustable Settings are: 1200, 1600, 2000, 2500 **A25RES25T1**
4-Pole ④ High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac							
1600 ③	**RDC416T33W**	**RDC416T32W**	—	—	800 1000 1200 1250 1400 1500 1600	**16RES08T** **16RES10T** **16RES12T** **16RES125T** **16RES14T** **16RES15T** **16RES16T**	Adjustable Settings are: 800, 1000, 1200, 1600 **A16RES16T1**
2000	**RDC420T33W**	**RDC420T32W**	—	—	1000 1200 1250 1400 1600 2000	**20RES10T** **20RES12T** **20RES125T** **20RES14T** **20RES16T** **20RES20T**	Adjustable Settings are: 1000, 1200, 1600, 2000 **A20RES20T1**
2500	**RDC425T33W**	**RDC425T32W**	—	—	1200 1250 1600 2000 2500	**25RES12T** **25RES125T** **25RES16T** **25RES20T** **25RES25T**	Adjustable Settings are: 1200, 1600, 2000, 2500 **A25RES25T1**

① See **Table 12-277** below for prices.
② Add **R** to Catalog Number for ground fault remote indication compatibility, i.e., RDC316T35**R**W.
③ For SCR application use 2000 ampere frame.
④ Unprotected right pole neutral. Add **P** to Catalog Number for 100% protected right pole neutral, i.e., RDC416T33**P**W.

Table 12-277. Digitrip RMS 310 Electronic Circuit Breakers with Interchangeable Rating Plugs Prices

Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
A16RES16T1 **A20RES20T1** **A25RES25T1** **RDC316T32W** **RDC316T33W**		**RDC320T36W** **RDC325T32W** **RDC325T33W** **RDC325T35W** **RDC325T36W**		**RDC425T33W** **16RES08T** **16RES10T** **16RES12T** **16RES125T**		**20RES125T** **20RES14T** **20RES16T** **20RES20T** **25RES12T**	
RDC316T35W **RDC316T36W** **RDC320T32W** **RDC320T33W** **RDC320T35W**		**RDC416T32W** **RDC416T33W** **RDC420T32W** **RDC420T33W** **RDC425T32W**		**16RES14T** **16RES15T** **16RES16T** **20RES10T** **20RES12T**		**25RES125T** **25RES16T** **25RES20T** **25RES25T** —	

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Discount Symbol **CB-2**

100% Rated Digitrip RMS 310 Electronic Circuit Breakers

The NEC allows the breaker to be rated at 100% of its frame size in an assembly, provided that 90°C wire is applied at 75°C ampacity. Order as individual components: Breaker Frame (which includes Trip Unit) and Rating Plug.

Table 12-278. 100% Rated Digitrip RMS 310 Electronic Circuit Breakers ①

Maximum Continuous Ampere Rating at 40°C	Circuit Breaker Frame Only				Digitrip RMS 310 Rating Plug Only		
	L – Adjustable Long Delay Pickup (By Adjustable Rating Plug) S – Adjustable Short Delay Pickup with Fixed Short Delay Time (I^2t Response) or Adjustable Short Delay Time (Flat Response) I – Adjustable Instantaneous Pickup by Setting Short Delay Time to Instantaneous G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time (Flat Response)				Ampere Rating	Fixed Rating Plug	Adjustable Rating Plug Adjustable Ampere Ratings
	LS	LSI	LSG ②	LSIG ②			
	Catalog Number					Catalog Number	
3-Pole Standard Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac							
1600 ③	**CRD316T33W**	**CRD316T32W**	**CRD316T35W**	**CRD316T36W**	800 1000 1200 1250 1400 1500 1600	**16RES08T** **16RES10T** **16RES12T** **16RES125T** **16RES14T** **16RES15T** **16RES16T**	Adjustable Settings are: 800, 1000, 1200, 1600 **A16RES16T1**
2000 ④	**CRD320T33W**	**CRD320T32W**	**CRD320T35W**	**CRD320T36W**	1000 1200 1250 1400 1600 2000	**20RES10T** **20RES12T** **20RES125T** **20RES14T** **20RES16T** **20RES20T**	Adjustable Settings are: 1000, 1200, 1600, 2000 **A20RES20T1**
3-Pole High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac							
1600 ③	**CRDC316T33W**	**CRDC316T32W**	**CRDC316T35W**	**CRDC316T36W**	800 1000 1200 1250 1400 1500 1600	**16RES08T** **16RES10T** **16RES12T** **16RES125T** **16RES14T** **16RES15T** **16RES16T**	Adjustable Settings are: 800, 1000, 1200, 1600 **A16RES16T1**
2000 ④	**CRDC320T33W**	**CRDC320T32W**	**CRDC320T35W**	**CRDC320T36W**	1000 1200 1250 1400 1600 2000	**20RES10T** **20RES12T** **20RES125T** **20RES14T** **20RES16T** **20RES20T**	Adjustable Settings are: 1000, 1200, 1600, 2000 **A20RES20T1**

① See **Table 12-279** below for prices.
② Add **R** to Catalog Number for ground fault remote indication compatibility, i.e., CRD316T35RW.
③ For SCR application use 2000 ampere frame.
④ Includes B2016RDL rear connectors.

Table 12-279. 100% Rated Digitrip RMS 310 Electronic Circuit Breakers Prices

Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
A16RES16T1		**CRD316T32W**		**16RES12T**		**20RES20T**	
A20RES20T1		**CRD316T33W**		**16RES125T**		—	
CRDC316T32W		**CRD316T35W**		**16RES14T**		—	
CRDC316T33W		**CRD316T36W**		**16RES15T**		—	
CRDC316T35W		**CRD320T32W**		**16RES16T**		—	
CRDC316T36W		**CRD320T33W**		**20RES10T**		—	
CRDC320T32W		**CRD320T35W**		**20RES12T**		—	
CRDC320T33W		**CRD320T36W**		**20RES125T**		—	
CRDC320T35W		**16RES08T**		**20RES14T**		—	
CRDC320T36W		**16RES10T**		**20RES16T**		—	

Discount Symbol **CB-2**

Digitrip RMS 510 Electronic Circuit Breakers with Interchangeable Rating Plugs

Order as individual components: Breaker Frame (which includes Trip Unit) and Rating Plug.

Table 12-280. Digitrip RMS 510 Electronic Circuit Breakers with Interchangeable Rating Plugs ①

Maximum Continuous Ampere Rating at 40°C	Circuit Breaker Frame Only						Digitrip Rating Plug Only	
	L – Adjustable Long Delay Pickup (I_r) with Adjustable Long Delay Time S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I^2t or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time Delay (I^2t or Flat Response)						Rated Current (I_n)	Fixed Rating Plug
	LI	LS	LSI	LIG	LSG	LSIG		
	Catalog Number							Catalog Number
3-Pole Standard Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac								
1600	RD316T51W	RD316T53W	RD316T52W	RD316T54W	RD316T55W	RD316T56W	800 1000 1200 1600	RP6R16A080 RP6R16A100 RP6R16A120 RP6R16A160
2000	RD320T51W	RD320T53W	RD320T52W	RD320T54W	RD320T55W	RD320T56W	1000 1200 1600 2000	RP6R20A100 RP6R20A120 RP6R20A160 RP6R20A200
2500	RD325T51W	RD325T53W	RD325T52W	RD325T54W	RD325T55W	RD325T56W	1600 2000 2500	RP6R25A160 RP6R25A200 RP6R25A250
3-Pole High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac								
1600	RDC316T51W	RDC316T53W	RDC316T52W	RDC316T54W	RDC316T55W	RDC316T56W	800 1000 1200 1600	RP6R16A080 RP6R16A100 RP6R16A120 RP6R16A160
2000	RDC320T51W	RDC320T53W	RDC320T52W	RDC320T54W	RDC320T55W	RDC320T56W	1000 1200 1600 2000	RP6R20A100 RP6R20A120 RP6R20A160 RP6R20A200
2500	RDC325T51W	RDC325T53W	RDC325T52W	RDC325T54W	RDC325T55W	RDC325T56W	1600 2000 2500	RP6R25A160 RP6R25A200 RP6R25A250

① See **Table 12-281** below for prices.

Table 12-281. Digitrip RMS 510 Electronic Circuit Breakers with Interchangeable Rating Plugs Prices

Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
RDC316T51W RDC316T52W RDC316T53W RDC316T54W RDC316T55W		RDC320T55W RDC320T56W RDC325T51W RDC325T52W RDC325T53W		RD316T53W RD316T54W RD316T55W RD316T56W RD320T51W		RD325T51W RD325T52W RD325T53W RD325T54W RD325T55W		RP6R20A100 RP6R20A120 RP6R20A160 RP6R20A200 RP6R25A160	
RDC316T56W RDC320T51W RDC320T52W RDC320T53W RDC320T54W		RDC325T54W RDC325T55W RDC325T56W RD316T51W RD316T52W		RD320T52W RD320T53W RD320T54W RD320T55W RD320T56W		RD325T56W RP6R16A080 RP6R16A100 RP6R16A120 RP6R16A160		RP6R25A200 RP6R25A250 — — —	

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100% Rated Digitrip RMS 510 Circuit Breakers

The NEC allows the breaker to be rated at 100% of its frame size in an assembly, provided that 90°C wire is applied at 75°C ampacity. Order as individual components: Breaker Frame (which includes Trip Unit) and Rating Plug.

Table 12-282. 100% Rated Digitrip RMS 510 Circuit Breakers ①

Maximum Continuous Ampere Rating at 40°C	Circuit Breaker Frame Only						Digitrip Rating Plug Only	
	L – Adjustable Long Delay Pickup (I_r) with Adjustable Long Delay Time S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I^2t or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time Delay (I^2t or Flat Response)						Rated Current (I_n)	Fixed Rating Plug
	LI	LS	LSI	LIG	LSG	LSIG		
	Catalog Number							Catalog Number
3-Pole Standard Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac								
1600	CRD316T51W	CRD316T53W	CRD316T52W	CRD316T54W	CRD316T55W	CRD316T56W	800 1000 1200 1600	RP6R16A080 RP6R16A100 RP6R16A120 RP6R16A160
2000 ②	CRD320T51W	CRD320T53W	CRD320T52W	CRD320T54W	CRD320T55W	CRD320T56W	1000 1200 1600 2000	RP6R20A100 RP6R20A120 RP6R20A160 RP6R20A200
3-Pole High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac								
1600	—	CRDC316T53W	CRDC316T52W	CRDC316T54W	CRDC316T55W	CRDC316T56W	800 1000 1200 1600	RP6R16A080 RP6R16A100 RP6R16A120 RP6R16A160
2000 ②	CRDC320T51W	CRDC320T53W	CRDC320T52W	CRDC320T54W	CRDC320T55W	CRDC320T56W	1000 1200 1600 2000	RP6R20A100 RP6R20A120 RP6R20A160 RP6R20A200

① See **Table 12-283** below for prices.

② Includes B2016RDL rear connectors.

Table 12-283. 100% Rated Digitrip RMS 510 Circuit Breakers Prices

Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
CRDC316T52W CRDC316T53W CRDC316T54W CRDC316T55W CRDC316T56W		CRDC320T56W CRD316T51W CRD316T52W CRD316T53W CRD316T54W		CRD320T54W CRD320T55W CRD320T56W RP6R16A080 RP6R16A100		RP6R20A200 — — — —	
CRDC320T51W CRDC320T52W CRDC320T53W CRDC320T54W CRDC320T55W		CRD316T55W CRD316T56W CRD320T51W CRD320T52W CRD320T53W		RP6R16A120 RP6R16A160 RP6R20A100 RP6R20A120 RP6R20A160		— — — — —	

Discount Symbol **CB-2**

Digitrip RMS 610 Electronic Circuit Breakers with Interchangeable Rating Plugs

Order as individual components: Breaker Frame (which includes Trip Unit) and Rating Plug.

Table 12-284. Digitrip RMS 610 Electronic Circuit Breakers with Interchangeable Rating Plugs ①

Maximum Continuous Ampere Rating at 40°C	Circuit Breaker Frame Only						Digitrip Rating Plug Only	
	L – Adjustable Long Delay Pickup (I_r) with Adjustable Long Delay Time S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I^2t or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time Delay (I^2t or Flat Response)						Rated Current (I_n)	Fixed Rating Plug
	LI	LS	LSI	LIG	LSG	LSIG		
	Catalog Number							Catalog Number
3-Pole Standard Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac								
1600	RD316T61W	RD316T63W	RD316T62W	RD316T64W	RD316T65W	RD316T66W	800 1000 1200 1600	RP6R16A080 RP6R16A100 RP6R16A120 RP6R16A160
2000	RD320T61W	RD320T63W	RD320T62W	RD320T64W	RD320T65W	RD320T66W	1000 1200 1600 2000	RP6R20A100 RP6R20A120 RP6R20A160 RP6R20A200
2500	RD325T61W	RD325T63W	RD325T62W	RD325T64W	RD325T65W	RD325T66W	1600 2000 2500	RP6R25A160 RP6R25A200 RP6R25A250
3-Pole High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac								
1600	RDC316T61W	RDC316T63W	RDC316T62W	RDC316T64W	RDC316T65W	RDC316T66W	800 1000 1200 1600	RP6R16A080 RP6R16A100 RP6R16A120 RP6R16A160
2000	RDC320T61W	RDC320T63W	RDC320T62W	RDC320T64W	RDC320T65W	RDC320T66W	1000 1200 1600 2000	RP6R20A100 RP6R20A120 RP6R20A160 RP6R20A200
2500	RDC325T61W	RDC325T63W	RDC325T62W	RDC325T64W	RDC325T65W	RDC325T66W	1600 2000 2500	RP6R25A160 RP6R25A200 RP6R25A250

① See **Table 12-285** below for prices.

Table 12-285. Digitrip RMS 610 Electronic Circuit Breakers with Interchangeable Rating Plug Prices

Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
RDC316T61W RDC316T62W RDC316T63W RDC316T64W RDC316T65W		RDC320T65W RDC320T66W RDC325T61W RDC325T62W RDC325T63W		RD316T63W RD316T64W RD316T65W RD316T66W RD320T61W		RD325T61W RD325T62W RD325T63W RD325T64W RD325T65W		RP6R20A100 RP6R20A120 RP6R20A160 RP6R20A200 RP6R25A160	
RDC316T66W RDC320T61W RDC320T62W RDC320T63W RDC320T64W		RDC325T64W RDC325T65W RDC325T66W RD316T61W RD316T62W		RD320T62W RD320T63W RD320T64W RD320T65W RD320T66W		RD325T66W RP6R16A080 RP6R16A100 RP6R16A120 RP6R16A160		RP6R25A200 RP6R25A250 — — —	

100% Rated Digitrip RMS 610 Circuit Breakers

The NEC allows the breaker to be rated at 100% of its frame size in an assembly, provided that 90°C wire is applied at 75°C ampacity. Order as individual components: Breaker Frame (which includes Trip Unit) and Rating Plug.

Table 12-286. 100% Rated Digitrip RMS 610 Circuit Breakers ①

Maximum Continuous Ampere Rating at 40°C	Circuit Breaker Frame Only						Digitrip Rating Plug Only	
	L – Adjustable Long Delay Pickup (I_r) with Adjustable Long Delay Time S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I^2t or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time Delay (I^2t or Flat Response)						Rated Current (I_n)	Fixed Rating Plug
	LI	LS	LSI	LIG	LSG	LSIG		
	Catalog Number							Catalog Number
3-Pole Standard Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac								
1600	CRD316T61W	CRD316T63W	CRD316T62W	CRD316T64W	CRD316T65W	CRD316T66W	800 1000 1200 1600	RP6R16A080 RP6R16A100 RP6R16A120 RP6R16A160
2000 ②	CRD320T61W	CRD320T63W	CRD320T62W	CRD320T64W	CRD320T65W	CRD320T66W	1000 1200 1600 2000	RP6R20A100 RP6R20A120 RP6R20A160 RP6R20A200
3-Pole High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac								
1600	CRDC316T61W	CRDC316T63W	CRDC316T62W	CRDC316T64W	CRDC316T65W	CRDC316T66W	800 1000 1200 1600	RP6R16A080 RP6R16A100 RP6R16A120 RP6R16A160
2000 ②	CRDC320T61W	CRDC320T63W	CRDC320T62W	CRDC320T64W	CRDC320T65W	CRDC320T66W	1000 1200 1600 2000	RP6R20A100 RP6R20A120 RP6R20A160 RP6R20A200

① See **Table 12-287** below for prices.
② Includes B2016RDL rear connectors.

Table 12-287. 100% Rated Digitrip RMS 610 Circuit Breaker Prices

Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
CRDC316T61W CRDC316T62W CRDC316T63W CRDC316T64W CRDC316T65W		CRDC320T65W CRDC320T66W CRD316T61W CRD316T62W CRD316T63W		CRD320T63W CRD320T64W CRD320T65W CRD320T66W RP6R16A080		RP6R20A160 RP6R20A200 — — —	
CRDC316T66W CRDC320T61W CRDC320T62W CRDC320T63W CRDC320T64W		CRD316T64W CRD316T65W CRD316T66W CRD320T61W CRD320T62W		RP6R16A100 RP6R16A120 RP6R16A160 RP6R20A100 RP6R20A120		— — — — —	

Discount Symbol **CB-2**

Digitrip RMS 810 Electronic Circuit Breakers with Interchangeable Rating Plugs

Order as individual components: Breaker Frame (which includes Trip Unit) and Rating Plug.

Table 12-288. Digitrip RMS 810 Electronic Circuit Breakers with Interchangeable Rating Plugs ①

Maximum Continuous Ampere Rating at 40°C	Circuit Breaker Frame Only						Digitrip Rating Plug Only	
	L – Adjustable Long Delay Pickup (I_r) with Adjustable Long Delay Time S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I^2t or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time Delay (I^2t or Flat Response)						Rated Current (I_n)	Fixed Rating Plug
	LI	LS	LSI	LIG	LSG	LSIG		
	Catalog Number							Catalog Number
3-Pole Standard Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac								
1600	RD316T81W	RD316T83W	RD316T82W	RD316T84W	RD316T85W	RD316T86W	800 1000 1200 1600	RP6R16A080 RP6R16A100 RP6R16A120 RP6R16A160
2000	RD320T81W	RD320T83W	RD320T82W	RD320T84W	RD320T85W	RD320T86W	1000 1200 1600 2000	RP6R20A100 RP6R20A120 RP6R20A160 RP6R20A200
2500	RD325T81W	RD325T83W	RD325T82W	RD325T84W	RD325T85W	RD325T86W	1600 2000 2500	RP6R25A160 RP6R25A200 RP6R25A250
3-Pole High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac								
1600	RDC316T81W	RDC316T83W	RDC316T82W	RDC316T84W	RDC316T85W	RDC316T86W	800 1000 1200 1600	RP6R16A080 RP6R16A100 RP6R16A120 RP6R16A160
2000	RDC320T81W	RDC320T83W	RDC320T82W	RDC320T84W	RDC320T85W	RDC320T86W	1000 1200 1600 2000	RP6R20A100 RP6R20A120 RP6R20A160 RP6R20A200
2500	RDC325T81W	RDC325T83W	RDC325T82W	RDC325T84W	RDC325T85W	RDC325T86W	1600 2000 2500	RP6R25A160 RP6R25A200 RP6R25A250

① See **Table 12-289** below for prices.

Table 12-289. Digitrip RMS 810 Electronic Circuit Breakers with Interchangeable Rating Plug Prices

Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
RDC316T81W RDC316T82W RDC316T83W RDC316T84W RDC316T85W		RDC320T85W RDC320T86W RDC325T81W RDC325T82W RDC325T83W		RD316T83W RD316T84W RD316T85W RD316T86W RD320T81W		RD325T81W RD325T82W RD325T83W RD325T84W RD325T85W		RP6R20A100 RP6R20A120 RP6R20A160 RP6R20A200 RP6R25A160	
RDC316T86W RDC320T81W RDC320T82W RDC320T83W RDC320T84W		RDC325T84W RDC325T85W RDC325T86W RD316T81W RD316T82W		RD320T82W RD320T83W RD320T84W RD320T85W RD320T86W		RD325T86W RP6R16A080 RP6R16A100 RP6R16A120 RP6R16A160		RP6R25A200 RP6R25A250 — — —	

100% Rated Digitrip RMS 810 Circuit Breakers

The NEC allows the breaker to be rated at 100% of its frame size in an assembly, provided that 90°C wire is applied at 75°C ampacity. Order as individual components: Breaker Frame (which includes Trip Unit) and Rating Plug.

Table 12-290. 100% Rated Digitrip RMS 810 Circuit Breakers ①

Maximum Continuous Ampere Rating at 40°C	Circuit Breaker Frame Only						Digitrip Rating Plug Only	
	L – Adjustable Long Delay Pickup (I_r) with Adjustable Long Delay Time S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I^2t or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time Delay (I^2t or Flat Response)						Rated Current (I_n)	Fixed Rating Plug
	LI	LS	LSI	LIG	LSG	LSIG		
	Catalog Number							Catalog Number
3-Pole Standard Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac								
1600	CRD316T81W	CRD316T83W	CRD316T82W	CRD316T84W	CRD316T85W	CRD316T86W	800 1000 1200 1600	RP6R16A080 RP6R16A100 RP6R16A120 RP6R16A160
2000 ②	CRD320T81W	CRD320T83W	CRD320T82W	CRD320T84W	CRD320T85W	CRD320T86W	1000 1200 1600 2000	RP6R20A100 RP6R20A120 RP6R20A160 RP6R20A200
3-Pole High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac								
1600	CRDC316T81W	CRDC316T83W	CRDC316T82W	CRDC316T84W	CRDC316T85W	CRDC316T86W	800 1000 1200 1600	RP6R16A080 RP6R16A100 RP6R16A120 RP6R16A160
2000 ②	CRDC320T81W	CRDC320T83W	CRDC320T82W	CRDC320T84W	CRDC320T85W	CRDC320T86W	1000 1200 1600 2000	RP6R20A100 RP6R20A120 RP6R20A160 RP6R20A200

① See **Table 12-291** below for prices.

② Includes B2016RDL rear connectors.

Table 12-291. 100% Rated Digitrip RMS 810 Circuit Breaker Prices

Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
CRDC316T81W CRDC316T82W CRDC316T83W CRDC316T84W CRDC316T85W		CRDC320T85W CRDC320T86W CRD316T81W CRD316T82W CRD316T83W		CRD320T83W CRD320T84W CRD320T85W CRD320T86W RP6R16A080		RP6R20A160 RP6R20A200 — — —	
CRDC316T86W CRDC320T81W CRDC320T82W CRDC320T83W CRDC320T84W		CRD316T84W CRD316T85W CRD316T86W CRD320T81W CRD320T82W		RP6R16A100 RP6R16A120 RP6R16A160 RP6R20A100 RP6R20A120		— — — — —	

Digitrip RMS 910 Electronic Circuit Breakers with Interchangeable Rating Plugs

Order as individual components: Breaker Frame (which includes Trip Unit) and Rating Plug.

Table 12-292. Digitrip RMS 910 Electronic Circuit Breakers with Interchangeable Rating Plugs ①

Maximum Continuous Ampere Rating at 40°C	Circuit Breaker Frame Only						Digitrip Rating Plug Only	
	L – Adjustable Long Delay Pickup (I_r) with Adjustable Long Delay Time S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I^2t or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time Delay (I^2t or Flat Response)						Rated Current (I_n)	Fixed Rating Plug
	LI	LS	LSI	LIG	LSG	LSIG		
	Catalog Number							Catalog Number
3-Pole Standard Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac								
1600	RD316T91W	RD316T93W	RD316T92W	RD316T94W	RD316T95W	RD316T96W	800 1000 1200 1600	RP6R16A080 RP6R16A100 RP6R16A120 RP6R16A160
2000	RD320T91W	RD320T93W	RD320T92W	RD320T94W	RD320T95W	RD320T96W	1000 1200 1600 2000	RP6R20A100 RP6R20A120 RP6R20A160 RP6R20A200
2500	RD325T91W	RD325T93W	RD325T92W	RD325T94W	RD325T95W	RD325T96W	1600 2000 2500	RP6R25A160 RP6R25A200 RP6R25A250
3-Pole High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac								
1600	RDC316T91W	RDC316T93W	RDC316T92W	RDC316T94W	RDC316T95W	RDC316T96W	800 1000 1200 1600	RP6R16A080 RP6R16A100 RP6R16A120 RP6R16A160
2000	RDC320T91W	RDC320T93W	RDC320T92W	RDC320T94W	RDC320T95W	RDC320T96W	1000 1200 1600 2000	RP6R20A100 RP6R20A120 RP6R20A160 RP6R20A200
2500	RDC325T91W	RDC325T93W	RDC325T92W	RDC325T94W	RDC325T95W	RDC325T96W	1600 2000 2500	RP6R25A160 RP6R25A200 RP6R25A250

① See **Table 12-293** below for prices.

Table 12-293. Digitrip RMS 910 Electronic Circuit Breakers with Interchangeable Rating Plug Prices

Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
RDC316T91W RDC316T92W RDC316T93W RDC316T94W RDC316T95W		RDC320T95W RDC320T96W RDC325T91W RDC325T92W RDC325T93W		RD316T93W RD316T94W RD316T95W RD316T96W RD320T91W		RD325T91W RD325T92W RD325T93W RD325T94W RD325T95W		RP6R20A100 RP6R20A120 RP6R20A160 RP6R20A200 RP6R25A160	
RDC316T96W RDC320T91W RDC320T92W RDC320T93W RDC320T94W		RDC325T94W RDC325T95W RDC325T96W RD316T91W RD316T92W		RD320T92W RD320T93W RD320T94W RD320T95W RD320T96W		RD325T96W RP6R16A080 RP6R16A100 RP6R16A120 RP6R16A160		RP6R25A200 RP6R25A250 — — —	

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Discount Symbol ..... **CB-**

100% Rated Digitrip RMS 910 Circuit Breakers

The NEC allows the breaker to be rated at 100% of its frame size in an assembly, provided that 90°C wire is applied at 75°C ampacity. Order as individual components: Breaker Frame (which includes Trip Unit) and Rating Plug.

Table 12-294. 100% Rated Digitrip RMS 910 Circuit Breakers ①

Maximum Continuous Ampere Rating at 40°C	Circuit Breaker Frame Only						Digitrip Rating Plug Only	
	L – Adjustable Long Delay Pickup (I_r) with Adjustable Long Delay Time S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I^2t or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time Delay (I^2t or Flat Response)						Rated Current (I_n)	Fixed Rating Plug
	LI	LS	LSI	LIG	LSG	LSIG		
	Catalog Number							Catalog Number
3-Pole Standard Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac								
1600	CRD316T91W	CRD316T93W	CRD316T92W	CRD316T94W	CRD316T95W	CRD316T96W	800 1000 1200 1600	RP6R16A080 RP6R16A100 RP6R16A120 RP6R16A160
2000 ②	CRD320T91W	CRD320T93W	CRD320T92W	CRD320T94W	CRD320T95W	CRD320T96W	1000 1200 1600 2000	RP6R20A100 RP6R20A120 RP6R20A160 RP6R20A200
3-Pole High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac								
1600	CRDC316T91W	CRDC316T93W	CRDC316T92W	CRDC316T94W	CRDC316T95W	CRDC316T96W	800 1000 1200 1600	RP6R16A080 RP6R16A100 RP6R16A120 RP6R16A160
2000 ②	CRDC320T91W	CRDC320T93W	CRDC320T92W	CRDC320T94W	CRDC320T95W	CRDC320T96W	1000 1200 1600 2000	RP6R20A100 RP6R20A120 RP6R20A160 RP6R20A200

① See **Table 12-295** below for prices.

② Includes B2016RDL rear connectors.

Table 12-295. 100% Rated Digitrip RMS 910 Circuit Breaker Prices

Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
CRDC316T91W CRDC316T92W CRDC316T93W CRDC316T94W CRDC316T95W		CRDC320T95W CRDC320T96W CRD316T91W CRD316T92W CRD316T93W		CRD320T93W CRD320T94W CRD320T95W CRD320T96W RP6R16A080		RP6R20A160 RP6R20A200 — — —	
CRDC316T96W CRDC320T91W CRDC320T92W CRDC320T93W CRDC320T94W		CRD316T94W CRD316T95W CRD316T96W CRD320T91W CRD320T92W		RP6R16A100 RP6R16A120 RP6R16A160 RP6R20A100 RP6R20A120		— — — — —	

Digitrip OPTIM Electronic Circuit Breakers with Interchangeable Rating Plugs

Order as individual components: Breaker Frame (which includes Trip Unit) and Rating Plug.

Table 12-296. Digitrip OPTIM Electronic Circuit Breakers with Interchangeable Rating Plugs

Maximum Continuous Ampere Rating at 40°C	Circuit Breaker Frame Only				Digitrip OPTIM Rating Plug Only		
	L – Adjustable Long Delay Pickup (I_r) with Adjustable Long Delay Time S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I^2t or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time Delay (I^2t or Flat Response) A – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time Delay (I^2t or Flat Response)				Ampere Rating	Fixed Rating Plug	
	LSIA 1050		LSIG 1050				
	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $		Catalog Number	Price U.S. $
3-Pole Standard Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac							
1600	**RD316T107W**		**RD316T106W**		800 1000 1200 1600	**ORPR16A080** **ORPR16A100** **ORPR16A120** **ORPR16A160**	
2000	**RD320T107W**		**RD320T106W**		1000 1200 1600 2000	**ORPR20A100** **ORPR20A120** **ORPR20A160** **ORPR20A200**	
2500	**RD325T107W**		**RD325T106W**		1600 2000 2500	**ORPR25A160** **ORPR25A200** **ORPR25A250**	
3-Pole High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac							
1600	**RDC316T107W**		**RDC316T106W**		800 1000 1200 1600	**ORPR16A080** **ORPR16A100** **ORPR16A120** **ORPR16A160**	
2000	**RDC320T107W**		**RDC320T106W**		1000 1200 1600 2000	**ORPR20A100** **ORPR20A120** **ORPR20A160** **ORPR20A200**	
2500	**RDC325T107W**		**RDC325T106W**		1600 2000 2500	**ORPR25A160** **ORPR25A200** **ORPR25A250**	

Discount Symbol **CB-2**

100% Rated 600 Volts ac Digitrip OPTIM Circuit Breakers with Interchangeable Rating Plugs

Order as individual components: Breaker Frame (which includes Trip Unit) and Rating Plug.

Table 12-297. 100% Rated 600 Volts ac Digitrip OPTIM Circuit Breakers with Interchangeable Rating Plugs

Maximum Continuous Ampere Rating at 40°C	Circuit Breaker Frame Only				Digitrip OPTIM Rating Plug Only		
	L – Adjustable Long Delay Pickup (I_r) with Adjustable Long Delay Time S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I^2t or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time Delay (I^2t or Flat Response) A – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time Delay (I^2t or Flat Response)				Ampere Rating	Fixed Rating Plug	
	LSIA 1050		LSIG 1050				
	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $		Catalog Number	Price U.S. $
3-Pole Standard Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac							
1600	**CRD316T107W**		**CRD316T106W**		800 1000 1200 1600	**ORPR16A080** **ORPR16A100** **ORPR16A120** **ORPR16A160**	
2000 ①	**CRD320T107W**		**CRD320T106W**		1000 1200 1600 2000	**ORPR20A100** **ORPR20A120** **ORPR20A160** **ORPR20A200**	
3-Pole High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac							
1600	**CRDC316T107W**		**CRDC316T106W**		800 1000 1200 1600	**ORPR16A080** **ORPR16A100** **ORPR16A120** **ORPR16A160**	
2000 ①	**CRDC320T107W**		**CRDC320T106W**		1000 1200 1600 2000	**ORPR20A100** **ORPR20A120** **ORPR20A160** **ORPR20A200**	

① Includes B2016RDL rear connectors.

Discount Symbol **CB-2**

Molded Case Switches

Refer to Eaton for UL listed, series tested Molded Case Switch application data.

Table 12-298. Molded Case Switches

Cont. Amp Rating at 40°C	Complete without Terminals			
	3-Pole		4-Pole	
	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
Type RD — High Instantaneous (K)				
1600	**RD316WK**		**RD416WK**	
Type RD — High Instantaneous (K)				
2000	**RD320WK**		**RD420WK**	

Note: Molded case switch may trip above 17,500 amperes.

Line and Load Terminals

Line and Load Terminals provide wire connecting capabilities for specific ranges of continuous current ratings and wire types. All terminals comply with Underwriters Laboratories Standards UL 486A and UL 486B and CSA C22.2 No. 65M. Unless otherwise specified, R-Frame circuit breaker line load terminals are shipped separately for field installation.

Ordering Information

R-Frame circuit breakers have Cu/Al terminals as standard and Cu only terminals as an option. Specify if factory installation is required.

Table 12-299. Line and Load Terminals

Maximum Breaker Amperes	Terminal Body Material	Wire Type	Hardware	AWG/kcmil Wire Range/ No. Conductors	Metric Wire Range mm^2	Catalog Number	Price U.S. $
Wire Terminals							
1600	Aluminum	Cu/Al	English	500 – 1000 (4)	300 – 500	**TA1600RD**	
1600	Copper	Cu	English	1 – 600 (4)	50 – 300	**T1600RD**	
2000	Aluminum	Cu/Al	English	2 – 600 (6)	35 – 300	**TA2000RD** ①	
Rear Connectors							
2000	Copper	—	English	—	—	**B2016RD**	
2000	Copper	—	English	—	—	**B2016RDL** ②	
2500	Copper	—	English	—	—	**B2500RD** ③	

① Catalog Number includes bus connection, terminals and hardware for either line side or load side of 3-pole breaker.

② For use with 100% rated 1600 A and 2000 A frame. Do not order separately unless for replacement purposes. Included in breaker carton when 100% rated device is ordered.

③ For use with 2500 A frame. Do not order separately unless for replacement purposes. Included in breaker carton when 2500 A breaker is ordered.

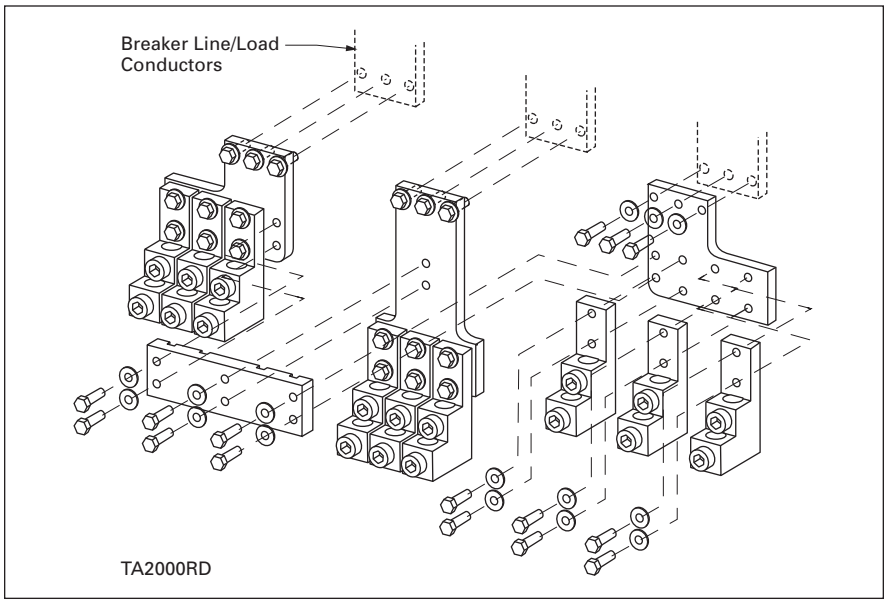

Figure 12-39. Mounting Hardware

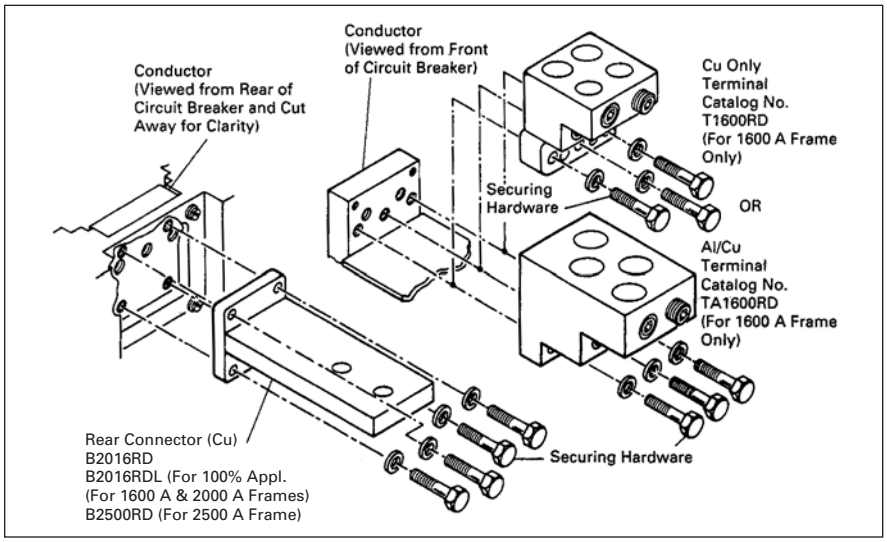

Figure 12-40. Mounting Hardware

Discount Symbol..... **CB-2**

Allowable Accessory Combinations

Different combinations of accessories can be supplied, depending on the types of accessories and the number of poles in the circuit breaker.

Table 12-300. Accessories

Description	Reference Page	3-Pole			4-Pole			
		Left	Center	Right	Left	Center	Right	Neu.
Internal Accessories ①								
Alarm Lockout (Make/Break)	12-219			■			■	
Alarm Lockout (2Make/2Break)	12-219			■			■	
Auxiliary Switch (2A, 2B)	12-222			■			■	
Auxiliary Switch (4A, 4B)	12-222			■			■	
Shunt Trip — Standard	12-226			■			■	
Shunt Trip — Low Energy	12-231			■			■	
Undervoltage Release Mechanism	12-232			■			■	
Accessory Terminal Block ②	12-241			■				■
External Accessories								
Base Mounting Hardware	12-246							
Padlockable Handle Lock Hasp	12-252		●			●		
Key Interlock Kit	12-253		■			■		
Walking Beam Interlock	12-254							
Electrical (Motor) Operator	12-255		■			■		
Drawout Cassette	12-66		●					
Handle Mechanisms	12-262		■			■		
Handle Extension ③	12-267		■			■		
Solid-State (Electronic) Portable Test Kit (310 Only)	12-268		●			●		
OPTIM System Components								
Breaker Interface Module (BIM)	12-269		●					
Digitrip OPTIMizer	12-269		●					
Auxiliary Power Module	12-269		●					
Modifications (Refer to Eaton)								
Special Calibration	—		●				●	
Moisture Fungus Treatment	12-73		●				●	
Freeze-Tested Circuit Breakers	—		●				●	
Marine Application	—		●				●	

① All accessories mount in the RH cavity which will accept one each shunt trip, UVR, auxiliary switch and alarm switch.

② Mounts outside breaker.

③ Included with breaker.

■ Applicable in indicated pole position

● Accessory available/Modification available

Motor Circuit Protectors

Motor Circuit Protectors

Product Description

Designated as Eaton's Cutler-Hammer Types GMCP and HMCP, the instantaneous-only Motor Circuit Protector (MCP) is available in ratings from 3 A to 1200 A for motor starter sizes 0 through 8. The MCP is designed to comply with the applicable requirements of Underwriters Laboratories Standard UL 489, Canadian Standards Association Standard C22.2 No. 5.1, and International Electrotechnical Commission Recommendations IEC 157-1.

An innovative design of internal components allows higher MCP-starter combination interrupting ratings. The MCP is marked to permit proper electrical application within the assigned equipment ratings.

The MCP is a recognized component (UL File E7819) and complies with the applicable requirements of Underwriters Laboratories Standard UL 489. It is also designed to comply with the applicable requirements of Canadian Standards Association Standard C22.2 No. 5.1, International Electrotechnical Commission Recommendations IEC 157-1, and nameplates bear the CE marking.

Note: Interrupting ratings are dependent on starter it is used with.

Product Selection

This information is presented only as an aid to understanding catalog numbers. It is not to be used to build catalog numbers for circuit breakers or trip units.

Table 12-301. Motor Circuit Protector Catalog Numbering System

HMCP 003 A0 C

Motor Circuit Protective Type	Continuous Ampere Rating	Magnetic Trip Range/ NEMA Starter Size	Suffix
HMCP = 3 Poles	**003**	**A0** = 9 – 30/0	**C** = Non-aluminum Terminals
HM2P = 2 Poles ①	**007**	**C0** = 21 – 70/0	**W** = Without Terminals
HMCPS = 3 Poles	**015**	**E0** = 45 – 150/0	**X** = Load Terminals Only
	025	**D0** = 40 – 60/0	**Y** = Line Terminals Only
	030	**H1** = 90 – 300/1	**S** = Stainless Steel Terminals (150 A Frame Only)
	050	**G2** = 80 – 120/2	**No Suffix:** Standard Terminals on Line and Load
		K2 = 150 – 500/2	
	070	**J2** = 115 – 170/2	
		M2 = 210 – 700/2	
	100	**L3** = 160 – 240/3	
		R3 = 300 – 1000/3	
	150	**T4** = 450 – 1500/4	
		U4 = 750 – 2500/4	
	250	**A5** = 350 – 700/5	
		C5 = 450 – 900/5	
	400	**D5** = 500 – 1000/5	
		F5 = 625 – 1250/5	
		G5 = 750 – 1500/5	
		J5 = 875 – 1750/5	
		K5 = 1000 – 2000/5	
		L5 = 1125 – 2250/5	
		W5 = 1250 – 2500/5	
		N5 = 1500 – 3000/5	
		R5 = 1750 – 3500/5	
		X5 = 2000 – 4000/5	
		Y5 = 2250 – 4500/5	
	600	**L6** = 1800 – 6000/6 (Electronic)	
		X6 = 500 – 2500/6 (Electronic)	
		Y6 = 1000 – 4000/6 (Electronic)	
	800	**X7** = 1600 – 6400/7 (Electronic)	
	1200	**Y8** = 2400 – 9600/8 (Electronic)	

① On J- and K-Frame HMCPs only.

Table 12-302. Motor Circuit Protector Catalog Numbering System

GMCP 003 A0 C

Motor Circuit Protective Device	Continuous Ampere Rating	Magnetic Trip Range/NEMA Starter Size	Suffix
GMCP = 3 Poles	GMCP **003**	**A0** = 15 – 30/0	**C** = Non-aluminum Terminals
	007	**C0** = 35 – 70/0	
	015	**E0** = 75 – 150/0	
	030	**H1** = 150 – 300/1	
	050	**K2** = 250 – 500/2	
	060	**J2** = 300 – 600/2	
	063	**M2** = 320 – 630/2	

Product Selection

G-Frame

Table 12-303. 480 Vac Maximum, 600Y/347 Vac

NEMA Starter Size	Cont. Amps	Cam Setting	Motor Full Load Current Amperes (FLA) ①	MCP Trip Setting	MCP Catalog Number	Price U.S. $
0	3	A	1.1 – 1.2	15	**GMCP003A0C**	
		B	1.3 – 1.5	18		
		C	1.6 – 1.7	21		
		D	1.8 – 1.9	24		
		E	2.0 – 2.2	27		
		F	2.3 – 2.5	30		
0	7	A	2.6 – 3.1	35	**GMCP007C0C**	
		B	3.2 – 3.6	42		
		C	3.7 – 3.9	49		
		D	4.3 – 4.7	56		
		E	4.8 – 5.2	63		
		F	5.3 – 5.7	70		
0	15	A	5.7 – 6.8	75	**GMCP015E0C**	
		B	6.9 – 7.9	90		
		C	8.0 – 9.1	105		
		D	9.2 – 10.3	120		
		E	10.4 – 11.4	135		
		F	11.5 – 12.6	150		
1	30	A	11.5 – 13.7	150	**GMCP030H1C**	
		B	13.8 – 16.0	180		
		C	16.1 – 18.3	210		
		D	18.4 – 20.6	240		
		E	20.7 – 22.9	270		
		F	23.0 – 25.2	300		
2	50	A	19.3 – 22.9	250	**GMCP050K2C**	
		B	23.0 – 26.8	300		
		C	26.9 – 30.6	350		
		D	30.7 – 34.5	400		
		E	34.6 – 38.3	450		
		F	38.4 – 42.1	500		
3	60	A	23.1 – 27.5	300	**GMCP060J2C**	
		B	27.7 – 32.2	360		
		C	32.3 – 36.7	420		
		D	36.9 – 41.4	480		
		E	41.5 – 46.0	540		
		F	46.2 – 50.5	600		
3	63	A	24.2 – 32.1	320	**GMCP063M2C**	
		B	29.1 – 34.8	380		
		C	33.9 – 39.4	440		
		D	38.8 – 46.4	500		
		E	43.6 – 48.9	570		
		F	48.5 – 53.7	630		

① Motor FLA ranges are typical. The corresponding trip setting is at 13 x the minimum FLA value shown. Where a 13 x setting is required for an intermediate FLA value, alternate Cam settings and/or MCP ratings should be used.

Note: All GMCP 3 – 63 A come with line and load steel body terminals for Cu only wire. Refer to **Table 12-131** on **Page 12-77** under Optional Terminal Types.

Note: UL recognized and CSA approved.

Modifications for GMCP

Internal accessories must be factory installed.

Table 12-304. Internal Accessories ①

Type Accessory	Electrical Ratings			Contact Arrangement	Factory Suffix	Style Number	Adder U.S. $
	Volts	Frequency	Amperes				
Shunt Trip ② Shunt Trip ②	120 240	50/60 Hz 50/60 Hz	1.1 2.1	— —	S5 S6	**1373D62G18** **1373D62G19**	
Auxiliary Switch ③ Auxiliary Switch ③	240 240	50/60 Hz 50/60 Hz	6.0 6.0	1A/1B 2A/2B	A3 A6	**1288C74G03** **1288C73G03**	
Alarm Switch ③	240	50/60 Hz	6.0	Make/Break	B3	**1288C75G03**	
Auxiliary Switch/Alarm Switch Combination ③	240	50/60 Hz	6.0	1A/1B Make/Break	B13	**1288C76G09**	

① Only one accessory may be installed in GMCP.
② LH only.
③ RH only.

Note: No UVR available on GMCP.

Table 12-305. External Mounted Accessories

Description	Number Units in Package	Style Number	Price U.S. $
Lock Dog (Non-padlockable)	1	**1294C01H01**	
Mounting Hardware	1	**624B375G23**	
DIN Rail Adapter ④	10	**1225C79G02**	

④ For use with standard 35 mm DIN rail such as, 35 x 7.5 or 15 mm per DIN EN50022.

Table 12-306. Vari-Depth Handle Mechanism ⑤

Description	Catalog Number	Price U.S. $
For Type 1 use	**HRGMV11L**	
For Type 3R, 4X, 12 use	**HRGMV14L**	
Close Coupled Black with Gray Handle	**HRGMC10**	
Close Coupled Red with Yellow Handle	**HRGMC30**	

⑤ For use with GMCP only.

Modifications for HMCP

See Internal Accessories starting on **Page 12-217**.

F-Frame

Table 12-307. 600 Vac Maximum, 250 Vdc Maximum

NEMA Starter Size	Cont. Amps	Cam Setting	Motor Full Load Current Amperes (FLA) ①	MCP Trip Setting ②	MCP Catalog Number	Price U.S. $
0	3	A	.69 – .91	9	**HMCP003A0C**	
		B	.92 – 1.0	12		
		C	1.1 – 1.2	15		
		D	1.3 – 1.5	18		
		E	1.6 – 1.7	21		
		F	1.8 – 1.9	24		
		G	2.0 – 2.2	27		
		H	2.3 – 2.5	30		
0	7	A	1.5 – 2.0	21	**HMCP007C0C**	
		B	2.1 – 2.5	28		
		C	2.6 – 3.1	35		
		D	3.2 – 3.6	42		
		E	3.7 – 3.9	49		
		F	4.3 – 4.7	56		
		G	4.8 – 5.2	63		
		H	5.3 – 5.7	70		
0	15	A	3.4 – 4.5	45	**HMCP015E0C**	
		B	4.6 – 5.6	60		
		C	5.7 – 6.8	75		
		D	6.9 – 7.9	90		
		E	8.0 – 9.1	105		
		F	9.2 – 10.3	120		
		G	10.4 – 11.4	135		
		H	11.5 – 12.6	150		
1	30	A	6.9 – 9.1	90	**HMCP030H1C**	
		B	9.2 – 11.4	120		
		C	11.5 – 13.7	150		
		D	13.8 – 16.0	180		
		E	16.1 – 18.3	210		
		F	18.4 – 20.6	240		
		G	20.7 – 22.9	270		
		H	23.0 – 25.2	300		
2	50	A	11.5 – 15.2	150	**HMCP050K2C**	
		B	15.3 – 19.1	200		
		C	19.2 – 22.9	250		
		D	23.0 – 26.8	300		
		E	26.9 – 30.6	350		
		F	30.7 – 34.5	400		
		G	34.6 – 38.3	450		
		H	38.4 – 42.1	500		

Table 12-307. 600 Vac Maximum, 250 Vdc Maximum (Continued)

NEMA Starter Size	Cont. Amps	Cam Setting	Motor Full Load Current Amperes (FLA) ①	MCP Trip Setting ②	MCP Catalog Number	Price U.S. $
2	70	A	16.1 – 21.4	210	**HMCP070M2C**	
		B	21.5 – 26.8	280		
		C	26.9 – 32.2	350		
		D	32.3 – 37.5	420		
		E	37.6 – 42.9	490		
		F	43.0 – 48.3	560		
		G	48.4 – 53.7	630		
		H	53.8 – 59.1	700		
3	100	A	23.0 – 30.6	300	**HMCP100R3C**	
		B	30.7 – 38.3	400		
		C	38.4 – 46.0	500		
		D	46.1 – 53.7	600		
		E	53.8 – 61.4	700		
		F	61.5 – 69.1	800		
		G	69.2 – 76.8	900		
		H	76.9 – 84.5	1000		
4	150	A	34.6 – 46.0	450	**HMCP150T4C**	
		B	46.1 – 57.5	600		
		C	57.6 – 69.1	750		
		D	69.2 – 80.6	900		
		E	80.7 – 92.2	1050		
		F	92.3 – 103.7	1200		
		G	103.8 – 115.2	1350		
		H	115.3 – 126.7	1500		
4	150	A	57.0 – 75.0	750	**HMCP150U4C**	
		B	76.0 – 95.0	1000		
		C	96.0 – 114.0	1250		
		D	115.0 – 130.7	1500		
		E	③	1750		
		F	③	2000		
		G	③	2250		
		H	③	2500		

① Motor FLA ranges are typical. The corresponding trip setting is at 13 x the minimum FLA value shown. Where a 13 x setting is required for an intermediate FLA value, alternate Cam settings and/or MCP ratings should be used.

② For dc applications, actual trip levels are approximately 40% higher than values shown.

③ Settings above 130 amperes are for special applications. NEC Article 430-110(a) requires the ampere rating of the disconnecting means to be not less than 115% of the motor full load ampere rating.

Note: HMCP 3 – 100 A come with line and load steel body terminals, 3T100FB. HMCP 150 A come with line and load steel body terminals, 3T150FB.

Special Low Magnetic Protection Application MCP

Table 12-308. 600 Vac Maximum, 250 Vdc Maximum

Cont. Amps	Cam Setting	MCP Trip Setting ①	MCP Catalog Number	Price U.S. $
25	A	40	**HMCP025D0C**	
	B	43		
	C	46		
	D	49		
	E	52		
	F	55		
	G	58		
	H	60		
50	A	80	**HMCP050G2C**	
	B	87		
	C	93		
	D	98		
	E	103		
	F	109		
	G	115		
	H	120		
70	A	115	**HMCP070J2C**	
	B	122		
	C	130		
	D	139		
	E	145		
	F	153		
	G	160		
	H	170		
100	A	160	**HMCP100L3C**	
	B	174		
	C	185		
	D	196		
	E	207		
	F	218		
	G	229		
	H	240		

① For dc applications, actual trip levels are approximately 40% higher than values shown.

Note: HMCP 25 – 100 A come with line and load steel body terminals, 3T100FB.

MCPs for Application with Motor Starters Equipped with Electronic Overload Relays

Table 12-309. 600 Vac Maximum, 250 Vdc Maximum

NEMA Starter Size	Cont. Amps	Cam Setting	Motor Full Load Current Amperes (FLA) ②	MCP Trip Setting ③	MCP Catalog Number	Price U.S. $
0	3	A	.69 – .91	9	**HMCPS003A0C**	
		B	.92 – 1.0	12		
		C	1.1 – 1.2	15		
		D	1.3 – 1.5	18		
		E	1.6 – 1.7	21		
		F	1.8 – 1.9	24		
		G	2.0 – 2.2	27		
		H	2.3 – 2.5	30		
0	7	A	1.5 – 2.0	21	**HMCPS007C0C**	
		B	2.1 – 2.5	28		
		C	2.6 – 3.1	35		
		D	3.2 – 3.6	42		
		E	3.7 – 3.9	49		
		F	4.3 – 4.7	56		
		G	4.8 – 5.2	63		
		H	5.3 – 5.7	70		

Table 12-309. 600 Vac Maximum, 250 Vdc Maximum (Continued)

NEMA Starter Size	Cont. Amps	Cam Setting	Motor Full Load Current Amperes (FLA) ②	MCP Trip Setting ③	MCP Catalog Number	Price U.S. $
0	15	A	3.4 – 4.5	45	**HMCPS015E0C**	
		B	4.6 – 5.6	60		
		C	5.7 – 6.8	75		
		D	6.9 – 7.9	90		
		E	8.0 – 9.1	105		
		F	9.2 – 10.3	120		
		G	10.4 – 11.4	135		
		H	11.5 – 12.6	150		
1	30	A	6.9 – 9.1	90	**HMCPS030H1C**	
		B	9.2 – 11.4	120		
		C	11.5 – 13.7	150		
		D	13.8 – 16.0	180		
		E	16.1 – 18.3	210		
		F	18.4 – 20.6	240		
		G	20.7 – 22.9	270		
		H	23.0 – 25.2	300		
2	50	A	11.5 – 15.2	150	**HMCPS050K2C**	
		B	15.3 – 19.1	200		
		C	19.2 – 22.9	250		
		D	23.0 – 26.8	300		
		E	26.9 – 30.6	350		
		F	30.7 – 34.5	400		
		G	34.6 – 38.3	450		
		H	38.4 – 42.1	500		
3	100	A	23.0 – 30.6	300	**HMCPS100R3C**	
		B	30.7 – 38.3	400		
		C	38.4 – 46.0	500		
		D	46.1 – 53.7	600		
		E	53.8 – 61.4	700		
		F	61.5 – 69.1	800		
		G	69.2 – 76.8	900		
		H	76.9 – 84.5	1000		
4	150	A	34.6 – 46.0	450	**HMCPS150T4C**	
		B	46.1 – 57.5	600		
		C	57.6 – 69.1	750		
		D	69.2 – 80.6	900		
		E	80.7 – 92.2	1050		
		F	92.3 – 103.7	1200		
		G	103.8 – 115.2	1350		
		H	115.3 – 126.7	1500		
4	150	A	57.0 – 75.0	750	**HMCPS150U4C**	
		B	76.0 – 95.0	1000		
		C	96.0 – 114.0	1250		
		D	115.0 – 130.7	1500		
		E	④	1750		
		F	④	2000		
		G	④	2250		
		H	④	2500		

② Motor FLA ranges are typical. The corresponding trip setting is at 13 x the minimum FLA value shown. Where a 13 x setting is required for an intermediate FLA value, alternate cam settings and/or MCP ratings should be used.

③ For dc applications, actual trip levels are approximately 40% higher than values shown.

④ Settings above 130 amperes are for special applications. NEC Article 430-110(a) requires the ampere rating of the disconnecting means to be not less than 115% of the motor full load ampere rating.

Note: HMCPS 3 – 100 A come with line and load steel body terminals, 3T100FB. HMCPS 150 A come with line and load steel body terminals, 3T150FB.

Type ELC Current Limiter Attachment (Size 0 – 4)

Type ELC Current Limiter Attachment

Product Description

Eaton's Cutler-Hammer Type ELC current limiter attachment for the MCP is designed to provide increased interrupting capacity. The combination may be used for the application up to 200,000 A symmetrical at 600 Vac, making the MCP suitable for use in network distribution systems or other applications where unusually high fault currents are available. The current limiter connects to the load end of the MCP and is provided with terminals suitable for copper or aluminum conductors. (See **Table 12-310.**)

Limiters are coordinated with the MCP so that normal fault currents are interrupted automatically by the MCP without any damage to the limiter. Only the rare very high fault is opened by the limiter. Faults that are interrupted by the limiter also magnetically trip the MCP, opening all three poles, preventing single-phase operation.

Each of the three poles of the type ELC limiter is equipped with an indicator that extends when a fault is interrupted by the limiter.

Table 12-310. Type ELC Current Limiter Terminal Wire Sizes ①

Type ELC Current Limiter Maximum Amperes	Wire Range AWG	Metric (mm^2)
Standard Aluminum Terminals		
50	14 – 2	2.5 – 35
100	1 – 4/0	50 – 95
150	1 – 4/0	50 – 95
Non-standard Terminals (Steel)		
50	14 – 2 ②	2.5 – 35
100	—	—
150	—	—

① Terminal wire connectors are UL listed for standard stranded wire sizes as defined in UL 486A or UL 486B.

② Optional on special order for copper cable only.

Table 12-311. ELC Current Limiter Attachment

MCP Rating (Amperes)	Catalog Number	Price U.S. $
3	**ELC3003R**	
7	**ELC3007R**	
15	**ELC3015R**	
30	**ELC3030R**	
50	**ELC3050R**	
100	**ELC3100R**	
150	**ELC3150R**	

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Discount Symbol **CB-2**

J-Frame

Table 12-312. 600 Vac Maximum, 250 Vdc Maximum

NEMA Starter Size	Cont. Amps	Cam Setting	Motor Full Load Current Amperes (FLA) ①	MCP Trip Setting ②	MCP Catalog Number ③	Price U.S. $
4	250	A	27.0 – 30.7	350	**HMCP250A5C**	
4		B	30.8 – 33.8	400		
4		C	33.9 – 36.9	440		
5		D	37.0 – 40.3	480		
5		E	40.4 – 43.8	525		
5		F	43.9 – 46.9	570		
5		G	47.0 – 50.7	610		
5		H	50.8 – 53.8	660		
5		I	53.9 – 57.2	700		
5	250	A	34.7 – 38.8	450	**HMCP250C5C**	
5		B	38.9 – 43.4	505		
5		C	43.5 – 47.6	565		
5		D	47.7 – 52.2	620		
5		E	52.3 – 56.5	680		
5		F	56.6 – 60.7	735		
5		G	60.8 – 64.9	790		
5		H	65.0 – 69.2	845		
5		I	69.3 – 73.5	900		
5	250	A	38.5 – 43.4	500	**HMCP250D5C**	
5		B	43.5 – 48.0	565		
5		C	48.1 – 53.0	625		
5		D	53.1 – 57.6	690		
5		E	57.7 – 62.3	750		
5		F	62.4 – 67.3	810		
5		G	67.4 – 71.9	875		
5		H	72.0 – 76.9	935		
5		I	77.0 – 81.6	1000		
5	250	A	48.1 – 53.8	625	**HMCP250F5C**	
5		B	53.9 – 59.9	700		
5		C	60.0 – 66.1	780		
5		D	66.2 – 72.3	860		
5		E	72.4 – 78.4	940		
5		F	78.5 – 83.8	1020		
5		G	83.9 – 89.9	1090		
5		H	90.0 – 96.1	1170		
5		I	96.2 – 102.0	1250		
5	250	A	57.7 – 64.6	750	**HMCP250G5C**	
5		B	64.7 – 71.9	840		
5		C	72.0 – 79.2	935		
5		D	79.3 – 86.5	1030		
5		E	86.6 – 93.8	1125		
5		F	93.9 – 101.1	1220		
5		G	101.2 – 108.4	1315		
5		H	108.5 – 115.3	1410		
5		I	115.4 – 122.4	1500		

Table 12-312. 600 Vac Maximum, 250 Vdc Maximum (Continued)

NEMA Starter Size	Cont. Amps	Cam Setting	Motor Full Load Current Amperes (FLA) ①	MCP Trip Setting ②	MCP Catalog Number ③	Price U.S. $
5	250	A	67.4 – 75.3	875	**HMCP250J5C**	
5		B	75.4 – 83.8	980		
5		C	83.9 – 92.3	1090		
5		D	92.4 – 100.7	1200		
5		E	100.8 – 109.2	1310		
5		F	109.3 – 117.6	1420		
5		G	117.7 – 126.1	1530		
5		H	126.2 – 134.6	1640		
5		I	134.7 – 142.8	1750		
5	250	A	77.0 – 86.6	1000	**HMCP250K5C**	
5		B	86.6 – 96.1	1125		
5		C	96.2 – 105.7	1250		
5		D	105.8 – 115.3	1375		
5		E	115.4 – 124.9	1500		
5		F	125.0 – 134.6	1625		
5		G	134.7 – 144.2	1750		
5		H	144.3 – 153.8	1875		
5		I	153.9 – 163.3	2000		
5	250	A	86.6 – 97.3	1125	**HMCP250L5C**	
5		B	97.4 – 108.4	1265		
5		C	108.5 – 118.8	1410		
5		D	118.9 – 129.9	1545		
5		E	130.0 – 140.7	1690		
5		F	140.8 – 151.5	1830		
5		G	151.6 – 162.3	1970		
5		H	162.4 – 173.0	2110		
5		I	173.1 – 183.6	2250		
5	250	A	96.2 – 108.0	1250	**HMCP250W5C**	
5		B	108.1 – 119.9	1405		
5		C	120.0 – 132.3	1560		
5		D	132.4 – 144.2	1720		
5		E	144.3 – 156.1	1875		
5		F	156.2 – 168.0	2030		
5		G	168.1 – 179.9	2185		
5		H	180.0 – 192.3	2340		
5		I	192.4 – 204.0	2500		

① Motor FLA ranges are typical. The corresponding trip setting is at 13 times the minimum FLA value shown. Where a 13 times setting is required for an intermediate FLA value, alternate cam settings and/or MCP ratings should be used.

② For dc applications, actual trip levels are approximately 40% higher than values shown.

③ Three-pole catalog numbers shown. Two-pole catalog numbers begin with HM2P in place of HMCP.

Note: All HMCP and HM2P 250 A come with line and load steel body terminals, T250KB. (With suffix "C", without "C" comes with TA250KB.)

K-Frame

Table 12-313. 600 Vac Maximum, 250 Vdc Maximum

NEMA Starter Size	Cont. Amps	Cam Setting	Motor Full Load Current Amperes (FLA) ①	MCP Trip Setting ②	MCP Catalog Number ③	Price U.S. $
4	400	A	27.0 – 30.7	350	**HMCP400A5C**	
4		B	30.8 – 33.8	400		
4		C	33.9 – 36.9	440		
5		D	37.0 – 40.3	480		
5		E	40.4 – 43.8	525		
5		F	43.9 – 46.9	570		
5		G	47.0 – 50.7	610		
5		H	50.8 – 53.8	660		
5		I	53.9 – 57.2	700		
5	400	A	38.5 – 43.4	500	**HMCP400D5C**	
5		B	43.5 – 48.0	565		
5		C	48.1 – 53.0	626		
5		D	53.1 – 57.6	690		
5		E	57.7 – 62.3	750		
5		F	62.4 – 67.3	810		
5		G	67.4 – 71.9	875		
5		H	72.0 – 76.9	935		
5		I	77.0 – 81.6	1000		
5	400	A	48.1 – 53.8	625	**HMCP400F5C**	
5		B	53.9 – 59.9	700		
5		C	60.0 – 66.1	780		
5		D	66.2 – 72.3	860		
5		E	72.4 – 78.4	940		
5		F	78.5 – 83.8	1020		
5		G	83.9 – 89.9	1090		
5		H	90.0 – 96.1	1170		
5		I	96.2 – 102.0	1250		
5	400	A	57.7 – 64.6	750	**HMCP400G5C**	
5		B	64.7 – 71.9	840		
5		C	72.0 – 79.2	935		
5		D	79.3 – 86.5	1030		
5		E	86.6 – 93.8	1125		
5		F	93.9 – 101.1	1220		
5		G	101.2 – 108.4	1315		
5		H	108.5 – 115.3	1410		
5		I	115.4 – 122.4	1500		
5	400	A	67.4 – 75.3	875	**HMCP400J5C**	
5		B	75.4 – 83.8	980		
5		C	83.9 – 92.3	1090		
5		D	92.4 – 100.7	1200		
5		E	100.8 – 109.2	1310		
5		F	109.3 – 117.6	1420		
5		G	117.7 – 126.1	1530		
5		H	126.2 – 134.6	1640		
5		I	134.7 – 142.8	1750		
5	400	A	77.0 – 86.5	1000	**HMCP400K5C**	
5		B	86.6 – 96.1	1125		
5		C	96.2 – 105.7	1250		
5		D	105.8 – 115.3	1375		
5		E	115.4 – 124.9	1500		
5		F	125.0 – 134.6	1625		
5		G	134.7 – 144.2	1750		
5		H	144.3 – 153.8	1875		
5		I	153.9 – 163.3	2000		
5	400	A	86.6 – 97.3	1125	**HMCP400L5C**	
5		B	97.4 – 108.4	1265		
5		C	108.5 – 118.8	1410		
5		D	118.9 – 129.9	1545		
5		E	130.0 – 140.7	1690		
5		F	140.8 – 151.5	1830		
5		G	151.6 – 162.3	1970		
5		H	162.4 – 173.0	2110		
5		I	173.1 – 183.6	2250		

Table 12-313. 600 Vac Maximum, 250 Vdc Maximum (Continued)

NEMA Starter Size	Cont. Amps	Cam Setting	Motor Full Load Current Amperes (FLA) ①	MCP Trip Setting ②	MCP Catalog Number ③	Price U.S. $
5	400	A	96.2 – 108.0	1250	**HMCP400W5C**	
5		B	108.1 – 119.9	1405		
5		C	120.0 – 132.3	1560		
5		D	132.4 – 144.2	1720		
5		E	144.3 – 156.1	1875		
5		F	156.2 – 168.0	2030		
5		G	168.1 – 179.9	2185		
5		H	180.0 – 192.3	2340		
5		I	192.4 – 204.0	2500		
5	400	A	115.4 – 129.9	1500	**HMCP400N5C**	
5		B	130.0 – 144.2	1690		
5		C	144.3 – 158.4	1875		
5		D	158.5 – 173.0	2060		
5		E	173.1 – 187.6	2250		
5		F	187.7 – 201.9	2440		
5		G	202.0 – 216.1	2625		
5		H	216.2 – 230.7	2810		
5		I	230.8 – 244.9	3000		
5	400	A	134.7 – 151.5	1750	**HMCP400R5C**	
5		B	151.6 – 168.4	1970		
5		C	168.5 – 185.3	2190		
5		D	185.4 – 201.9	2410		
5		E	202.0 – 218.8	2625		
5		F	218.9 – 235.7	2845		
5		G	235.8 – 252.6	3065		
5		H	252.7 – 269.2	3285		
5		I	269.3 – 285.7	3500		
5	400	A	153.9 – 173.0	2000	**HMCP400X5C**	
5		B	173.1 – 192.3	2250		
5		C	192.4 – 211.5	2500		
5		D	211.6 – 230.7	2750		
5		E	230.8 – 249.9	3000		
5		F	250.0 – 269.2	3250		
5		G	269.3 – 288.4	3500		
5		H	288.5 – 307.6	3750		
5		I	307.7 – 326.9	4000		
5	400	A	173.1 – 194.5	2250	**HMCP400Y5C**	
5		B	194.6 – 216.1	2530		
5		C	216.2 – 237.6	2810		
5		D	237.7 – 259.5	3090		
5		E	259.6 – 281.1	3375		
5		F	281.2 – 302.6	3655		
5		G	302.7 – 324.1	3935		
5		H	324.2 – 346.1	4215		
5		I	346.2 – 368.1	4500		

① Motor FLA ranges are typical. The corresponding trip setting is at 13 x the minimum FLA value shown. Where a 13 x setting is required for an intermediate FLA value, alternate cam settings and/or MCP ratings should be used.

② For dc applications, actual trip levels are approximately 40% higher than values shown.

③ Three-pole Catalog Numbers shown. Two-pole Catalog Numbers begin with **HM2P** in place of **HMCP**.

Note: All HMCP and HM2P 400A come with aluminum body terminals, 3TA400K. Catalog numbers with suffix "C" as shown above come with copper body terminals 3T400K.

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Discount Symbol **CB-2**

L-Frame

Table 12-314. 600 Vac Maximum ①

NEMA Starter Size	Cont. Amps	Cam Setting	Motor Full Load Current Amperes (FLA) ②	MCP Trip Setting	MCP Catalog Number	Price U.S. $
6	600	A	138.5 – 184.5	1800	**HMCP600L6W**	
6		B	184.6 – 230.7	2400		
6		C	230.8 – 276.8	3000		
6		D	276.9 – 323.0	3600		
6		E	323.1 – 369.1	4200		
6		F	369.2 – 415.3	4800		
6		G	415.4 – 461.4	5400		
6		H	461.5 – 507.7	6000		
6	600	A	38.5 – 46.1	500	**HMCP600X6W**	
6		B	46.2 – 61.4	600		
6		C	61.5 – 76.8	800		
6		D	76.9 – 96.1	1000		
6		E	96.2 – 115.3	1250		
6		F	115.4 – 153.7	1500		
6		G	153.8 – 192.2	2000		
6		H	192.3 – 230.7	2500		
6	600	A	76.9 – 96.1	1000	**HMCP600Y6W**	
6		B	96.2 – 115.3	1250		
6		C	115.4 – 153.7	1500		
6		D	153.8 – 192.2	2000		
6		E	192.3 – 230.7	2500		
6		F	230.8 – 269.1	3000		
6		G	269.2 – 307.6	3500		
6		H	307.7 – 346.1	4000		

① Equipped with electronic trip device.

② Motor FLA ranges are typical. The corresponding trip setting is at 13X the minimum FLA value shown. Where a 13X setting is required for an intermediate FLA value, alternate cam settings and/or MCP ratings should be used.

Note: All HMCP 600 A come without terminals. For Terminals, see **Table 12-240** on **Page 12-140**.

N-Frame

Table 12-315. 600 Vac Maximum ①

NEMA Starter Size	Cont. Amps	Cam Setting	Motor Full Load Current Amperes (FLA) ②	MCP Trip Setting	MCP Catalog Number	Price U.S. $
7	800	A	123.1 – 184.5	1600	**HMCP800X7W**	
7		B	184.6 – 246.1	2400		
7		C	246.2 – 307.6	3200		
7		D	307.7 – 369.1	4000		
7		E	369.2 – 430.7	4800		
7		F	430.8 – 492.2	5600		
7		G	492.3 – 553.7	6400		
8	1200	A	184.6 – 276.8	2400	**HMCP12Y8W**	
8		B	276.9 – 369.1	3600		
8		C	369.2 – 461.4	4800		
8		D	461.5 – 553.7	6000		
8		E	553.8 – 646.1	7200		
8		F	646.2 – 738.4	8400		
8		G	738.5 – 830.7	9600		

① Equipped with electronic trip device.

② Motor FLA ranges are typical. The corresponding trip setting is at 13X the minimum FLA value shown. Where a 13X setting is required for an intermediate FLA value, alternate cam settings and/or MCP ratings should be used.

Note: All HMCP 800 A and 1200 A come without terminals. For Terminals, see **Table 12-307** on **Page 12-187.**

Engine Generator Circuit Breakers

Product Description

Eaton's Cutler-Hammer engine generator molded case circuit breakers are designed specifically for application on diesel engine powered standby generators where high interrupting circuit breakers are not required. The JG through NG breakers are equipped with a special trip unit, that includes standard thermal (overload) protection and special low magnetic pickup range (FG includes a fixed thermal-magnetic pickup). The standard thermal trip unit provides overload protection for conductors per the National Electrical Code. The low magnetic pickup range is approximately two to five times the continuous rating and provides closer low-level short-circuit protection when applied on generators that have very low short-circuit capacity. This combination allows the user to customize the breaker to the generator output.

Engine generator circuit breakers are suitable for reverse feed application.

Standards and Certifications

Engine generator molded case circuit breakers are designed to conform with the following standards:

- Underwriters Laboratories Standard UL 489, Molded Case Circuit Breakers and Circuit Breaker Enclosures File E7819.
- Canadian Standards Association Standard C22.2 No. 5, Service Entrance and Branch Circuit Breakers.
- International Electrotechnical Commission Recommendations IEC 947-2, Circuit Breakers.

Conformance with these standards satisfies most local and international codes, assuming user acceptability and simplified application.

Technical Data and Specifications

Table 12-316. UL 489 Interrupting Capacity Ratings

Volts ac (50/60 Hz)	Interrupting Capacity (Symmetrical Amperes)
240	18,000
480	14,000
600	10,000

Table 12-317. IEC 947-2 Interrupting Capacity Ratings

Volts ac (50/60 Hz)	Interrupting Capacity (Symmetrical Amperes)
220, 240	18,000/9,000
380, 415	14,000/7,000
660, 690	10,000/5,000

Product Selection

This information is presented only as an aid to understanding catalog numbers. It is not to be used to build catalog numbers for circuit breakers.

- FG breakers include both line and load side terminals.
- JG, KG, LG and NG breakers with **W** Catalog Number Suffix do not include any terminals.
- JG, KG, LG and NG breakers without **W** Catalog Number Suffix include both line and load terminals.
- Contact Eaton for additional ratings and internal/external accessories.
- Reverse feed.

Table 12-318. Catalog Numbering System

FG 3 100 W

Frame	Number of Poles	Trip Amperes	Suffix
FG	**3** = 3 Poles	**015**	**W** = Without Terminals
		020	
		025	
		030	
		035	
		040	
		045	
		050	
		060	
		070	
		080	
		090	
		100	
		125	
		150	
		175	
		200	
		225	
JG		**175**	
		200	
		225	
		250	
KG		**300**	
		350	
		400	
LG		**450**	
		500	
		600	
NG		**700**	
		800	
		900	
		1000	
		1200	

Product Selection

The following table lists FG through NG engine generator breakers with the maximum generator kVA and kW rating. Engine generator breakers are applied at 115% of the generator full load current rating (FLA). The maximum kW rating is based on 3-phase generators at 80% power factor.

Table 12-319. Product Selection

Magnetic Pickup Range	Maximum Generator Rating 60 Hz						Engine Generator Breaker ③	
	240 Vac		480 Vac		600 Vac			
	kVA ①	kW ②	kVA ①	kW ②	kVA ①	kW ②	Catalog Number	Price U.S. $
Thermal Magnetic								
Fixed	5	4	11	9	14	11	**FG3015** ④	
Fixed	7	6	14	12	18	14	**FG3020** ④	
Fixed	9	7	18	14	23	18	**FG3025** ④	
Fixed	11	9	22	17	27	22	**FG3030** ④	
Fixed	13	10	25	20	32	25	**FG3035** ④	
Fixed	14	12	29	23	36	29	**FG3040** ④	
Fixed	16	13	32	26	41	32	**FG3045** ④	
Fixed	18	14	36	29	45	36	**FG3050** ④	
Fixed	22	17	43	35	54	43	**FG3060** ④	
Fixed	25	20	51	40	63	51	**FG3070** ④	
Fixed	29	23	58	46	72	58	**FG3080** ④	
Fixed	32	26	65	52	81	65	**FG3090** ④	
Fixed	36	29	72	58	90	72	**FG3100** ④	
Fixed	40	32	79	64	99	79	**FG3110** ④	
Fixed	45	36	90	72	113	90	**FG3125** ④	
Fixed	54	43	108	87	135	108	**FG3150** ④	
Fixed	63	51	126	101	158	126	**FG3175** ④	
Fixed	72	58	144	116	181	144	**FG3200** ④	
Fixed	81	65	162	130	203	162	**FG3225** ④	
350 – 700	63	51	126	101	158	126	**JG3175W** ⑤ **JG3175** ④	
350 – 700	72	58	144	116	181	144	**JG3200W** ⑤ **JG3200** ④	
350 – 700	81	65	162	130	203	162	**JG3225W** ⑤ **JG3225** ④	
350 – 700	90	72	181	144	226	181	**JG3250W** ⑤ **JG3250** ④	
500 – 1000	108	87	217	173	271	217	**KG3300W** ⑤ **KG3300** ④	
500 – 1000	126	101	253	202	316	253	**KG3350W** ⑤ **KG3350** ④	
1000 – 2000	144	116	289	231	361	289	**KG3400** ④	
Electronic								
500 – 2500	162	130	325	260	406	325	**LG3450** ④	
500 – 2500	181	144	361	289	451	361	**LG3500** ④	
500 – 2500	217	173	433	347	542	433	**LG3600** ④	
500 – 2500	253	202	505	404	632	505	**NG3700** ④	
500 – 2500	289	231	578	462	722	578	**NG3800** ④	
1250 – 5000	325	260	650	520	812	650	**NG3900** ④	
1250 – 5000	361	289	722	578	903	722	**NG31000** ④	
1250 – 5000	433	347	867	693	1083	867	**NG31200** ④	

① Breaker continuous current is based on 115% of the generator full load ampere rating.
② Based on 3-phase generators at 80% power factor.
③ FG, JG, KG include Thermal-Magnetic Trip Units, LG and NG include Electronic Trip Units.
④ Breaker includes line and load terminals.
⑤ Without terminals.

Note: The following catalog numbers have center tap studs for dual voltage applications: JG3070CT, JG3100CT, JG3125CT, KG3175CT, LG3300CTW.

Enclosures

Type 1 General Purpose

- Surface or flush mounting.
- 15 – 1200 ampere range.
- 600 Vac, 500 Vdc.

Type 1 enclosed breakers are designed for use in commercial buildings, apartment buildings and other areas where a general purpose enclosure is applicable. The breaker is front operable and is capable of being padlocked in either the ON or OFF position. Ratings through 1200 amperes are listed with Underwriters Laboratories as approved for service entrance application. Both surface and flush mounted enclosures are available.

Type 3R Rainproof Surface Mounting

- Interchangeable hubs (through 400 amperes).
- 15 – 1200 ampere range.
- 600 Vac, 500 Vdc.

This general purpose outdoor service center employs a circuit breaker inside a weatherproof sheet steel breaker enclosure to serve as a main disconnect and protective device for feeder circuits. Ratings through 1200 amperes are listed by Underwriters Laboratories as suitable for service entrance application.

Type 12 Dustproof Surface Mounting

- No knockouts or other openings.
- 15 – 1200 ampere range.
- 600 Vac, 500 Vdc.

The Type 12 enclosure is designed in line with specifications for special industry applications where unusually severe conditions involving oil, coolant, dust and other foreign materials exist in the operating atmosphere. The handle padlocks in the OFF position and the cover is interlocked with the handle mechanism to prevent opening the cover with the circuit breaker in the ON position. Ratings through 1200 amperes are listed by Underwriters Laboratories as suitable for service entrance application.

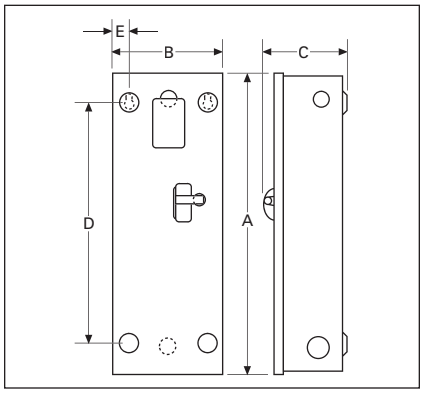

Figure 12-41. Type 1 Surface Mounted

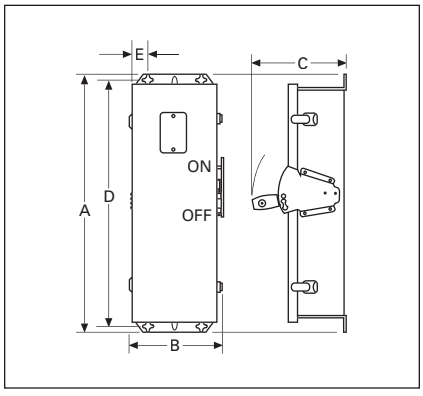

Figure 12-42. Type 3R Rainproof

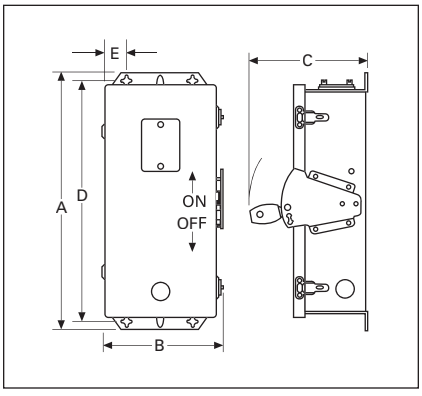

Figure 12-43. Type 12, 12K Dustproof

Table 12-320. Enclosure Selection Data

Breaker Frame Amperes	Enclosure Type Class	Dimensions A Inches	A mm	B Inches	B mm	C Inches	C mm	D Inches	D mm	E Inches	E mm	Approx. Weight Lbs. (kg)	Conduit Sizes, Inches	Catalog Number	Price U.S. $
FG 15 – 225	Type 1 Type 3R Type 12	23.25 25.66 25.66	591 652 652	8.41 8.84 8.84	214 225 226	6.28 9.31 9.31	160 237 238	18.75 24.28 24.28	476 617 618	1.20 1.70 1.70	31 43 43	15 (7) 19 (9) 18 (8)	.25, .50, .75, 1, 1.25, 1.50, 2, 2.50 .25, .50, .75, 1, 1.25, 1.50, 2, 2.50	**SFDN225** **RFDN225** **JFDN225**	
JG 175 – 250	Type 1 Type 3R Type 12	34.70 37.50 37.53	881 891 953	10.92 11.56 11.56	227 294 294	7.20 10.22 10.22	183 260 260	30.00 35.77 35.77	762 909 909	1.88 1.94 1.94	48 49 49	31 (14) 40 (18) 37 (17)	.25, .50, 2, 2.50, 3 .25, .50, 2, 2.50, 3	**SJDN250** **RJDN250** **JJDN250**	
KG 300 – 400	Type 1 Type 3R Type 12	38.81 41.69 41.69	986 997 997	11.06 11.75 11.75	281 298 298	10.94 14.06 14.06	278 357 357	34.00 39.90 39.90	869 1014 1015	2.28 1.97 1.97	58 50 50	53 (24) 60 (27) 53 (24)	.25, .50, .75, 1.50, 2, 2.50, 3, 3.50 .25, .50, .75, 2.50, 3, 3.50	**SKDN400** **RKDN400** **JKDN400**	
LG 450 – 600	Type 1 Type 3R Type 12	45.88 48.31 48.31	1165 1227 1227	14.31 14.91 14.91	364 379 379	12.38 15.50 15.50	314 394 394	46.56 46.56 46.56	1183 1183 1183	1.91 1.92 1.92	48 49 49	81 (37) 84 (38) 81 (37)	.25, .50, .75, 3, 3.50, 4 .25, .50, .75, 3, 3.50, 4	**SLDN600** **RLDN600** **JLDN600**	
NG 700 – 1200	Type 1 Type 3R Type 12	61.22 63.59 63.59	1555 1615 1615	21.44 22.00 22.00	545 559 559	15.41 17.63 17.63	391 448 448	61.84 61.84 61.84	1571 1571 1571	1.97 1.97 1.97	50 50 50	178 (81) 175 (79) 170 (77)	—	**SNDN1200** **RNDN1200** **JNDN1200**	

Discount Symbol **CB-2**

Options and Accessories

Table 12-321. Standard Terminals

Breaker Frame	Max. Amp Rating	AWG Wire Range	Metric Wire Range mm^2	Catalog Number	Price U.S. $
FG	100	14 – 1/0	2.5 – 50	**3T100FB** ①	
FG	150	4 – 4/0	25 – 95	**3TA225FD** ①	
JG	250	4 – 350 kcmil	25 – 185	**TA250KB**	
KG	350	250 – 500 kcmil	120 – 240	**TA350K**	
KG	400	3/0 – 250 kcmil (2)	95 – 120	**3TA400K** ①	
LG	600	250 – 500 kcmil (2)	120 – 240	**3TA603LDK**	
NG	700	1 – 500 kcmil (2)	50 – 300	**TA700NB1**	
NG	1000	3/0 – 400 kcmil (3)	95 – 185	**TA1000NB1**	
NG	1200	4/0 – 500 kcmil (4)	120 – 300	**TA1200NB1**	

① Package of 3 terminals.

Table 12-322. Neutral Kits, Insulated and Groundable

Max. Enclosure Rating (Amperes)	Main Lug Number Size Cu/Al	Ground Lug Size Cu/Al	Catalog Number	Price U.S. $
100	(1) 14 – 1/0	(1) 14 – 1/0	**INK100**	
250	(1) 6 – 350 kcmil	(1) 4 – 300 kcmil	**INK250**	
400	(1) 4 – 750 kcmil or (2) 1/0 – 250 kcmil	(1) 4 – 300 kcmil	**INK400**	
600	(2) 250 – 500 kcmil	(1) 4 – 300 kcmil	**INK600**	
1200	(3) 1/0 to 750 kcmil or (4) 1/0 to 750 kcmil	(1) 6 – 250 kcmil	**INK1200**	

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Internal Accessories

Table 12-323. Auxiliary Switch ②

Breaker Frame	1A-1B Catalog Number	Price U.S. $	2A-2B Catalog Number	Price U.S. $
FG	**A1X1PK**		**A2X1RPK**	
JG	**A1X2PK**		**A2X2PK**	
KG	**A1X3PK**		**A2X3PK**	
LG	**A1X4PK**		**A2X4PK**	
NG	**A1X5PK**		**A2X5PK**	

② Other accessories are available. Same as standard frame breakers.

Table 12-324. Shunt Trip ③

Breaker Frame	Rating	Catalog Number	Price U.S. $
FG	12 – 24 Vdc	**SNT1LP03K**	
JG	12 – 24 Vdc	**SNT2P04K**	
KG	12 – 24 Vdc	**SNT3P04K**	
LG	12 – 24 Vdc	**SNT4LP03K**	
NG	12 – 24 Vdc	**SNT5LP03K**	

③ Other accessories are available. Same as standard frame breakers.

Direct Current Circuit Breakers

Product Description

Eaton's Cutler-Hammer dc molded case circuit breakers are UL listed for use in general dc circuits and battery supply circuits of UPS systems providing continuous, reliable ac power to computer controlled applications such as financial transactions and telecommunications.

For standard interrupting capacity 250 dc molded case circuit breakers. Refer to **Table 12-129** on **Page 12-74**.

The Series C dc breakers listed below use the same internal and external accessories as the standard Series C breaker. NBDC and PBDC use the same internal and external accessories as standard NB and PB breakers.

Molded case circuit breakers for transportation application requiring 750 Vdc are available for certain amperages interrupting capacity at 750 Vdc. Breakers require 4 poles in series for 750 Vdc application. However, 750 volt is not a UL rating. For 750 Vdc application refer to Eaton for ordering information. Dimensions are the same as the standard thermal-magnetic equivalent.

Technical Data and Specifications

Interrupting Capacity Ratings

Table 12-325. UL 489 Interrupting Capacity Ratings

Circuit Breaker Type	Interrupting Capacity (Symmetrical kA)			
	Volts dc ①			
	125 ②	250 ③	600 ④	750 ⑤
HFDDC	42	42	35	42
HJDDC	42	42	35	—
HKDDC	42	42	35	—
HLDDC	42	42	35	—
HMDLDC	42	42	35	—
NBDC	42	50	50	—
PBDC	42	65	65	—

① dc ratings apply to substantially non-inductive circuits. 8 millisecond time constant.
② 1 pole in series.
③ 2 poles in series.
④ 3 poles in series.
⑤ 4 poles in series. 750 Vdc is not a UL listed voltage rating.

Wiring Diagrams

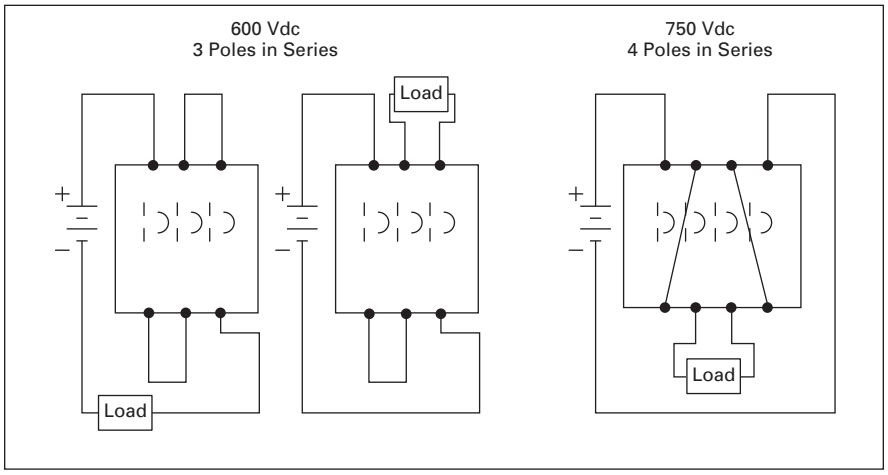

Figure 12-44. Series Connection Diagrams for dc Application

Note: Use rated cable per NEC. Connect to terminals as per breaker nameplate.

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Product Selection

Table 12-326. Type HFDDC DC Circuit Breakers

Maximum Continuous Ampere Rating at 40°C	Complete Circuit Breaker with Line and Load Terminals							
	1-Pole		2-Pole		3-Pole		4-Pole	
	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
3-Pole High Interrupting Capacity 35 kAIC at 600 Vdc								
15 20 25 30 35	HFDDC1015L HFDDC1020L HFDDC1025L HFDDC1030L HFDDC1035L		HFDDC2015L HFDDC2020L HFDDC2025L HFDDC2030L HFDDC2035L		HFDDC3015L HFDDC3020L HFDDC3025L HFDDC3030L HFDDC3035L		HFDDC4015L HFDDC4020L HFDDC4025L HFDDC4030L HFDDC4035L	
40 45 50 60	HFDDC1040L HFDDC1045L HFDDC1050L HFDDC1060L		HFDDC2040L HFDDC2045L HFDDC2050L HFDDC2060L		HFDDC3040L HFDDC3045L HFDDC3050L HFDDC3060L		HFDDC4040L HFDDC4045L HFDDC4050L HFDDC4060L	
70 80 90 100	HFDDC1070L HFDDC1080L HFDDC1090L HFDDC1100L		HFDDC2070L HFDDC2080L HFDDC2090L HFDDC2100L		HFDDC3070L HFDDC3080L HFDDC3090L HFDDC3100L		HFDDC4070L HFDDC4080L HFDDC4090L HFDDC4100L	
110 125 150	HFDDC1110L HFDDC1125L HFDDC1150L		HFDDC2110L HFDDC2125L HFDDC2150L		HFDDC3110L HFDDC3125L HFDDC3150L		HFDDC4110L HFDDC4125L HFDDC4150L	

Table 12-327. DC Circuit Breakers

Maximum Continuous Ampere Rating at 40°C	Circuit Breaker Frame Only ①		Thermal-Magnetic Trip Unit		Standard Terminals	
	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
3-Pole High Interrupting Capacity 35 kAIC at 600 Vdc						
70 90 100 125 150 175 200 225 250	HJDDC3250F		JT3070T JT3090T JT3100T JT3125T JT3150T JT3175T JT3200T JT3225T JT3250T		TA250KB TA250KB TA250KB TA250KB TA250KB TA250KB TA250KB TA250KB TA250KB	
100 125 150 175 200 225 250 300 350 400	HKDDC3400F		KT3100T KT3125T KT3150T KT3175T KT3200T KT3225T KT3250T KT3300T KT3350T KT3400T		TA300K TA300K TA300K TA300K TA300K TA300K TA350K TA350K TA350K 3TA400K	
300 350 400 450 500 600	HLDDC3600F		LT3300T LT3350T LT3400T LT3450T LT3500T LT3600T		TA602LD TA602LD TA602LD TA602LD TA602LD 3TA603LDK	

① Complete circuit breaker includes frame, trip unit and terminals.

Discount Symbol **CB-2**

Table 12-328. Type HMDLDC DC Circuit Breakers

Maximum Continuous Ampere Rating at 40°C	Circuit Breaker Frame Only ①		Thermal-Magnetic Trip Unit	
	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
3-Pole High Interrupting Capacity 35 kAIC at 600 Vdc				
300	**HMDLDC3800F**		**MT3300T**	
350			**MT3350T**	
400			**MT3400T**	
450			**MT3450T**	
500			**MT3500T**	
600			**MT3600T**	
700			**MT3700T**	
800			**MT3800T**	

① Complete circuit breaker includes frame, trip unit and terminals.

Table 12-329. Type NBDC DC Circuit Breakers

Maximum Continuous Ampere Rating at 40°C	Complete Circuit Breaker Factory Assembled without Terminals ②		Includes Magnetic Only Trip Unit Calibrated at 135%	Standard Terminals	
	Catalog Number	Price U.S. $		Catalog Number	Price U.S. $
3-Pole High Interrupting Capacity 50 kAIC at 600 Vdc					
700	**NBDC3700MW**		Included	**TA1000NB1**	
800	**NBDC3800MW**		Included	**TA1000NB1**	
900	**NBDC3900MW**		Included	**TA1000NB1**	
1000	**NBDC31000MW**		Included	**TA1000NB1**	
1200	**NBDC31200MW**		Included	**TA1200NB1**	

② Complete circuit breaker includes frame, trip unit and terminals.

Table 12-330. Type PBDC DC Circuit Breakers

Maximum Continuous Ampere Rating at 40°C	Complete Circuit Breaker Factory Assembled without Terminals ③		Includes Magnetic Only Trip Unit Calibrated at 135%	Standard Rear Connectors	
	Catalog Number	Price U.S. $		Catalog Number	Price U.S. $
3-Pole High Interrupting Capacity 65 kAIC at 600 Vdc					
1600	**PBDC31600W**		Included	**BA2000PB**	
2000	**PBDC32000W**		Included	**BA2000PB**	
2500	**PBDC32500W**		Included	**BA2500PB**	

③ Complete circuit breaker includes frame, trip unit and terminals.

E^2 Mining Service Breakers

Product Description

State-of-the-art E^2 Mining Service Breakers incorporate the rigid specifications and testing procedures developed by a focus group led by engineers from several large coal companies and Eaton's design engineers. Additionally, the performance of these breakers was proven and verified during hundreds of hours of field testing in harsh mine environments.

E^2 Mining Breakers are available in 600 Vac and l000Y/577 Vac. Interchangeable trip units can be used on either 600 or 1000 Vac frames.

The E^2 mining breaker family is designed especially for trailing cable application per MSHA 30 CFR 75. Field interchangeable electronic rms sensing trip units are available from 150 to 2000 amperes with instantaneous pickup settings conforming to the code of Federal Regulations 30 CFR 75.601-2. Electromechanical trip units are also available with a wide range of magnetic pickup ranges.

E^2 electronic trip units are the first to provide the mining industry with true rms sensing, made possible by the patented SuRE™ chip microprocessor in each electronic trip unit.

E^2 breakers are designed to be physically and electrically interchangeable with Classic Mining Service Breakers and supersede Series C Mining Service Breakers. **Table 12-331** outlines direct replacements.

Table 12-331. 600 Vac Mining Breaker Replacement Chart

Classic	Series C	E^2
FBM HFBM	FDBM FDM HFDM (Mag. Only)	E^2F
—	JDM	E^2J
KAM KAMH	KDM	E^2K
LAM LAMH LCM LCMH	LDM	E^2L
MAM MAMH MCM MCMH NBM NBMH NCM NCMH	—	E^2N ①
—	—	E^2R ②

① E^2N/E^2NM is physically different than the MAM/MCM/HMAM/HMCM/HLCLM see DS29-170MS.

② E^2R/E^2RM is a new frame physically different than the HPBM see DS29-170MS.

Table 12-332. 1000 Vac Mining Breaker Replacement Chart

Classic	Series C	E^2M
HFM	—	E^2FM
—	JDCM	E^2JM
HKAM	KDCM	E^2KM
HLAM HLCM	LDCM	E^2LM
HMAM HMCM	—	E^2MM
HNBM HNBMH HNCM HLCLM	—	E^2NM
HPBM	—	E^2RM ③

③ E^2R/E^2RM is a new frame physically different than the HPBM see DS29-170MS.

Table 12-333. Interrupting Capacity Rating

Circuit Breaker Type	Interrupting Capacity (Symmetrical kA)				
	Vac (50/60 Hz)				Vdc ⑤
	240	480	600	1000Y/577	250
E^2F	65	25	18	—	10
E^2J	65	35	18	—	10
E^2K	65	35	25	—	10
E^2L	65	35	25	—	22
E^2M	65	35	25	—	22
E^2N	65	50	25	—	—
E^2R	125	65	50	—	—
E^2FM	65	25	18	10	10
E^2JM	65	35	18	10	22
E^2KM	65	35	25	14	10
E^2LM	—	35	25	18	22
E^2MM	—	35	25	18	22
E^2NM ④⑤	—	50	25	25	—
E^2RM ④	—	65	50	25	—

④ Series rated for application with Eaton's Cutler-Hammer E^2NM and E^2RM Breakers.

⑤ Two poles in series. Breakers with electronic trip units are not dc rated.

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Eaton's Cutler-Hammer mining service circuit breakers provide short circuit protection as specified in the code of Federal Regulations 30 CFR 75.601-2. E^2 225/400 ampere K frame and 400/600 ampere L frame electronic trip units feature specifically designed instantaneous pickup settings to conform exactly with the code of Federal Regulations 30 CFR 75.601-2. Electromechanical trip units are also available with a wide range of magnetic pickup ranges.

Table 12-334 lists the conductor size maximum allowable circuit breaker instantaneous setting and the E^2 breaker that meets that setting.

Table 12-334. Trailing Cable Setting Per 30 CFR 75

Conductor Size	Maximum Breaker Instantaneous Setting	Maximum Ampere 75°C Insulated Conductor	E^2/E^2M Instantaneous Only	Setting
14	50	15	E^2K 150 A	A
12	75	20	E^2K 150 A	B
10	150	30	E^2K 150 A	C
8	200	50	E^2K 225 A	A
6	300	65	E^2K 225 A	B
4	500	85	E^2K 225 A/E2L 400 A	C/A
3	600	100	E^2K 225 A/E2L 400 A	D/B
2	800	115	E^2K 225 A/E2L 400 A	E/C
1	1000	130	E^2K 225 A/E2L 400 A	F/D
1/0	1250	150	E^2K 225 A/E2L 400 A	G/E
2/0	1500	175	E^2K 225 A/E2L 400 A	H/F
3/0	2000	200	E^2L 400 A	G
4/0	2500	230	E^2L 400 A	H
250	2500	255	E^2L 400 A	H
300	2500	285	E^2L 400 A	H
350	2500	310	E^2L 400 A	H
400	2500	335	E^2L 400 A	H
500	2500	380	E^2L 400 A	H

E^2F/E^2FM

Table 12-335. Interrupting Capacity Ratings

Circuit Breaker Type	Interrupting Capacity (Symmetrical Amperes)				
	Vac (50/60 Hz)				Vdc
	240	480	600	1000Y/577	250
E^2F	65,000	25,000	18,000	—	10,000
E^2FM	—	25,000	18,000	10,000	10,000

Table 12-336. Thermal-Magnetic Circuit Breakers Sealed Breakers with Non-Interchangeable Trip Unit — Include Line/Load Terminals

Maximum Continuous Ampere Rating at 40°C	600 Vac Maximum, 250 Vdc 25 kA at 480 Vac 3-Pole ①		1000Y/577 Vac Maximum, 250 Vdc 10 kA at 1000 Vac 3-Pole	
	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
15	**E2F3015**		—	
20	**E2F3020**		—	
25	**E2F3025**		—	
30	**E2F3030**		—	
35	**E2F3035**		—	
40	**E2F3040**		—	
45	**E2F3045**		—	
50	**E2F3050**		**E2FM3050**	
60	**E2F3060**		**E2FM3060**	
70	**E2F3070**		**E2FM3070**	
80	**E2F3080**		**E2FM3080**	
90	**E2F3090**		**E2FM3090**	
100	**E2F3100**		**E2FM3100**	
125	**E2F3125**		**E2FM3125**	
150	**E2F3150**		**E2FM3150**	

① For 2-pole application use outer poles.

Table 12-337. Magnetic Only Circuit Breakers Sealed Breakers with Non-Interchangeable Trip Unit — Include Line/Load Terminals

Maximum Continuous Ampere Rating at 40°C	Magnetic Trip Range	600 Vac Maximum, 250 Vdc 25 kA at 480 Vac 3-Pole		1000Y/577 Vac Maximum, 250 Vdc 10 kA at 1000 Vac 3-Pole	
		Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
3	9 – 30	**E2F003AM**		—	
7	21 – 70	**E2F007CM**		—	
15	45 – 150	**E2F015EM**		—	
30	90 – 300	**E2F030HM**		—	
30	50 – 150	**E2F030EM**		—	
50	150 – 500	**E2F050KM**		**E2FM050KM**	
50	66 – 190	**E2F050YM**		**E2FM050YM**	
70	210 – 700	**E2F070MM**		**E2FM070MM**	
100	150 – 500	**E2F100KM**		**E2FM100KM**	
100	300 – 1000	**E2F100RM**		**E2FM100RM**	
150	450 – 1500	**E2F150TM**		**E2FM150TM**	
150	750 – 2500	**E2F150UM**		**E2FM150UM**	

Further Information
Dimensions ..... **DS 29-170MS**
Discount Symbol **CB-2**

E^2J/E^2JM

Table 12-338. Interrupting Capacity Ratings

Circuit Breaker Type	Interrupting Capacity (Symmetrical Amperes)				
	Vac (50/60 Hz)				Vdc
	240	480	600	1000Y/577	250
E^2J	65,000	35,000	18,000	—	10,000
E^2JM	—	35,000	18,000	10,000	10,000

Table 12-339. Circuit Breakers with Interchangeable Thermal-Magnetic Trip Unit

Maximum Continuous Ampere Rating at 40°C	Magnetic Trip Range	600 Vac Maximum, 250 Vdc 35 kA at 480 Vac 3-Pole				1000Y/577 Vac Maximum, 250 Vdc 10 kA at 1000 Vac 3-Pole					
		Complete Breaker		Frame Only		Complete Breaker		Frame Only		Trip Unit Only	
		Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
70	300 – 650	**E2J3070W**		**E2J3250F**		**E2JM3070W**		**E2JM3250F**		**E2J3070T**	
90	450 – 900	**E2J3090W**		—		**E2JM3090W**		—		**E2J3090T**	
100	500 – 1000	**E2J3100W**		—		**E2JM3100W**		—		**E2J3100T**	
125	625 – 1250	**E2J3125W**		—		**E2JM3125W**		—		**E2J3125T**	
150	750 – 1500	**E2J3150W**		—		**E2JM3150W**		—		**E2J3150T**	
175	875 – 1750	**E2J3175W**		—		**E2JM3175W**		—		**E2J3175T**	
200	1000 – 2000	**E2J3200W**		—		**E2JM3200W**		—		**E2J3200T**	
225	300 – 650	**E2J3225AW**		—		**E2JM3225AW**		—		**E2J3225TA**	
225	500 – 1000	**E2J3225DW**		—		**E2JM3225DW**		—		**E2J3225TD**	
225	1125 – 2250	**E2J3225W**		—		**E2JM3225W**		—		**E2J3225T**	
250	1250 – 2500	**E2J3250W**		—		**E2JM3250W**		—		**E2J3250T**	

Table 12-340. Circuit Breakers with Interchangeable Magnetic Only Trip Unit

Maximum Continuous Ampere Rating at 40°C	Magnetic Trip Range	600 Vac Maximum, 250 Vdc 25 kA at 480 Vac 3-Pole				1000Y/577 Vac Maximum, 250 Vdc 10 kA at 1000 Vac 3-Pole					
		Complete Breaker		Frame Only		Complete Breaker		Frame Only		Trip Unit Only	
		Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
250	300 – 650	**E2J3250MAW**		**E2J3250F**		**E2JM3250MAW**		**E2JM3250F**		**E2J3250TMA**	
250	450 – 900	**E2J3250MCW**		—		**E2JM250MCW**		—		**E2J3250TMC**	
250	500 – 1000	**E2J3250MDW**		—		**E2JM3250MDW**		—		**E2J3250TMD**	
250	625 – 1250	**E2J3250MFW**		—		**E2JM3250MFW**		—		**E2J3250TMF**	
250	750 – 1500	**E2J3250MGW**		—		**E2JM3250MGW**		—		**E2J3250TMG**	
250	875 – 1750	**E2J3250MJW**		—		**E2JM3250MJW**		—		**E2J3250TMJ**	
250	1000 – 2000	**E2J3250MKW**		—		**E2JM3250MKW**		—		**E2J3250TMK**	
250	1125 – 2250	**E2J3250MLW**		—		**E2JM3250MLW**		—		**E2J3250TML**	
250	1250 – 2500	**E2J3250MW**		—		**E2JM3250MW**		—		**E2J3250TM**	

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Further Information
Dimensions . . . . . **DS 29-170MS**
Discount Symbol **CB-2**

E²K/E²KM

Table 12-341. Interrupting Capacity Ratings

Circuit Breaker Type	Interrupting Capacity (Symmetrical Amperes)				
	Vac (50/60 Hz)				Vdc
	240	480	600	1000Y/577	250 ①
E²K	65,000	35,000	25,000	—	10,000
E²KM	—	35,000	25,000	14,000	10,000

① dc rating applies to breakers with thermal-magnetic trip unit, breakers with electronic trip unit are not dc rated.

Table 12-342. Circuit Breakers with Interchangeable Thermal-Magnetic Trip Unit

Maximum Continuous Ampere Rating at 40°C	Magnetic Trip Range	600 Vac Maximum, 250 Vdc 35 kA at 480 Vac 3-Pole				1000Y/577 Vac Maximum, 250 Vdc 14 kA at 1000 Vac 3-Pole					
		Complete Breaker		Frame Only		Complete Breaker		Frame Only		Trip Unit Only	
		Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
100	500 – 1000	E2K3100W		E2K3400F		E2KM3100W		E2KM3400F		E2K3100T	
125	625 – 1250	E2K3125W		—		E2KM3125W		—		E2K3125T	
150	750 – 1500	E2K3150W		—		E2KM3150W		—		E2K3150T	
175	875 – 1750	E2K3175W		—		E2KM3175W		—		E2K3175T	
200	1000 – 2000	E2K3200W		—		E2KM3200W		—		E2K3200T	
225	300 – 650	E2K3225AW		—		E2KM3225AW		—		E2K3225TA	
225	500 – 1000	E2K3225DW		—		E2KM3225DW		—		E2K3225TD	
225	1125 – 2250	E2K3225W		—		E2KM3225W		—		E2K3225T	
250	1250 – 2500	E2K3250W		—		E2KM3250W		—		E2K3250T	
300	1500 – 3000	E2K3300W		—		E2KM3300W		—		E2K3300T	
350	1750 – 3500	E2K3500W		—		E2KM3350W		—		E2K3500T	
400	2000 – 4000	E2K3400W		—		E2KM3400W		—		E2K3400T	

Table 12-343. Circuit Breakers with Interchangeable Magnetic Only Trip Unit

Maximum Continuous Ampere Rating at 40°C	Magnetic Trip Range	600 Vac Maximum, 250 Vdc 35 kA at 480 Vac 3-Pole				1000Y/577 Vac Maximum, 250 Vdc 14 kA at 1000 Vac 3-Pole					
		Complete Breaker		Frame Only		Complete Breaker		Frame Only		Trip Unit Only	
		Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
400	300 – 650	E2K3400MAW		E2K3400F		E2KM3250MAW		E2KM3400F		E2K3400TMA	
400	500 – 1000	E2K3400MDW		—		E2KM3400MDW		—		E2K3400TMD	
400	625 – 1250	E2K3400MFW		—		E2KM3400MFW		—		E2K3400TMF	
400	750 – 1500	E2K3400MGW		—		E2KM3400MGW		—		E2K3400TMG	
400	875 – 1750	E2K3400MJW		—		E2KM3400MJW		—		E2K3400TMJ	
400	1000 – 2000	E2K3400MKW		—		E2KM3400MKW		—		E2K3400TMK	
400	1125 – 2250	E2K3400MLW		—		E2KM3400MLW		—		E2K3400TML	
400	1250 – 2500	E2K3400MWW		—		E2KM3400MWW		—		E2K3400TMW	
400	1500 – 3000	E2K3400MNW		—		E2KM3400MNW		—		E2K3400TMN	
400	1750 – 3500	E2K3400MRW		—		E2KM3400MRW		—		E2K3400TMR	
400	2000 – 4000	E2K3400MW		—		E2KM3400MW		—		E2K3400TM	

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Discount Symbol **CB-2**

Table 12-344. Circuit Breakers with Interchangeable Electronic Trip Unit, Long/Instantaneous (Includes Rating Plug)

Maximum Continuous Ampere Rating at 40°C	Magnetic Trip Range	600 Vac Maximum 35 kA at 480 Vac 3-Pole				1000Y/577 Vac Maximum 14 kA at 1000 Vac 3-Pole					
		Complete Breaker		Frame Only		Complete Breaker		Frame Only		Trip Unit Only	
		Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
100	50 – 800	E2KE3100W		E2K3400F		E2KEM3100W		E2KM3400F		KEM3100T	
125	50 – 800	E2KE3125W		—		E2KEM3125W		—		KEM3125T	
150	50 – 800	E2KE3150W		—		E2KEM3150W		—		KEM3150T	
200	200 – 1500	E2KE3200W		—		E2KEM3200W		—		KEM3200T	
225	200 – 1500	E2KE3225W		—		E2KEM3225W		—		KEM3225T	
225	500 – 2500	E2KE32252W		—		E2KEM32252W		—		KEM3225T2	
400	200 – 1500	E2KE3400W		—		E2KEM3400W		—		KEM3400T	
400	500 – 2500	E2KE34002W		—		E2KEM34002W		—		KEM3400T2	

Table 12-345. Circuit Breakers with Interchangeable Electronic Trip Unit, Instantaneous Only (Includes Rating Plug)

Maximum Continuous Ampere Rating at 40°C	Magnetic Trip Range	600 Vac Maximum 35 kA at 480 Vac 3-Pole				1000Y/577 Vac Maximum 14 kA at 1000 Vac 3-Pole					
		Complete Breaker		Frame Only		Complete Breaker		Frame Only		Trip Unit Only	
		Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
150	50 – 800	E2KE3150MW		E2K3400F		E2KEM3150MW		E2KM3400F		KEM3150TM	
225	200 – 1500	E2KE3225MW		—		E2KEM3225MW		—		KEM3225TM	
225	500 – 2500	E2KE3225M2W		—		E2KEM3225M2W		—		KEM3225TM2	
400	200 – 1500	E2KE3400MW		—		E2KEM3400MW		—		KEM3400TM	
400	500 – 2500	E2KE3400M2W		—		E2KEM3400M2W		—		KEM3400TM2	

Further Information
Dimensions . . . . . **DS 29-170MS**
Discount Symbol **CB-2**

E2L/E2LM

Table 12-346. Interrupting Capacity Ratings

Circuit Breaker Type	Interrupting Capacity (Symmetrical Amperes)				
	Volts ac (50/60 Hz)				Volts dc
	240	480	600	1000Y/577	250 ①
E2L	65,000	35,000	25,000	—	22,000
E2LM	—	35,000	25,000	14,000	22,000

① dc rating applies to breakers with thermal-magnetic trip unit, breakers with electronic trip unit are not dc rated.

Table 12-347. Circuit Breakers with Interchangeable Thermal-Magnetic Trip Unit

Maximum Continuous Ampere Rating at 40°C	Magnetic Trip Range	600 Vac Maximum, 250 Vdc 35 kA at 480 Vac, 3-Pole				1000Y/577 Vac Maximum, 250 Vdc 18 kA at 1000 Vac, 3-Pole					
		Complete Breaker		Frame Only		Complete Breaker		Frame Only		Trip Unit Only	
		Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
300	1500 – 3000	E2L3300W		E2L3600F		E2LM3300W		E2LM3600F		E2L3300T	
350	1750 – 3500	E2L3550W		—		E2LM3500W		—		E2L3500T	
400	2000 – 4000	E2L3400W		—		E2LM3400W		—		E2L3400T	
450	2250 – 4500	E2L3450W		—		E2LM3450W		—		E2L3450T	
500	2500 – 5000	E2L3500W		—		E2LM3500W		—		E2L3500T	
600	3000 – 6000	E2L3600W		—		E2LM3600W		—		E2L3600T	
600	1125 – 2250	—		—		—		—		E2L3600TL ②	

② 600 Ampere Thermal 1125 – 2250 T.A.

Table 12-348. Circuit Breakers with Interchangeable Magnetic Only Trip Unit

Maximum Continuous Ampere Rating at 40°C	Magnetic Trip Range	600 Vac Maximum, 250 Vdc 35 kA at 480 Vac, 3-Pole				1000Y/577 Vac Maximum, 250 Vdc 18 kA at 1000 Vac, 3-Pole					
		Complete Breaker		Frame Only		Complete Breaker		Frame Only		Trip Unit Only	
		Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
600	1125 – 2250	E2L3600MLW		E2L3600F		E2LM3600MLW		E2LM3600F		E2L3600TML	
600	1500 – 3000	E2L3600MNW		—		E2LM3600MNW		—		E2L3600TMN	
600	1750 – 3500	E2L3600MRW		—		E2LM3600MRW		—		E2L3600TMR	
600	2000 – 4000	E2L3600MXW		—		E2LM3600MXW		—		E2L3600TMX	
600	2250 – 4500	E2L3600MYW		—		E2LM3600MYW		—		E2L3600TMY	
600	2500 – 5000	E2L3600MPW		—		E2LM3600MPW		—		E2L3600TMP	
600	3000 – 6000	E2L3600MW		—		E2LM3600MW		—		E2L3600TM	

Table 12-349. Circuit Breakers with Interchangeable Electronic Trip Unit, Long/Instantaneous (Includes Rating Plug)

Maximum Continuous Ampere Rating at 40°C	Magnetic Trip Range	600 Vac Maximum 35 kA at 480 Vac, 3-Pole				1000Y/577 Vac Maximum 18 kA at 1000 Vac, 3-Pole					
		Complete Breaker		Frame Only		Complete Breaker		Frame Only		Trip Unit Only	
		Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
300	500 – 2500	E2LE3300W		E2L3600F		E2LEM3300W		E2LM3600F		LEM3300T	
350	500 – 2500	E2LE3350W		—		E2LEM3350W		—		LEM3350T	
400	500 – 2500	E2LE3400W		—		E2LEM3400W		—		LEM3400T	
400	1000 – 4000	E2LE34002W		—		E2LEM34002W		—		LEM3400T2	
600	500 – 2500	E2LE3600W		—		E2LEM3600W		—		LEM3600T	
600	2500 – 5000	E2LE36002W		—		E2LEM36002W		—		LEM3600T2	

Table 12-350. Circuit Breakers with Interchangeable Electronic Trip Unit, Instantaneous Only (Includes Rating Plug)

Maximum Continuous Ampere Rating at 40°C	Magnetic Trip Range	600 Vac Maximum 35 kA at 480 Vac, 3-Pole				1000Y/577 Vac Maximum 18 kA at 1000 Vac, 3-Pole					
		Complete Breaker		Frame Only		Complete Breaker		Frame Only		Trip Unit Only	
		Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
400	500 – 2500	E2LE3400MW		E2L3600F		E2LEM3400MW		E2LM3600F		LEM3400TM	
400	1000 – 4000	E2LE3400M2W		—		E2LEM3400M2W		—		LEM3400TM2	
600	500 – 2500	E2LE3600MW		—		E2LEM3600MW		—		LEM3600TM	
600	1000 – 4000	E2LE3600M2W		—		E2LEM3600M2W		—		1483D53G50	

Further Information
Dimensions..... **DS 29-170MS**
Discount Symbol..... **CB-2**

E^2M/E^2MM

Table 12-351. Interrupting Capacity Ratings

Circuit Breaker Type	Interrupting Capacity (Symmetrical Amperes)				
	Volts ac (50/60 Hz)				Volts dc
	240	480	600	1000Y/577	250
E^2M	65,000	35,000	25,000	—	22,000
E^2MM	—	35,000	25,000	18,000	22,000

Table 12-352. Circuit Breaker with Interchangeable Thermal-Magnetic Trip Unit

Maximum Continuous Ampere Rating	Magnetic Trip Range	600 Vac Maximum				1000 Vac Maximum					
		Complete Breaker		Frame Only		Complete Breaker		Frame Only		Trip Unit Only	
		Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
600	1500 – 3000	E2M3600W		E2M3800F		E2MM3600W		E2MM3800F		E2M3600TN	
800	2000 – 4000	E2M3800W		E2M3800F		E2MM3800W		E2MM3800F		E2M3800TX	

Table 12-353. Circuit Breaker with Interchangeable Magnetic Only Trip Unit

Maximum Continuous Ampere Rating	Magnetic Trip Range	600 Vac Maximum				1000 Vac Maximum					
		Complete Breaker		Frame Only		Complete Breaker		Frame Only		Trip Unit Only	
		Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
800	1500 – 3000	E2M3800MNW		E2M3800F		E2MM3800MNW		E2MM3800F		E2M3800TMN	
800	2000 – 4000	E2M3800MXW		E2M3800F		E2MM3800MXW		E2MM3800F		E2M3800TMX	
800	2500 – 5000	E2M3800MPW		E2M3800F		E2MM3800MPW		E2MM3800F		E2M3800TMP	
800	3000 – 6000	E2M3800MWW		E2M3800F		E2MM3800MWW		E2MM3800F		E2M3800TMW	

Table 12-354. Circuit Breaker with Interchangeable Electronic Trip Unit, Long/Instantaneous

Maximum Continuous Ampere Rating	Magnetic Trip Range	600 Vac Maximum				1000 Vac Maximum					
		Complete Breaker		Frame Only		Complete Breaker		Frame Only		Trip Unit Only	
		Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
800	500 – 2500	E2ME3800W		E2M3800F		E2MEM3800W		E2MM3800F		MEM3800T	
800	1000 – 4000	E2ME38002W		E2M3800F		E2MEM38002W		E2MM3800F		MEM3800T2	

Table 12-355. Circuit Breaker with Interchangeable Electronic Trip Unit, Instantaneous Only

Maximum Continuous Ampere Rating	Magnetic Trip Range	600 Vac Maximum				1000 Vac Maximum					
		Complete Breaker		Frame Only		Complete Breaker		Frame Only		Trip Unit Only	
		Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
800	500 – 2500	E2ME3800MW		E2M3800F		E2MEM3800MW		E2MM3800F		MEM3800TM	
800	1000 – 4000	E2ME3800M2W		E2M3800F		E2MEM3800M2W		E2MM3800F		MEM3800TM2	

Further Information
Dimensions . . . . . **DS 29-170MS**
Discount Symbol **CB-2**

E2N2MM

Table 12-356. Interrupting Capacity Rating

Circuit Breaker Type	Interrupting Capacity (Symmetrical Amperes)			
	Volts ac (50/60 Hz)			
	240	480	600	1000Y/577
E2N	65,000	50,000	25,000	—
E2NM	—	50,000	25,000	25,000

Note: The E2NM is series rated with E2KM and E2LM for application where 25 kAIC is required at 1000Y/577 Vac.

Table 12-357. Circuit Breakers with Electronic Trip Unit, Long/Instantaneous (Includes Rating Plug)

Maximum Continuous Ampere Rating at 40°C	Magnetic Trip Range	600 Vac Maximum 50 kA at 480 Vac 3-Pole Frame		1000Y/577 Vac Maximum 25 kA at 1000 Vac 3-Pole Frame	
		Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
400	500 – 2500	E2N3400W		E2NM3400W	
500	500 – 2500	E2N3500W		E2NM3500W	
600	500 – 2500	E2N3600W		E2NM3600W	
700	500 – 2500	E2N3700W		E2NM3700W	
800	500 – 2500	E2N3800W		E2NM3800W	
900	1250 – 5000	E2N3900W		E2NM3900W	
1000	1250 – 5000	E2N310W		E2NM310W	
1200	1250 – 5000	E2N312W		E2NM312W	

Table 12-358. Circuit Breakers with Electronic Trip Unit, Instantaneous Only (Includes Rating Plug)

Maximum Continuous Ampere Rating at 40°C	Magnetic Trip Range	600 Vac Maximum 50 kA at 480 Vac 3-Pole Frame		1000Y/577 Vac Maximum 25 kA at 1000 Vac 3-Pole Frame	
		Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
800	500 – 2500	E2N3800MW		E2NM3800MW	
1200	1250 – 5000	E2N312MW		E2NM312MW	

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Further Information
Dimensions ..... **DS 29-170MS**
Discount Symbol **CB-2**

E^2R/E^2RM

Table 12-359. Interrupting Capacity Ratings

Circuit Breaker Type	Interrupting Capacity (Symmetrical Amperes)			
	Volts ac (50/60 Hz)			
	240	480	600	1000Y/577
E^2R	125,000	65,000	50,000	—
E^2RM	—	65,000	50,000	25,000

Table 12-360. Circuit Breakers with Electronic Trip Unit, Long/Instantaneous (Does Not Include Rating Plugs) ①

Maximum Continuous Ampere Rating at 40°C	Magnetic Trip Range	600 Vac Maximum 50 kA at 480 Vac 3-Pole Frame		1000Y/577 Vac Maximum 25 kA at 1000 Vac 3-Pole Frame	
		Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
LS					
1600	2 – 8 x I_n	**E2R316T33W**		**E2RM316T33W**	
2000	2 – 8 x I_n	**E2R320T33W**		**E2RM320T33W**	
LSI					
1600	2 – 8 x I_n	**E2R316T32W**		**E2RM316T32W**	
2000	2 – 8 x I_n	**E2R320T32W**		**E2RM320T32W**	

① Rating Plugs: 1600 amperes **16RES16T**; 2000 amperes **20RES20T.**

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Further Information
Dimensions ..... **DS 29-170MS**
Discount Symbol **CB-2**

Accessories

Table 12-361. Line and Load Terminals

Breaker Type	Maximum Breaker Amperes	Wire Type	AWG Wire Range (No. Conductors)	Catalog Number	Price U.S. $
E^2F/E^2FM	100 150 250	Cu/Al Cu	#14-1/0 (1) #4-4/0 (1)	**3T100FB Package of 3** **3T150FB Package of 3**	
E^2J/E^2JM	250	Cu	#4-350 (1)	**T250KB**	
E^2K/E^2KM	225 350 400	Cu Cu Cu	#3-350 (1) 250-500 (1) 2/0-250 (2)	**T300K** **T350K** **3T400K (3-Pole Kit)**	
E^2L/E^2LM	400 600	Cu/Al Cu	4/0-600 (1) 250-350 (2)	**3TA401LDK (3-Pole Kit)** **T602LD**	
E^2M/E^2MM	600 600 800 std. 800 800	Cu Cu/Al Cu/Al Cu/Al Cu	(2) 2/0 – 500 kcmil (2) 1 – 500 kcmil (3) 3/0 – 400 kcmil (2) 500 – 750 kcmil (3) 3/0 – 300 kcmil	**T600MA1** **TA700MA1** **TA800MA2** **TA801MA** **T800MA1**	
E^2N/E^2NM	700 1000 1200 1600 2000	Cu Cu Cu Cu/Al Cu/Al	2/0-500 (2) 3/0-500 (3) 3/0-400 (4) 500-1000 (4) 2-600 (6)	**T700NB1** **T1000NB1** **T1200NB3** **TA1600RD** **TA2000RD**	

Table 12-362. End Cap Terminals — for Use with Ring Type Terminals

Breaker Type	Maximum Breaker Amperes	Catalog Number	Price U.S. $
E^2F/E^2FM	150	**KPEK1**	
E^2J/E^2JM	250	**KPEK2**	
E^2K/E^2KM	400	**KPEK3**	
E^2L/E^2LM	600	**KPEK4**	

External Accessories

Table 12-363. Padlockable Handle Lock Hasp

Breaker Type	Catalog Number	Price U.S. $
E^2F/E^2FM	**PLK1**	
E^2J/E^2JM	**PLK3**	
E^2K/E^2KM	**PLK3**	
E^2L/E^2LM	**HLK4**	
E^2M/E^2MM	**HLK4**	
E^2N/E^2NM	**PLK5**	
E^2R/E^2RM	**HLK6**	

Discount Symbol **CB-2**

Internal Accessories

Table 12-364. Undervoltage Release ①

Breaker Type	UVR Type	Voltage Rating	Mounting Location	Catalog Number	Price U.S. $
E2F/E2FM	Handle Reset	208 – 240 Vac	Left Pole	**UVH1LP11K (Thermal/Magnetic Only)** ②	
		110 – 127 Vdc	Left Pole	**UVH1LP26K (Thermal/Magnetic Only)** ②	
		110 – 127 Vac	Left Pole	**MUVH1LP08K (Magnetic Only)** ②	
		208 – 240 Vac	Left Pole	**MUVH1LP11K (Magnetic Only)** ②	
		110 – 127 Vdc	Left Pole	**MUVH1LP26K (Magnetic Only)** ②	
E2J/E2JM	Handle Reset	110 – 127 Vac	Left Pole	**UVH2LP08K** ②	
		208 – 240 Vac	Left Pole	**UVH2LP11K** ②	
		110 – 125 Vdc	Left Pole	**UVH2LP26K** ②	
E2K/E2KM	120 Volt Handle Reset with LED	120 Vac	Left Pole	**UVM3LP08K** ②③	
	120 Volt Handle Reset with LED	120 Vac	Left Pole	**UVM3LP08KT** ②④	
	Handle Reset	110 – 127 Vac	Left Pole	**UVH3LP08K** ②	
	Handle Reset	208 – 240 Vac	Left Pole	**UVH3LP11K** ②	
	Handle Reset	110 – 125 Vdc	Left Pole	**UVH3LP26K** ②	
E2L/E2LM/ E2M/E2MM	120 Volt Handle Reset with LED	120 Vac	Left Pole	**UVM4LP08K** ②③	
	120 Volt Handle Reset with LED	120 Vac	Left Pole	**UVM4LP08KT** ②④	
	Handle Reset	110 – 127 Vac	Left Pole	**UVH4LP08K** ②	
	Handle Reset	208 – 240 Vac	Left Pole	**UVH4LP11K** ②	
	Handle Reset	110 – 125 Vdc	Left Pole	**UVH4LP26K** ②	
E2N/E2NM	120 Volt Handle Reset with LED	120 Vac	Left Pole	**UVM5LP08K** ③	
	120 Volt Handle Reset with LED	120 Vac	Left Pole	**UVM5LT08K** ④	
	Handle Reset	110 – 127 Vac	Left Pole	**UVH5LP08K** ②	
	Handle Reset	208 – 240 Vac	Left Pole	**UVH5LP11K** ②	
	Handle Reset	110 – 125 Vdc	Left Pole	**UVH5LP26K** ②	
E2R/E2RM	120 Volt Handle Reset with LED	120 Vac	Right Pole	**UVM6RP08K** ③⑤	
	Handle Reset	110 – 127 Vac	Right Pole	**UVH6RP08K** ⑤	
	Handle Reset	208 – 240 Vac	Right Pole	**UVH6RP11K** ⑤	
	Handle Reset	110 – 125 Vdc	Right Pole	**UVH6RP26K** ⑤	

① Contact Eaton for internal accessory voltage ratings not listed.
② LH (RH also available).
③ Pigtail leads.
④ Terminal blocks.
⑤ RH only.

Table 12-365. Shunt Trip ⑥

Breaker Type	Voltage Rating	Mounting Location	Catalog Number	Price U.S. $
E2F/E2FM	48 – 127 Vac or 48 – 60 Vdc	Left Pole	**SNT1LP08K** ⑦	
	208 – 230 Vac or 110 – 127 Vdc	Left Pole	**SNT1LP12K** ⑦	
E2J/E2JM	110 – 240 Vac or 110 – 125 Vdc	Left Pole	**SNT2P11K** ⑧	
E2K/E2KM	110 – 240 Vac or 110 – 125 Vdc	Left Pole	**SNT3P11K** ⑧	
E2L/E2LM/ E2M/E2MM	48 – 60 Vac	Left Pole	**SNT4LP05K** ⑦	
	48 – 60 Vdc	Left Pole	**SNT4LP23K** ⑦	
	110 – 240 Vac	Left Pole	**SNT4LP11K** ⑦	
	110 – 125 Vdc	Left Pole	**SNT4LP26K** ⑦	
E2N/E2NM	110 – 240 Vac	Left Pole	**SNT5LP11K** ⑦	
	110 – 125 Vdc	Left Pole	**SNT5LP26K** ⑦	
E2R/E2RM	110 – 240 Vac	Right Pole	**SNT6P11K** ⑨	
	110 – 125 Vdc	Right Pole	**SNT6P26K** ⑨	

⑥ Contact Eaton for internal accessory voltage ratings not listed.
⑦ LH (RH also available).
⑧ LH or RH.
⑨ RH only.

Table 12-366. Auxiliary Switch Electrical Rating Data

Maximum Voltage	Frequency	Maximum Current Amperes
600 125 250	50/60 Hz dc dc	6.0 0.5 (non-inductive load) 0.25 (non-inductive load)

Table 12-367. Auxiliary Switch

Breaker Type	Number of Sets of Contacts (1A and 1B)	Mounting Location	Catalog Number	Price U.S. $
E^2F/E^2FM	1 2 2	Left or Right Left Right	**A1X1PK** **A2X1LPK** **A2X1RPK**	
E^2J/E^2JM	1 2	Left or Right Left or Right	**A1X2PK** **A2X2PK**	
E^2K/E^2KM	1 2	Left or Right Left or Right	**A1X3PK** **A2X3PK**	
E^2L/E^2LM/ E^2M/E^2MM	1 2 3	Left or Right Left or Right Left or Right	**A1X4PK** **A2X4PK** **A3X4PK**	
E^2N/E^2NM	1 2 3 3	Left or Right Left or Right Left Right	**A1X5PK** **A2X5PK** **A3X5LPK** **A3X5RPK**	
E^2R/E^2RM	2 4	Right Right	**A2X6RPK** **A4X6RPK**	

Table 12-368. Alarm (Signal/Lockout Switch) Electrical Rating Data

Maximum Voltage	Frequency	Maximum Current Amperes
600 125 250	50/60 Hz dc dc	6.0 0.5 (non-inductive load) 0.25 (non-inductive load)

Table 12-369. Alarm (Signal/Lockout Switch)

Breaker Type	Number of Sets of Contacts (Make and Break)	Mounting Location	Catalog Number	Price U.S. $
E^2F/E^2FM	1 2	Left/Right Left/Right	**A1L1LPK/A1L1RPK** **A2L1LPK/A2L1RPK**	
E^2J/E^2JM	1	Left/Right	**A1L2LPK/A1L2RPK**	
E^2K/E^2KM	1 2	Left/Right Left/Right	**A1L3LPK/A1L3RPK** **A2L3LPK/A2L3RPK**	
E^2L/E^2LM/ E^2M/E^2MM	1 2	Left/Right Left/Right	**A1L4LPK/A1L4RPK** **A2L4LPK/A2L4RPK**	
E^2N/E^2NM	1 2	Left/Right Left/Right	**A1L5LPK/A1L5RPK** **A2L5LPK/A2L5RPK**	
E^2R/E^2RM	1 2	Right Right	**A1L6RPK** **A2L6RPK**	

Type GFR

GFR Relay

Product Description

Eaton's Cutler-Hammer GFR ground fault relays, current sensors, test panels and accessory devices are UL listed by Underwriters Laboratories in accordance with their standard for Ground Fault Sensing and Relaying Equipment, UL 1053, under File E48381.

Note: Suitable for either surface or semi-flush mounting.

A Type GFR ground fault protection system, when properly installed on a grounded electrical system, will sense phase-to-ground fault currents. When the level of fault current is in excess of the pre-selected current pickup and time delay settings, the GFR relay will initiate a trip action of a disconnect device, which will open the faulted circuit and clear the fault.

The GFR devices are UL Class I devices designed to protect electrical equipment against extensive damage from arcing ground faults.

A basic Type GFR ground fault protection system consists of a ground fault relay, a ground fault current sensor and a disconnect device equipped with a shunt trip device. This disconnect device can be a molded case circuit breaker, a power circuit breaker, a bolted pressure switch or other fusible disconnect device, suitable for application with UL Class I Ground Fault Sensing and Relaying equipment.

Note: Relays are also listed with CSA under their file number 43357.

Typical Current Sensor

Sensor

- 600 volt, 50/60 Hz maximum system voltage.

Electrical Ratings

GFR Relay

- Ground fault detection ranges:
  - 1 to 12, 5 to 60 or 100 to 1200 amperes
- Output contacts:
  - 240 volt, 50/60 Hz: 3.0 amperes
  - 120 volt, 50/60 Hz: 6.0 amperes
  - 28 Vdc: 3.0 amperes
  - 125 Vdc: .5 amperes
- Control power requirements:
  - 120 volt, 50/60 Hz or 125 Vdc (optional)

Options and Accessories

Options

Additional optional equipment can be added to the protection system to meet the requirements of the specifying engineer, including:

- Ground fault test panel.
- Ground fault warning indicator relay.
- Ground fault indicating ammeter.

GFR relays are available with zone selective interlocking circuitry to interlock several relays within the same system. This allows the relay which detects a ground fault to instantly clear the fault by tripping the disconnect device. The relay simultaneously sends a signal to relay units "upstream" from the fault to time delay or to block their operation completely. Current sensors in various designs provide a range of "window" sizes to accommodate standard bus and cable arrangements.

Shunt trip attachments may be ordered for field mounting in Eaton's Cutler-Hammer molded case circuit breakers, or may be ordered factory installed in the breaker.

Accessories

Test Panel (120 Vac)

Used to test the ground fault system, to give an indication the relay has tripped the breaker, and to reset the relay after tripping. These functions may be separately mounted pilot devices.

Note: When a mechanically reset relay is used with a test panel, both the relay and test panel must be reset following either a simulated ground fault test or actual ground fault. Not UL listed.

Table 12-370. Optional Test Panel

Control	Test	Catalog Number	Price U.S. $
120 Volt 50/60 Hz	120 Volt 50/60 Hz	**GFRTP**	

Ground Fault Warning Indicator

This is an accessory item for use with GFR relays with interlocking circuitry. At approximately 30 – 50% of the relay pickup setting, the indicator switches separate 120 Vac control power to a lamp or relay, (not included) to give an indication of a ground fault. The indicator is rated 110/120 Vac 50/60 Hz for a maximum indicator load of .5 amperes.

Table 12-371. Ground Fault Warning Indicator

Description	Catalog Number	Price U.S. $
Manual Reset	**1234C67G01**	
Self-Resetting	**1234C67G02**	

Indicating Ammeter

The optional indicating ammeter connects to the sensor terminals through a momentary contact push-button, and will indicate (in amperes) any ground fault current flowing through the sensor. Kit includes the ammeter and pushbutton.

Note: Not UL listed.

Table 12-372. Ammeter Kit

GFR System Used with	Kit Catalog Number	Price U.S. $
1 – 12 Ampere	**752B820G01**	
5 – 60 Ampere	**752B820G02**	
100 – 1200 Ampere	**752B820G03**	

Shunt Trip Attachments

Use 120 Vac shunt trips.

Faceplate

Recommended when these relays are semi-flush mounted, to close the door cutout opening.

Table 12-373. Face Plate

Description	Catalog Number	Price U.S. $
Faceplate	**752B410G01**	

Product Selection

Each installation requires:

- One relay unit (select trip ampere as required).
- One current sensor (select configuration required).
- One circuit breaker or disconnect device with shunt trip, or a shunt trip attachment for mounting in existing breaker.
- Test panel (optional).

Table 12-374. GFR Relay

GFR Relay Types	Ground Fault Pickup Amperes					
	1 – 12		5 – 60		100 – 1200	
	Catalog Number ①	Price U.S. $	Catalog Number ①	Price U.S. $	Catalog Number ①	Price U.S. $
For 120 Volt 50/60 Hz Control						
Electrical Reset with Zone Interlocking	**GFR12EI**		**GFR60EI**		**GFR1200EI**	
Electrical Reset without Zone Interlocking	**GFR12E**		**GFR60E**		**GFR1200E**	
Mechanical Reset with Zone Interlocking	**GFR12MI**		**GFR60MI**		**GFR1200MI**	
Mechanical Reset without Zone Interlocking	**GFR12M**		**GFR60M**		**GFR1200M**	
For 120 Vdc Control						
Electrical Reset with Zone Interlocking	—		—		**GFR1200EID**	
Electrical Reset without Zone Interlocking	—		—		**GFR1200ED**	
Mechanical Reset with Zone Interlocking	—		—		**GFR1200MID**	
Mechanical Reset without Zone Interlocking	—		—		**GFR1200MD**	

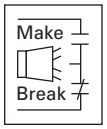
① Suitable for either surface or semi-flush mounting.

Table 12-375. Current Sensor

Window Size in Inches (mm)	Catalog Number	Price U.S. $
Used with Relays Rated 1 – 12 Amperes		
5.50 (139.7) I.D.	**1283C45G01**	
Used with Relays Rated 5 – 60 Amperes		
2.50 (63.5) I.D.	**179C768G01**	
5.50 (139.7) I.D.	**1256C13G01**	
7.81 x 11.00 (198.4 x 279.4) Rect. ②	**1257C88G04**	
3.31 x 24.94 (84.1 x 760.5) Rect. ②	**1257C92G03**	
Used with Relays Rated 100 – 1200 Amperes		
2.50 (63.5) I.D.	**179C768G02**	
5.50 (139.7) I.D.	**1256C13G02**	
8.25 (209.6). I.D.	**179C767G02**	
7.81 x 11.00 (198.4 x 279.4) Rect. ②	**1257C88G03**	
9.94 x 16.94 (252.5 x 430.3) Rect. ②	**1257C90G02**	
9.94 x 23.94 (252.5 x 608.1) Rect. ②	**1257C91G02**	
15.94 x 19.94 (404.9 x 506.4) Rect. ②	**1257C89G02**	
3.31 x 24.94 (84.1 x 633.5) Rect. ②	**1257C92G04**	
6.75 x 29.64 (171.5 x 752.9) Rect. ②	**1255C39G03**	

② One end removable for installation.

Alarm Switch



For remote indication of automatic trip operation. Does not function with manual switching; however, it will operate when either a shunt trip or undervoltage release is operated. A "make" contact closes and a "break" contact opens when the alarm/lockout switch operates. The switch automatically resets when the circuit breaker is reset.

Table 12-376. F-Frame Electrical Rating Data ①②

Maximum Voltage	Frequency	Maximum Current Amperes	Dielectric Withstand Voltage
Multi-Pole Circuit Breakers			
600 125 250	50/60 Hz dc dc	6 0.50 ③ 0.25 ③	2500
Single-Pole Circuit Breakers			
125/250 28 28	50/60 Hz dc dc	6 ③ 3 ③ 5 ④	2000

① Endurance: 6,000 electrical operations plus 4,000 mechanical operations.
② Endurance: 6,000 electrical operations plus 2,000 mechanical operations.
③ Non-inductive load.
④ Inductive (L/R = 0.026).

Table 12-377. J-Frame Electrical Rating Data ⑤⑥

Maximum Voltage	Frequency	Maximum Current Amperes	Dielectric Withstand Voltage
600 125 250	50/60 Hz dc dc	6 0.50 ⑦ 0.25 ⑦	2500

⑤ Endurance: 6,000 electrical operations plus 2,000 mechanical operations.
⑥ Pigtail wire size: 18 AWG (0.82 mm^2).
⑦ Non-inductive load.

Table 12-378. K-Frame Electrical Rating Data ⑧⑨

Maximum Voltage	Frequency	Maximum Current Amperes	Dielectric Withstand Voltage
600 125 250	50/60 Hz dc dc	6 0.50 ⑩ 0.25 ⑩	2500

⑧ Pigtail wire size: 18 AWG (0.82 mm^2).
⑨ Endurance: 5,000 electrical operations plus 1,000 mechanical operations.
⑩ Non-inductive load.

Table 12-379. L- and M-Frames Electrical Rating Data ⑪⑫

Maximum Voltage	Frequency	Maximum Current Amperes	Dielectric Withstand Voltage
600 125 250	50/60 Hz dc dc	6 0.50 ⑬ 0.25 ⑬	2500

⑪ Pigtail wire size: 18 AWG (0.82 mm^2).
⑫ Endurance: 5,000 electrical operations plus 1,000 mechanical operations.
⑬ Non-inductive load.

Table 12-380. N-Frame Electrical Rating Data ⑭

Maximum Voltage	Frequency	Maximum Current Amperes	Dielectric Withstand Voltage
600 125 250	50/60 Hz dc dc	6 0.50 ⑮ 0.25 ⑮	2500

⑭ Endurance: 3,000 electrical operations plus 1,000 mechanical operations.
⑮ Non-inductive load.

Table 12-381. R-Frame Electrical Rating Data ⑯⑰

Maximum Voltage	Frequency	Maximum Current Amperes	Dielectric Withstand Voltage
600 125 250	50/60 Hz dc dc	6 0.50 ⑱ 0.25 ⑱	2500

⑯ Endurance: 500 electrical operations plus 2,500 mechanical operations.
⑰ Pigtail wire size: 18 AWG (0.82 mm^2). Leads are red, black and blue.
⑱ Non-inductive load.

Table 12-382. G-Frame Alarm Switch (RH Only) ⑲

Electrical Ratings			Contact Arrangement	Factory Suffix	Adder U.S. $	Catalog Number ⑳㉑㉒	Price U.S. $
Volts	Frequency	Amperes					
Alarm Switch							
240	50/60 Hz	6	1 Make/1 Break	**B3**		**1288C75G03**	
Alarm Switch Auxiliary Switches Combination							
240	50/60 Hz	6	1 Make/1 Break and 1A/1B	**B13**		**1288C76G09**	

⑲ F-Frame circuit breakers are factory sealed. Underwriters Laboratories, requires that internal accessories be installed at the factory. Internal accessories are UL listed for factory installation under E7819. Where local codes and standards permit and UL listing is not required, internal accessories can be field installed. Accessory installation should be done before the circuit breaker is mounted and connected.
⑳ Includes 24-inch (609.6 mm) external pigtail leads,18 AWG (16-.010).
㉑ A maximum of two internal accessories may be mounted in a 3-pole circuit breaker.
㉒ Suitable for mounting in right pole only of 2- or 3-pole breaker.

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Table 12-383. F-Frame Alarm Switch ①

Number of Contacts (Make and Break)	Mounting Location (Pole)	Factory Mounted								Field Mounted			
		Connection Type and Location								Field Installation Kits ②			
		18-Inch (457.2 mm) Pigtail Leads						Terminal Block		Pigtail Leads		Terminal Block	
		Same Side		Rear ③		Opposite Side		Same Side					
		Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
1	Left ④ Right	B01 B05		B02 B06		B03 B07		B04 B08		A1L1LPK A1L1RPK		A1L1LTK A1L1RTK	
2	Left ④ Right	B09 B12		B10 B13		— —		B11 B14		A2L1LPK A2L1RPK		A2L1LTK A2L1RTK	
1 (Make Only)	Single-Pole	B15 ⑤		—		—		—		—		—	

① F-Frame circuit breakers are factory sealed. Underwriters Laboratories, requires that internal accessories be installed at the factory. Internal accessories are UL listed for factory installation under E7819. Where local codes and standards permit and UL listing is not required, internal accessories can be field installed. Accessory installation should be done before the circuit breaker is mounted and connected.
② Not listed with Underwriters Laboratories, for field installation.
③ Standard pigtail lead exit location.
④ Standard mounting location.
⑤ Factory installation only. Leads exit load end of circuit breaker.

Table 12-384. F-Frame HMCP Alarm Switch ⑥

Number of Contacts (Make and Break)	Mounting Location (Pole)	Factory Mounted								Field Mounted			
		Connection Type and Location								Field Installation Kits ⑦			
		18-Inch (457.2 mm) Pigtail Leads						Terminal Block		Pigtail Leads		Terminal Block	
		Same Side		Rear ⑧		Opposite Side		Same Side					
		Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
1	Left ⑨ Right	B01 B05		B02 B06		B03 B07		B04 B08		MA1L1LPK MA1L1RPK		MA1L1LTK MA1L1RTK	
2	Left ⑨ Right	B09 B12		B10 B13		— —		B11 B14		MA2L1LPK MA2L1RPK		MA2L1LTK MA2L1RTK	

⑥ F-Frame circuit breakers are factory sealed. Underwriters Laboratories, requires that internal accessories be installed at the factory. Internal accessories are UL listed for factory installation under E7819. Where local codes and standards permit and UL listing is not required, internal accessories can be field installed. Accessory installation should be done before the circuit breaker is mounted and connected.
⑦ Not listed with Underwriters Laboratories, for field installation.
⑧ Standard pigtail lead exit location.
⑨ Standard mounting location.

Table 12-385. J-Frame and HMCP (J) Alarm Switch

Number of Contacts (Make and Break)	Mounting Location (Pole)	Factory Mounted								Field Mounted			
		Connection Type and Location								Field Installation Kits ⑩			
		18-Inch (457.2 mm) Pigtail Leads						Terminal Block		Pigtail Leads		Terminal Block	
		Same Side		Rear ⑪		Opposite Side		Same Side					
		Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
1	Left ⑫ Right	B01 B05		B02 B06		B03 B07		B04 B08		A1L2LPK A1L2RPK		A1L2LTK A1L2RTK ⑬	

⑩ Listed with Underwriters Laboratories, for field installation on interchangeable trip unit breakers under E64983.
⑪ Standard mounting location.
⑫ Standard mounting location — leads exit rear of breaker.
⑬ Standard pigtail lead exit location.

Table 12-386. K-Frame and HMCP (K) Alarm Switch

Number of Sets of Contacts (1M and 1B)	Mounting Location (Pole)	Factory Mounted								Field Mounted			
		Connection Type and Location								Field Installation Kits ①			
		18-Inch (457.2 mm) Pigtail Leads						Terminal Block		Pigtail Leads		Terminal Block	
		Same Side		Rear ②		Opposite Side		Same Side					
		Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
1	Left ③ Right ④	B01 B05		B02 B06		B03 B07		B04 B08		A1L3LPK A1L3RPK		A1L3LTK A1L3RTK	
2	Left ③ Right ④	B09 B12		B10 B13		— —		B11 B14		A2L3LPK A2L3RPK		A2L3LTK A2L3RTK	

① Listed with Underwriters Laboratories, for field installation on interchangeable trip unit breakers under E64983.
② Standard mounting location.
③ Standard mounting location — leads exit rear of breaker.
④ Breakers with K-Frame OPTIM 550 can only accept accessories in left pole.

Table 12-387. L-, HMCP (L) and (M) Frames and Alarm Switch

Number of Sets of Contacts (1M and 1B)	Mounting Location (Pole)	Factory Mounted								Field Mounted			
		Connection Type and Location								Field Installation Kits ⑤			
		18-Inch (457.2 mm) Pigtail Leads						Terminal Block		Pigtail Leads		Terminal Block	
		Same Side		Rear ⑥		Opposite Side		Same Side					
		Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
1	Left ⑦ Right	B01 B05		B02 B06		B03 B07		B04 B08		A1L4LPK A1L4RPK		A1L4LTK A1L4RTK	
2	Left ⑦ Right	B09 B12		B10 B13		— —		B11 B14		A2L4LPK A2L4RPK		A2L4LTK A2L4RTK	

⑤ Listed with Underwriters Laboratories, for field installation on interchangeable trip unit breakers under E64983.
⑥ Standard mounting location.
⑦ Standard mounting location — leads exit rear of breaker.

Table 12-388. N-Frame and HMCP (N) Alarm Switch

Number of Sets of Contacts (Make and Break)	Mounting Location (Pole)	Factory Mounted								Field Mounted			
		Connection Type and Location								Field Installation Kits ⑧			
		18-Inch (457.2 mm) Pigtail Leads						Terminal Block		Pigtail Leads		Terminal Block	
		Same Side		Rear ⑨		Opposite Side		Same Side					
		Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
1	Left Right ⑩	B01 B05		B02 B06		B03 B07		B04 B08		A1L5LPK A1L5RPK		A1L5LTK A1L5RTK	
2	Left Right ⑩	B09 B12		B10 B13		— —		B11 B14		A2L5LPK A2L5RPK		A2L5LTK A2L5RTK	

⑧ Listed with Underwriters Laboratories for field installation under E64983.
⑨ Standard mounting location.
⑩ Standard mounting location — leads exit rear of breaker.

Table 12-389. R-Frame Alarm Switch (RH only)

Number of Contacts (Make and Break)	Factory Mounted		Field Mounted	
	Connection Type and Location		Field Installation Kits ⑪	
	18-Inch (457.2 mm) Pigtail Leads		Pigtail Leads	
	Suffix Number ⑫	Adder U.S. $	Catalog Number ⑫	Price U.S. $
1	B05		A1L6RPK	
2	B12		A2L6RPK	

⑪ Listed with Underwriters Laboratories for field installation under E64983.
⑫ A maximum of three ASL plug-in modules may be installed in a circuit breaker.

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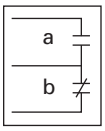
Auxiliary Switch



The Auxiliary Switch provides circuit breaker contact status information by monitoring the position of the molded cross bar which contains the moving contact arms. The auxiliary switch is used for remote indication and interlock system verification, and consists of one or two SPDT switches housed in a plug-in module. Each SPDT switch has one "a" and one "b" contact. When the circuit breaker contacts are open, the "a" contact is open and the "b" contact is closed.

Table 12-390. F-Frame Electrical Rating Data ①②

Maximum Voltage	Frequency	Maximum Current Amperes	Dielectric Withstand Voltage
125 ③ 600 125 250	50/60 Hz 50/60 Hz dc dc	1 6 0.50 ④ 0.25 ④	2500

① Endurance: 6,000 electrical operations plus 4,000 mechanical operations.
② Pigtail wire size: 18 AWG (0.82 mm^2).
③ For use in electronic circuit of 100 micro amperes and 15 Vdc minimum.
④ Non-inductive load.

Table 12-391. J-Frame Electrical Rating Data ⑤⑥

Maximum Voltage	Frequency	Maximum Current Amperes	Dielectric Withstand Voltage
600 125 250	50/60 Hz dc dc	6 0.50 ⑦ 0.25 ⑦	2500

⑤ Endurance: 6,000 electrical operations plus 4,000 mechanical operations.
⑥ Pigtail wire size: 18 AWG (0.82 mm^2).
⑦ Non-inductive load.

Table 12-392. K-Frame Electrical Rating Data ⑧⑨

Maximum Voltage	Frequency	Maximum Current Amperes	Dielectric Withstand Voltage
600 125 250	50/60 Hz dc dc	6 0.50 ⑩ 0.25 ⑩	2500

⑧ Endurance: 5,000 electrical operations plus 1,000 mechanical operations.
⑨ Pigtail wire size: 18 AWG (0.82 mm^2).
⑩ Non-inductive load.

Table 12-393. L- and M-Frames Electrical Rating Data ⑪

Maximum Voltage	Frequency	Maximum Current Amperes	Dielectric Withstand Voltage
600 125 250	50/60 Hz dc dc	6 0.50 ⑫ 0.25 ⑫	2500

⑪ Pigtail wire size: 18 AWG (0.82 mm^2).
⑫ Non-inductive load.

Table 12-394. N-Frame Electrical Rating Data ⑬⑭

Maximum Voltage	Frequency	Maximum Current Amperes	Dielectric Withstand Voltage
600 125 250	50/60 Hz dc dc	6 0.50 ⑮ 0.25 ⑮	2500

⑬ Endurance: 3,000 electrical operations plus 1,000 mechanical operations.
⑭ Pigtail wire size: 18 AWG (0.82 mm^2).
⑮ Non-inductive load.

Table 12-395. R-Frame Electrical Rating Data ⑯⑰

Maximum Voltage	Frequency	Maximum Current Amperes
600 125 250	50/60 Hz dc dc	6 0.50 ⑱ 0.25 ⑱

⑯ Endurance: 500 electrical operations plus 2,500 mechanical operations.
⑰ Pigtail wire size: 18 AWG (0.82 mm^2). Leads are red, black and blue.
⑱ Non-inductive load.

Table 12-396. G-Frame Auxiliary Switch (RH only)

Electrical Ratings			Contact Arrangement	Factory Suffix	Adder U.S. $	Catalog Number ⑲⑳	Price U.S. $
Volts	Frequency	Amperes					
240 240	50/60 Hz 50/60 Hz	6 6	1a/1b 2a/2b	**A3** **A6**	.	**1288C74G03** **1288C73G03**	

⑲ Includes 24-inch external pigtail leads, 18 AWG (16-.010).
⑳ A maximum of two internal accessories may be mounted in a 3-pole circuit breaker. Suitable for mounting in right pole only of 2- or 3-pole breaker.

Discount Symbol **CB-2**

Table 12-397. F-Frame and HMCP (F) Auxiliary Switch

Number of Contacts A and B	Mounting Location (Pole)	Factory Mounted								Field Mounted			
		Connection Type and Location								Field Installation Kits ②			
		18-Inch (457.2 mm) Pigtail Leads						Terminal Block		Pigtail Leads		Terminal Block	
		Same Side		Rear ①		Opposite Side		Same Side					
		Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
1	Left ③	A01 A15 ⑤		A02 A16 ⑤		A03 A17 ⑤		A04 —		A1X1PK E1X1PK		A1X1LTK —	
	Right or Neutral ④	A05 A18 ⑤		A06 A19 ⑤		A07 A20 ⑤		A08 —		A1X1PK —		A1X1RTK ⑥ —	
2	Left ③	A09 A21 ⑤		A10 A22 ⑤		— —		A11 —		A2X1LPK E2X1LPK		A2X1LTK —	
	Right or Neutral ④	A12 A23 ⑤		A13 A24 ⑤		— —		A14 —		A2X1RPK E2X1RPK		A2X1RTK ⑥ —	

① Standard pigtail lead exit location.
② Not listed with Underwriters Laboratories, for field installation.
③ Pigtail wire size: 18 AWG (0.82 mm^2).
④ Not for use on F-Frame with electronic trip unit.
⑤ 125 volts (Max.), 50/60 Hz switch for use in electronic circuit of 100 micro amperes and 15 Vdc minimum.
⑥ Not for use on 4-pole circuit breakers.

Table 12-398. F-Frame with Electronic Trip Unit Auxiliary Switch ⑦

Number of Contacts A and B	Mounting Location (Pole)	Factory Mounted								Field Mounted			
		Connection Type and Location								Field Installation Kits ⑧			
		18-Inch (457.2 mm) Pigtail Leads						Terminal Block		Pigtail Leads		Terminal Block	
		Same Side		Rear		Opposite Side		Same Side					
		Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
1	Right	A30		A31		A32		—		A1X1RPKFDE		—	

⑦ Only for use on 3-pole F-Frame breakers with electronic trip unit.
⑧ Not listed with Underwriters Laboratories, for field installation.

Table 12-399. J-Frame and HMCP (J) Auxiliary Switch

Number of Sets of Contacts A and B	Mounting Location (Pole)	Factory Mounted								Field Mounted			
		Connection Type and Location								Field Installation Kits ⑨			
		18-Inch (457.2 mm) Pigtail Leads						Terminal Block		Pigtail Leads		Terminal Block	
		Same Side		Rear ▽		Opposite Side		Same Side					
		Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
1	Left Right ⑩	A01 A05		A02 A06		A03 A07		A04 A08		A1X2PK A1X2PK		A1X2LTK A1X2RTK ⑪	
2	Left Right ⑩	A09 A12		A10 A13		— —		A11 A14		A2X2PK A2X2PK		A2X2LTK A2X2RTK ⑪	

⑨ Listed with Underwriters Laboratories for field installation or interchangeable trip unit breakers under E64983.
⑩ Standard mounting location — leads exit rear of breaker.
⑪ Not for use on 4-pole circuit breakers.

Table 12-400. K-Frame and HMCP (K) Auxiliary Switch

Number of Sets of Contacts A and B	Mounting Location (Pole)	Factory Mounted								Field Mounted			
		Connection Type and Location								Field Installation Kits ⑫			
		18-Inch (457.2 mm) Pigtail Leads						Terminal Block		Pigtail Leads		Terminal Block	
		Same Side		Rear ⑬		Opposite Side		Same Side					
		Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
1	Left Right ⑬⑭	A01 A05		A02 A06		A03 A07		A04 A08		A1X3PK A1X3PK		A1X3LTK A1X3RTK ⑮	
2	Left Right ⑬⑭	A09 A12		A10 A13		— —		A11 A14		A2X3PK A2X3PK		A2X3LTK A2X3RTK ⑮	
3	Left Right ⑭	A18 A17		— —		— —		A15 A16		A3X3LPK A3X3RPK		A3X3LTK A3X3RTK ⑮	

⑫ Listed with Underwriters Laboratories for field installation under E64983.
⑬ Standard mounting location — leads exit rear of breaker.
⑭ Breakers with K-Frame OPTIM 550 can only accept accessories in left pole.
⑮ Not for use on 4-pole circuit breaker.

Discount Symbol **CB-2**

Table 12-401. L-, HMCP (L) and (M) Frames and Auxiliary Switch

Number of Sets of Contacts A and B	Mounting Location (Pole)	Factory Mounted								Field Mounted			
		Connection Type and Location								Field Installation Kits ①			
		18-Inch (457.2 mm) Pigtail Leads						Terminal Block		Pigtail Leads		Terminal Block	
		Same Side		Rear ②		Opposite Side		Same Side					
		Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
1	Left Right ②	A01 A05		A02 A06		A03 A07		A04 A08		A1X4PK A1X4PK		A1X4LTK A1X4RTK ③	
2	Left Right ②	A09 A12		A10 A13		— —		A11 A14		A2X4PK A2X4PK		A2X4LTK A2X4RTK ③	
3	Left Right ②	A18 A17		— —		— —		A15 A16		A3X4PK A3X4PK		A3X4LTK A3X4RTK ③	

① Listed with Underwriters Laboratories for field installation under E64983.
② Standard mounting location — leads exit rear of breaker.
③ Not for use on 4-pole circuit breaker.

Table 12-402. N-Frame and HMCP (N) Auxiliary Switch

Number of Sets of Contacts A and B	Mounting Location (Pole)	Factory Mounted								Field Mounted			
		Connection Type and Location								Field Installation Kits ④			
		18-Inch (457.2 mm) Pigtail Leads						Terminal Block		Pigtail Leads		Terminal Block	
		Same Side		Rear ⑤		Opposite Side		Same Side					
		Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
1	Left Right ⑤	A01 A05		A02 A06		A03 A07		A04 A08		A1X5PK A1X5PK		A1X5LTK A1X5RTK ⑥	
2	Left Right ⑤	A09 A12		A10 A13		— —		A11 A14		A2X5PK A2X5PK		A2X5LTK A2X5RTK ⑥	
3	Left Right ⑤	A18 A17		— —		— —		A15 A16		A3X5LPK A3X5RPK		A3X5LTK A3X5RTK ⑥	

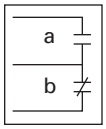
④ Listed with Underwriters Laboratories for field installation under E64983.
⑤ Standard mounting location — leads exit rear of breaker.
⑥ Not for use on 4-pole circuit breaker.

Table 12-403. R-Frame Auxiliary Switch (RH Only)

Number of Contacts A and B	Factory Mounted		Field Mounted	
	Connection Type and Location		Field Installation Kits ⑦	
	18-Inch (457.2 mm) Pigtail Leads		Pigtail Leads	
	Suffix Number ⑧	Adder U.S. $	Catalog Number ⑧	Price U.S.
2	A12		A2X6RPK	
4	A19		A4X6RPK	

⑦ Listed with Underwriters Laboratories for field installation under E64983.
⑧ A maximum of two auxiliary switches (any combination of 2a/2b or 4a/4b plug-in modules may be installed in a circuit breaker.

Auxiliary Switch and Alarm Switch Combination



Each Catalog Number listed in **Tables 12-402 – 12-412** includes one Auxiliary Switch and one Alarm Switch. In an auxiliary switch ASL switch combination, the auxiliary switch is always mounted on the side of the plug-in module next to the center pole of the circuit breaker.

Table 12-404. F-Frame Electrical Rating Data ①②

Maximum Voltage	Frequency	Maximum Current Amperes	Dielectric Withstand Voltage
600	50/60 Hz	6	2500
125	dc	0.50 ③	2200
250	dc	0.25 ③	2200

① Endurance: 6,000 electrical operations plus 4,000 mechanical operations.
② Pigtail wire size: 18 AWG (0.82 mm^2).
③ Non-inductive load.

Table 12-405. J-Frame Electrical Rating Data ④⑤

Maximum Voltage	Frequency	Maximum Current Amperes	Dielectric Withstand Voltage
600	50/60 Hz	6	2500
125	dc	0.50 ⑥	
250	dc	0.25 ⑥	

④ Endurance: 6,000 electrical operations plus 2,000 mechanical operations.
⑤ Pigtail wire size: 18 AWG (0.82 mm^2).
⑥ Non-inductive load.

Table 12-406. K-Frame Electrical Rating Data ⑦⑧

Maximum Voltage	Frequency	Maximum Current Amperes	Dielectric Withstand Voltage
600	50/60 Hz	6	2500
125	dc	0.50 ⑨	
250	dc	0.25 ⑨	

⑦ Endurance: 5,000 electrical operations plus 1,000 mechanical operations.
⑧ Pigtail wire size: 18 AWG (0.82 mm^2).
⑨ Non-inductive load.

Table 12-407. L- and M-Frames Electrical Rating Data ⑩⑪

Maximum Voltage	Frequency	Maximum Current Amperes	Dielectric Withstand Voltage
600	50/60 Hz	6	2500
125	dc	0.50 ⑫	
250	dc	0.25 ⑫	

⑩ Endurance: 5,000 electrical operations plus 1,000 mechanical operations.
⑪ Pigtail wire size: 18 AWG (0.82 mm^2).
⑫ Non-inductive load.

Table 12-408. N-Frame Electrical Rating Data ⑬⑭

Maximum Voltage	Frequency	Maximum Current Amperes	Dielectric Withstand Voltage
600	50/60 Hz	6	2500
125	dc	0.50 ⑮	
250	dc	0.25 ⑮	

⑬ Endurance: 3,000 electrical operations plus 1,000 mechanical operations.
⑭ Pigtail wire size: 18 AWG (0.82 mm^2).
⑮ Non-inductive load.

Table 12-409. F-Frame Auxiliary Switch and Alarm Switch Combination

Mounting Location (Pole)	Factory Mounted						Field Mounted			
	Connection Type and Location						Field Installation Kits ①			
	18-Inch (457 mm) Pigtail Leads				Terminal Block		Pigtail Leads		Terminal Block	
	Same Side		Rear ②		Same Side					
	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
Left ②	C01		C02		C03		AAL1LPK		AAL1LTK	
Right	C04		C05		C06		AAL1RPK		AAL1RTK ③	

① Not listed with Underwriters Laboratories for field installation.
② Standard mounting location.
③ Not for use on 4-pole circuit breakers

Table 12-410. F-Frame HMCP Auxiliary Switch and Alarm Switch Combination

Mounting Location (Pole)	Factory Mounted						Field Mounted			
	Connection Type and Location						Field Installation Kits ④			
	18-Inch (457 mm) Pigtail Leads				Terminal Block		Pigtail Leads		Terminal Block	
	Same Side		Rear ⑤		Same Side					
	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
Left ⑥	C01		C02		C03		MAAL1LPK		MAAL1LTK	
Right	C04		C05		C06		MAAL1RPK		MAAL1RPK	

④ Not listed with Underwriters Laboratories for field installation.
⑤ Standard mounting location.
⑥ Not for use on 4-pole circuit breakers

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Table 12-411. J-Frame and HMCP (J) Auxiliary Switch and Alarm Switch Combination

Number of Sets of Contacts (1A and 1B) (1M – 1B)	Mounting Location (Pole)	Factory Mounted								Field Mounted			
		Connection Type and Location								Field Installation Kits ⑦			
		18-Inch (457 mm) Pigtail Leads						Terminal Block		Pigtail Leads		Terminal Block	
		Same Side		Rear ⑧		Opposite Side		Same Side					
		Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
1	Left	C01		C02		—		C03		AAL2LPK		AAL2LTK	
	Right ⑨	C04		C05		—		C06		AAL2RPK		AAL2RTK ⑨	

⑦ Listed with Underwriters Laboratories for field installation of interchangeable trip unit breakers under E64983.
⑧ Standard mounting location — leads exit rear of breaker.
⑨ Not for use on 4-pole circuit breakers.

Table 12-412. K-Frame and HMCP (K) Auxiliary Switch and Alarm Switch Combination

Number of Sets of Contacts (1A and 1B) (1M – 1B)	Mounting Location (Pole)	Factory Mounted								Field Mounted			
		Connection Type and Location								Field Installation Kits ⑩			
		18-Inch (457 mm) Pigtail Leads						Terminal Block		Pigtail Leads		Terminal Block	
		Same Side		Rear ⑪		Opposite Side		Same Side					
		Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
1	Left	C01		C02		—		C03		AAL3LPK		AAL3LTK	
	Right ⑪⑫	C04		C05		—		C06		AAL3RPK ⑬		AAL3RTK	

⑩ Listed with Underwriters Laboratories for field installation of interchangeable trip unit breakers under E64983.
⑪ Standard mounting location — leads exit rear of breaker.
⑫ Breakers with K-Frame OPTIM 550 can only accept accessories in left pole.
⑬ Will not install on OPTIM Trip (RH).

Table 12-413. L-, HMCP (L) and (M) Frames and Auxiliary Switch and Alarm Switch Combination

Number of Sets of Contacts	Mounting Location (Pole)	Factory Mounted								Field Mounted			
		Connection Type and Location								Field Installation Kits ①			
		18-Inch (457.2 mm) Pigtail Leads						Terminal Block		Pigtail Leads		Terminal Block	
		Same Side		Rear ②		Opposite Side		Same Side					
		Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
1A, 1B and 1 Make/1 Break	Left Right ②	C01 C04		C02 C05		— —		C03 C06		AA114LPK AA114RPK		AA114LTK AA114RTK ③	
2A, 2B and 1 Make/1 Break	Left Right ②	C07 C10		C08 C11		— —		C12 C13		AA214LPK AA214RPK		AA214LTK AA214RTK ③	
3A, 3B and 1 Make/1 Break	Left Right ②	C14 C15		— —		— —		— —		AA314LPK AA314RPK		— —	

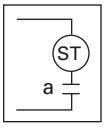
① Listed with Underwriters Laboratories for field installation under E64983.
② Standard mounting location — leads exit rear of breaker.
③ Not for use on 4-pole circuit breaker.

Table 12-414. N-Frame and HMCP (N) Auxiliary Switch and Alarm Switch Combination

Number of Sets of Contacts	Mounting Location (Pole)	Factory Mounted								Field Mounted			
		Connection Type and Location								Field Installation Kits ④			
		18-Inch (457.2 mm) Pigtail Leads						Terminal Block		Pigtail Leads		Terminal Block	
		Same Side		Rear ⑤		Opposite Side		Same Side					
		Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
1A, 1B and 1 Make/1 Break	Left Right ⑤	C01 C04		C02 C05		— —		C03 C06		AA115LPK AA115RPK		AA115LTK AA115RTK ⑥	
2A, 2B and 1 Make/1 Break	Left Right ⑤	C07 C10		C08 C11		— —		C12 C13		AA215LPK AA215RPK		AA215LTK AA215RTK ⑥	

④ Listed with Underwriters Laboratories for field installation under E64983.
⑤ Standard mounting location — leads exit rear of breaker.
⑥ Not for use on 4-pole circuit breaker.

Shunt Trip



The Shunt Trip provides remote controlled tripping of the circuit breaker. The shunt trip consists of an intermittent rated solenoid with a tripping plunger and a cutoff switch assembled to a plug-in module. When required for ground fault protection applications, certain ac rated shunt trips, as noted in the Electrical Rating Table, are suitable for operation at 55 percent of rated voltage.

Select shunt trip catalog number for the voltage within the indicated voltage range. Shunt trip coils are designed to be applied at specific ac or dc voltages within the voltage range shown. Electrical ratings are also shown on applicable circuit breaker accessory nameplates.

Table 12-415. F-Frame Electrical Rating Data ①②③

50/60 Hz			dc		
Supply Voltage	**Minimum Operating Voltage**	**VA**	**Supply Voltage**	**Minimum Operating Voltage**	**VA**
12 24	6.75	75 300	12 24	9	100 400
48 60	36	92 140	48 60	36	100 160
110 120 127 208 220 240	156	480 570 640 180 200 240	110 120 125	77	55 66 71
380 415 440	300	610 130 330	127 220 250	— —	72 110 140
480 525 550 600	300	380 450 530 590	— — — —	— — — —	— — — —

① Average unlatching time: 6 milliseconds.
② Average circuit breaker contact total opening time: 18 milliseconds.
③ Endurance: 6,000 electrical operations plus 4,000 mechanical operations.

Table 12-416. J-Frame Electrical Rating Data ④⑤⑥

50/60 Hz			dc		
Supply Voltage	**Minimum Operating Voltage**	**VA**	**Supply Voltage**	**Minimum Operating Voltage**	**VA**
12 24	9	31 173	12 24	8.4	50 247
48 60	36	686 1014	48 60	33.6	1094 1698
110 ⑦ 120 ⑦ 127 ⑦ 208 ⑦ 220 ⑦ 240 ⑦	60.5	66 84 102 354 396 432	110 120 125 — — —	77 — —	112 138 150 — — —
380 400 415 440	285	180 200 240 610	110 120 125 127	154	40 58 — —
480 525 550 600	360	34 42 50 60	— — — —	— — — —	— — — —

④ Average unlatching time: 6 milliseconds.
⑤ Average circuit breaker contact total opening time: 18 milliseconds.
⑥ Endurance: 6,000 electrical operations plus 2,000 mechanical operations.
⑦ Supply voltages suitable for use with Class 1 GFP devices. Marking label included with accessory kits.

Table 12-417. K-Frame Electrical Rating Data ⑧⑨⑩

50/60 Hz			dc		
Supply Voltage	**Minimum Operating Voltage**	**VA**	**Supply Voltage**	**Minimum Operating Voltage**	**VA**
12 24	9	45 200	12 24	8.4	35 170
48 60		830 1280	48 60		710 1105
110 ⑪ 120 ⑪ 127 ⑪ 208 ⑪ 220 ⑪ 240 ⑪	60	100 120 140 420 470 550	110 120 125 — — —	77 — —	110 130 140 — — —
380 400 415 440	285	95 108 120 136	220 250 — —	154	41 54 — —
480 525 550 600	360	40 50 50 70	— — — —	— — — —	— — — —

⑧ Approximate unlatching time: 6 milliseconds.
⑨ Approximate total circuit breaker contact opening time: 8 milliseconds.
⑩ Endurance: 5,000 electrical operations plus 1,000 mechanical operations.
⑪ Supply voltages suitable for use with Class 1 GFP devices. Marking label included with accessory kits.

Table 12-418. L- and M-Frame Electrical Rating Data ⑫⑬⑭

50/60 Hz			dc		
Supply Voltage	**Minimum Operating Voltage**	**VA**	**Supply Voltage**	**Minimum Operating Voltage**	**VA**
12 24	9	45 200	12 24	9	35 170
48 60	34	830 1280	48 60	34	710 1105
110 ⑮ 120 ⑮ 127 ⑮ 208 ⑮ 220 ⑮ 240 ⑮	60	100 120 140 420 470 550	110 120 125 — — —	77 — —	110 130 140 — — —
380 400 415 440	266	95 108 120 136	220 250 — —	154 — —	41 54 — —
480 525 550 600	336	40 50 50 70	— — — —	— — — —	— — — —

⑫ Approximate unlatching time: 6 milliseconds.
⑬ Approximate total circuit breaker contact opening time: 18 milliseconds.
⑭ Endurance: 5,000 electrical operations plus 1,000 mechanical operations.
⑮ Supply voltages suitable for use with Class 1 GFP devices. Marking label included with accessory kits.

Table 12-419. N-Frame Electrical Rating Data ①②③

50/60 Hz			dc		
Supply Voltage	**Minimum Operating Voltage**	**VA**	**Supply Voltage**	**Minimum Operating Voltage**	**VA**
24	16.8	200	24	16.8	170
48 60	33.6	830 1280	48 60	33.6	710 1150
110 ④ 120 ④ 127 ④ 208 ④ 220 ④ 240 ④	60	100 120 140 420 470 550	110 120 125 — — —	77 — — —	110 130 140 — — —
380 400 415 440	266	95 108 120 136	220 250 — —	154 — — —	41 54 — —
480 525 550 600	336	40 50 50 70	— — — —	— — — —	— — — —

① Approximate unlatching time: 6 milliseconds.
② Approximate total circuit breaker contact opening time: 18 milliseconds.
③ Endurance: 3,000 electrical operations plus 1,000 mechanical operations.
④ Supply voltages suitable for use with Class 1 GFP devices. Marking label included with accessory kits.

Table 12-420. R-Frame Electrical Rating Data ⑤⑥⑦⑧⑨⑩

Suffix Number	Application Ratings		Electrical Operating Ratings						
	Voltage (V)	**Frequency (Hz)**	**Supply Voltage (V)**	**Minimum Operating Voltage (V)**	**I_p (A)**	**I_{rms} at 0.250s (A)**	**I_{rms} at 0.033s (A)**	**VA**	**One Minute Dielectric Withstand Voltage (V)**
03/03K	24	50/60	24	16.8	36.1	—	25.5	612	1050
	24	dc	24	16.8	36.1	16.5	—	396	1050
05/05K	48 – 60	50/60	48 60	34.0	13.1 17.2	—	9.2 12.2	450 740	1120
11/11K ⑦	110 – 240	50/60	110 120 127 208 220 240	60.5	4.2 4.5 4.6 7.9 8.5 8.7	—	3.0 3.2 3.3 5.6 6.0 6.1	330 390 430 1170 1370 1470	1480
14/14K	380 – 440	50/60	380 415 440	266.0	4.5 5.0 5.3	—	3.2 3.6 3.7	1220 1500 1640	1880
	220 – 250	dc	220 250	154.0	—	2.4 2.7	—	530 680	1500
18/18K	480 – 600	50/60	480 525 550 600	336.0	0.6 0.7 0.7 0.8	—	0.4 0.5 0.5 0.6	200 270 280 360	2200
23/23K	48 – 60	dc	48 60	34.0	—	9.8 11.6	—	470 700	1120
26/26K	110 – 125	dc	110 120 125	77.0	—	3.3 3.6 3.8	—	370 440 480	1250

⑤ Approximate unlatching time of 6 milliseconds.
⑥ Average circuit breaker contact total opening time approximately 62 milliseconds, at rated voltage.
⑦ Endurance: 500 electrical operations and 2,500 mechanical operations.
⑧ Shunt trip can be operated up to a maximum of six times per minute.
⑨ Maximum operating voltage — 110% of maximum voltage range rating.
⑩ Pigtail wire size: 18 AWG (0.82 mm^2). Leads are yellow and white.

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Table 12-421. G-Frame Shunt Trip (LH 3-Pole only)

Electrical Ratings			Suffix Number	Adder U.S. $	Catalog Number	Price U.S. $
Volts	Frequency	Amperes				
120	50/60 Hz	1.1	S1		1373D62G01	
240	50/60 Hz	2.1	S2		1373D62G02	
12	dc	2.8	S3		1373D62G15	
24	dc	5.7	S4		1373D62G16	
24	60 Hz	—	S7		1373D62G20	

Note: G-Frame circuit breakers are factory sealed. Underwriters Laboratories requires that internal accessories be installed at the factory.

Note: Internal accessories are UL listed for factory installation under E7819.

Note: Where local codes and standards permit and UL listing is not required, internal accessories can be field installed. Accessory installation should be done before the circuit breaker is mounted and connected.

Table 12-422. F-Frame and HMCP (F) Shunt Trip

Voltage Rating (ac Frequency = 50/60 Hz)	Factory Mounted								Field Mounted			
	Connection Type and Location								Field Installation Kits ①			
	18-Inch (457.2 mm) Pigtail Leads ②						Terminal Block		Pigtail Leads		Terminal Block	
	Same Side		Rear ③		Opposite Side		Same Side					
	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
Left-Pole Mounting ac/dc Ratings												
12 – 24 Vac or dc	S01		S02		S03		S04		SNT1LP03K		SNT1LT03K	
48 – 127 Vac or 48 – 60 Vdc ④	S05		S06		S07		S08		SNT1LP08K		SNT1LT08K	
208 – 380 Vac or 110 – 127 Vdc	S09		S10		S11		S12		SNT1LP12K		SNT1LT12K	
415 – 600 Vac or 220 – 250 Vdc	S13		S14		S15		S16		SNT1LP18K		SNT1LT18K	
Right- or Neutral-Pole Mounting ac/dc Ratings ⑤												
12 – 24 Vac or dc	S17		S18		S19		S20		SNT1RP03K		SNT1RT03K ⑥	
48 – 127 Vac or 48 – 60 Vdc ④	S21		S22		S23		S24		SNT1RP08K		SNT1RT08K ⑥	
208 – 380 Vac or 110 – 127 Vdc	S25		S26		S27		S28		SNT1RP12K		SNT1RT12K ⑥	
415 – 600 Vac or 220 – 250 Vdc	S29		S30		S31		S32		SNT1RP18K		SNT1RT18K ⑥	

① Not listed with Underwriters Laboratories, for field installation.
② Pigtail wire size: 18 AWG (0.82 mm^2).
③ Standard pigtail lead exit location.
④ 120 Vac marked suitable for ground fault protection devices.
⑤ Standard mounting location.
⑥ Not for use on 4-pole circuit breakers

Table 12-423. J-Frame and HMCP (J) Shunt Trip

Voltage Rating (ac Frequency = 50/60 Hz)	Factory Mounted								Field Mounted			
	Connection Type and Location								Field Installation Kits ①			
	18-Inch (457.2 mm) Pigtail Leads						Terminal Block		Pigtail Leads		Terminal Block	
	Same Side		Rear ②		Opposite Side		Same Side					
	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
Left-Pole Mounting ac/dc Ratings ②												
12 – 24 Vac or dc	S41		S42		S43		S44		SNT2P04K		SNT2T04K	
48 – 60 Vac or dc	S49		S50		S51		S52		SNT2P06K		SNT2T06K	
110 – 240 Vac or 110 – 125 Vdc ③	S09		S10		S11		S12		SNT2P11K		SNT2T11K	
380 – 440 Vac or 220 – 250 Vdc	S13		S14		S15		S16		SNT2P14K		SNT2T14K	
480 – 600 Vac	S17		S18		S19		S20		SNT2P18K		SNT2T18K	
Right- or Neutral-Pole Mounting ac/dc Ratings												
12 – 24 Vac or dc	S45		S46		S47		S48		SNT2P04K		SNT2T04K ④	
48 – 60 Vac or dc	S53		S54		S55		S56		SNT2P06K		SNT2T06K ④	
110 – 240 Vac or 110 – 125 Vdc ③	S29		S30		S31		S32		SNT2P11K		SNT2T11K ④	
380 – 440 Vac or 220 – 250 Vdc	S33		S34		S35		S36		SNT2P14K		SNT2T14K ④	
480 – 600 Vac	S37		S38		S39		S40		SNT2P18K		SNT2T18K ④	

① Listed with Underwriters Laboratories for field installation under E64983.
② Standard mounting location — leads exit rear of breaker.
③ Suitable for use with Class 1 ground fault sensing element.
④ Not for use on 4-pole circuit breakers.

Table 12-424. K-Frame and HMCP (K) Shunt Trip

Voltage Rating (ac Frequency = 50/60 Hz)	Factory Mounted								Field Mounted			
	Connection Type and Location								Field Installation Kits ⑤			
	18-Inch (457.2 mm) Pigtail Leads						Terminal Block		Pigtail Leads		Terminal Block	
	Same Side		Rear ⑥		Opposite Side		Same Side					
	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
Left-Pole Mounting ac/dc Ratings ⑥												
12 – 24 Vac or dc	S41		S42		S43		S44		SNT3P04K		SNT3T04K	
48 – 60 Vac or dc	S49		S50		S51		S52		SNT3P06K		SNT3T06K	
110 – 240 Vac or 110 – 125 Vdc ⑦	S09		S10		S11		S12		SNT3P11K		SNT3T11K	
380 – 440 Vac or 220 – 250 Vdc	S13		S14		S15		S16		SNT3P14K		SNT3T14K	
480 – 600 Vac	S17		S18		S19		S20		SNT3P18K		SNT3T18K	
Right- or Neutral-Pole Mounting ac/dc Ratings ⑧⑨												
12 – 24 Vac or dc	S45		S46		S47		S48		SNT3P04K		SNT3T04K ⑩	
48 – 60 Vac or dc	S53		S54		S55		S56		SNT3P06K		SNT3T06K ⑩	
110 – 240 Vac or 110 – 125 Vdc ⑦	S29		S30		S31		S32		SNT3P11K		SNT3T11K ⑩	
380 – 440 Vac or 220 – 250 Vdc	S33		S34		S35		S36		SNT3P14K		SNT3T14K ⑩	
480 – 600 Vac	S37		S38		S39		S40		SNT3P18K		SNT3T18K ⑩	

⑤ Listed with Underwriters Laboratories, for field installation under E64983.
⑥ Standard mounting location — leads exit rear of breaker.
⑦ Suitable for use with Class 1 ground fault sensing element.
⑧ For use with KT (thermal-magnetic) trip units only.
⑨ Breakers with K-Frame OPTIM 550 can only accept accessories in left pole.
⑩ Not for use on 4-pole circuit breaker.

Table 12-425. L-, HMCP (L) and (M) Frames and Shunt Trip

Voltage Rating (ac Frequency = 50/60 Hz)	Factory Mounted								Field Mounted			
	Connection Type and Location								Field Installation Kits ①			
	18-Inch (457.2 mm) Pigtail Leads						Terminal Block		Pigtail Leads		Terminal Block	
	Same Side		Rear ②		Opposite Side		Same Side					
	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
Left-Pole Mounting ac/dc Ratings ②												
12 – 24 Vac or dc	S01		S02		S03		S04		SNT4LP03K		SNT4LT03K	
48 – 60 Vdc	S05		S06		S07		S08		SNT4LP05K		SNT4LT05K	
48 – 60 Vdc	S85		S86		S87		—		SNT4LP23K		SNT4LT23K	
110 – 240 Vac	S09		S10		S11		S12		SNT4LP11K		SNT4LT11K	
110 – 125 Vdc	S41		S42		S43		S44		SNT4LP26K		SNT4LT26K	
380 – 440 Vac or 220 – 250 Vdc	S13		S14		S15		S16		SNT4LP14K		SNT4LT14K	
480 – 600 Vac	S17		S18		S19		S20		SNT4LP18K		SNT4LT18K	
Right-Pole Mounting ac/dc Ratings ③												
12 – 24 Vac or dc	S21		S22		S23		S24		SNT4RP03K		SNT4RT03K	
48 – 60 Vdc	S25		S26		S27		S28		SNT4RP05K		SNT4RT05K	
48 – 60 Vdc	S88		S89		S90		—		SNT4RP23K		SNT4RT23K	
110 – 240 Vac	S29		S30		S31		S32		SNT4RP11K		SNT4RT11K	
110 – 125 Vdc	S45		S46		S47		S48		SNT4RP26K		SNT4RT26K	
380 – 440 Vac or 220 – 250 Vdc	S33		S34		S35		S36		SNT4RP14K		SNT4RT14K	
480 – 600 Vac	S37		S38		S39		S40		SNT4RP18K		SNT4RT18K	

① Listed with Underwriters Laboratories, for field installation under E64983.
② Standard mounting location — leads exit rear of breaker.
③ For use with LT (thermal-magnetic) 3-pole trip units only.

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Table 12-426. N-Frame and HMCP (N) Shunt Trip

Voltage Rating (ac Frequency = 50/60 Hz)	Factory Mounted								Field Mounted			
	Connection Type and Location								Field Installation Kits ④			
	18-Inch (457.2 mm) Pigtail Leads						Terminal Block		Pigtail Leads		Terminal Block	
	Same Side		Rear ⑤		Opposite Side		Same Side					
	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
Left-Pole Mounting ac/dc Ratings ⑤												
9 – 24 Vac or dc	S01		S02		S03		S04		SNT5LP03K		SNT5LT03K	
48 – 60 Vac	S05		S06		S07		S08		SNT5LP05K		SNT5LT05K	
110 – 240 Vac ⑥	S09		S10		S11		S12		SNT5LP11K		SNT5LT11K	
110 – 125 Vdc	S41		S42		S43		S44		SNT5LP26K		SNT5LT26K	
380 – 440 Vac or 220 – 250 Vdc	S13		S14		S15		S16		SNT5LP14K		SNT5LT14K	
480 – 600 Vac	S17		S18		S19		S20		SNT5LP18K		SNT5LT18K	
48 – 60 Vdc	S21		S22		S23		S24		SNT5LP23K		SNT5LT23K	

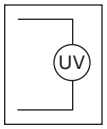
④ Listed with Underwriters Laboratories for field installation under E64983.
⑤ Standard mounting location — leads exit rear of breaker.
⑥ Supply voltages suitable for use with Class 1 GFP devices. Marking label included with accessory kits.

Table 12-427. R-Frame Shunt Trip (RH Only)

Voltage Rating (ac Frequency = 50/60 Hz)	Factory Mounted		Field Mounted	
	Connection Type and Location		Field Installation Kits ⑦	
	18-Inch (457.2 mm) Pigtail Leads		Pigtail Leads	
	Suffix Number ⑧	Adder U.S. $	Catalog Number ⑧	Price U.S. $
24 Vac or dc	S21		SNT6P03K	
48 – 60 Vac	S25		SNT6P05K	
110 – 240 Vac	S29		SNT6P11K	
380 – 440 Vac or 220 – 250 Vdc	S33		SNT6P14K	
480 – 600 Vac	S37		SNT6P18K	
48 – 60 Vdc	S88		SNT6P23K	
110 – 125 Vdc	S45		SNT6P26K	

⑦ Listed with Underwriters Laboratories for field installation under E64983.
⑧ A maximum of two shunt trip plug-in modules may be installed in a circuit breaker.

Low Energy Shunt Trip



Low Energy Shunt Trip devices are designed to operate from low energy output signals from dedicated current sensors typically applied in ground fault protection schemes. However, with a proper control voltage source, they may be applied in place of conventional trip devices for special applications. Flux paths surrounding permanent magnets used in the shunt trip assembly hold a charged spring poised in readiness to operate the circuit breaker trip mechanism.

When a 100 microfarad capacitor charged to 28 Vdc is discharged through the shunt trip coil, the resultant flux opposes the permanent magnet flux field, which releases the stored energy in the spring to trip the circuit breaker. As the circuit breaker resets, the shunt trip reset arm is actuated by the circuit breaker handle, resetting the shunt trip. The plug-in module is mounted in retaining slots in the top of the trip unit. Coil is intermittent-rated only. Cutoff provisions required in control circuit.

Ordering Information

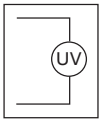
Select shunt trip catalog number for the voltage within the indicated voltage range. Shunt trip coils are designed to be applied at specific ac or dc voltages within the voltage range shown. Electrical ratings are also shown on applicable circuit breaker accessory nameplates.

Table 12-428. F-, J-, K-, L-, M-, N- and R-Frames and HMCPs Low Energy Shunt Trip ①

Mounting Positions (Pole)	Factory Mounted								Field Mounted			
	Connection Type and Location								Field Installation Kits ②			
	18-Inch (457.2 mm) Pigtail Leads						Terminal Block		Pigtail Leads		Terminal Block	
	Same Side		Rear ③		Opposite Side		Same Side					
	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
F-Frame												
Left Right ③	NO1 NO5		NO2 NO6		NO3 NO7		NO4 NO8		LST1LPK ④ LST1RPK ④		LST1LTK ④ LST1RTK ④	
J-Frame												
Left Right ③	NO1 NO5		NO2 NO6		NO3 NO7		— —		LST2LPK LST2RPK		— —	
K-Frame												
Left ③ Right ⑤⑥	NO1 NO5		NO2 NO6		NO3 NO7		— —		LST3LPK LST3RPK		— —	
L- and M-Frames												
Left Right	NO1 NO5		NO2 NO6		NO3 NO7		— —		LST4LPK LST4RPK		— —	
N-Frame												
Left ③	NO1		NO2		NO3		—		LST5LPK		—	
R-Frame												
Right	NO1		—		—		—		LST6RPK		—	

① Cutoff provisions required in control circuit.
② Listed with Underwriters Laboratories for field installation under E64983.
③ Standard mounting location — leads exit rear of breaker.
④ For F-Frame HMCP, add an "M" to beginning of catalog number.
⑤ For use with thermal-magnetic trip units only.
⑥ Breakers with K-Frame OPTIM 550 can only accept accessories in left pole.

Undervoltage Release Mechanism



The Undervoltage Release Mechanism monitors a voltage (typically a line voltage) and trips the circuit breaker when the voltage falls to between 70 and 35 percent of the solenoid coil rating.

The undervoltage release mechanism consists of a continuous rated solenoid with a plunger and tripping lever mounted in a plug-in module. The tab on the tripping lever resets the undervoltage release mechanism when normal voltage has been restored and the circuit breaker handle is moved to the reset (or OFF) position. With less than pickup voltage applied to the undervoltage release mechanism, the circuit breaker contacts will not touch when a closing operation is attempted.

Note: Undervoltage release mechanism accessories are not designed for, and should not be used as, circuit interlocks.

Ordering Information

Select handle reset undervoltage release mechanism catalog number for the voltage within the indicated voltage range. Undervoltage release mechanism coils are designed to be applied at specific ac or dc voltages within the voltage range shown on applicable circuit breaker accessory nameplates.

Table 12-429. F-Frame Electrical Rating Data ①

50/60 Hz					dc				
Supply Voltage	Dropout Voltage		Pickup Voltage	VA	Supply Voltage	Dropout Voltage		Pickup Voltage	VA
	Minimum	Maximum	Maximum			Minimum	Maximum	Maximum	
12	4.2	6.3	7.6	1.3 2.5	12	4.2	8.4	10.2	2.8
24	8.4	16.8	20.4	1.4	24	8.4	16.8	20.4	1.6
48 60	21.0	33.6	40.8	1.2 1.9	48 60	21.0	33.6	40.8	1.3 2.0
110 120 127	44.5	77.0	93.5	1.3 1.5 1.7	110 120 125	44.5	77.0	93.5	1.5 1.7 1.9
208 220 240	84.0	145.6	176.8	2.2 2.4 2.9	220 250 —	87.5 —	154.0 —	187.0 —	2.6 3.4 —
380 415 440 480	168.0	266.0	323.0	2.9 3.5 3.9 4.6	— — — —	— — — —	— — — —	— — — —	— — — —
525 550 600	210.0	367.0	446.0	4.3 4.8 5.8	— — —	— — —	— — —	— — —	— — —

① Endurance: 6,000 electrical operations plus 4,000 mechanical operations.

Table 12-430. J-Frame Electrical Rating Data ②③

50/60 Hz					dc				
Supply Voltage	Dropout Voltage		Pickup Voltage	VA	Supply Voltage	Dropout Voltage		Pickup Voltage	VA
	Minimum	Maximum	Maximum			Minimum	Maximum	Maximum	
12	4.2	8.4	10.2	1.9	12	4.2	8.4	10.2	1.6
24	8.4	16.8	20.4	3.9	24	8.4	16.8	20.4	3.1
48 60	21.0	33.6	40.8	2.5 3.8	48 60	21.0	33.6	40.8	2.0 3.1
110 120 127	44.5	77.0	93.5	1.8 2.1 2.4	110 120 125	44.5	77.0	93.5	1.6 1.9 2.2
208 220 240	84.0	145.6	176.8	2.7 3.1 3.8	220 250 —	87.5 —	154.0 —	187.0 —	3.1 4.0 —
380 415 440 480	168.0	266.0	323.0	3.4 4.0 4.6 5.4	— — — —	— — — —	— — — —	— — — —	— — — —

② Endurance: 6,000 electrical operations plus 2,000 mechanical operations.

③ For electrical rating data for manual, automatic and electrical reset undervoltage release mechanisms, refer to Eaton.

Table 12-431. K-Frame Electrical Rating Data ①

50/60 Hz					dc				
Supply Voltage	Dropout Voltage		Pickup Voltage	VA	Supply Voltage	Dropout Voltage		Pickup Voltage	VA
	Minimum	Maximum	Maximum			Minimum	Maximum	Maximum	
12	4.2	8.4	10.2	1.9	12	4.2	8.4	10.2	1.6
24	8.4	16.8	20.4	3.9	24	8.4	16.8	20.4	3.1
48 60	21.0	33.6	40.8	2.5 3.8	48 60	21.0	33.6	40.8	2.0 3.1
110 120 127	44.5	77.0	93.5	1.8 2.1 2.4	110 120 125	44.5	77.0	93.5	1.6 1.9 2.2
208 220 240	84.0	145.6	176.8	2.7 3.1 3.8	220 250 —	87.5	154.0 —	187.0 —	3.1 4.0 —
380 415 440 480	168.0	266.0	323.0	3.4 4.0 4.6 5.4	— — — —	— — — —	— — — —	— — — —	— — — —

① Endurance: 5,000 electrical operations plus 1,000 mechanical operations.

Table 12-432. L- and M-Frames Electrical Rating Data ②

50/60 Hz					dc				
Supply Voltage	Dropout Voltage		Pickup Voltage	VA	Supply Voltage	Dropout Voltage		Pickup Voltage	VA
	Minimum	Maximum	Maximum			Minimum	Maximum	Maximum	
12	4.2	8.4	10.2	1.9	12	4.2	8.4	10.2	1.6
24	8.4	16.8	20.4	3.9	24	8.4	16.8	20.4	3.1
48 60	21.0	33.6	40.8	2.5 3.8	48 60	21.0	33.6	40.8	2.0 3.1
110 120 127	44.5	77.0	93.5	1.8 2.1 2.4	110 120 125	44.5	77.0	93.5	1.6 1.9 2.2
208 220 240	84.0	145.6	176.8	2.7 3.1 3.8	220 250 —	87.5	154.0 —	187.0 —	3.1 4.0 —
380 415 440 480	168.0	266.0	323.0	3.4 4.0 4.6 5.4	— — — —	— — — —	— — — —	— — — —	— — — —

② Endurance: 5,000 electrical operations plus 1,000 mechanical operations.

Table 12-433. N-Frame Electrical Rating Data ③

50/60 Hz					dc				
Supply Voltage	Dropout Voltage		Pickup Voltage	VA	Supply Voltage	Dropout Voltage		Pickup Voltage	VA
	Minimum	Maximum	Maximum			Minimum	Maximum	Maximum	
12	4.2	8.4	10.2	1.9	12	4.2	8.4	10.2	1.6
24	8.4	16.8	20.4	3.9	24	8.4	16.8	20.4	3.1
48 60	21.0	33.6	40.8	2.5 3.8	48 60	21.0	33.6	40.8	2.0 3.1
110 120 127	44.5	77.0	93.5	1.8 2.1 2.4	110 120 125	44.5	77.0	93.5	1.6 1.9 2.2
208 220 240	84.0	145.6	176.8	2.7 3.1 3.8	220 250	87.5 —	154.0 —	187.0 —	3.1 — 4.0
380 415 480 500	175.0	266.0	323.0	3.4 4.0 4.6 5.4	— — — —	— — — —	— — — —	— — — —	— — — —

③ Endurance: 3,000 electrical operations plus 1,000 mechanical operations.

Table 12-434. R-Frame ac Undervoltage Release Mechanism (Handle Reset) Ratings ①②

Catalog Suffix	Application Ratings	Electrical Operating Ratings				Approximate Operating Time (ms)				
	Voltage (V)	Supply Voltage (V)	Dropout Voltage (V)		Pickup Voltage (V) Max.	VA	Minimum UVR Response ③	Initiation Circuit Breaker Contact Separation ④	Maximum Circuit Breaker Contact Opening	Dielectric Withstand Voltage (V) ⑤
			Minimum	Maximum						
02/02K	12	12	4.2	8.4	10.2	2.3	5	46	77	1024
03/03K	24	24	8.4	16.8	20.4	3.1	5	46	77	1048
05/05K	48 – 60	48 60	21.0	33.5	40.8	3.4 6.0	5	46	77	1120
08/08K	110 – 127	110 120 127	44.5	77.0	93.5	3.3 3.6 3.8	5	46	77	1254
11/11K	208 – 240	208 220 240	84.0	145.6	176.8	4.2 6.6 7.2	5	46	77	1480
29/29K	380 – 500	380 415 440 480 500	168.0	266.0	323.0	3.8 8.3 8.8 9.6 10.0	5	46	77	2000

① Endurance: 500 electrical operations plus 2500 mechanical operations.
② Pigtail wire size: 18 AWG (0.82 mm^2). Leads are orange and brown.
③ UVR will override a momentary voltage dip up to the response time shown.
④ Unlatching occurs 1 millisecond before circuit breaker contacts begin to separate.
⑤ For 1 minute.

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Table 12-435. R-Frame dc Undervoltage Release Mechanism (Handle Reset) Ratings ⑥⑦

Catalog Suffix	Application Ratings	Electrical Operating Ratings				Approximate Operating Time (ms)				
	Voltage (V)	Supply Voltage (V)	Dropout Voltage (V)		Pickup Voltage (V) Max.	VA	Minimum UVR Response ⑧	Initiation Circuit Breaker Contact Separation ⑨	Maximum Circuit Breaker Contact Opening	Dielectric Withstand Voltage (V) ⑩
			Minimum	Maximum						
20/20K	12	12	4.2	8.4	10.2	3.4	5	46	77	1024
21/21K	24	24	8.4	16.8	20.4	4.3	5	46	77	1048
23/23K	48 – 60	48 60	21.0	33.5	40.8	4.8 7.2	5	46	77	1120
26/26K	110 – 127	110 120 125	43.8	77.0	93.5	3.3 3.6 3.8	5	46	77	1250
28/28K	220 – 250	220 250	87.5	154.0	187.0	6.6 7.5	5	46	77	1500

⑥ Endurance: 500 electrical operations plus 2500 mechanical operations.
⑦ Pigtail wire size: 18 AWG (0.82 mm^2). Leads are orange and brown.
⑧ UVR will override a momentary voltage dip up to the response time shown.
⑨ Unlatching occurs 1 millisecond before circuit breaker contacts begin to separate.
⑩ For 1 minute.

Table 12-436. G-Frame Undervoltage Release Mechanism (LH 3-Pole Only)

Electrical Ratings			Style Numbers ⑪⑫⑬	Price U.S. $	Factory Suffix	Adder U.S. $
Volts (ac Only)	Frequency	Amperes				
120	50/60 Hz	0.05	**1373D62G03**		**T1**	
24	50/60 Hz	0.22	**1373D62G04**		**T2**	
48	50/60 Hz	0.11	**1373D62G05**		**T3**	
60	50/60 Hz	0.10	**1373D62G06**		**T4**	
110	50 Hz	0.049	**1373D62G07**		**T5**	
208	60 Hz	0.026	**1373D62G08**		**T6**	
220	50 Hz	0.025	**1373D62G09**		**T7**	
240	50/60 Hz	0.024	**1373D62G10**		**T8**	
380	50 Hz	0.015	**1373D62G11**		**T9**	
415	50 Hz	0.013	**1373D62G12**		**T10**	
440	50 Hz	0.012	**1373D62G13**		**T11**	
480	60 Hz	0.01	**1373D62G14**		**T12**	

⑪ Includes 24-inch (609.6 mm) external pigtail leads, 18 AWG (16-.010).
⑫ A maximum of two internal accessories may be mounted in a 3-pole circuit breaker.
⑬ Suitable for mounting in left pole only of 3-pole breaker.

Note: G-frame circuit breakers are factory sealed. Underwriters Laboratories, requires that internal accessories be installed at the factory.

Note: Internal accessories are UL listed for factory installation under E7819.

Note: Where local codes and standards permit and UL listing is not required, internal accessories can be field installed. Accessory installation should be done before the circuit breaker is mounted and connected.

Discount Symbol **CB-2**

Table 12-437. F-Frame Factory Mounted (For F-Frame Breaker and F-Frame HMCP) Undervoltage Release Mechanism

Voltage Rating (ac Freq. = 50/60 Hz)	Connection Type and Location							
	18-Inch Pigtail Leads						Terminal Block	
	Same Side		Rear ①		Opposite Side		Same Side	
	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $
Left-Pole Mounting ac Ratings								
12 Vac	U01		U02		U03		U04	
24 Vac	U05		U06		U07		U08	
48 Vac	U37		U38		U39		U40	
60 Vac	U97		U98		U99		U100	
110 – 127 Vac	U13		U14		U15		U16	
208 – 240 Vac	U17		U18		U19		U20	
380 – 480 Vac	U21		U22		U23		U24	
525 – 600 Vac	U25		U26		U27		U28	
Right-Pole Mounting ac Ratings ②③								
12 Vac	U49		U50		U51		U52	
24 Vac	U53		U54		U55		U56	
48 Vac	U85		U86		U87		U88	
60 Vac	U101		U102		U103		U104	
110 – 127 Vac	U61		U62		U63		U64	
208 – 240 Vac	U65		U66		U67		U68	
380 – 480 Vac	U69		U70		U71		U72	
525 – 600 Vac	U73		U74		U75		U76	
Left-Pole Mounting dc Ratings								
12 Vdc	U29		U30		U31		U32	
24 Vdc	U33		U34		U35		U36	
48 Vdc	U37		U38		U39		U40	
60 Vdc	U97		U98		U99		U100	
110 – 127 Vdc	U41		U42		U43		U44	
220 – 250 Vdc	U45		U46		U47		U48	
Right-Pole Mounting dc Ratings ②③								
12 Vdc	U77		U78		U79		U80	
24 Vdc	U81		U82		U83		U84	
48 Vdc	U85		U86		U87		U88	
60 Vdc	U101		U102		U103		U104	
110 – 127 Vdc	U89		U90		U91		U92	
220 – 250 Vdc	U93		U94		U95		U96	

① Standard pigtail lead exit location.
② Standard mounting location.
③ Not for use on right pole of 4-pole circuit breaker.

Note: F-frame circuit breakers are factory sealed. Underwriters Laboratories, requires that internal accessories be installed at the factory.

Note: Internal accessories are UL listed for factory installation under E7819.

Note: Where local codes and standards permit and UL listing is not required, internal accessories can be field installed. Accessory installation should be done before the circuit breaker is mounted and connected.

Table 12-438. F-Frame Field Mounted Undervoltage Release Mechanism

Voltage Rating (ac Freq. = 50/60 Hz)	F-Frame Breaker				F-Frame Breaker HMCP			
	Field Installation Kits ①							
	Pigtail Leads		Terminal Block		Pigtail Leads		Terminal Block	
	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
Left-Pole Mounting ac Ratings								
12 Vac	UVH1LP02K		UVH1LT02K		MUVH1LP02K		MUVH1LT02K	
24 Vac	UVH1LP03K		UVH1LT03K		MUVH1LP03K		MUVH1LT03K	
48 Vac	UVH1LP22K		UVH1LT22K		MUVH1LP22K		MUVH1LT22K	
60 Vac	UVH1LP24K		UVH1LT24K		MUVH1LP24K		MUVH1LT24K	
110 – 127 Vac	UVH1LP08K		UVH1LT08K		MUVH1LP08K		MUVH1LT08K	
208 – 240 Vac	UVH1LP11K		UVH1LT11K		MUVH1LP11K		MUVH1LT11K	
380 – 480 Vac	UVH1LP15K		UVH1LT15K		MUVH1LP15K		MUVH1LT15K	
525 – 600 Vac	UVH1LP18K		UVH1LT18K		MUVH1LP18K		MUVH1LT18K	
Right-Pole Mounting ac Ratings ②③								
12 Vac	UVH1RP02K		UVH1RT02K		MUVH1RP02K		MUVH1RT02K	
24 Vac	UVH1RP03K		UVH1RT03K		MUVH1RP03K		MUVH1RT03K	
48 Vac	UVH1RP22K		UVH1RT22K		MUVH1RP22K		MUVH1RT22K	
60 Vac	UVH1RP24K		UVH1RT24K		MUVH1RP24K		MUVH1RT24K	
110 – 127 Vac	UVH1RP08K		UVH1RT08K		MUVH1RP08K		MUVH1RT08K	
208 – 240 Vac	UVH1RP11K		UVH1RT11K		MUVH1RP11K		MUVH1RT11K	
380 – 480 Vac	UVH1RP15K		UVH1RT15K		MUVH1RP15K		MUVH1RT15K	
525 – 600 Vac	UVH1RP18K		UVH1RT18K		MUVH1RP18K		MUVH1RT18K	
Left-Pole Mounting dc Ratings								
12 Vdc	UVH1LP20K		UVH1LT20K		MUVH1LP20K		MUVH1LT20K	
24 Vdc	UVH1LP21K		UVH1LT21K		MUVH1LP21K		MUVH1LT21K	
48 Vdc	UVH1LP22K		UVH1LT22K		MUVH1LP22K		MUVH1LT22K	
60 Vdc	UVH1LP24K		UVH1LT24K		MUVH1LP24K		MUVH1LT24K	
110 – 127 Vdc	UVH1LP26K		UVH1LT26K		MUVH1LP26K		MUVH1LT26K	
220 – 250 Vdc	UVH1LP28K		UVH1LT28K		MUVH1LP28K		MUVH1LT28K	
Right-Pole Mounting dc Ratings ②③								
12 Vdc	UVH1RP20K		UVH1RT20K		MUVH1RP20K		MUVH1RT20K	
24 Vdc	UVH1RP21K		UVH1RT21K		MUVH1RP21K		MUVH1RT21K	
48 Vdc	UVH1RP22K		UVH1RT22K		MUVH1RP22K		MUVH1RT22K	
60 Vdc	UVH1RP22K		UVH1RT22K		MUVH1RP22K		MUVH1RT22K	
110 – 127 Vdc	UVH1RP26K		UVH1RT26K		MUVH1RP26K		MUVH1RT26K	
220 – 250 Vdc	UVH1RP28K		UVH1RT28K		MUVH1RP28K		MUVH1RT28K	

① Not listed with Underwriters Laboratories, for field installation.
② Standard mounting location.
③ Not for use on right pole of 4-pole circuit breaker.

Table 12-439. J-Frame and HMCP (J) Undervoltage Release Mechanism

Voltage Rating (ac Freq. = 50/60 Hz)	Factory Mounted								Field Mounted			
	Connection Type and Location								Field Installation Kits ②			
	18-Inch (457.2 mm) Pigtail Leads						Terminal Block ①		Pigtail Leads		Terminal Block ③	
	Same Side		Rear ②		Opposite Side		Same Side					
	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
Left-Pole Mounting ac Ratings ④												
12 Vac	U05		U06		U07		U08		UVH2LP02K		UVH2LT02K	
24 Vac	U09		U10		U11		U12		UVH2LP03K		UVH2LT03K	
48 – 60 Vac	U13		U14		U15		U16		UVH2LP05K		UVH2LT05K	
110 – 127 Vac	U17		U18		U19		U20		UVH2LP08K		UVH2LT08K	
208 – 240 Vac	U21		U22		U23		U24		UVH2LP11K		UVH2LT11K	
380 – 480 Vac	U25		U26		U27		U28		UVH2LP15K		UVH2LT15K	
Right-Pole Mounting ac Ratings ③												
12 Vac	U37		U38		U39		U40		UVH2RP02K		UVH2RT02K	
24 Vac	U41		U42		U43		U44		UVH2RP03K		UVH2RT03K	
48 – 60 Vac	U45		U46		U47		U48		UVH2RP05K		UVH2RT05K	
110 – 127 Vac	U49		U50		U51		U52		UVH2RP08K		UVH2RT08K	
208 – 240 Vac	U53		U54		U55		U56		UVH2RP11K		UVH2RT11K	
380 – 480 Vac	U57		U58		U59		U60		UVH2RP15K		UVH2RT15K	
Left-Pole Mounting dc Ratings ④												
12 Vdc	T01		T02		T03		T04		UVH2LP20K		UVH2LT20K	
24 Vdc	T05		T06		T07		T08		UVH2LP21K		UVH2LT21K	
48 – 60 Vdc	T09		T10		T11		T12		UVH2LP23K		UVH2LT23K	
110 – 127 Vdc	T13		T14		T15		T16		UVH2LP26K		UVH2LT26K	
220 – 250 Vdc	T17		T18		T19		T20		UVH2LP28K		UVH2LT28K	
Right-Pole Mounting dc Ratings ③												
12 Vdc	T21		T22		T23		T24		UVH2RP20K		UVH2RT20K	
24 Vdc	T25		T26		T27		T28		UVH2RP21K		UVH2RT21K	
48 – 60 Vdc	T29		T30		T31		T32		UVH2RP23K		UVH2RT23K	
110 – 127 Vdc	T33		T34		T35		T36		UVH2RP26K		UVH2RT26K	
220 – 250 Vdc	T37		T38		T39		T40		UVH2RP28K		UVH2RT28K	

① For electrical rating data for manual, automatic and electrical reset undervoltage release mechanisms, refer to Eaton.
② Listed with Underwriters Laboratories for field installation under E64983.
③ Not for use on right pole of 4-pole circuit breakers.
④ Standard mounting location — leads exit rear of breaker.

Table 12-440. K-Frame and HMCP (K) Undervoltage Release Mechanism

Voltage Rating (ac Freq. = 50/60 Hz)	Factory Mounted								Field Mounted			
	Connection Type and Location								Field Installation Kits ①			
	18-Inch (457.2 mm) Pigtail Leads						Terminal Block		Pigtail Leads		Terminal Block	
	Same Side		Rear ②		Opposite Side		Same Side					
	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
Left-Pole Mounting ac Ratings ②												
12 Vac	U05		U06		U07		U08		UVH3LP02K		UVH3LT02K	
24 Vac	U09		U10		U11		U12		UVH3LP03K		UVH3LT03K	
48 – 60 Vac	U13		U14		U15		U16		UVH3LP05K		UVH3LT05K	
110 – 127 Vac	U17		U18		U19		U20		UVH3LP08K		UVH3LT08K	
208 – 240 Vac	U21		U22		U23		U24		UVH3LP11K		UVH3LT11K	
380 – 480 Vac	U25		U26		U27		U28		UVH3LP15K		UVH3LT15K	
Right-Pole Mounting ac Ratings ③④⑤												
12 Vac	U37		U38		U39		U40		UVH3RP02K		UVH3RT02K	
24 Vac	U41		U42		U43		U44		UVH3RP03K		UVH3RT03K	
48 – 60 Vac	U45		U46		U47		U48		UVH3RP05K		UVH3RT05K	
110 – 127 Vac	U49		U50		U51		U52		UVH3RP08K		UVH3RT08K	
208 – 240 Vac	U53		U54		U55		U56		UVH3RP11K		UVH3RT11K	
380 – 480 Vac	U57		U58		U59		U60		UVH3RP15K		UVH3RT15K	
Left-Pole Mounting dc Ratings ②												
12 Vdc	T01		T02		T03		T04		UVH3LP20K		UVH3LT20K	
24 Vdc	T05		T06		T07		T08		UVH3LP21K		UVH3LT21K	
48 – 60 Vdc	T09		T10		T11		T12		UVH3LP23K		UVH3LT23K	
110 – 127 Vdc	T13		T14		T15		T16		UVH3LP26K		UVH3LT26K	
220 – 250 Vdc	T17		T18		T19		T20		UVH3LP28K		UVH3LT28K	
Right-Pole Mounting dc Ratings ③④⑤												
12 Vdc	T21		T22		T23		T24		UVH3RP20K		UVH3RT20K	
24 Vdc	T25		T26		T27		T28		UVH3RP21K		UVH3RT21K	
48 – 60 Vdc	T29		T30		T31		T32		UVH3RP23K		UVH3RT23K	
110 – 127 Vdc	T33		T34		T35		T36		UVH3RP26K		UVH3RT26K	
220 – 250 Vdc	T37		T38		T39		T40		UVH3RP28K		UVH3RT28K	

① Listed with Underwriters Laboratories, for field installation under E64983.
② Standard mounting location — leads exit rear of breaker.
③ For use with KT (thermal-magnetic) trip units only.
④ Not for use on right pole of 4-pole circuit breaker.
⑤ Breakers with K-Frame OPTIM 550 can only accept accessories in left pole.

Table 12-441. L-, HMCP (L) and (M)-Frames and Undervoltage Release Mechanism

Voltage Rating (ac Freq. = 50/60 Hz)	Factory Mounted								Field Mounted			
	Connection Type and Location								Field Installation Kits ①			
	18-Inch (457.2 mm) Pigtail Leads						Terminal Block		Pigtail Leads		Terminal Block	
	Same Side		Rear ②		Opposite Side		Same Side					
	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
Left-Pole Mounting ac Ratings ②												
12 Vac	U05		U06		U07		U08		UVH4LP02K		UVH4LT02K	
24 Vac	U09		U10		U11		U12		UVH4LP03K		UVH4LT03K	
48 – 60 Vac	U13		U14		U15		U16		UVH4LP05K		UVH4LT05K	
110 – 127 Vac	U17		U18		U19		U20		UVH4LP08K		UVH4LT08K	
208 – 240 Vac	U21		U22		U23		U24		UVH4LP11K		UVH4LT11K	
380 – 480 Vac	U25		U26		U27		U28		UVH4LP15K		UVH4LT15K	
Right-Pole Mounting ac Ratings ③④												
12 Vac	U37		U38		U39		U40		UVH4RP02K		UVH4RT02K	
24 Vac	U41		U42		U43		U44		UVH4RP03K		UVH4RT03K	
48 – 60 Vac	U45		U46		U47		U48		UVH4RP05K		UVH4RT05K	
110 – 127 Vac	U49		U50		U51		U52		UVH4RP08K		UVH4RT08K	
208 – 240 Vac	U53		U54		U55		U56		UVH4RP11K		UVH4RT11K	
380 – 480 Vac	U57		U58		U59		U60		UVH4RP15K		UVH4RT15K	
Left-Pole Mounting dc Ratings ②												
12 Vdc	T01		T02		T03		T04		UVH4LP20K		UVH4LT20K	
24 Vdc	T05		T06		T07		T08		UVH4LP21K		UVH4LT21K	
48 – 60 Vdc	T09		T10		T11		T12		UVH4LP23K		UVH4LT23K	
110 – 127 Vdc	T13		T14		T15		T16		UVH4LP26K		UVH4LT26K	
220 – 250 Vdc	T17		T18		T19		T20		UVH4LP28K		UVH4LT28K	
Right-Pole Mounting dc Ratings ③④												
12 Vdc	T21		T22		T23		T24		UVH4RP20K		UVH4RT20K	
24 Vdc	T25		T26		T27		T28		UVH4RP21K		UVH4RT21K	
48 – 60 Vdc	T29		T30		T31		T32		UVH4RP23K		UVH4RT23K	
110 – 127 Vdc	T33		T34		T35		T36		UVH4RP26K		UVH4RT26K	
220 – 250 Vdc	T37		T38		T39		T40		UVH4RP28K		UVH4RT28K	

① Listed with Underwriters Laboratories for field installation under E64983.
② Standard mounting location — leads exit rear of breaker.
③ For use with LT (thermal-magnetic) trip units only.
④ Not for use on right pole of 4-pole circuit breaker.

Table 12-442. N-Frame and HMCP (N) Undervoltage Release Mechanism

Voltage Rating (ac Freq. = 50/60 Hz)	Factory Mounted								Field Mounted			
	Connection Type and Location								Field Installation Kits ⑤			
	18-Inch (457.2 mm) Pigtail Leads						Terminal Block		Pigtail Leads		Terminal Block	
	Same Side		Rear ⑥		Opposite Side		Same Side					
	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Suffix Number	Adder U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
Left-Pole Mounting ac Ratings ⑥												
12 Vac	U05		U06		U07		U08		UVH5LP02K		UVH5LT02K	
24 Vac	U09		U10		U11		U12		UVH5LP03K		UVH5LT03K	
48 – 60 Vac	U13		U14		U15		U16		UVH5LP05K		UVH5LT05K	
110 – 127 Vac	U17		U18		U19		U20		UVH5LP08K		UVH5LT08K	
208 – 240 Vac	U21		U22		U23		U24		UVH5LP11K		UVH5LT11K	
380 – 480 Vac	U25		U26		U27		U28		UVH5LP29K		UVH5LT29K	
Left-Pole Mounting dc Ratings ⑥												
12 Vdc	T01		T02		T03		T04		UVH5LP20K		UVH5LT20K	
24 Vdc	T05		T06		T07		T08		UVH5LP21K		UVH5LT21K	
48 – 60 Vdc	T09		T10		T11		T12		UVH5LP23K		UVH5LT23K	
110 – 127 Vdc	T13		T14		T15		T16		UVH5LP26K		UVH5LT26K	
220 – 250 Vdc	T17		T18		T19		T20		UVH5LP28K		UVH5LT28K	

⑤ Listed with Underwriters Laboratories for field installation under E64983.
⑥ Standard mounting location — leads exit rear of breaker.

Table 12-443. R-Frame Undervoltage Release Mechanism (RH only)

Voltage Rating (ac Frequency = 50/60 Hz)	Factory Mounted		Field Mounted	
	Connection Type and Location		Field Installation Kits ①	
	18-Inch (457.2 mm) Pigtail Leads		Pigtail Leads	
	Suffix Number ②	Adder U.S. $	Catalog Number ②	Price U.S. $
12 Vac	**U37**		**UVH6RP02K**	
24 Vac	**U41**		**UVH6RP03K**	
48 – 60 Vac	**U45**		**UVH6RP05K**	
110 – 127 Vac	**U49**		**UVH6RP08K**	
208 – 240 Vac	**U53**		**UVH6RP11K**	
380 – 500 Vac	**U57**		**UVH6RP29K**	
12 Vdc	**T21**		**UVH6RP20K**	
24 Vdc	**T25**		**UVH6RP21K**	
48 – 60 Vdc	**T29**		**UVH6RP23K**	
110 – 125 Vdc	**T33**		**UVH6RP26K**	
220 – 250 Vdc	**T37**		**UVH6RP28K**	

① Endurance: 500 electrical operations plus 2500 mechanical operations.
② Pigtail wire size: 18 AWG (0.82 mm^2). Leads are orange and brown.

Accessory Terminal Block (R-Frame)

(For Fixed Mounted Configuration)

Accessory Terminal Block

Internal accessory wiring leads are normally supplied with pigtail leads (18 AWG) that exit from the right side of the circuit breaker. Where specified, fixed mounted Accessory Terminal Blocks are available. A maximum of one 24-point terminal block can be installed on the right side of the circuit breaker for the internal accessories.

For convenience in determining the appropriate number of terminal block points required, refer to **Table 12-444**.

Table 12-444. Number of Control Wires for Each Internally Mounted Accessory

Type of Accessory	Number of Contacts per Single Accessory	Required Number of Wires
Auxiliary Switch	2a/2b 4a/4b	6 12
Alarm (Signal)/ Lockout Switch	1m/1b 2m/2b	6 12
Shunt Trip	N/A	2
Low Energy Shunt	N/A	2
Undervoltage Release Mechanism	N/A	2

Table 12-445. R-Frame Accessory Terminal Block ①

Factory Installed		Field Mounted	
Suffix Number	Adder U.S. $	Catalog Number	Price U.S. $
Q01		TBRDK	

① One 24-point accessory terminal block provided with circuit breaker when ordered factory installed or shipped from warehouse as separate item when ordered for field installation. See Digitrip RMS master connection diagram (IL 29C714).

12

Eaton's Cutler-Hammer PowerNet and Zone Interlock Kits (OPTIM 550 only) K-, L- and N-Frames

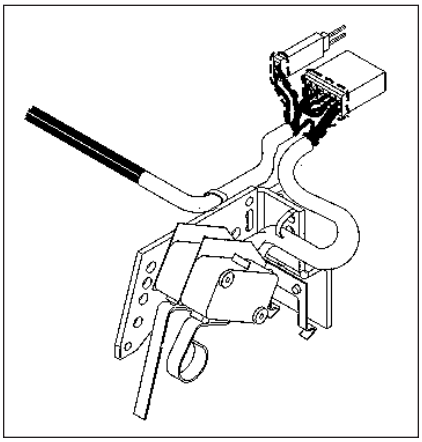

Figure 12-45. PowerNet Communication Kit

Eaton's Cutler-Hammer PowerNet Communications Kit can be ordered to add PowerNet communications to an existing OPTIM 550 breaker in the field. An 18-inch (457.2 mm) wiring pigtail is routed to the rear of the breaker: two wires for PowerNet and two wires for 24 Vdc (45 mA load). It is recommended that the power supply be an "isolated high quality" unit.

Table 12-446. PowerNet and Zone Interlock Kits ①

Circuit Breaker	PowerNet			Zone Interlocking/ Ground ②			PowerNet & Zone Interlocking/Ground ②		
	Factory Install Suffix	Catalog Number	Price U.S. $	Factory Install Suffix	Catalog Number	Price U.S. $	Factory Install Suffix	Catalog Number	Price U.S. $
K-Frame	PN	ICK550K		ZG	ZGK550K		ZGP	ZGPK550K	
L-Frame	PN	ICK550L		ZG	ZGK550L		ZGP	ZGPK550L	
N-Frame	PN	ICK550N		ZG	ZGK550N		ZGP	ZGPK550N	

① Installation of these kits restrict any other attachments from being installed in the RH pole.
② Includes a ground fault alarm signal which can drive the Ground Fault Alarm unit (Catalog Number GFAU).

Termination Hardware

End Cap Kit

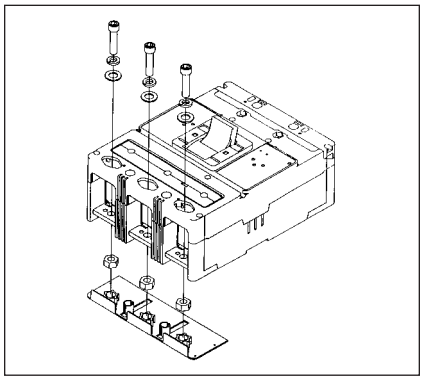

Figure 12-46. End Cap Kit

The End Cap Kit slides onto the line or load conductor of the circuit breaker and acts as a threaded adapter for the conductor to accept a ring terminal or other bolt-on connector. The end cap kit is available with English and metric thread sizes. (Field installation only.) Listed per UL File E7819.

Table 12-447. End Cap Kit

Thread Type	Thread Size	Catalog Number	Price U.S. $
2-Pole F-Frame (225 A)			
Imperial Metric	10-32 M-5	**KPEK12** **KPEKM12**	
3-Pole F-Frame (225 A)			
Imperial Metric	10-32 M-5	**KPEK1** **KPEKM1**	
4-Pole F-Frame (225 A)			
Imperial Metric	10-32 M-5	**KPEK14** **KPEKM14**	
3-Pole J-Frame			
Imperial Metric	.312-18 M-8	**KPEK2** **KPEKM2**	
4-Pole J-Frame			
Imperial Metric	.312-18 M-8	**KPEK24** **KPEKM24**	
3-Pole K-Frame			
Imperial Metric	.312-18 M-8	**KPEK3** **KPEKM3**	
4-Pole K-Frame			
Imperial Metric	.312-18 M-8	**KPEK34** **KPEKM34**	
3-Pole L-Frame			
Imperial Metric	.312-18 M-8	**KPEK4** **KPEKM4**	
4-Pole L-Frame			
Imperial Metric	.312-18 M-8	**KPEK44** **KPEKM44**	

Keeper Nut

The Keeper Nut slides onto the line or load conductor of the circuit breaker and acts as a threaded adapter for the conductor to accept a ring terminal or other bolt-on connector. The keeper nut is available with English and metric thread sizes. Screws and washers are supplied by customer. (Field installation only.) Listed per UL File E7819.

Table 12-448. F-Frame Keeper Nut

Thread Type	Thread Size	Catalog Number Package of 12 (Priced Individually)	Price U.S. $
Imperial Metric	10-32 M-5	**KPR1A** **KPR1AM**	

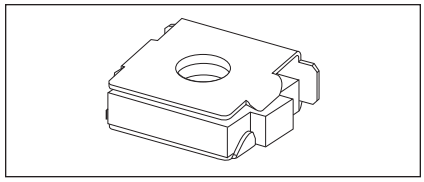

Figure 12-47. F-Frame Keeper Nut

Table 12-449. K-Frame Keeper

Thread Type	Thread Size	Line/ Load End	Catalog Number Package of 3	Price U.S. $
Imperial	.375-16	Line Load	**KPR3A** **KPR3B**	
Metric	M-8	Line Load	**KPR3AM** **KPR3BM**	

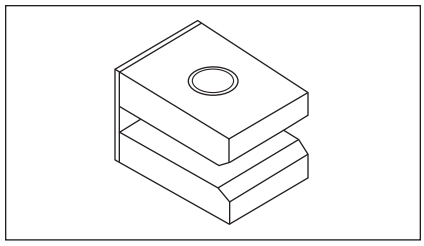

Figure 12-48. K-Frame Keeper Nut

L-, M-, N-Frames

Not required. Terminals are threaded.

12

Plug Nut

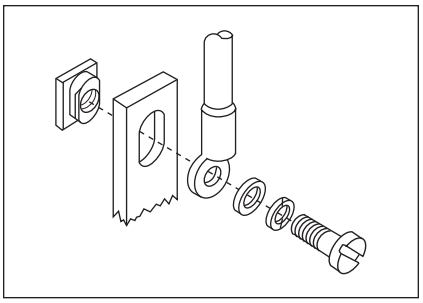

Figure 12-49. J-Frame Plug Nut

The Plug Nut is used in applications where screw-connected ring-type terminals are preferred to connect cables to circuit breaker conductors. The plug nut is press-fit into the opening in the circuit breaker terminal conductor. Screws and washers are supplied by customer.

Table 12-450. J-Frame Plug Nut

Thread Type	Thread Size	Catalog Number Package of 6	Price U.S. $
Imperial Metric	.250-20 M-6	**PLN2** **PLN2M**	

Terminal Adapter

Table 12-451. K-Frame Terminal Adapter ①

Line/Load End	Catalog Number	Price U.S. $
Line & Load	**TAD3**	

① K-Frame terminal adapter for use in replacing LB/DA breakers.

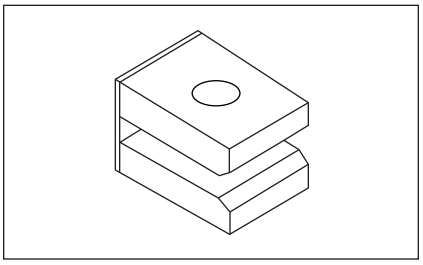

Figure 12-50. K-Frame Terminal Adapter

Control Wire Terminal Kit

Table 12-452. G-Frame Control Wire Terminal

Description	Catalog Number	Catalog Number	Price U.S. $
Control Wire Terminal (Kit of 12)	**5652B38G01**	**GCWTK**	

The Control Wire Terminal Kit provides a means to tap off control power from a main disconnect, using the provided male end of a quick disconnect.

For use with steel or stainless steel terminals only.

Note: Terminal Kits contain one terminal for each pole and one terminal cover.

F-Frame Ordering Information

Package of 12 control wire terminal tangs. Terminals must be ordered separately. Priced individually.

Table 12-453. F-Frame Control Wire Terminal Kit

Maximum Amperes	Catalog Number	Price U.S. $
150 225	**FCWTK** **FCWTK225**	

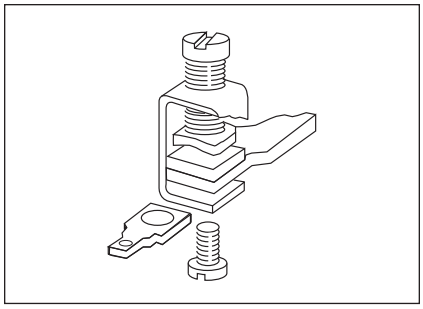

Figure 12-51. F-Frame Kit

Not for use with T250KB terminals.

J- and K-Frame Ordering Information

Package of 12 control wire terminal tangs. Terminals must be ordered separately. Priced individually.

Table 12-454. J- and K-Frame Control Wire Terminal Kit Ordering Information

Catalog Number	Price U.S. $
KCWTK	

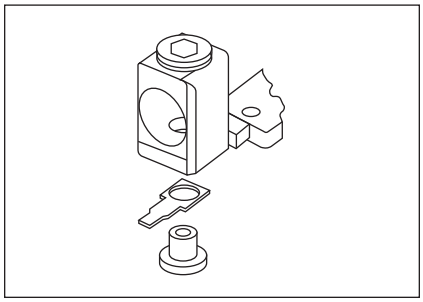

Figure 12-52. J- and K-Frame Kit

Table 12-455. L-Frame Control Wire Terminal Kit

AWG Wire Range/Number Conductors	Metric Wire Range mm^2	Catalog Number	Price U.S. $
Al/Cu (2) 250 – 350 kcmil	120 – 150	**TA602LDCW** ②	
Cu (2) 3/0 – 350 kcmil	120 – 150	**T602LDCW** ②	
Al/Cu (2) 400 – 500 kcmil	185 – 240	**2TA603LDKCW** ③ **2-Pole Kit**	
Al/Cu (2) 400 – 500 kcmil	185 – 240	**3TA603LDKCW** ③ **3-Pole Kit**	
Al/Cu (2) 400 – 500 kcmil	185 – 240	**4TA603LDKCW** ③ **4-Pole Kit**	

② Individually packed.

③ Terminal kits contain one terminal for each pole and one terminal cover.

Multiwire Connectors

Eaton's Cutler-Hammer field-installed multiwire connectors for the load side (OFF) end terminals, are used to distribute the load from the circuit breaker to multiple devices without the use of separate distribution terminal blocks.

Multiwire lug kits include mounting hardware, insulators and tin-plated aluminum connectors to replace three mechanical load lugs. UL listed as used on the load side (OFF) end.

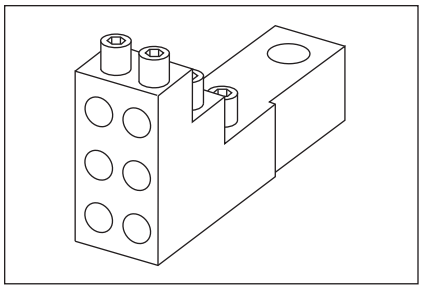

Figure 12-53. Multiwire Connectors

Table 12-456. Multiwire Connectors Ordering Information (Package of 3)

Maximum Amperes	Wires per Terminal	Wire Size Range AWG Cu	Kit Catalog Number	Price U.S. $
G-Frame ①				
100	3	14 – 2	**3TA100G3K**	
100	6	14 – 6	**3TA100G6K**	
F-Frame				
225	3	14 – 2	**3TA150F3K**	
225	6	14 – 6	**3TA150F6K**	
J-Frame				
250	3	14 – 2	**3TA250J3K**	
250	6	14 – 6	**3TA250J6K**	
K-Frame				
400	3	14 – 2/0	**3TA400K3K**	
400	6	14 – 3	**3TA400K6K**	

① GD breakers require special tapping for multiwire lugs, as described in the IL. Special terminals are required as well.

12

Base Mounting Hardware

Ordering Information

Hardware for surface mounting of circuit breakers is supplied only on request. Hardware consists of mounting screws and lockwashers. Order hardware for circuit breaker pole configurations as required.

Table 12-457. Mounting Hardware

Screw Length in Inches (mm)	Catalog Number	Price U.S. $
G-Frame		
.138-32 x 2.63 (3.5 x 66.7 mm) Std.	**624B375G23**	
.138-32 x 3.00 (3.5 x 76.2 mm)	**8703C80G05**	

Table 12-458. Imperial Thread Mounting Hardware

Number of Poles	Description	Type of Mounting	Catalog Number	Price U.S. $
F-Frame				
1	.164-32 x 3.188-inch Pan-Head Steel Screws, Lockwashers, and Clamps	Individual Group ①	**624B375G01 624B375G02**	
2	.164-32 x 1.5-inch Pan-Head Steel Screws and Lockwashers	Individual	**4218B80G01**	
3, 4	.164-32 x 1.5-inch Pan-Head Steel Screws and Lockwashers	Individual	**BMH1**	
J-Frame				
2, 3, 4	.250-20 x 2.75 inch Pan-Head Steel Screws and Lockwashers	Individual	**BMH2**	
K-Frame				
2, 3, 4	.250-20 x 1.5 inch Pan-Head Steel Screws and Lockwashers	Individual	**BMH3**	
L-Frame				
2, 3, 4	.250-20 x 1.5 inch Filister-Head Steel Screws and Lockwashers and Flat Washers	Individual	**BMH4**	
M-Frame				
2, 3	.3125-18 x 1.25 inch Filister-Head Steel Screws and Lockwashers and Flat Washers	Individual	**BMH5**	
N-Frame				
2, 3, 4	.3125-18 x 1.25 inch Pan-Head Steel Screws and Lockwashers	Individual	**BMH5**	
R-Frame				
Supplied by customer				

① One set of hardware for two circuit breakers.

Table 12-459. Metric Thread Mounting Hardware

Number of Poles	Description	Type of Mounting	Catalog Number	Price U.S. $
F-Frame				
1	M4 – 0.7 x 80 mm Pan-Head Steel Screws, Lockwashers, and Clamps	Individual Group (one set of hardware for two circuit breakers)	**4218B80G09 4218B80G10**	
2	M4 – 0.7 x 38 mm Pan-Head Steel Screws and Lockwashers	Individual	**4218B80G11**	
3, 4	M4 – 0.7 x 38 mm Pan-Head Steel Screws and Lockwashers	Individual	**BMH1M**	
J-Frame				
2, 3, 4	M6 – 0.7 x 70 mm Pan-Head Steel Screws and Lockwashers	Individual	**BMH2M**	
K-Frame				
2, 3, 4	M6 – 0.7 x 38 mm Pan-Head Steel Screws and Lockwashers	Individual	**BMH3M**	
L-Frame				
2, 3	—	Individual	**BMH4M**	
M-Frame				
2, 3	—	Individual	**BMH5M**	
N-Frame				
2, 3	—	Individual	**BMH5M**	
R-Frame				
Supplied by customer				

Drawout Cassette

R-Frame with Moveable Mechanism

Product Description

The Drawout Cassette is currently for use with the standard 3-pole 65 kA/ 480 Vac, 1600 and 2000 ampere RD circuit breakers only. It consists of two separate components: the movable mechanism which is factory mounted to the circuit breaker frame and the stationary mechanism which is housed in the cassette and shipped separately.

The drawout mechanism has four positions.

- **Connected**: The breaker is fully connected to the primary stabs and secondary contacts.
- **Test:** The breaker is not connected to the primary stab but is connected to the secondary contacts.
- **Disconnected**: Both the primary stabs and the secondary contacts are disconnected.
- **Withdraw**: The breaker can be removed from the cassette.

Product Selection

Table 12-460. RD Drawout Cassette

Description	Catalog Number	Price U.S. $
65 kA/480 Vac Version		
Movable Mechanism	**RD20DOM** ①	
Stationary Mechanism	**RD20DOS** ② **RD20DOSS** ③	
100 kA/480 Vac Version		
Movable Mechanism	**RDC20DOM** ①	
Stationary Mechanism	**RDC20DOS (without shutters)** **RDC20DOSS (with shutters)**	

① List price included in price of the stationary mechanism.
② Without shutters.
③ With shutters.

Movable mechanism must be ordered with RD or RDC circuit breaker and is shipped mounted to circuit breaker frame. Stationary mechanism is ordered separately.

All internal accessories must be factory installed for use with drawout.

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Discount Symbol **CB-2**

Terminal Shields

Terminal Shields provide protection against accidental contact with live line side terminations. Terminal shields are fabricated from high dielectric insulating material and fasten over the front terminal access openings. Small openings in the shields provide limited access to the terminals for tightening connectors. (Field installation only.)

Table 12-461. G-Frame Terminal Shield

Number Units in Package	Catalog Number	Price U.S. $
10	GTSK3	

F-Frame

Table 12-462. F-Frame Terminal Shield

Number of Poles	Location	Standard (Package of 10) (Priced Individually)		Special — For use when electrical operator is mounted on circuit breaker	
		Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
1	Line	625B229G06		—	
2		625B229G07		—	
3		625B229G08		4210B95G01	
4		625B229G09		4210B95G02	

J-Frame

Table 12-463. J-Frame Terminal Shield

Number of Poles	Location	Catalog Number (Package of 10)	Price U.S. $
2,3	Line End	1266C07G01	
4		6631C01G01	
2,3	Load End	6641C16G01	
4		6641C16G02	

K-Frame

Table 12-464. K-Frame Terminal Shield

Number of Poles	Location	Catalog Number (Package of 10)	Price U.S. $
2, 3	Line	TS33LN	
4	Line	TS34LN	
3	Load	TS33LD	

L-Frame

Table 12-465. L-Frame Terminal Shield

Catalog Number (Package of 1)	Price U.S. $
314C420G05	

M-Frame

Table 12-466. M-Frame Terminal Shield

Catalog Number (Package of 1)	Price U.S. $
208B966G01	

Table 12-467. N-Frame Terminal Shield

Catalog Number (Package of 1)	Price U.S. $
NTS3K	

Discount Symbol **CB-2**

Terminal End Covers

F-Frame

Product Description

The Terminal End Covers are designed for use in motor control center applications where, because of confined spaces, line side conductors are normally custom fitted. The molded end covers are made of high dielectric glass-polyester and slide over the line ends of the circuit breaker. Close fitting conductor openings are molded into the end covers. The end cover and circuit breaker case fit together to form terminal compartments that isolate discharged ionizing gases during circuit breaker tripping. Terminal end covers are available with two conductor opening diameters, 0.25-inch (6.4 mm) and 0.41-inch (10.4 mm), and are listed per UL File E7819. (Field installation only.)

Ordering Information

The terminal end cover is available for 3-pole circuit breakers only. Two conductor opening sizes are available. Specify quantity (one per circuit breaker) when ordering.

Table 12-468. F-Frame Terminal End Covers

Conductor Opening Diameter in Inches (mm)	Catalog Number	Price U.S. $
0.25 (6.35 mm)	**TEC1**	
0.41 (10.41 mm)	**TEC2**	

Interphase Barriers

The interphase barriers provide additional electrical clearance between circuit breaker poles for special termination applications. The barriers are high dielectric insulating plates that are installed in the molded slots between the terminals. (Field installation only.) Two per package.

Interphase Barrier

Table 12-469. Interphase Barriers

Frame	Catalog Number	Price U.S. $
F	**IPB1**	
J, K	**IPB3**	
L	**IPB4**	
M	**IPB4**	
N	**IPB5**	

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Discount Symbol **CB-2**

Base Mounting Plate

Base Mounting Plate

Suitable for mounting (6) single-pole circuit breakers.

Table 12-470. Base Mounting Plate G-Frame GD/GHC

Number Units in Package	Catalog Number	Price U.S. $
1	**207B513G01**	

DIN Rail Adapter

DIN Rail Adapter

For use with standard 35 mm DIN Rail such as, 35 x 7.5 or 35 x 15 mm per DIN EN50022.

Adapter mounting screws included are for use with 2- and 3-pole circuit breakers. Adapters for 1-pole circuit breakers (pictured above) clip into the base molding.

Table 12-471. DIN Rail Adapter G-Frame GD/GHC

Poles	Number Units in Package	Catalog Number	Price U.S. $
1, 2-Pole 3-Pole	10 10	**1225C79G01** **1225C79G02** ①	

① For use on 3-pole breakers only.

Key Operated Attachment

Table 12-472. Key Operated Attachment G-Frame GD/GHC

Number Units in Package	Catalog Number	Price U.S. $
10	**GKOA**	

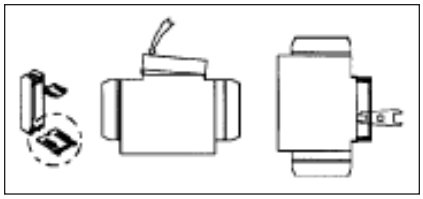


Figure 12-54. Key Operated Attachment

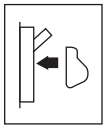
Lock Dog (Non-Padlockable)

Lock Dog (Non-Padlockable)

Table 12-473. Lock Dog (Non-Padlockable) G-Frame GD/GHC/GHB/GMCP

Number Units in Package	Catalog Number	Price U.S. $
1	**1294C01H01**	

Non-Padlockable Handle Block



Non-Padlockable Handle Block

Product Description

The Non-Padlockable Handle Block secures the circuit breaker handle in either the ON or OFF position. (Trip-free operation allows the circuit breaker to trip when the handle block holds the circuit breaker handle in the ON position.) The device is positioned over the circuit breaker handle and secured by a setscrew to deter accidental operation of the circuit breaker handle. Listed per UL File E7819. (Field installation only.)

Table 12-474. Non-Padlockable Handle Block

Frame	Catalog Number	Price U.S. $
F J, K L, M, N	**LKD1** **LKD3** **LKD4**	

Padlockable Handle

Padlockable Handle

Table 12-475. Padlockable G-Frame GD/GHC/GHB

Number Units in Package	Catalog Number ①	Price U.S. $
10 10 100	**1223C77G03** **1223C77G05** ② **1223C77G06** ②	

① Accepts .285 Lock Shank.
② Padlockable in the OFF position only.

Padlockable Handle Lock

Padlockable Handle Lock

The device is positioned in the cover opening to prevent handle movement. Will accommodate one 5/16-inch (8 mm) padlock.

Table 12-476. Padlockable Handle Lock

Frame	Catalog Number	Price U.S. $
G J, K	**GPHBOFF** **PHB3**	

Snap-on Padlockable Handle Lock Hasp

Snap-on Padlockable Handle Lock Hasp

Product Description

The Snap-on Padlockable Handle Lock allows the handle to be locked in the OFF or ON position. (Trip-free operation allows the circuit breaker to trip when the handle lock holds the circuit breaker handle in the ON position.) This device was designed for use on the 1-pole circuit breaker, but may be used on 1-, 2-, 3- and 4-pole styles. The handle lock snaps onto the escutcheon area of the handle with an optional retaining screw for added secureness. The handle lock will accommodate one padlock with a 1/4-inch (6.4 mm) shackle. Listed per UL File E7819. (Field installation only.)

Table 12-477. Snap-on Padlockable Handle Lock Hasp

Frame	Catalog Number	Price U.S. $
F	**PHL1**	

12

Discount Symbol **CB-2**

Padlockable Handle Lock Hasp

Padlockable Handle Lock Hasp

Product Description

The Padlockable Handle Lock Hasp allows the handle to be locked in the ON or OFF position. (Trip-free operation allows the circuit breaker to trip when the handle lock holds the circuit breaker handle in the ON position.) The hasp mounts on the circuit breaker cover within the trimline. The cover is predrilled on both sides of the operating handle so that the hasp can be mounted on either side of the handle. The hasp will accommodate up to three padlocks with 1/4-inch (6.4 mm) shackles, one per circuit breaker. Listed per UL File E7819. (Field installation only.)

Table 12-478. Padlockable Handle Lock Hasp

Description	Catalog Number	Price U.S. $
F-Frame		
1-Pole Breakers	**PHL1**	
2-, 3-, 4-Pole Breakers	**PLK1**	
For Left Side Mounting	**PLK1LOFF**	
For Right Side Mounting	**PLK1ROFF**	
J, K-Frames		
2-, 3-, 4-Pole Breakers	**PLK3**	
For Left Side Mounting	**PLK3LOFF** ①	
For Right Side Mounting	**PLK3ROFF** ①	
L-Frame (Side Mounted)		
Side Mounted		
Lock ON or OFF	**HLK4**	
Lock OFF Only (Left-Hand Mount)	**HLK4LOFF** ①	
L-Frame (Top Mounted)		
Lock ON or OFF	**HLK4S**	
Lock OFF Only	**HLK4SOFF** ①	
M-Frame		
Lock ON or OFF	**HLK4**	
Lock OFF Only (Left-Hand Mount)	**HLK4LOFF** ①	
M-Frame (Vertical Mounting)		
Lock ON/OFF	**HLK4S**	
Lock OFF Only	**HLK4SOFF**	
N-Frame		
Side Mounted	**PLK5**	
Top Mounted (ON/OFF)	**PLK5S**	
Top Mounted (OFF Only)	**PLK5SOFF** ①	
R-Frame		
Lock ON/OFF	**HLK6**	
Lock OFF Only	**HLK6OFF** ①	

① For padlockable handle lock hasp to padlock handle in OFF position only order either catalog number.

Cylinder Lock

Cylinder Lock

Product Description

The Cylinder Lock internally blocks the trip bar in the tripped position to prevent the circuit breaker from being switched to ON. The cylinder lock is factory installed in the left pole only of the circuit breaker cover. Other internally mounted accessories cannot be installed in the same pole as the cylinder lock. (Factory installation only.)

Table 12-479. Cylinder Lock

Frame	Catalog Number	Price U.S. $
F, J, K	Order by Description	

Discount Symbol **CB-2**

Key Interlock Kit (Lock Not Included)

Key Interlock Kit

Product Description

The Key Interlock is used to externally lock the circuit breaker handle in the OFF position. When the key interlock is locked, an extended deadbolt blocks movement of the circuit breaker handle. Uniquely coded keys are removable only with the deadbolt extended. Each coded key controls a group of circuit breakers for a given specific customer installation.

The key interlock assembly is Underwriters Laboratories listed for field installation under UL File E7819 and consists of a mounting kit and a purchaser supplied deadbolt lock. The mounting kit comprises a mounting plate, which is secured to the circuit breaker cover in either the left- or right-pole position, key interlock mounting screws, and a wire seal. Specific mounting kits are required for individual key interlock types.

Ordering Information

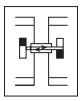
Key interlock mounting kits are for field installation only. Select mounting kit catalog numbers to match type of lock used. Key interlocks are supplied by customer.

Table 12-480. Key Interlock Kit

Lock Manufacturer	Lock Type	Bolt Projection in Withdrawn Position in Inches (mm)	Kit Catalog Number	Price U.S. $
F-Frame				
Superior Kirk® Square D®	B-4003-1 F SF	.38 (9.5) .38 (9.5) None	**KYK1**	
Castell ①	K or QK	.38 (9.5)	**CTK1**	
J, K-Frames				
Superior Kirk Square D	B-4003-1 F SF	.38 (9.5) .38 (9.5) None	**KYK3**	
Castell ①	K or QK	.38 (9.5)	**CTK3**	
L-, M-, N-Frames				
Superior Kirk Square D	B-4003-1 F SF	.38 (9.5) .38 (9.5) None	**KYK4**	
Castell ①	K or QK	.38 (9.5)	**CTK4**	
R-Frame				
Superior Kirk Square D	B-4003-1 F SF	1.0 (25.4) 1.0 (25.4) 1.0 (25.4)	**KYK6**	
Castell ①	K or QK	1.0 (25.4)	**CTK6**	
JG-Frame				
Superior Kirk Square D	B-4003-1 F SF	.38 (9.5) .38 (9.5) None	**KYKJG**	
Castell ①	K or QK	.38 (9.5)	**CTKJG**	
LG-Frame				
Superior Kirk Square D	B-4003-1 F SF	.38 (9.5) .38 (9.5) None	**KYKLG**	
Castell ①	K or QK	.38 (9.5)	**CTKLG**	

① When ordering Castell Interlock, it is necessary for customer to specify that the mounting bolt holes must be 10 mm in diameter.

Sliding Bar Interlock



Sliding Bar Interlock

Product Description

The Sliding Bar Interlock provides mechanical interlocking between two adjacent 3-pole circuit breakers. It is installed on the enclosure cover between the circuit breakers. When the sliding bar interlock handle is moved from one side to the other, a bar extends to alternately block movement of the circuit breaker handles and prevents both circuit breakers from being switched to ON at the same time. Sliding bar interlocks are not UL listed. (Field installation only.)

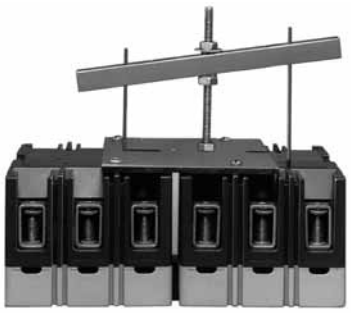
Ordering Information

The sliding bar interlock is available for mounting between two adjacent 3-pole circuit breakers with circuit breakers centerline spacing as indicated in table and enclosure front panel thickness of 1/8 or 3/16 inch (3.2 or 4.8 mm). (For field installation only.)

Table 12-481. Sliding Bar Interlock

Frame	Centerline Spacing in Inches (mm)	Catalog Number	Price U.S. $
F	4.19 (106.4)	**SBK1**	
J	4.38 (111.3)	**SBK2**	
K	5.75 (146.0)	**SBK3**	
L, M	8.50 (215.9)	**SBK4**	
N	8.50 (215.9)	**SBK5**	

Walking Beam Interlock



Walking Beam Interlock

Product Description

The Walking Beam Interlock provides mechanical interlocking between two adjacent circuit breakers of the same pole configuration. The walking beam interlock mounts on a bracket behind and between the circuit breakers. A plunger on each end of the beam is inserted through an access hole in the back plate and base of each circuit breaker. The walking beam interlock prevents both circuit breakers from being switched ON at the same time. If a walking beam interlock is installed, the wiring troughs in the back of the circuit breaker case are blocked by the plungers and cannot be used for cross wiring. Factory modified circuit breakers are required for this application. UL File E3816.

Ordering Information

The walking beam interlock is available for mounting between two adjacent circuit breakers spaced 1/4-inch (6.4 mm) apart and having the same pole configuration. The two circuit breakers must be factory modified to accept the walking beam interlock assembly (suitable for use with either 2-, 3- or 4-pole circuit breakers). With properly modified circuit breakers, the walking beam interlock is suitable for field installation. Order circuit breakers specifying modification for walking beam (20% price adder) and select walking beam interlock from table below. Circuit breakers and walking beam interlock are boxed and shipped separately.

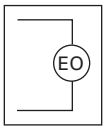
Table 12-482. Walking Beam Interlock

Frame	Catalog Number	Price U.S. $
F	**WBL1**	
K	**WBL3**	
L, M	**WBL4A**	
N	**WBL5**	
R ①	**WBL6**	

① 3-pole only.

Discount Symbol **CB-2**

Electrical Operator



Electrical Operator

Product Description

The Electrical (Solenoid) Operator is a single solenoid mechanism that enables local and remote circuit breaker ON, OFF, and reset switching. The electrical operator is mounted on the circuit breaker cover within the trimline of the circuit breaker. The electrical operator uses a unique bi-stable latch that allows the device to operate using one solenoid. The accessory provides high-speed switching with a maximum operating time of 5 cycles (80 mS), making it suitable for generator synchronizing applications.

Means are provided for remote electrical operation and for local manual operation. A special slide includes provisions for padlocking the circuit breaker handle in the OFF position. The slide will accept three padlock shackles with a maximum diameter of 1/4-inch (6.4 mm) each. An interlock electrically disconnects the solenoid when the electrical operator cover is removed. The Rating Data Tables provide electrical rating data for the electrical (solenoid) operator.

The Electrical (Motor) Operator allows the circuit's breaker to be opened, closed or reset remotely. It also has a lock-off capability and provisions for manual operation.

The Electrical (Motor) Operator contains a reversible motor connected to a ball screw. The ball screw drives the circuit breaker handle. Limit switches and relays are used to control the motor.

Table 12-483. F-Frame Electrical (Solenoid) Operator Rating Data ①②

Voltage ③	Frequency	Inrush Current Amperes	Maximum Operating Time	Fuse ④ Amperes
120 240	50/60 Hz ac	10 5	5 cycles (80 ms)	3 2

① UL listed under UL File E64983.
② The electrical operator design is endurance tested for 8,000 electrical operations.
③ Tolerance: +10%, –15% of nominal voltage.
④ Use current-limiting type fuse where required.

Table 12-484. F-Frame Electrical (Solenoid) Operator

Voltage	Frequency	Terminal Block		18-Inch (457.2 mm) Pigtail Lead	
		Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
120 240	ac	**EOP1T07** **EOP1T11**		**EOP1P07** **EOP1P11**	

Table 12-485. F-Frame Electrical (Motor) Operator Rating Data ⑤⑥⑦⑧

Voltage ⑨	Frequency	Inrush Current Amperes
120	ac	2
24 48 125	dc	5 3 2

⑤ UL listed under UL File E64124.
⑥ Frequency: 50/60 Hz.
⑦ The electrical operator design has been endurance tested for 8,000 electrical operations.
⑧ Maximum operating time: 3 seconds max. Operator is an intermittent duty device. The safe duty cycle (OFF to ON to OFF) should not exceed one per minute.
⑨ Tolerance: +10%, -15% of nominal voltage.

Table 12-486. F-Frame Electrical (Motor) Operator

Voltage	Frequency	18-Inch (457.2 mm) Pigtail Lead	
		Catalog Number	Price U.S. $
120	50/60 Hz ac	**MOP1P07**	
24 48 125	dc	**MOP1P03DC** **MOP1P05DC** **MOP1P07DC**	

Table 12-487. J-Frame Electrical (Solenoid) Operator Rating Data ⑩⑪⑫⑬

Voltage ⑭	Inrush Current Amperes	Fuse Amperes
120 240	30 16	6 4

⑩ UL listed under UL File E64983.
⑪ The electrical operator design has been endurance tested for 6,000 electrical operations.
⑫ Frequency: 50/60 Hz.
⑬ Maximum operating time: 5 cycles (80 mS).
⑭ Tolerance: +10%, -15% of nominal voltage.

Table 12-488. J-Frame Electrical (Solenoid) Operator

Operating Voltage	Frequency	Terminal Block	
		Catalog Number	Price U.S. $
120 240	50/60 Hz ac	**EOP2T07** **EOP2T11**	

Table 12-489. K-Frame Electrical (Solenoid) Operator Rating Data ①②③④

Operating Voltage ⑤	Inrush Current Amperes	Fuse Amperes
120	30	6
240	16	4

① UL listed under UL File E64983.
② The electrical operator design has been endurance tested for 6,000 electrical operations.
③ Frequency: 50/60 Hz.
④ Maximum operating time: 5 cycles (80 mS).
⑤ Tolerance: +10%, -15% of nominal voltage.

Table 12-490. K-Frame Electrical (Solenoid) Operator

Operating Voltage	Frequency	Terminal Block	
		Catalog Number	Price U.S. $
120 240	50/60 Hz ac	**EOP3MT07** **EOP3MT11**	

Table 12-491. K-Frame Electrical (Solenoid) Operator Base Mounting Kit

Frame	Catalog Number	Price U.S. $
K	**BBMK3**	

Table 12-492. L- and M-Frame Electrical (Motor) Operator Rating Data ⑥⑦⑧⑨

Operating Voltage ⑩	Inrush Current Amperes
120 ac	31
208	13
240	12
125 dc	21
24	50

⑥ UL listed under UL File E64983.
⑦ The electrical operator design has been endurance tested for 6,000 electrical operations.
⑧ Frequency: 50/60 Hz.
⑨ Maximum operating time: 12 cycles.
⑩ Tolerance: +10%, –15% of nominal voltage.

Table 12-493. L- and M-Frame Electrical (Motor) Operator 310 and OPTIM)

Operating Voltage	Frequency	Terminal Block	
		Catalog Number	Price U.S. $
120 208 240 480	50/60 Hz	**EOP4MT07** **EOP4MT11** **EOP4MT11A** **EOP4MT15**	
125 24	dc	**EOP4MT26** **EOP4MT21**	

Table 12-494. N-Frame Electrical (Motor) Operator Rating Data ⑪⑫⑬⑭

Operating Voltage ⑮	Frequency	Inrush Current Amperes	Fuse Amperes
120	50/60 Hz	31	6
208		21	—
240		19	4
480		—	—
24	dc	50	—
48		80	—
125		21	—

⑪ UL listed under UL File E64983.
⑫ Frequency: 50/60 Hz.
⑬ The electrical operator design has been endurance tested for 2,500 electrical operations.
⑭ Maximum operating time: 12 cycles max. Operator is an intermittent duty device. The safe duty cycle (OFF to ON to OFF) should not exceed one per minute.
⑮ Tolerance: +10%, –15% of nominal voltage.

Table 12-495. N-Frame Electrical (Motor) Operator

Operating Voltage	Frequency	Pigtail Leads	
		Catalog Number	Price U.S. $
120 208 240 480	50/60 Hz	**EOP5T07** **EOP5T09** **EOP5T11** **EOP5T15**	
24 48 125	dc	**EOP5T21** **EOP5T22** **EOP5T26**	

Note: For OPTIM trip, OPEOPCK kit required.

Table 12-496. R-Frame Electrical (Motor) Operator Rating Data ⑯⑰⑱⑲

Operating Voltage ⑳	Frequency	Motor Inrush Current Amperes
120	50/60 Hz	40
240	50/60 Hz	27
48	dc	53
24		58

⑯ Operator is an intermittent duty service. The safe duty cycle (OFF to ON to OFF) should not exceed one per minute.
⑰ Electric Operating time at rated voltage; (a) To turn breaker ON – 1/2 second max. (b) To turn breaker OFF – 1/2 second max.
⑱ Motor operating temperature; Class "A" temperature limits apply.
⑲ A minimum 1 kVA power source is recommended for motor operation.
⑳ Applied voltage should be no less than 85% or no more than 110% of rated voltage.

Table 12-497. R-Frame Electrical (Motor) Operator

Operating Voltage	Frequency	Factory-Installed Terminal Block	
		Catalog Number	Price U.S. $
120	50/60 Hz	**EOP6T08K**	
240	50/60 Hz	**EOP6T11K**	
48	dc	**EOP6T21K**	

Plug-in Adapters

Plug-in Adapter

Product Description

Plug-in Adapters simplify installation and front removal of circuit breakers. Individual line and load plug-in adapters are available for rear connection applications on 2-, 3- and 4-pole circuit breakers. Common mounting plates for line- and load-end adapters are available.

One Plug-in Adapter Kit is required for line-end and one for load-end.

Plug-in Adapters are UL approved unless otherwise noted.

Table 12-498. F-Frame Ordering Information (Flat Bar Type)

Continuous Current Rating (Amperes)	2-Pole		3-Pole		4-Pole	
	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
100 – 225	**1480D13G01**		**1480D13G02**		**1480D13G07** ①	
Mounting Plate	**176C511H01**		**507C047H01**		—	

① 100 ampere maximum.

Table 12-499. J-Frame Ordering Information (Flat Bar Type)

Continuous Current Rating (Amperes)	Terminal End	2-Pole		3-Pole		4-Pole	
		Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
250	Line Load 1 Line and 1 Load	**1260C86G05** **1260C86G07** **506C144G27**		**1260C86G06** **1260C86G08** **506C144G28**		**1231C67G01** **1231C67G02** —	
Mounting Plate	—	②		**PMP23**		—	

② Use 3-pole mounting plate for 2-pole circuit breaker.

Table 12-500. K-Frame Ordering Information (Flat Bar Type) — 600 Vac Maximum

Continuous Current Rating (Amperes)	2-Pole		3-Pole		4-Pole	
	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
400	**PAD32**		**PAD33**		—	
Mounting Plate	③		**PMP33**		—	

③ Use 3-pole mounting plate for 2-pole circuit breaker.

Table 12-501. L-Frame Ordering Information (Threaded Stud Type)

Continuous Current Rating (Amperes)	2-Pole		3-Pole		4-Pole	
	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
600 (Threaded Stud Type)	**506C059G03**		**506C059G04**		**PAD44**	
600 (Flat Bar Type)	**1288C19G01**		**1288C19G02**		**6636C55H01**	
Mounting Plate	**504C824H01**		**504C824H01**		—	

Table 12-502. M-Frame Ordering Information (Flat Bar Type) — 600 Vac Maximum

Continuous Current Rating (Amperes)	2-Pole		3-Pole	
	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
800	**2614D53G05**		**2614D53G06**	
Mounting Plate	**1290C73H01**		**1290C73H01**	

Table 12-503. N-Frame Ordering Information (Flat Bar Type)

Continuous Current Rating (Amperes)	2-Pole		3-Pole	
	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
1200	**2614D53G03**		**2614D53G04**	
Mounting Plate	**1290C73H01**		**1290C73H01**	

Table 12-504. Plug-in Adapters

Frame	Poles	Standard Certification	Catalog Number	Price U.S. $
FD	3	IEC	**PAD3F**	
FD	4	IEC	**PAD4F**	
JD	3	IEC	**PAD3JD**	
KD	3	IEC	**PAD3K**	
LD	3	IEC	**PAD3LD**	
LD	4	IEC	**PAD4LD**	

Discount Symbol..... **CB-2**

Rear Connecting Studs

Product Description

Rear Connecting Studs are available in several sizes to accommodate specific fixed-mounted circuit breaker applications.

Each rear connecting stud assembly consists of one stud and one tube. To maintain proper clearances between poles, select alternate long and short stud assemblies for circuit breakers with more than one pole. One assembly is required for line-end and one for load-end of each pole. Tubes must be ordered separately. Connecting studs are available only with English thread sizes.

Note: Not UL listed.

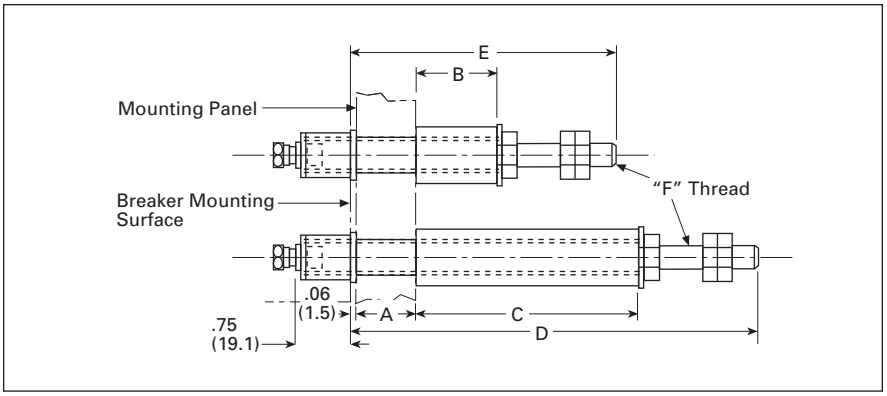


Figure 12-55. F-Frame

Table 12-505. F-Frame Ordering Information — Dimensions in Inches (mm) ①

Stud Ampere Rating	Stud Catalog Number	Price U.S. $	Panel Thickness A	Tube Length B	Tube Length C	Tube Catalog Number	Price U.S. $	Dimensions D	Dimensions E	Dimensions F
For 15 to 100 Ampere Circuit Breakers										
100 A Short	**451D874G01**		1.00 (25.4)	1.06 (26.9)	—	**32B9446H20**		—	3.63 (92.1)	.31
100 A Short	**451D874G01**		.69 – .94 (17.5 to 23.8)	1.38 (34.9)	—	**32B9446H21**		—		(7.9) – 18
100 A Short	**451D874G01**		.38 – .63 (9.5 to 15.9)	1.69 (42.9)	—	**32B9446H22**		—		
100 A Short	**451D874G01**		.25 – .31 (6.4 to 7.9)	2.00 (50.8)	—	**32B9446H23**		—		
100 A Long	**451D874G02**		1.00 (25.4)	—	3.44 (87.3)	**32B9446H24**		6.13 (155.6)	—	
100 A Long	**451D874G02**		.69 – .94 (17.5 to 23.8)	—	3.75 (95.2)	**32B9446H25**			—	
100 A Long	**451D874G02**		.38 – .63 (9.5 to 15.9)	—	4.06 (103.1)	**32B9446H26**			—	
100 A Long	**451D874G02**		.25 – .31 (6.4 to 7.9)	—	4.38 (111.3)	**32B9446H27**			—	
For 110 to 225 Amperes Circuit Breakers										
225 A Short	**374D883G01**		1.00 (25.4)	1.06 (26.9)	—	**374D883H06**		—	4.25 (108.0)	.44
225 A Short	**374D883G01**		.69 – .94 (17.5 to 23.8)	1.38 (34.9)	—	**374D883H07**		—		(11.1) – 14
225 A Short	**374D883G01**		.38 – .63 (9.5 to 15.9)	1.69 (42.9)	—	**374D883H08**		—		
225 A Short	**374D883G01**		.25 – .31 (6.4 to 7.9)	2.00 (50.8)	—	**374D883H09**		—		
225 A Long	**374D883G02**		1.00 (25.4)	—	3.44 (87.3)	**374D883H10**		7.50 (190.5)	—	
225 A Long	**374D883G02**		.69 – .94 (17.5 to 23.8)	—	3.75 (95.2)	**374D883H11**			—	
225 A Long	**374D883G02**		.38 – .63 (9.5 to 15.9)	—	4.06 (103.1)	**374D883H12**			—	
225 A Long	**374D883G02**		.25 – .31 (6.4 to 7.9)	—	4.38 (111.3)	**374D883H13**			—	

① Not UL listed.

Table 12-506. J-Frame Ordering Information — Dimensions in Inches (mm) ①

Stud Ampere Rating	Stud Catalog Number	Price U.S. $	Panel Thickness A	Tube Length B	Tube Length C	Tube Catalog Number	Price U.S. $
250 A Short	**5010D23G01**		.75 – 1.00 (19.1 – 25.4)	.84 (21.4)	—	**456D983H05**	
250 A Short	**5010D23G01**		.50 – .75 (12.7 – 19.1)	1.09 (27.7)	—	**456D983H06**	
250 A Short	**5010D23G01**		.25 – .50 (6.4 – 12.7)	1.03 (26.2)	—	**456D983H07**	
250 A Long	**5010D23G02**		.75 – 1.00 (19.1 – 25.4)	—	3.88 (98.6)	**5010D23H05**	
250 A Long	**5010D23G02**		.50 – .75 (12.7 – 19.1)	—	4.13 (104.9)	**5010D23H06**	
250 A Long	**5010D23G02**		.25 – .50 (6.4 – 12.7)	—	4.38 (111.3)	**5010D23H07**	

① Not UL listed.

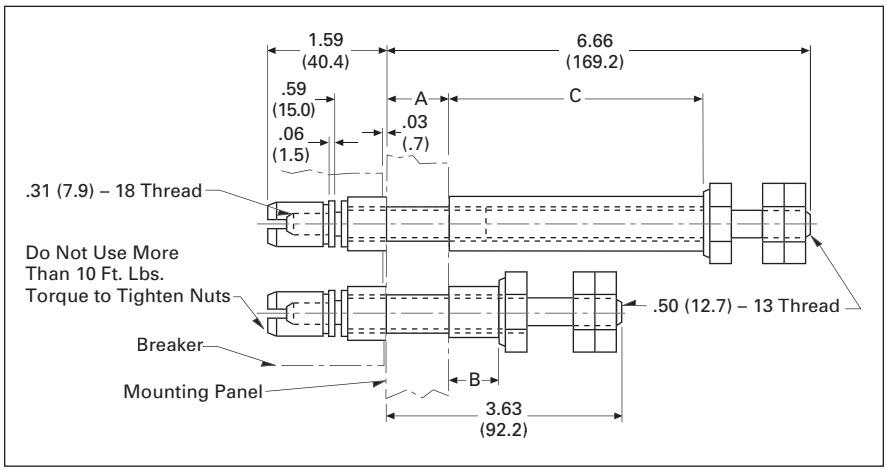


Figure 12-56. J-Frame

Table 12-507. K-Frame Ordering Information — Dimensions in Inches (mm) ②

Stud Ampere Rating	Stud Catalog Number	Price U.S. $	Panel Thickness A	Tube Length B	Tube Length C	Standard Tube Catalog Number	Price U.S. $	Dimensions D	Dimensions E	Dimensions F
400 A Short	**6642C14G02**		.75 – 1 (19.1 – 25.4)	.84 (21.3)	—	**313C909H17**		—	3.66 (93.0)	.75 – 16 (19.1 – 406.4)
400 A Short	**6642C14G04**		.50 – .75 (12.7 – 18.4)	1.09 (27.69)	—	**313C909H18**		—	—	—
400 A Short	**6642C14G06**		.25 – .5 (6.35 – 12.7)	1.03 (26.16)	—	**313C909H19**		—	—	—
400 A Long	**6642C14G03**		.75 – 1 (19.1 – 25.4)	—	3.78 (96.0)	**313C909H20**		—	—	—
400 A Long	**6642C14G05**		.50 – .75 (12.7 – 18.4)	—	4.03 (102.4)	**313C909H21**		6.58 (167.1)	—	—
400 A Long	**6642C14G07**		.25 – .5 (6.35 – 12.7)	—	4.28 (108.7)	**313C909H22**		—	—	—

② Not UL listed.

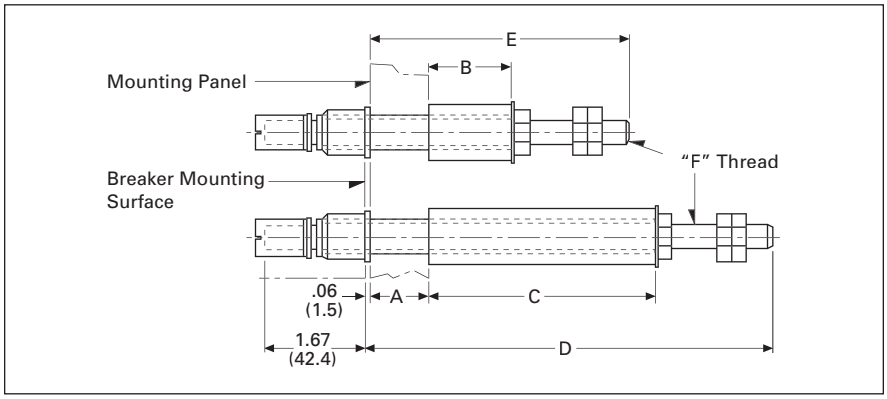


Figure 12-57. K-Frame

12

Table 12-508. L-Frame Ordering Information — Dimensions in Inches (mm)

Stud Length (A)	Stud Catalog Number	Price U.S. $
5.47 (138.9)	**314C960G07**	
7.97 (202.4)	**314C960G08**	
10.47 (265.9)	**314C960G09**	

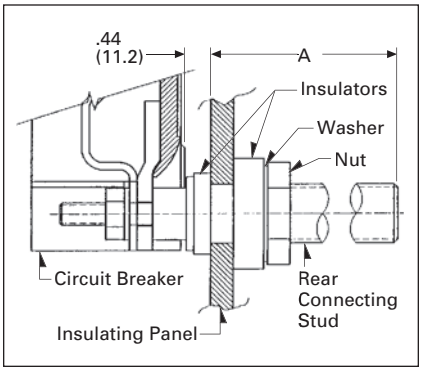


Figure 12-58. L-Frame

Table 12-509. M-Frame Ordering Information — Dimensions in Inches (mm) ①

Stud Ampere Rating	Diameter and Thread	Extension Back of Breaker	Stud Catalog Number	Price U.S. $
225	.50 (12.7) – 13	3.66 (93.0)	**314C960G01**	
400	.75 (19.1) – 16	5.91 (150.1)	**314C960G04**	
400	.75 (19.1) – 16	8.41 (213.6)	**314C960G05**	
400	.75 (19.1) – 16	10.91 (277.0)	**314C960G06**	
600	1.00 (25.4) – 12	5.91 (150.1)	**314C960G07**	
600	1.00 (25.4) – 12	8.41 (213.6)	**314C960G08**	
600	1.00 (25.4) – 12	10.91 (277.0)	**314C960G09**	
800	1.13 (28.7) – 12	5.91 (150.1)	**314C960G10**	
800	1.13 (28.7) – 12	8.41 (213.6)	**314C960G11**	
800	1.13 (28.7) – 12	10.91 (277.0)	**314C960G12**	

① Not UL listed.

Table 12-510. N-Frame Ordering Information — Dimensions in Inches (mm) ②

Stud Ampere Rating	Diameter and Thread	Extension Back of Breaker	Stud Catalog Number	Price U.S. $
800	1.13 (28.7) – 12	5.5 (139.7)	**623B222G01**	
800	1.13 (28.7) – 12	8.0 (203.2)	**623B222G02**	
800	1.13 (28.7) – 12	10.5 (266.7)	**623B222G03**	
1200	1.25 (31.8) – 12	5.5 (139.7)	**373B375G04**	
1200	1.25 (31.8) – 12	10.5 (266.7)	**373B375G03**	

② Not UL listed.

Panelboard Connecting Straps

Panelboard Connecting Straps

Product Description

Panelboard Connecting Straps are used to connect the circuit breaker terminals to the panelboard bus. The panelboard connecting straps are available with various ratings for outside and center poles. (Field installation only.)

Panelboard connecting straps are available to meet the needs of most standard panelboard applications. Style numbers for mounting brackets for CDP panelboard installations are also included.

Note: Not UL listed.

Refer to panelboard manufacturer for compatibility.

Table 12-511. F-Frame Panelboard Connecting Straps

Bus Spacing in Inches (mm)	Continuous Current Rating (Amperes)	Pole Connector Type			
		Center		Outside	
		Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
2.75 (69.9)	50	673B142G02		673B142G09	
2.75 (69.9)	100	673B142G02		673B142G10	
2.75 (69.9)	150	673B142G04		673B142G03	
3.50 (88.9)	50	1253C72G01		1253C72G03	
3.50 (88.9)	100	1253C73G03		1253C73G06	
3.50 (88.9)	150	1253C73G01		1253C73G05	

Table 12-512. F-Frame Mounting Bracket

Number of Poles	Catalog Number	Price U.S. $
2	624B600H02	
3	624B600H01	

Table 12-513. J-Frame Panelboard Connecting Straps

Bus Spacing in Inches (mm)	Continuous Current Rating (Amperes)	Pole Connector Type			
		Center		Outside	
		Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
3.50 (88.9)	250	2600D26G01		2600D26G02	

Table 12-514. K-Frame Panelboard Connecting Straps

Bus Spacing in Inches (mm)	Continuous Current Rating (Amperes)	Pole Connector Type			
		Center		Outside	
		Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
3.50 (88.9)	400	4212B78G02		4212B77G01	

Table 12-515. K-Frame Mounting Bracket

Number of Poles	Catalog Number	Price U.S. $
2, 3	208B264H01	

Table 12-516. L-Frame Panelboard Connecting Straps

Continuous Current Rating (Amperes)	Pole Connector Type			
	Center		Outside	
	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
600	624B609G01		506C052G01	

Table 12-517. L-Frame Mounting Bracket

Number of Poles	Catalog Number	Price U.S. $
2, 3	208B297H01	

Table 12-518. M-Frame Panelboard Connecting Straps

Bus Spacing in Inches (mm)	Continuous Current Rating (Amperes)	Connector Type	Pole Connector Type	
			Catalog Number	Price U.S. $
3.50 (88.9)	800	Short Medium Long	314C996G01 314C996G02 314C996G03	

Table 12-519. M-Frame Mounting Bracket

Catalog Number	Price U.S. $
315C270H01	

Table 12-520. N-Frame Panelboard Connecting Straps

Bus Spacing in Inches (mm)	Continuous Current Rating (Amperes)	Connector Type	Pole Connector Type	
			Catalog Number	Price U.S. $
3.50 (88.9)	1200	Short Medium Long	505C606G04 505C606G05 505C606G06	

Table 12-521. N-Frame Mounting Bracket (Four [4] Required)

Catalog Number	Price U.S. $
315C270H01	

12

Discount Symbol **CB-2**

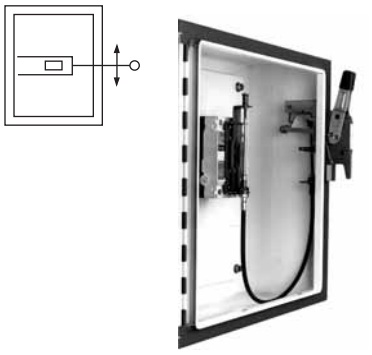
Handle Mechanisms Overview

Handle Mechanisms are used to operate molded case circuit breakers, molded case switches and motor circuit protectors. They are available in three basic configurations — Flange Mounted, Through-the-Door and Direct (Close-Coupled) — providing safe, dependable operation and ease of installation.

- Flange Mounted:
  - Flex Shaft
  - C371
- Through-the-Door:
  - Series C Rotary
  - Universal Rotary
- Direct (Close-Coupled):
  - Universal Direct
  - Euro IEC
  - G Direct

Handle mechanisms are typically used on enclosed circuit breakers, control panels and motor control centers in many different applications. Eaton has a handle mechanism for virtually any need.

Flange Mounted Handle Mechanisms



Flex Shaft™

Product Description

Flange Mounted Handle Mechanisms mount on the flange of an enclosure door. The Flex Shaft™ is an extra heavy-duty mechanism that includes a flexible shaft in various lengths, 3 feet (.9 m) through 10 feet (3 m) for use with various size enclosures.

The Flex Shaft Handle will accept up to three padlock shackles, each with a maximum diameter of 3/8-inch (9.5 mm). Can be used with NEMA 1, 3R and 12 fabricated enclosures. An optional handle is available for Flex Shaft that is suitable for use with NEMA 4 and 4X environments. Flex Shaft comes preset from the factory, requiring only minor field adjustments on installation, which takes about 10 minutes — a significant time savings compared to installation of other types of flange handle mechanisms. The Flex Shaft mechanism also takes up less interior enclosure space than competitive designs and the handle fits standard flange cutouts. Flex Shaft Handle can be remotely mounted from breaker, where an operator can use it by "funneling" the cable through conduit.

Flex Shaft is UL listed under File E64983 and meets CSA requirements.

The Type C371 Circuit Breaker Operating Mechanisms are designed for installation in control enclosures where main or branch circuit protective devices are required. All circuit breaker mechanisms are suitable for right-hand mounting.

Auxiliary contacts are not available for mounting on operating mechanisms. Where required, have them installed in circuit breaker.

Type C371 is UL listed under File E62635.

Table 12-522. Flex Shaft Ordering Information

Breaker Frame	Flexible Shaft Length in Feet (m)							
	3 (.9)		4 (1.2)		5 (1.5)		6 (1.8)	
	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
G F	F0S03C F1S03C		F0S04C F1S04C		F0S05C F1S05C		F0S06C F1S06C	
F (Dual) J K L and MDL	F1S03CD F2S03C F3S03C N/A		F1S04CD F2S04C F3S04C F4S04C		F1S05CD F2S05C F3S05C F4S05C		F1S06CD F2S06C F3S06C F4S06C	
N R MD, MDS (Old)	N/A N/A N/A		F5S04C F6S04 F7S04		F5S05C F6S05 F7S05		F5S06C F6S06 F7S06	

Table 12-522. Flex Shaft Ordering Information (Continued)

Breaker Frame	Flexible Shaft Length in Feet (m)							
	7 (2.1)		8 (2.4)		9 (2.7)		10 (3.0)	
	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
G F	N/A F1S07C		N/A F1S08C		N/A F1S09C		N/A F1S10C	
F (Dual) J K	F1S07CD F2S07C F3S07C		F1S08CD F2S08C F3S08C		F1S09CD F2S09C F3S09C		F1S10CD F2S10C F3S10C	
L and MDL N R MD	N/A N/A N/A N/A		N/A N/A N/A N/A		N/A N/A N/A N/A		F4S10C F5S10C N/A F7S10C	

Note: Type 4/4X handle mechanisms are available. Add Suffix **X** to complete catalog number. Add Suffix I to complete catalog number for IEC handle. Original narrow handle design (No C Suffix) is available. Remove C from catalog number.

Note: When selecting the length of shaft, ensure minimum bending radius of 4 inches (101.6 mm) (5 inches, 12.7 mm for L, N, R Frames) is maintained to operate properly. The standard method of shipment includes the mechanism preset at the factory; however, minor field adjustments may be required.

Note: Dual breakers operator available on F-Frame only. Only the F, J & K can mount LH & RH all other RH only.

Table 12-523. Type C371 Ordering Information — Dimensions in Inches (mm)

Circuit Breaker or Motor Circuit Protector	Frame Size	Variable Depth Mounting Range Min/Max ①②	Operating Mechanism Only ③		Operating Mechanism w/ 4-inch Handle			
					For NEMA 1–12 Enclosure		For NEMA 4/4X Enclosure	
			Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
HMCP & Series C EHD, FDB, FD, FDC, HFD, ED	150	6.5 – 16 (165.1 – 406.4)	**C371E**		**C371E1**		**C371E2**	
HMCP & Series C HJD, JD, JDB, JDC	250	6.5 – 16.63 (165.1 – 422.4)	**C371F**		**C371F5**		**C371F6**	
HMCP & Series C DK, HKD, KD, KDB	400	6.5 – 16.63 (165.1 – 422.4)	**C371F**		**C371F5**		**C371F6**	
Series C HLD, LD, LDC	600	8.5 – 22 (215.9 – 558.8)	**C371G**		**C371G5**		**C371G6**	
Series C MD, MDS (No MDL)	800	8.75 – 22 (222.3 – 558.8)	**C371K**		**C371K5**		**C371K6**	
Series C HND, ND, NDC	1200	9.75 – 22 (247.7 – 558.8)	**C371K**		**C371K5**		**C371K6**	

① For increased maximum allowable depth, see connecting rods right.
② Dimensions shown are from panel flange surface.
③ Does not include handle.

Table 12-524. Handle Only — Dimensions in Inches (mm)

Circuit Breaker Frame Size (Amperes)	NEMA Enclosure Type	Operating Handle Length	Catalog Number	Price U.S. $
150	1-3R-3-12 4/4X	4 (101.6)	**C371H1 C371H2**	
	1-3R-3-12 4/4X	6 (152.4)	**C371H3 C371H4**	
250 – 1200	1-3R-3-12 4/4X	4 (101.6)	**C371H5 C371H6**	
	1-3R-3-12 4/4X	6 (152.4)	**C371H7 C371H8**	

Table 12-525. Channel Support Kit (Rod Not Supplied)

For use to prevent bending of the operating handle mounting surface. This is especially useful when the operating handle is mounted on a channel in a multi-door enclosure. Included in 600 – 1200 A.

Catalog Number	Price U.S. $
C371CS6	

Table 12-526. Connecting Rods ④

Application	Catalog Number	Price U.S. $
Disconnect Switches (30, 60, 100, 200 A Sizes)	**C371CS1**	
Circuit Breakers (150, 250, 400 A Sizes)	**C371CS1**	
Circuit Breakers (600, 800, 1200 A Sizes)	**C371CS2**	

④ Increase maximum allowable depth by 5 inches (127 mm).

Flex Shaft Accessories (F- through R-Frame)

Table 12-527. NEMA 12 Safety Door Hardware for Flex Shaft and C371 ⑤

Handle Length in Inches (mm)	Catalog Number ⑥	Price U.S. $
4 (101.6) 6 (152.4)	**C361KJ4 C361KJ6**	
Roller Latch ⑦	**C361KR**	

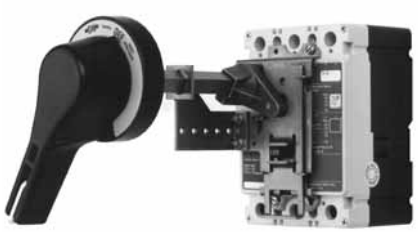
⑤ Customer: Consult with box manufacturer for correct door hardware and any adapters required for assembly.
⑥ The 1/4-inch x 1/2-inch (6.35 x 12.7 mm) standard mill rectangular locking bar is not supplied with these kits.
⑦ Third roller latch for use with 4- or 6-inch (101.6 or 152.4 mm) handle when 3 point latching is required.

Through-the-Door Handle Mechanisms

Eaton's Cutler-Hammer through-the-door handle mechanisms mount on the front of an enclosure or cabinet door and externally operate the circuit breaker via a variable depth shaft or a linear operator (Type MC). Each rotary type handle mechanism includes a handle, base operating mechanism and shaft that can be cut to various lengths.

Series C Rotary and Universal Rotary handle mechanisms are for use with Molded Case Circuit Breakers (G, F, J, K, L, MDL), Molded Case Switches and Motor Circuit Protectors.

Series C Rotary and Universal Rotary, are UL listed and meet CSA requirements. Universal Rotary also meets IEC947-1/2 for international compliance. Rotary UL File Number is E64983.



Series C Rotary

Type 4/4X handles are similar to standard handles except they include an internal neoprene gasket. Type 4/4X handle style number is 6648C22G03. Due to gasketing effect between the handle and the housing, the handle may not indicate a tripped position.

Series C Rotary Accessories

As an option, an auxiliary switch is offered so that the control panel builder may electrically indicate the status of the breaker. This accessory would be mounted on the mechanism and comes with 24-inch (609.6 mm) pigtail leads.

Table 12-528. Series C Auxiliary Switch

Catalog Number	Price U.S. $
5108A61G01	

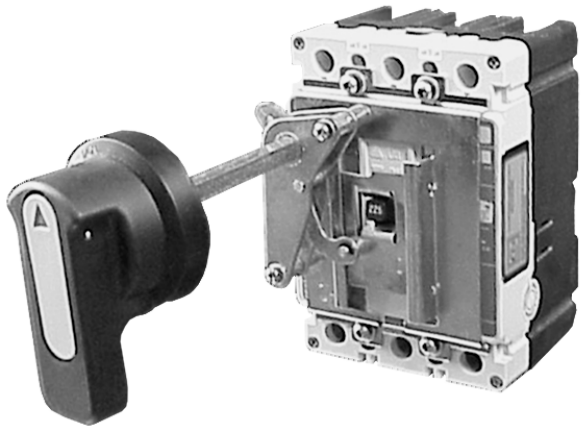
Table 12-529. Series C Rotary Ordering Information

12

Shaft Length Inches (mm)	Complete Catalog Number ①	Price U.S. $	Separate Catalog Number						Catalog Number			
			Standard Handle ②	Price U.S. $	Breaker Mechanism ③	Price U.S. $	Shaft ④	Price U.S. $	IEC IP65 ⑤⑥	Price U.S. $	IEC IP66 ⑤⑥	Price U.S. $
F-Frame												
6 (152.4)	HM1R06		6648C22G25		6648C23G11		4217B37G08		WHM1R06		WHM1R06X	
12 (304.8)	HM1R12		6648C22G25		6648C23G11		4217B37G05		WHM1R12		WHM1R12X	
16 (406.4)	HM1R16		6648C22G25		6648C23G11		4217B37G06		WHM1R16		WHM1R16X	
24 (609.6)	HM1R24		6648C22G25		6648C23G11		4217B37G07		WHM1R24		WHM1R24X	
J-Frame												
6 (152.4)	HM2R06		6648C22G01		6648C23G21		4217B37G08		WHM2R06		WHM2R06X	
12 (304.8)	HM2R12		6648C22G01		6648C23G21		4217B37G05		WHM2R12		WHM2R12X	
16 (406.4)	HM2R16		6648C22G01		6648C23G21		4217B37G06		WHM2R16		WHM2R16X	
24 (609.6)	HM2R24		6648C22G01		6648C23G21		4217B37G07		WHM2R24		WHM2R24X	
K-Frame												
6 (152.4)	HM3R06		6648C22G01		6648C23G25		4217B37G08		WHM3R06		WHM3R06X	
12 (304.8)	HM3R12		6648C22G01		6648C23G25		4217B37G05		WHM3R12		WHM3R12X	
16 (406.4)	HM3R16		6648C22G01		6648C23G25		4217B37G06		WHM3R16		WHM3R16X	
24 (609.6)	HM3R24		6648C22G01		6648C23G25		4217B37G07		WHM3R24		WHM3R24X	
L- and MDL-Frame												
6 (152.4)	HM4R06		6648C22G11		6648C23G19		4217B37G08		WHM4R06		WHM4R06X	
12 (304.8)	HM4R12		6648C22G11		6648C23G19		4217B37G05		WHM4R12		WHM4R12X	
16 (406.4)	HM4R16		6648C22G11		6648C23G19		4217B37G06		WHM4R16		WHM4R16X	
24 (609.6)	HM4R24		6648C22G11		6648C23G19		4217B37G07		WHM4R24		WHM4R24X	
MD/MDS												
6 (152.4)	HM7R06		6648C22G21		6648C23G17		4217B37G08		—		—	
12 (304.8)	HM7R12		6648C22G21		6648C23G17		4217B37G05		—		—	
16 (406.4)	HM7R16		6648C22G21		6648C23G17		4217B37G06		—		—	
24 (609.6)	HM7R24		6648C22G21		6648C23G17		4217B37G07		—		—	
N-Frame												
6 (152.4)	HM5R06		6648C22G21		6648C23G08		4217B37G08		WHM5R06		WHM5R06X	
12 (304.8)	HM5R12		6648C22G21		6648C23G08		4217B37G05		WHM5R12		WHM5R12X	
16 (406.4)	HM5R16		6648C22G21		6648C23G08		4217B37G06		WHM5R16		WHM5R16X	
24 (609.6)	HM5R24		6648C22G21		6648C23G08		4217B37G07		WHM5R24		WHM5R24X	

① Complete catalog number includes the standard handle, mechanism, shaft and support brace/bracket.
② Handle is designed suitable for NEMA Types 1, 3R and 12 enclosures. Use style number **6648C22G03** for Type 4/4X handle or add **X** Suffix to complete catalog number. Handle is cast aluminum.
③ Breaker mechanism includes a shaft support bracket and its parts. Shaft is .50-inch (12.7 mm).
④ Longer shafts,16-inch (406.4 mm) and 24-inch (609.6 mm), include an adjustable support extension.
⑤ IEC Handle Mechanism supplied with Metric thread mounting hardware.
⑥ Complete catalog number includes a handle, mechanism and shaft.

Discount Symbol..... **CB-2**



Universal Rotary F-Frame

Table 12-530. Series C Universal Rotary Ordering Information ①

Shaft Length in Inches (mm)	Handle Color	Complete Catalog Number	Price U.S. $
F-Frame			
6 (152.4)	Black	**FHMVD06B**	
12 (304.8)	Black	**FHMVD12B**	
6 (152.4)	Red	**FHMVD06R**	
12 (304.8)	Red	**FHMVD12R**	
G-Frame			
6 (152.4)	Black	**GHMVD06B**	
12 (304.8)	Black	**GHMVD12B**	
6 (152.4)	Red	**GHMVD06R**	
12 (304.8)	Red	**GHMVD12R**	
J-Frame			
6 (152.4)	Black	**JHMVD06B**	
12 (304.8)	Black	**JHMVD12B**	
6 (152.4)	Red	**JHMVD06R**	
12 (304.8)	Red	**JHMVD12R**	
K-Frame			
6 (152.4)	Black	**KHMVD06B**	
12 (304.8)	Black	**KHMVD12B**	
6 (152.4)	Red	**KHMVD06R**	
12 (304.8)	Red	**KHMVD12R**	
L-Frame			
6 (152.4)	Black	**LHMVD06B**	
12 (304.8)	Black	**LHMVD12B**	
6 (152.4)	Red	**LHMVD06R**	
12 (304.8)	Red	**LHMVD12R**	
MDL-Frame			
6 (152.4)	Black	**MHMVD06B**	
12 (304.8)	Black	**MHMVD12B**	
6 (152.4)	Red	**MHMVD06R**	
12 (304.8)	Red	**MHMVD12R**	

① Only available as complete handle mechanism. Parts not sold separately.

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Table 12-531. Series C G-Frame Vari-Depth Handle Mechanism (Not Shown)

For Use With:		Handle Color	Complete Catalog Number	Price U.S. $
Enclosure	Breaker	Black		
NEMA 1	GC/GHC/GD	Yellow	**HRGCV11L**	
NEMA 1	GC/GHC/GD	Black	**HRGCV31L**	
NEMA 3R/12/4X	GC/GHC/GD	Yellow	**HRGCV14L**	
NEMA 3R/12/4X	GC/GHC/GD	Black	**HRGCV34L**	
NEMA 1	GMCP	Yellow	**HRGMV11L**	
NEMA 1	GMCP	Black	**HRGMV31L**	
NEMA 3R/12/4X	GMCP	Yellow	**HRGMV14L**	
NEMA 3R/12/4X	GMCP	Black	**HRGMV34L**	

Table 12-532. Features Comparison of Series C Rotary and Universal Rotary Handle Mechanism

Rotary	Number of Poles	NEMA Enclosure Type				Handle Lock-Off ③	Handle Indication: ON/OFF TRIPPED/ RESET	International Markings ON (I) OFF (O)	Handle Material	Available Handle Colors	Handle Rotation ④	Shaft Lengths (Inches)
		1	3R	12	4/4X ②							
Series C Rotary		X	X	X	X	X	X	X	Metal	Black	45 deg.	6, 12, 16, 24
Universal Rotary		X	—	X	—	X	X	X	Molded Plastic	Yellow/Red	90 deg.	6, 12

② Type 4/4X application requires special handle. See "Ordering Information."

③ All rotary handle mechanisms include a handle "Lock Off" to prevent turning the breaker ON while in the OFF position.

④ Series C Rotary handle was ergonomically designed with extra clearance for a "gloved hand" to operate. Handle has a 45-degree rotation. Universal Rotary has a 90-degree rotation ("pipe valve" operation) where ON is vertical and OFF is horizontal. Shafts include a support brace to ensure proper alignment.

Discount Symbol **CB-2**

Direct (Close-Coupled) Handle Mechanisms

Product Description

Direct (Close-Coupled) Handle Mechanisms mount directly to the circuit breaker. They are used in shallow enclosures where the standard variable depth Through-the-Door type mechanism is not practical or cannot be used. They are typically for applications where high volume, standardized enclosures are being fabricated.

The Euro IEC Direct handle mechanism can be used on F- through R-Frames.

The G Direct is available with a black or the yellow handle, and with or without a shroud. It is suitable for use with NEMA 1 enclosures. It is for use only with the G-Frame (GD, GC, GHC, GMCP).

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An escutcheon ring and interlock clip are provided as standard. The standard design includes a lock-off feature.

The Universal Direct handle mechanism is UL 489 listed, IEC947-1/2 and meets CSA requirements. The Euro IEC Direct handle mechanism is IEC-240-1. G Direct is UL listed and meets CSA requirements.

Table 12-533. Euro IEC Direct Ordering Information

Frame	Black Handle		Red Handle	
	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
F J K	HMCC1B HMCC2B HMCC3B		HMCC1R HMCC2R HMCC3R	
L and M N R	HMCC4B HMVD5B HMVD6B		HMCC4R — —	

G Direct

Table 12-534. G Direct Ordering Information ①

Frame	Black Handle				Yellow Handle			
	with Shroud		without Shroud		with Shroud		without Shroud	
	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
GD/ GHC	HRGCC1S		HRGCC10		HRGCC3S		HRGCC30	
GMCP	HRGMC1S		HRGMC10		HRGMC3S		HRGMC30	

① Suitable for use on 2- or 3-Pole G-Frame.

Handle Extension

Handle Extension

Handle Extension is not included with J, K, L, M and N-Frame breakers. It must be purchased separately.

Table 12-535. Handle Extension

Frame	Style Number	Price U.S. $
J, K L, M	**HEX3** **HEX4**	

Handle Extension is included with breaker with R-Frame breakers.

Table 12-536. Handle Extension

Frame	Style Number	Price U.S. $
N R	**HEX5** **HEX6**	

Type LFD Current Limiter

The LFD Current Limiter is an accessory that bolts to the load end of a standard FDB or FD thermal-magnetic circuit breaker, providing 200,000 A interrupting capacity at up to 600 Vac. LFD current limiters for thermal-magnetic circuit breakers are listed with Underwriters Laboratories under File E47239.

Table 12-537. Type LFD Current Limiter

Circuit Breaker Rating Amperes	Catalog Number	Price U.S. $
15 – 70	**LFD3070R**	
80 – 160	**LFD3150R**	

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Ground Fault Alarm Unit

The Ground Fault Alarm Unit is a remotely mounted device with a combination indicating light/test button that will light when the breaker trips or alarms on ground fault. The Ground Fault Alarm Unit requires a separate 120 Vac power source to power the light and the internal relay which has 1NO and 1NC contacts for remote indication. The Ground Fault Alarm Unit can be panel mounted for ordering with an optional face mounting bracket. For use on Digitrip 310 only, K- through N-Frame.

Table 12-538. GF Alarm Unit

Description	Catalog Number	Price U.S. $
Ground Fault Alarm Unit	**GFAU**	
Face Mounting Bracket	**1264C67G01**	

IQ Energy Sentinel

The IQ Energy Sentinel is a highly accurate, microprocessor-based, breaker-mounted device designed to monitor power and energy readings. It represents an alternative to watt meters, watt-hour meters, and watt demand meters. Key advantages include savings in space, lower installation costs, and remote monitoring capability.

The IQ Energy Sentinel mounts on the load side of a Series C F-Frame (150 ampere) circuit breaker. It can be applied on 3-phase, 4-wire systems, or single-phase, 3-wire systems with voltage connected through phases A and C.

For more information, see Descriptive Bulletin 8178.

Potential Transformer Module

The Potential Transformer Module is required for the Digitrip OPTIM 1050 to provide a voltage input to allow the trip unit to monitor power and energy as well as power factor. The Potential Transformer Module is a 6 VA transformer with a primary voltage input of up to 600 volt line to line. Three 0.1 ampere fuses are provided on the primary of the transformer and can be used for isolation purposes during dielectric testing. The device is normally panel mounted and can feed up to 16 OPTIM trip units.

Table 12-539. Potential Transformer Module

Description	Catalog Number	Price U.S. $
Potential Transformer Module	**DOPTMLN**	

Solid-State (Electronic) Portable Test Kit

The Solid-State (Electronic) Portable Test Kit provides verification of performance of all ratings of Digitrip 310 electronic trip units installed in circuit breakers while in service under varying load and/or phase imbalance. The test kit operates on 120-volt, 50/60 Hz power; it includes complete instructions and test times for testing long time, short time/instantaneous operation and optional ground fault operation of the circuit breaker.

Table 12-540. Portable Test Kit

Description	Catalog Number	Price U.S. $
Solid-State (Electronic) Portable Test Kit	**STK2**	

Discount Symbol **CB-2**

Breaker Interface Module (BIM)

The Breaker Interface Module (BIM) is a panel mounted user interface device that is mounted on the front of an electrical assembly or at a remote location. The BIM is used to access, configure, test and display information for OPTIM trip units and other devices. The BIM consists of four display windows, eight function buttons, 18 LEDs, and a graphical time/current curve to provide breaker status, operational information, protection status and energy monitoring. A 24 Vdc power supply is required to provide power to the BIM. This is supplied by the switchboard builder to Eaton's specifications. The BIM is a member of Eaton's Cutler-Hammer PowerNet family of communicating devices that connects OPTIM trip units, Digitrip RMS 810/910 trip units and energy sentinels as a subnetwork system. The BIM can also be connected to a main network via a PONI module to PowerNet software.

Table 12-541. Breaker Interface Module (BIM)

Catalog Number	Price U.S. $
BIMII	

Digitrip OPTIMizer

The Digitrip OPTIMizer is a hand-held programmer that is used to access, configure, test and display information from OPTIM trip units. The OPTIMizer plugs into the front of an OPTIM trip unit via an eight-pin telephone jack and is powered by a nine-volt battery or the auxiliary power module. One highlighted feature is the "Copy" and "Download" commands. Setting up multiple OPTIM trips can be finished in minutes and with no errors. An Auxiliary Power Module connection provides a trip test when control power is not present at the breaker. The OPTIMizer is supplied as a standard package to include the programmer, the eight-pin connection cord, battery and carrying case. The Auxiliary Power Module is optional.

Table 12-542. Digitrip OPTIMizer

Catalog Number	Price U.S. $
OPTIMizer — Standard Package	

Note: 24 Vdc Power Supply
A 24 Vdc power supply is required for all Digitrip OPTIM trip units that are required to communicate either on the main Eaton's Cutler-Hammer PowerNet network or as a subnetwork to a BIM. The breaker's load is 45 mA of current. Typically one power supply is required per switchboard and can provide control power to a BIM and the OPTIM trip units. The 24 Vdc power supply should be an "isolated high quality" power supply with a "CE" label, and is normally provided by the switchboard manufacturer to Eaton's recommendations.

Auxiliary Power Module

The Auxiliary Power Module is a power supply requiring 120 Vac input at 50 or 60 Hz that provides a 32 Vdc output. The Auxiliary Power Module provides control power for testing an OPTIM trip unit when other means of control power is not available or for continuous OPTIMizer operation versus temporary with a battery. The Auxiliary Power Module connects into the top of the Digitrip OPTIMizer via a keyed receptacle. The main application for the Auxiliary Power Module would be for the testing of a stand-alone non-communicating OPTIM breaker that ordinarily would not have control power.

Note: The OPTIMizer can work off of 32 Vdc control power, although 24 Vdc is the standard on OPTIM breakers.

Table 12-543. Auxiliary Power Module

Catalog Number	Price U.S. $
PRTBAPMDV	

Discount Symbol **CB-2**

Dimensions

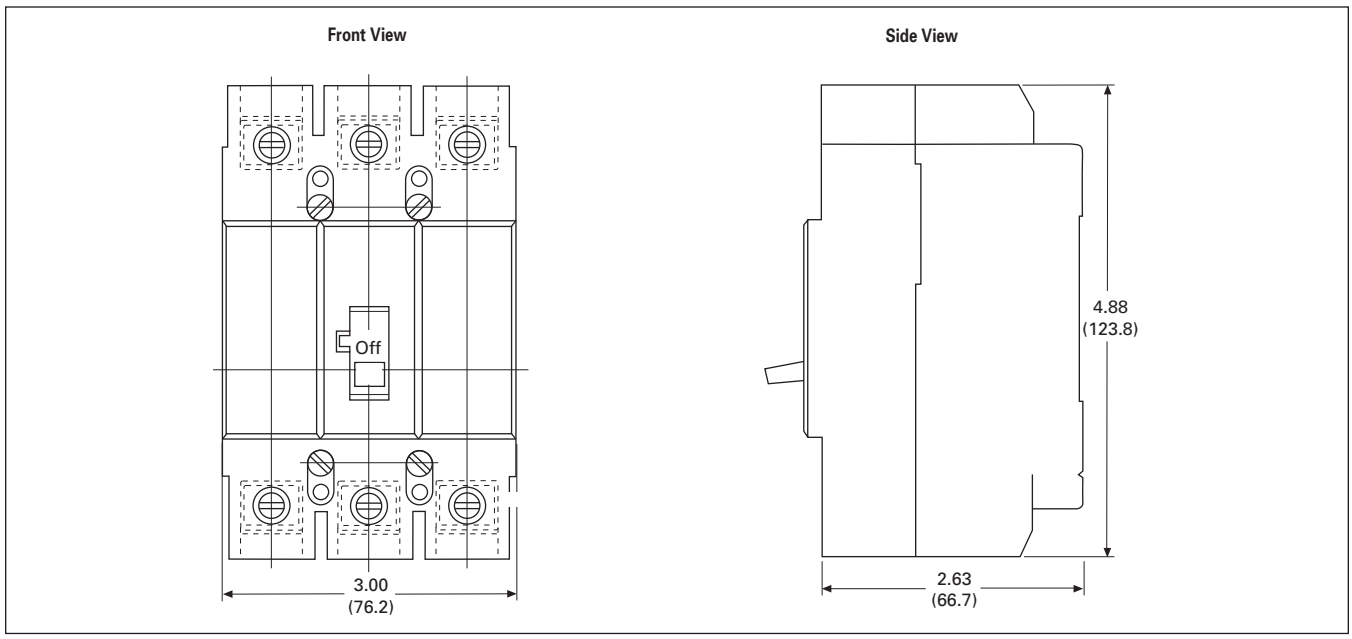

Figure 12-59. GD-Frame, 3-Pole — Dimensions in Inches (mm)

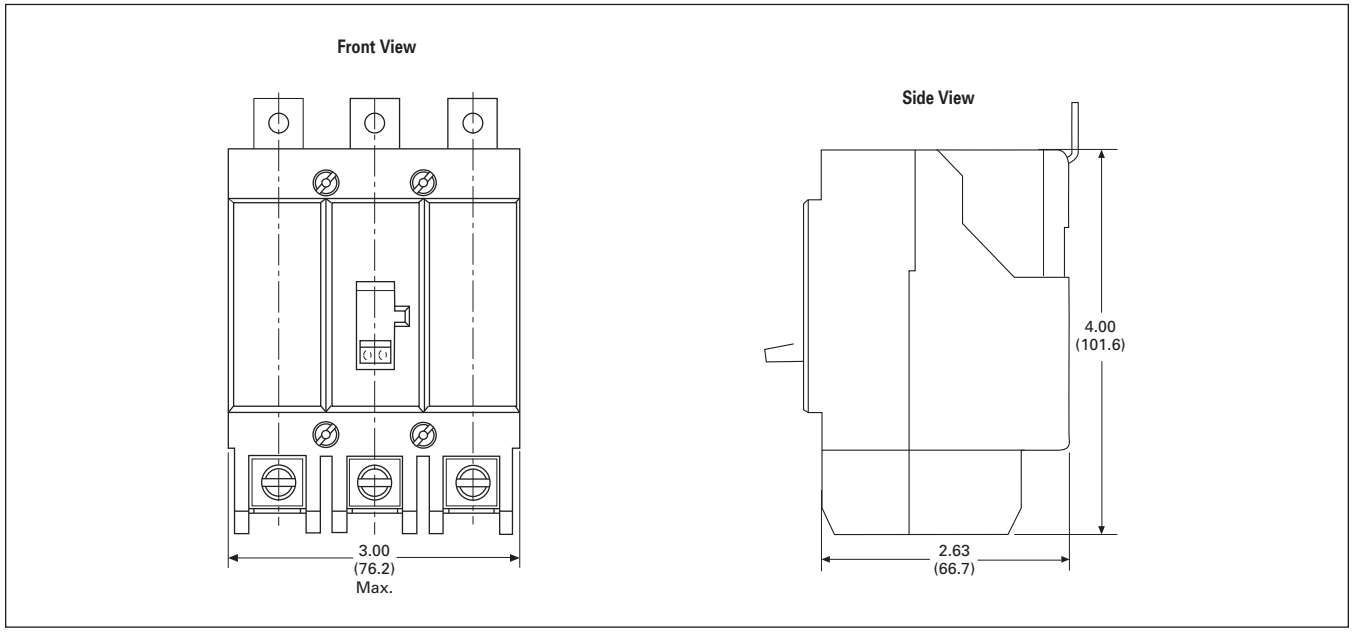

Figure 12-60. GDB-Frame, 3-Pole — Dimensions in Inches (mm)

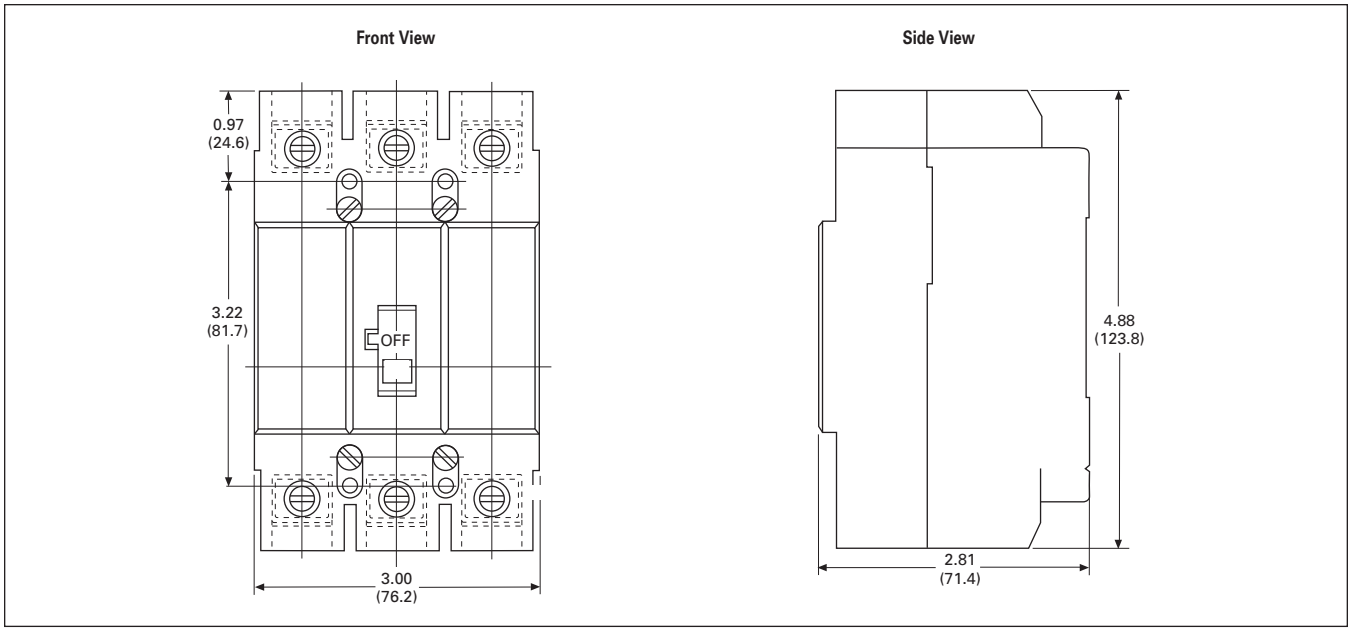

Figure 12-61. GC-Frame, 3-Pole — Dimensions in Inches (mm)

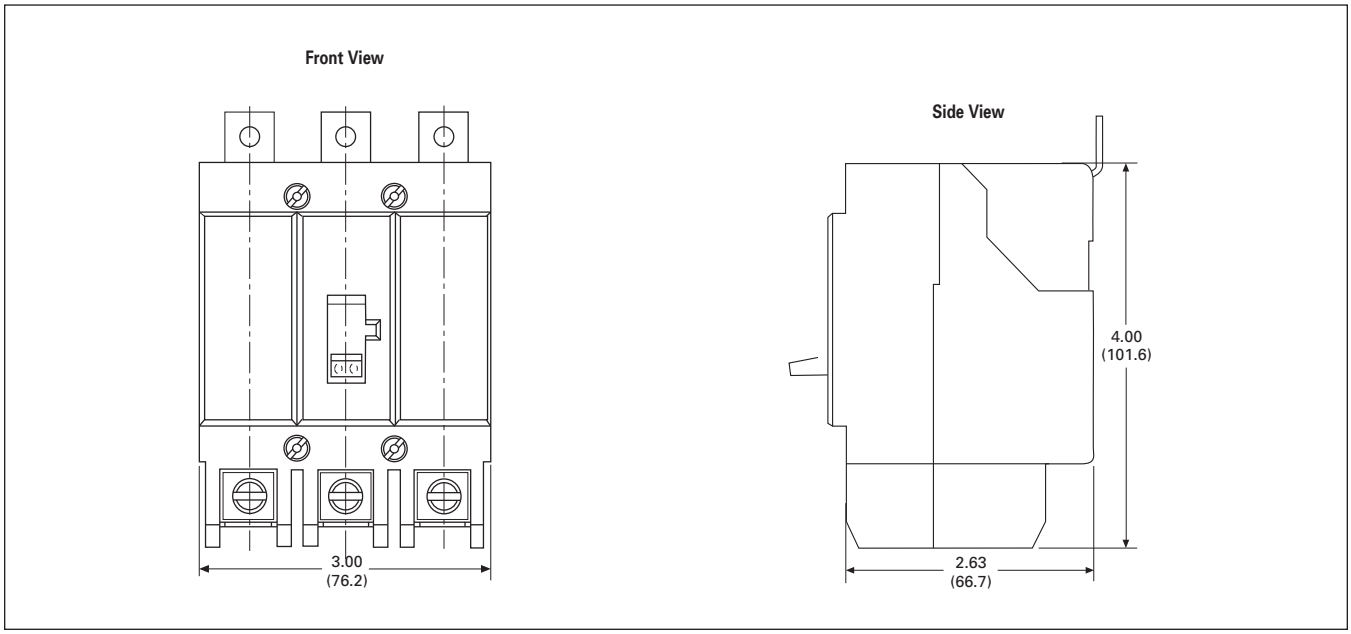

Figure 12-62. GHB-Frame, 3-Pole — Dimensions in Inches (mm)

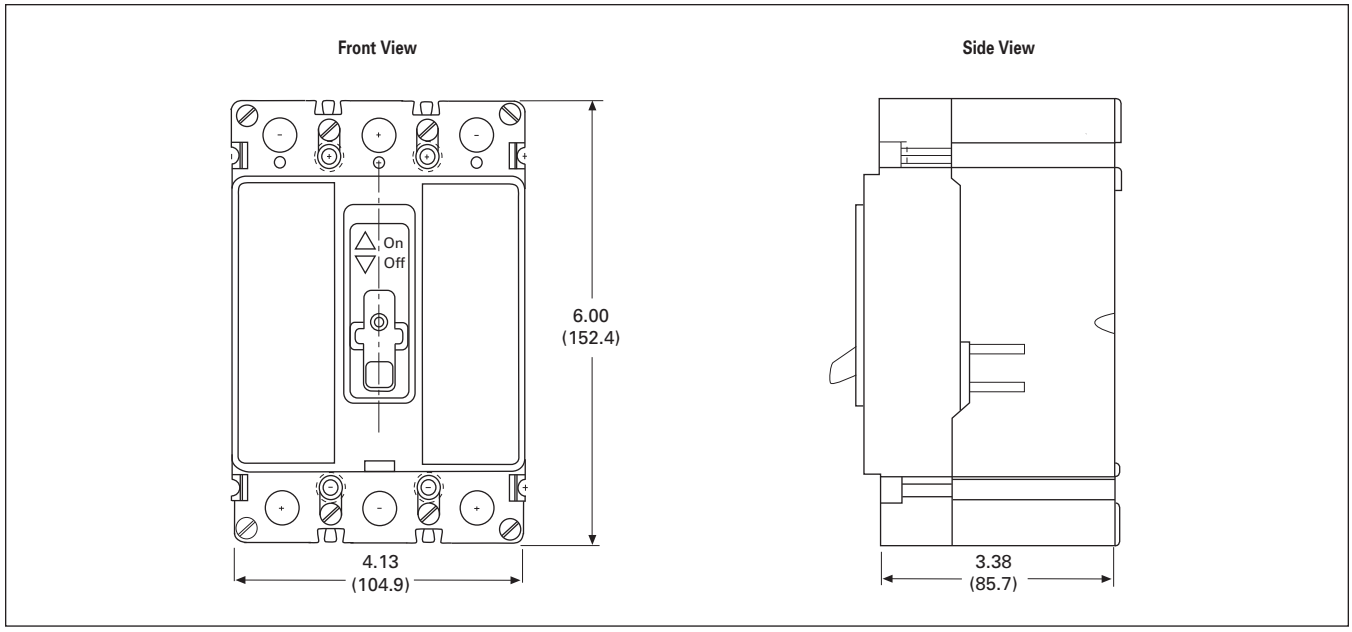

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Figure 12-63. FD-Frame, 3-Pole — Dimensions in Inches (mm)

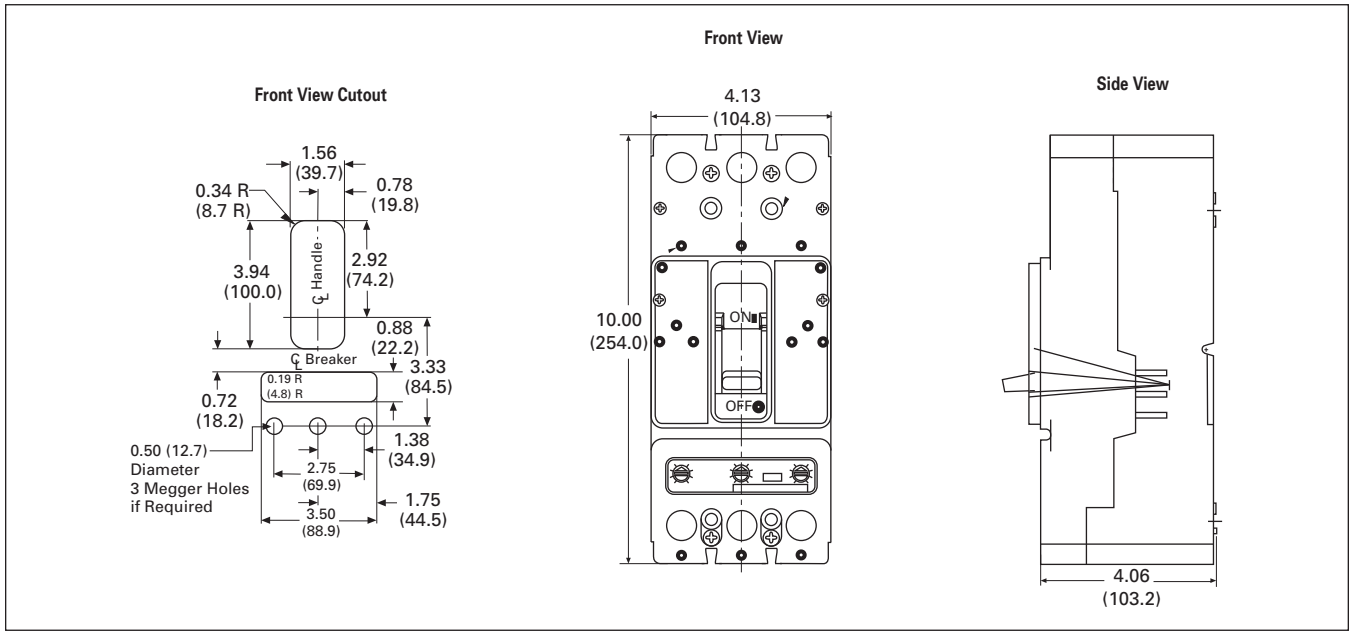

Figure 12-64. JD-Frame, 3-Pole — Dimensions in Inches (mm)

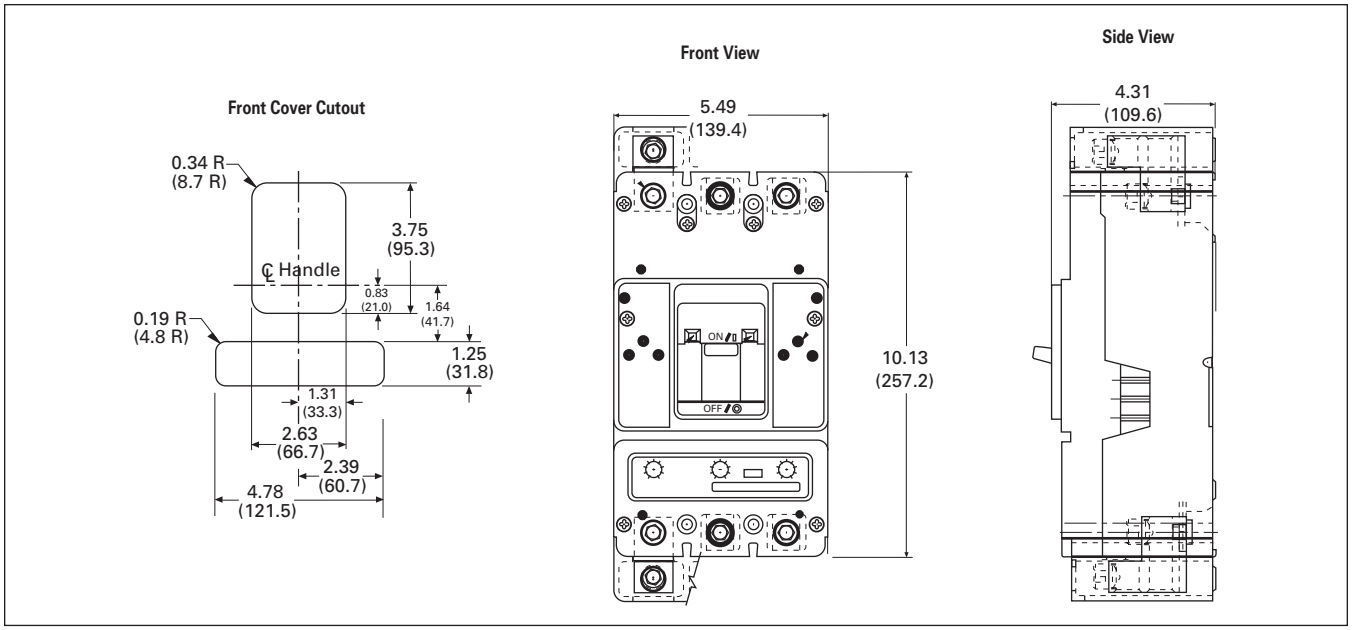

Figure 12-65. KD-Frame, 2- and 3-Pole — Dimensions in Inches (mm)

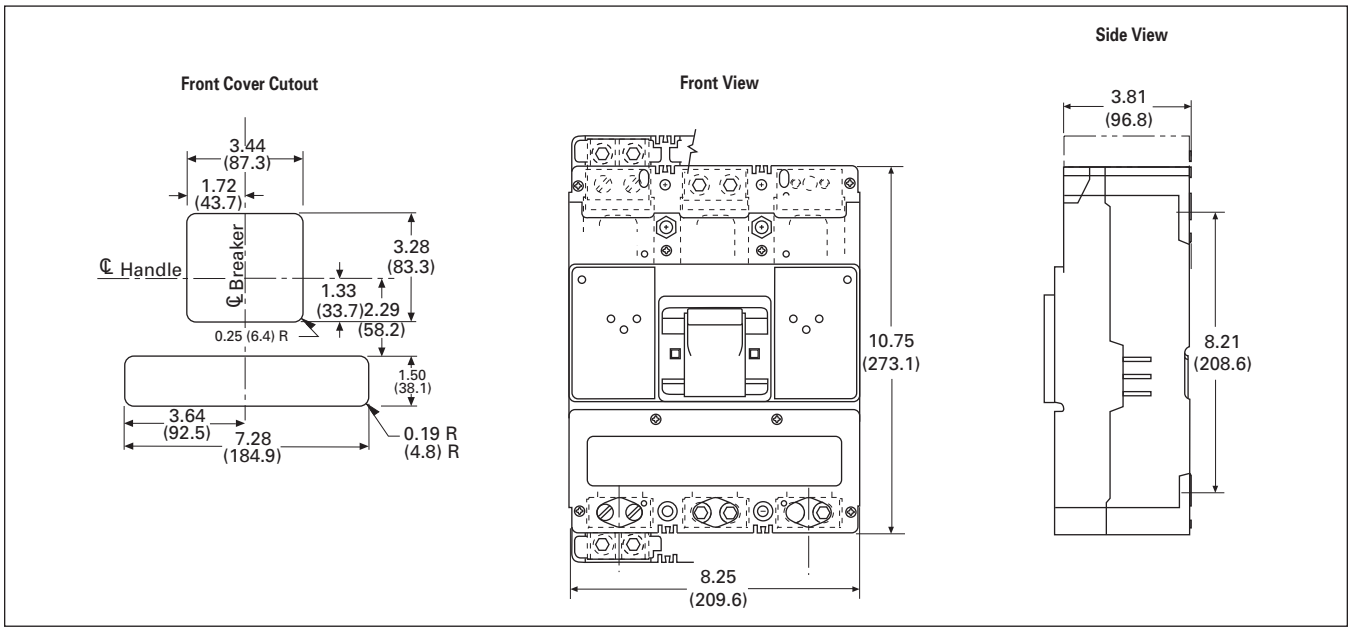

Figure 12-66. LD-Frame, 2- and 3-Pole — Dimensions in Inches (mm)

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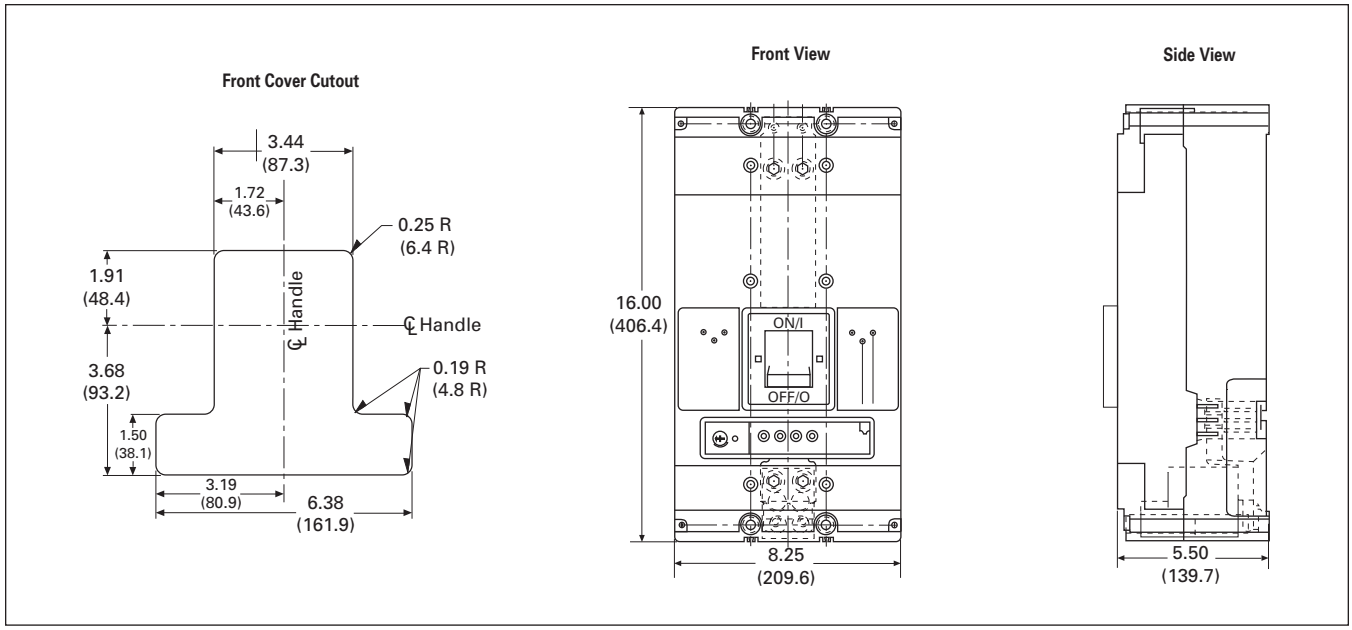

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Figure 12-67. ND-Frame, 2- and 3-Pole — Dimensions in Inches (mm)

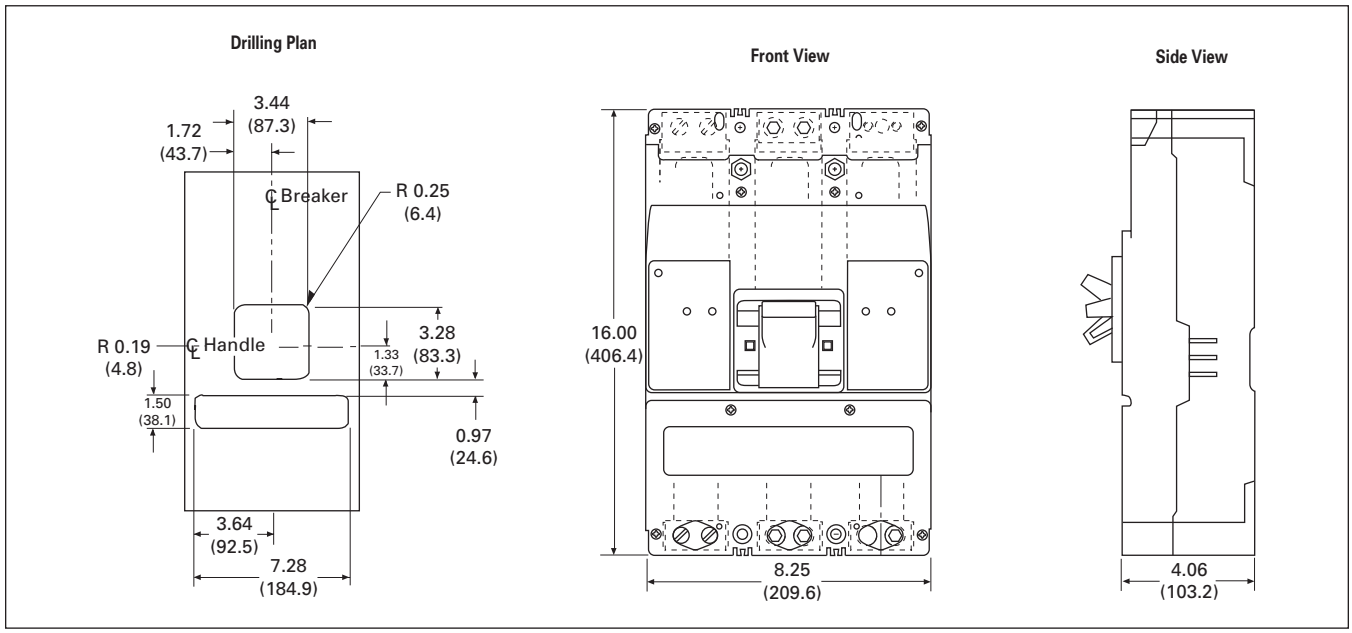

Figure 12-68. MDL-Frame, 2- and 3-Pole — Dimensions in Inches (mm)

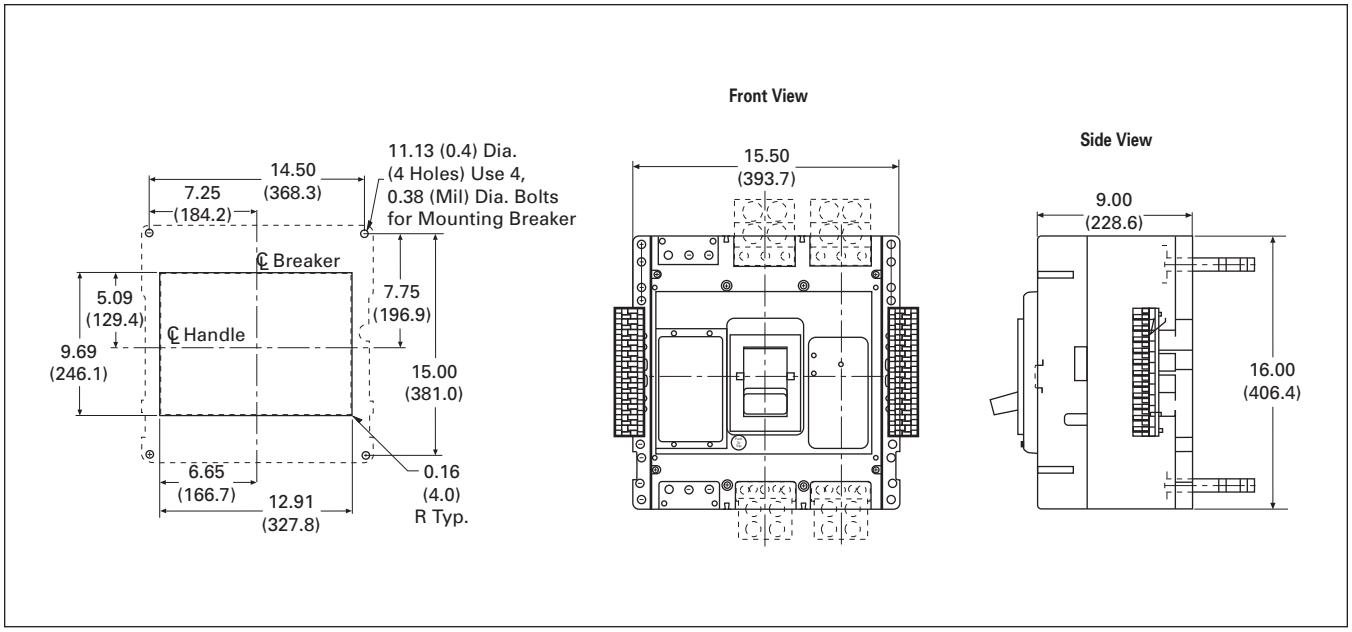

Figure 12-69. RD-Frame, 3-Pole, 1600 and 2000 Amperes — Dimensions in Inches (mm)

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