

**Obsolescent and Obsolete Circuit Breakers**

**Obsolescent and Obsolete Types**

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**Obsolescent Circuit Breakers**

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Table 11.1: Circuit Breaker Availability

Series of Cat. No.	Frame Size	Volts	Poles	Amperes	Availability	
					Obsolete No Longer Available	Obsolescent
115A-130A	MO-1 (Add-on)	120 Vac	1	15-30	X	
215A-250A	MO-2 (Add-on)	120/240 Vac	2	15-50	X	
215B-250B	MO-2B (Add-on)	120/240 Vac	2 S.P.	15-50	X	
70000	Multi-Breaker	120 Vac	4 S.P.	15-50	X	
111600	MO-2	120/240 Vac	2	15-30	X	
131600	MO-2	120/240 Vac	2	15-30	X	
151101	MO-1	120 Vac	1	15-30	X	
151600	MO-2	120/240 Vac	2	15-30	X	
161101	MO-1	120 Vac	1 With SN	15-30	X	
161600	MO-2	120/240 Vac	2 With SN	15-30	X	
161700	MO-2	120/240 Vac	2 S.P.	15-30	X	
260000	MB (Left-hand)	120 Vac	4 S.P.	15-50	X	
270000	MB (Right-hand)	120 Vac	4 S.P.	15-50	X	
460000	MO-8	120/240 Vac	4 S.P.	15-50	X	
470000	MO-4	120/240 Vac	4 S.P.	15-40	X	
480000	MO-4 (Plug-in)	120/240 Vac	4 S.P.	15-50	X	
940000	LM	600 Vac	2-3	125-800	X	
950000	50 A Form W	250 Vac	1, 2, 3	15-50	X	
951000	50 A Form W	250 Vac	2, 3	15-50	X	
952000	50 A Form W	250 Vac	2, 3	15-50	X	
953000	Flip-on Form W	230 Vac	1, 2, 3	15-50	X	
954000	100 A Form W (Trip Unit)	250 Vac	2, 3	50-100	X	
955000	100 A Form W	250 Vac	2, 3	50-100	X	
956000	225 A Form W	250 Vac	2, 3	70-225	X	
957000	400 A (KL) Form W	250 Vac	2, 3	125-400	X	
958000	600 A (WL) Form W	250 Vac	2, 3	225-600	X	
959000	KL Frame Only	600 Vac	2, 3	125-400	X	
961000	50 A Form W	600 Vac	2, 3	15-50	X	
962000	50 A Form W	600 Vac	2, 3	15-50	X	
964000	100 A Form W	600 Vac	2, 3	50-100	X	
965000	100 A Form W	600 Vac	2, 3	50-100	X	
966000	225 A Form W	600 Vac	2, 3	70-225	X	
967000	400 A (KL) Form W	600 Vac	2, 3	125-400	X	
968000	600 A (WL) Form W	600 Vac	2, 3	225-600	X	
970000	Type L Form W	240 Vac	1, 2, 3	10-50	X	
971000	Type L Form W (Flip-on)	240 Vac	1, 2, 3	10-50	X	
972000	M1 (Bolt-on)	240 Vac	2, 3	15-70	X	
973000	M2 (Bolt-on)	240 Vac	2, 3	50-100	X	
974000	MM (M) (Bolt-on)	120/240 Vac	2 S.P.	15-50	X	
975000	100 A Trip Unit	250 Vac	2, 3	50-100	X	
976000	225 A Trip Unit	250 Vac	2, 3	70-225	X	
977000	KL Trip Unit	600 Vac	2, 3	125-400	X	
978000	LM Trip Unit	600 Vac	2, 3	225-800	X	
979000	WL Frame	600 Vac	2, 3	225-600	X	
982000	50 A Form W (Flip-on)	125/250 Vac	1, 2, 3	15-50	X	
984000	ML-2	250 Vac	2, 3	50-100	X	
985000	100 A (G) Form W	600 Vac	2, 3	50-100	X	
986000	100 A (F) Form W	600 Vac	2, 3	10-100	X	
987000	ML-3	250 Vac	2, 3	125-225	X	
988000	ML-1	250 Vac	2, 3	15-100	X	
989000	ML-1	480 Vac	2, 3	15-100	X	
991000	QB	120/240 Vac	1	15-50	X	
992000	ML	120/240 Vac	1, 2, 3	10-50	X	
992900	ML Form Y	277 Vac	1	10-20	X	
994000	ML-2	600 Vac	2, 3	15-100	X	
995000	100 A (G) Form W	600 Vac	2, 3	15-100	X	
996000	100 A (F) Form W	600 Vac	2, 3	15-100	X	
997000	ML-3	600 Vac	2, 3	50-225	X	
998000	ML-1	600 Vac	2, 3	15-100	X	
999000	ML-1	600 Vac	2, 3	15-100	X	
A1B	100 A	120/240 Vac	1, 2, 3	15-100	X	
EH, EHB	100 A	480Y/277 Vac	1, 2, 3	15-100	EH	See page 11-14
FC	100 A	480 Vac	2, 3	15-100	FC	See page 11-5
FD, FG, FJ	100 A	480Y/277 Vac	1, 2, 3	15-100	X	
GJL / NENL	100 A	480 Vac	3	15-100	X	
KA, KH, KC	250 A	480 Vac	2, 3	70-250	X	See pgs. 11-6-11-8

Contact your local Sales Office for availability.

**Table 11.2: Circuit Breaker Availability. Continued**

Series of Cat. No.	Frame Size	Volts	Poles	Amperes	Availability	
					Obsolete No Longer Available	Obsolescent
FI, FIL	100 A	480 Vac	2, 3	20–100	X	
KI, KIL	225 A	480 Vac	2, 3	110–225	X	
LI, LIL	400 A	480 Vac	2, 3	300–400	X	
KD, KG	250 A	240 Vac	2, 3	100–250	KG	See page 11-17
LA(JKL) 0000	400 A	600 Vac	2, 3	125–400	X	
MA-0000	1000 A	600 Vac	2, 3	125–1000	X	
Masterpact M/MP/MC	6300 A	600 Vac	3, 4	800–6300		See pgs. 11-27–11-30
MEC	225 A	600 Vac	2, 3	100–225	X	
MEC	400 A	600 Vac	2, 3	250–400	X	
MEC	800 A	600 Vac	2, 3	400–800	X	
MHAB, BC, CA	MM (Plug-on)	120/240 Vac	2 S.P.	15–50	X	
MHAB, BC, CA	M1 (Plug-on)	120/240 Vac	2, 3	15–70	X	
MHAB, BC, CA	M2 (Plug-on)	120/240 Vac	2, 3	70–100	X	
NHL	1200 A	480 Vac	2, 3	800–1200		See page 11-18
PEC	1200 A	600 Vac	2, 3	600–1200	X	
PEC	1600 A	600 Vac	2, 3	1000–1600	X	
PEC	2000 A	600 Vac	2, 3	1000–2000	X	
QOT	Series 1	120/240 Vac	1, 2	30	X	
Q1, Q1B	150 A	120/240 Vac	1, 2	15–100	X	
Q1, Q1B	150 A	240 Vac	3	15–100	X	
Q1-H, Q1B-H	100 A	240 Vac	2	15–100	X	
Q1-VH, Q1B-VH	125 A	120/240 Vac	2	15–30	X	
Q1-VH, Q1B-VH	100 A	240 Vac	3	15–30	X	
Q2, Q2-H, Q2H	225 A	240 Vac	2, 3	100–225	X	
QE	200 A	120/240 Vac	2, 3	70–200		See page 11-16
SE	4000 A	600 Vac	3	200–4000		See pgs. 11-20
CK	1200 A	480 Vac	3	400–1200	X	
CM	2000 A	480 Vac	3	1250–2000	X	
XO	50 A	120/240 Vac	1, 2	15–50	X	
Y1B	100 A	277 Vac	1	15–100	X	
ME, MEL	250 A, 400 A, 800 A	600 Vac	3	100–800	X	
MX, MXL	250 A, 400 A, 800 A	600 Vac	3	100–800	X	
NA, NAL	1200 A	600 Vac	3	600–1200	X	
NC, NCL	1200 A	600 Vac	3	600–1200	X	
NX, NXL	1200 A	600 Vac	3	600–1200	X	
NE, NEL	1200 A	600 Vac	3	600–1200	X	
PAF	2000 A	600 Vac	3	600–2000	X	
PHF	2000 A	600 Vac	2, 3	600–2000	X	
PCF	2500 A	600 Vac	2, 3	1600–2500	X	
PXF	2500 A	600 Vac	2, 3	600–2500	X	
PEF	2500 A	600 Vac	3	600–2500	X	

Contact your local Sales Office for availability.

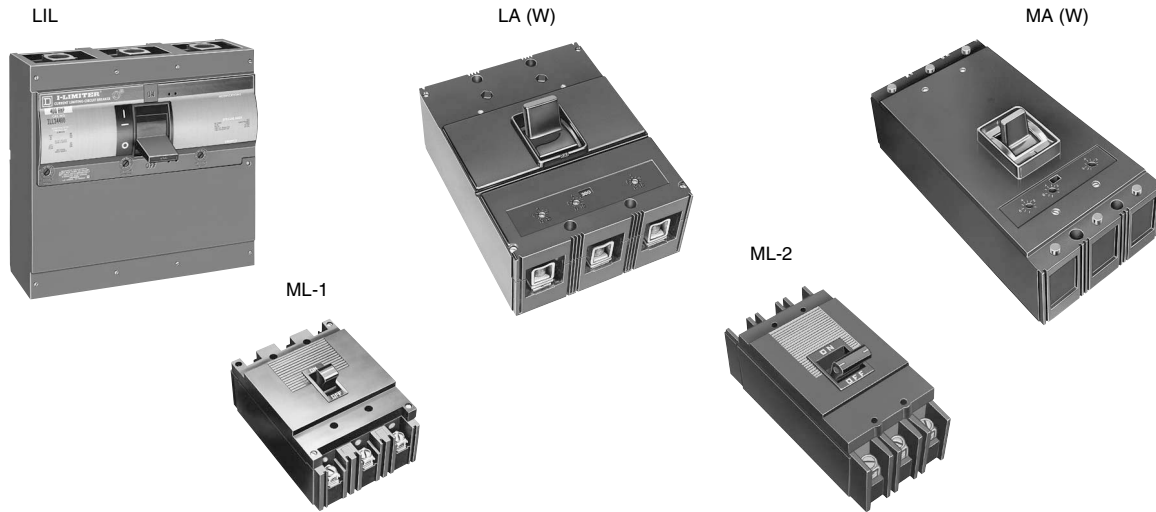


Table 11.3: Circuit Breaker Dimensions

Circuit Breaker Type	Cat. No. Prefix	Number Poles	Dimensions																
			A		B		C		D		E		F		G		H		
			in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	
QB	991	1	3.75	95	1.00	25	2.50	63	3.06	78	—	—	—	—	—	—	—	—	
ML	992	1	6.00	152	1.00	25	3.09	78	3.91	99	.88	22	4.25	108	—	—	—	.33	8
	992	2	6.00	152	2.00	51	3.09	78	3.91	99	.88	22	4.25	108	—	—	—	.19	5
	992	3	6.00	152	3.00	76	3.09	78	3.91	99	.88	22	4.25	108	—	—	—	1.83	46
ML-1	999	2 & 3	6.50	165	4.47	113	3.06	78	3.94	100	.94	24	4.25	108	1.50	38	.75	19	
ML-2	994	2 & 3	9.56	243	4.47	113	3.75	95	4.88	124	1.69	43	6.50	165	1.50	38	.75	19	
ML-3	997	2 & 3	10.38	264	5.97	152	3.88	98	5.31	135	1.69	43	6.63	168	2.00	51	1.00	25	
LA (W)	LA	2 & 3	10.75	273	8.25	209	4.31	109	5.50	140	.63	16	9.50	241	2.75	70	1.38	35	
MA (W)	MA	2 & 3	16.00	406	8.25	209	4.06	103	6.06	154	.88	22	14.25	362	2.75	70	1.38	35	
KL	967	2 & 3	22.00	559	8.25	209	5.50	140	7.00	178	.63	16	20.75	527	2.75	70	1.38	35	
LM	940	2 & 3	22.00	559	8.25	209	5.50	140	7.00	178	.63	16	20.75	527	2.75	70	1.38	35	
FIL (4)	IFL	2 & 3	8.29	210	4.46	113	3.67	93	4.70	119	.44	11	7.41	188	1.50	38	.75	19	
KIL (4)	IKL	2 & 3	11.00	279	6.00	152	4.02	102	5.51	140	.88	22	9.25	235	2.00	51	1.00	25	
LIL	ILL	2 & 3	11.00	279	12.00	305	4.05	103	6.11	155	.88	22	9.25	235	4.00	102	2.00	51	
NHL	NHL	2 & 3	20.00	508	12.00	305	5.75	146	8.12	206	5.87	149	7.76	197	4.00	102	2.00	51	

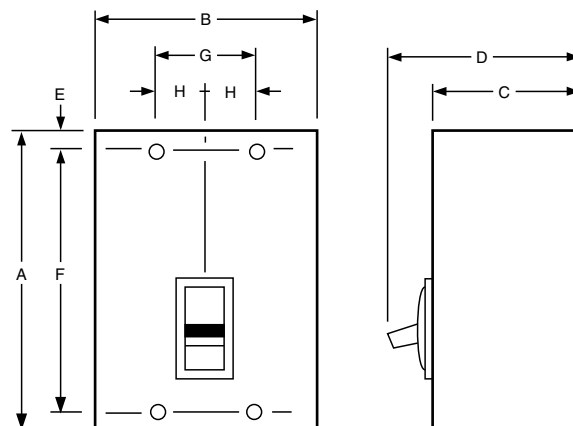


Figure 1

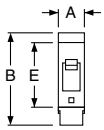


Figure 2

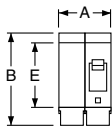
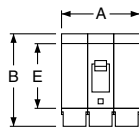


Figure 3



EH, EHB

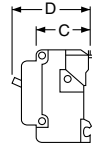


Figure 4

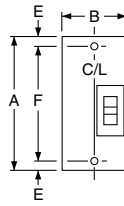
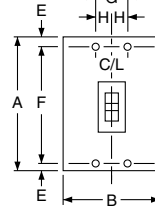


Figure 5



Q2L

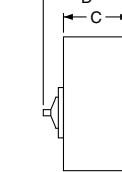


Figure 6

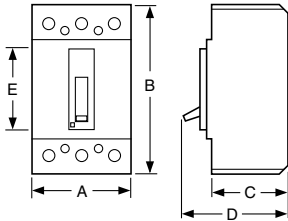


Figure 7

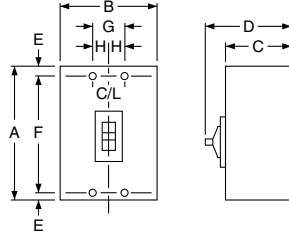


Figure 8

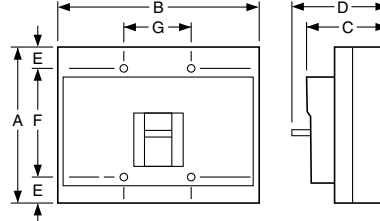


Figure 9

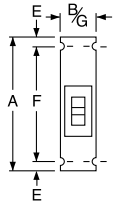


Figure 10

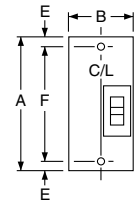


Figure 11

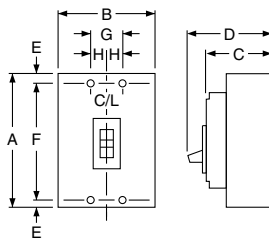


Figure 12

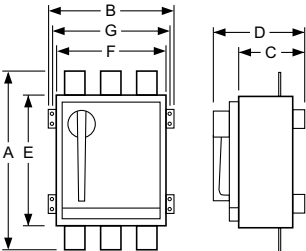
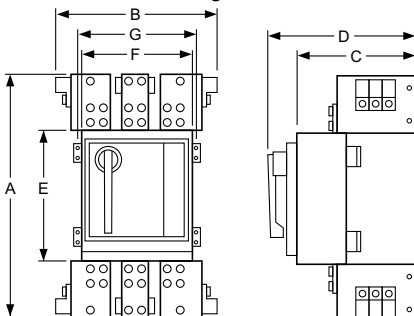


Figure 13



**Table 11.4: Circuit Breaker Dimensions**

Circuit Breaker Cat. No. Prefix	No. Poles	Fig. No.	Dimensions—In.							
			A	B	C	D	E	F	G	H
EH, EHB	1	1	1.00	3.50	2.00	2.97	2.44	—	—	—
	2	2	2.00	3.50▲	2.00	2.97	2.44	—	—	—
	3	3	3.00	3.50▲	2.00	2.97	2.44	—	—	—
FDA, FGA, FJA	1	Width 1.50								
	2, 3	Width 3.00								
Q2L, Q2L-H	2	4	6.44	3.00	3.16	3.92	■	4.25	—	—
	3	5	6.44	4.50	3.16	3.92	■	4.25	1.50	0.75
KD, KG	2, 3	6	4.12	7.35	3.20	4.17	3.34	—	—	—
MXL, MEL	2 & 3	7	14.75	9.00	4.37	6.50	1.66	11.43	3.00	1.50
NAL, NCL, NEL, NXL	2 & 3	8	12.12	14.98	6.40	8.07	1.69	8.75	5.00	—
FCL	1	9	6.00	1.50	3.16	4.13	0.44	5.13	1.50	—
	2	10	6.00	3.00♦	3.16	4.13	0.44	5.13	—	—
	3	11	6.00	4.50	3.16	4.13	0.44	5.13	1.50	0.75
MAL, MHL	2 & 3	8	14.00	9.00	4.53	6.50	1.66	10.69	3.00	1.50
NA, NC, NX, NE	2 & 3	8	12.12	14.98	6.40	8.07	1.69	8.75	5.0	—
PA, PH, PX, PE	2 & 3	12	20.06	13.70	7.25	10.47	14.00	12.00	12.75	—
PC, PX-25, PE-20-25	2 & 3	13	26.10	23.30	13.33	16.55	14.10	12.00	—	—

- ▲ 70–100 A is 4.00 in.
- Dimensions E are 1.59 in at ON end and 0.63 in at OFF end.
- ♦ FCL 2-pole circuit breaker dimension B is 4.50 as in Fig. 23.

**Table 11.5:**

Frame Size	Approx. Shipping Weight (Lbs.)
MAL MHL	34
PAF PHF	69
PXF PEF	80

**FC circuit breakers are obsolete. Please refer to Digest 176 for PowerPact™ molded case circuit breakers for new installations or replacement.**

FAL/FHL 2P  
15–100 A



FAL/FHL 3P  
15–100 A



Thermal-magnetic molded case circuit breakers shown on page 11-6 are permanent trip UL Listed, CSA® Certified, IEC rated, and also meet the requirements of Federal Specification W–C–375B/GEN as indicated on Digest pages 7-4 through 7-7.

**NOTE:** Consider using PowerPact™ circuit breakers for situations requiring circuit breaker accessories. See Digest Section 7 for more information.

**Table 11.6: F-Frame—100 A, Thermal-Magnetic, Individually-Mounted, 480 Vac**

Ampere Rating	Fixed AC Magnetic Trip		Extra-High Interrupting		Terminal Wire Range (AWG)
			2P	3P	
	Hold	Trip	480 Vac, 250 Vdc	480 Vac, 250 Vdc	
15 A	275 A	600 A	—	FCL34015	CU30FA4 (1) 14–10 Cu
20 A	275 A	600 A	—	FCL34020	
25 A	275 A	600 A	—	FCL34025	
30 A	275 A	600 A	—	FCL34030	
35 A	400 A	850 A	—	FCL34035	AL100FA4 (1) 14–3 Cu or (2) 12–1 Al
40 A	400 A	850 A	—	FCL34040	
45 A	400 A	850 A	—	FCL34045	
50 A	400 A	850 A	FCL24050	FCL34050	
60 A	800 A	1450 A	FCL24060	FCL34060	
70 A	800 A	1450 A	FCL24070	FCL34070	
80 A	800 A	1450 A	FCL24080	FCL34080	
90 A	900 A	1700 A	FCL24090	FCL34090	
100 A	900 A	1700 A	FCL24100	FCL34100	

**Table 11.7: Interrupting Ratings**

Voltage	FAL			FHL	FCL	FIL
	240 Vac	480 Vac	600 Vac			
240 Vac	10 kA	18 kA (1P), 25 kA (2P, 3P)	25 kA	25 kA (1P) 65 kA (2P, 3P)	100 kA	200 kA
480 Vac	—	18 kA	18 kA	25 kA (2P, 3P)	65 kA	200 kA
600 Vac	—	—	14 kA	18 kA (2P, 3P)	—	100 kA

**Termination Option**

**Termination Letter**  
F = No Lugs  
L = Lugs both ends  
P with MT Suffix = Lugs ON end  
P = Lugs OFF end

For factory-installed termination, place termination letter in the third block of the circuit breaker catalog number.

**FAL36100**

Termination Letter

**Table 11.8: F-Frame—100 A, Thermal-Magnetic, I-Line™ Construction, 480 Vac**

Ampere Rating	Fixed AC Magnetic Trip		Extra-High Interrupting ♦		Terminal Wire Range (AWG)
			2P ▲	3P	
	Hold	Trip	480 Vac, 250 Vdc ■	480 Vac, 250 Vdc ♦	
15 A	275 A	600 A	—	FC34015	CU30FA4 (1) 14–10 Cu
20 A	275 A	600 A	—	FC34020	
25 A	275 A	600 A	—	FC34025	
30 A	275 A	600 A	—	FC34030	
35 A	400 A	850 A	—	FC34035	AL100FA4 (1) 14–3 Cu or (1) 12–1 Al
40 A	400 A	850 A	—	FC34040	
45 A	400 A	850 A	—	FC34045	
50 A	400 A	850 A	FC24050( )	FC34050	
60 A	800 A	1450 A	FC24060( )	FC34060	
70 A	800 A	1450 A	FC24070( )	FC34070	
80 A	800 A	1450 A	FC24080( )	FC34080	
90 A	900 A	1700 A	FC24090( )	FC34090	
100 A	900 A	1700 A	FC24100( )	FC34100	

▲ 1P and 2P circuit breaker catalog numbers are completed by adding the required phase connection letters as a suffix. See Phase Option Table.  
■ FCL 2P circuit breakers are built using 3P module.  
♦ FCL circuit breakers are not rated for 250 Vdc.

OBSOLETE CIRCUIT BREAKERS

FA 2P  
3 in. (76 mm)  
Mounting Height



FA 3P  
4.5 in. (114 mm)  
Mounting Height



**Table 11.9: Phase Options**

Phase Option Letter	1P	2P	3P
A	FA14035A		
B	FA14035B		
C	FA14035C		
AB		FA24030AB	
AC		FA24030AC	
BC		FA24030BC	
ABC			FA34030
CBA			FA34030CBA

**Table 11.10: Interrupting Ratings**

Voltage	FA			FH	FC	FI
	240 Vac	480 Vac	600 Vac			
240 Vac	10 kA	18 kA (1P), 25 kA (2P, 3P)	25 kA	25 kA (1P) 65 kA (2P, 3P)	100 kA	200 kA
277 Vac	—	18 kA	—	—	65 kA	—
480 Vac	—	18 kA	18 kA	25 kA (2P, 3P)	65 kA	200 kA
600 Vac	—	—	14 kA	18 kA (2P, 3P)	—	100 kA

Accessories ..... Page 11-28  
Optional Lugs ..... Page 11-23  
Dimensions ..... Page 11-5  
Enclosures: see Digest Section 7

**K-frame circuit breakers are obsolete. Please refer to Digest 176 for PowerPact™ molded case circuit breakers for new installations or replacement.**



**Table 11.11: K-Frame—250 A, Thermal-Magnetic, Individually-Mounted, 600 Vac**

Ampere Rating	Adjustable AC Magnetic Trip▲		Standard Interrupting Cat. No.	High Interrupting Cat. No.	Extra-High Interrupting ■ Cat. No.	Terminal Wire Range	
	Low	High					
<b>2P, 600 Vac, 250 Vdc</b>							
70	350 A	700 A	KAL26070	KHL26070	—	AL250KA (1) 4 AWG–350 kcmil Al	
80	400 A	800 A	KAL26080	KHL26080	—		
90	450 A	900 A	KAL26090	KHL26090	—		
100	500 A	1000 A	KAL26100	KHL26100	—		
110	550 A	1100 A	KAL26110	KHL26110	KCL24110		
125	625 A	1250 A	KAL26125	KHL26125	KCL24125		
150	750 A	1500 A	KAL26150	KHL26150	KCL24150		
175	875 A	1750 A	KAL26175	KHL26175	KCL24175		
200	1000 A	2000 A	KAL26200	KHL26200	KCL24200		
225	1125 A	2250 A	KAL26225	KHL26225	KCL24225		
250	1250 A	2500 A	KAL26250	KHL26250	KCL24250		
<b>3P, 600 Vac, 250 Vdc</b>							
70	350 A	700 A	KAL36070	KHL36070	—		AL250KA (1) 4 AWG–350 kcmil Al
80	400 A	800 A	KAL36080	KHL36080	—		
90	450 A	900 A	KAL36090	KHL36090	—		
100	500 A	1000 A	KAL36100	KHL36100	—		
110	550 A	1100 A	KAL36110	KHL36110	KCL34110		
125	625 A	1250 A	KAL36125	KHL36125	KCL34125		
150	750 A	1500 A	KAL36150	KHL36150	KCL34150		
175	875 A	1750 A	KAL36175	KHL36175	KCL34175		
200	1000 A	2000 A	KAL36200	KHL36200	KCL34200		
225	1125 A	2250 A	KAL36225	KHL36225	KCL34225		
250	1250 A	2500 A	KAL36250	KHL36250	KCL34250		

**Table 11.12: K-Frame—250A, Thermal-Magnetic, I-Line™ Construction, 600 Vac**

Ampere Rating	Adjustable AC Magnetic Trip▲		Standard Interrupting Cat. No.	High Interrupting Cat. No.	Extra-High Interrupting ■ Cat. No.	Terminal Wire Range	
	Low	High					
<b>2P, 600 Vac, 250 Vdc ♦</b>							
70	350 A	700 A	KA26070( )	KH26070( )	—	AL250KA (1) 4 AWG–350 kcmil Al	
80	400 A	800 A	KA26080( )	KH26080( )	—		
90	450 A	900 A	KA26090( )	KH26090( )	—		
100	500 A	1000 A	KA26100( )	KH26100( )	—		
110	550 A	1100 A	KA26110( )	KH26110( )	KC24110( )		
125	625 A	1250 A	KA26125( )	KH26125( )	KC24125( )		
150	750 A	1500 A	KA26150( )	KH26150( )	KC24150( )		
175	875 A	1750 A	KA26175( )	KH26175( )	KC24175( )		
200	1000 A	2000 A	KA26200( )	KH26200( )	KC24200( )		
225	1125 A	2250 A	KA26225( )	KH26225( )	KC24225( )		
250	1250 A	2500 A	KA26250( )	KH26250( )	KC24250( )		
<b>3P, 600 Vac, 250 Vdc</b>							
70	350 A	700 A	KA36070	KH36070	—		AL250KA (1) 4 AWG–350 kcmil Al
80	400 A	800 A	KA36080	KH36080	—		
90	450 A	900 A	KA36090	KH36090	—		
100	500 A	1000 A	KA36100	KH36100	—		
110	550 A	1100 A	KA36110	KH36110	KC34110		
125	625 A	1250 A	KA36125	KH36125	KC34125		
150	750 A	1500 A	KA36150	KH36150	KH34150		
175	875 A	1750 A	KA36175	KH36175	KC34175		
200	1000 A	2000 A	KA36200	KH36200	KC34200		
225	1125 A	2250 A	KA36225	KH36225	KC34225		
250	1250 A	2500 A	KA36250	KH36250	KC34250		

KA/KH/KC 2P and 3P  
4.5 in. (114 mm)  
Mounting Height



▲ UL magnetic trip setting tolerances are ±25% for low and ±20% for high from nominal value shown.

■ KC circuit breakers are 480 Vac

♦ 2P and 3P circuit breaker catalog numbers are completed by adding the required phase connection letters as a suffix. See Phase Option Table.

**Table 11.13: Interrupting Ratings**

Voltage	KA, KAL	KH, KHL	KC, KCL	KI, KIL
240 Vac	42 kA	65 kA	100 kA	200 kA
480 Vac	25 kA	35 kA	65 kA	200 kA
600 Vac	22 kA	25 kA	—	100 kA

**Table 11.14: Phase Options**

Phase Option Letter	2P	3P
AB AC BC	KA26250AB KA26250AC KA26250BC	
ABC CBA		KA36250 KA36250CBA

**Table 11.15: Walking Beam Mechanical Interlock Components ▼**



Circuit Breaker Prefix	Manually Operated			Electrically Operated		
	Operator Suffix	Walking Beam Ass'y. Cat. No.	Mounting Pan Cat. No.	Operator Suffix	Walking Beam Ass'y. Cat. No.	Mounting Pan Cat. No.
KAL	WB	KA4WB	KAWBP4	WBMO	KA9WB	KAWBP9

★ Walking Beam Mechanical Interlock requires 2 circuit breakers with WB suffix, 1 walking beam assembly and 1 mounting pan.

▼ Fully enclosed interlocked units are available in Type 1 and Type 3R enclosures, with two neutrals provided in each enclosure. The completely enclosed assembly is not UL Listed. Consult your nearest Schneider Electric local sales office for more information.

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Enclosures: see Digest Section 7

These automatic molded case switches are in obsolescence. Do not use on new applications. Limited service stock is available for replacement or fill purposes. Contact your local Sales Office for product availability.

### Automatic Molded Case Switches

Automatic molded case switches open instantaneously at a factory preset magnetic trip point, calibrated to protect only the molded case switch itself, when it is subjected to high fault currents. The trip point is nonadjustable and provides no overload or low level fault protection.

Molded case switches open when the handle is switched to the OFF position or in response to an auxiliary tripping device such as a shunt trip.

Automatic switches will accept the same lugs and accessories as equivalent thermal-magnetic circuit breakers.

Automatic molded case switches are UL Listed per UL 489 and are CSA® Certified.

**Table 11.16: Automatic Molded Case Switches, 600 Vac**

Ampere Rating	2P		3P		Withstand Rating* ♦				Trip Point (A)▲		Lug Kit Installed
	Cat. No.	Availability	Cat. No.	Availability	240 Vac	480 Vac	600 Vac	250 Vdc	AC	DC	
100	FHL26000M■		FHL36000M■		65k	25k	18k	10k	1500	1725	AL100FA
150	—		FHL3600015M■		65k	25k	18k	—	2500	—	AL150FA
400	LHL26000M		LHL36000M		65k	35k	25k	10k	8000	9600	AL400LA
250	KHL26000M■	Not Available	KHL36000M■	Not Available	65k	35k	25k	10k	4500	5175	AL250KA
600	MHL260006M	Not Available	MHL360006M		65k	65k	25k	10k	9000	9900	AL900MA
800	MHL260008M	Not Available	MHL360008M		65k	65k	25k	10k	9000	9900	AL900MA

- ▲ UL magnetic trip tolerances are -20% / +30% from the nominal values shown.
- FHL and KHL automatic switches will not accept cylinder lock attachments.
- ♦ The withstand rating is the fault current at rated voltage that the molded case switch will withstand without damage when protected by a circuit breaker with an equal continuous current rating.
- ★ The short circuit current rating is the fault current, at rated voltage, that the molded case switch will withstand without damage when protected by a circuit breaker with an equal continuous current rating.

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These Mag-Gard™ motor circuit protectors are obsolete. Please refer to Digest 176 for PowerPact™ molded case circuit breakers for new installations or replacement.

**Mag-Gard™ Motor Circuit Protector**

Instantaneous trip magnetic only circuit breakers have a single adjustment which simultaneously sets the magnetic trip level of each individual pole. Mag-Gard circuit breakers comply with NEC® requirements for providing motor circuit protection when installed as part of a UL Listed combination controller having motor overload protection. Interrupting ratings are established for these UL Recognized Components only when they are used in combination with motor starters with properly sized overload relays and contactors.

Mag-Gard circuit breakers will accept the same lugs and accessories as equivalent thermal-magnetic circuit breakers. Mag-Gard circuit breakers are available with I-Line construction. H-construction Mag-Gard circuit breakers are also available.

**Table 11.17: Magnetic Only 3–1200 A 600 Vac, 50/60 Hz**

Ampere Rating	Adjustable▲ Trip Range	Cat. No. 3P only
KAL	150 A	750–1500 A KAL3615026M
	250 A	400–800 A 750–1500 A 1000–2000 A 1125–2250 A 1250–2500 A KAL3625021M KAL3625026M KAL3625030M KAL3625031M KAL3625032M
FAL	3 A	8–28 A FAL3600311M
	7 A	18–70 A FAL3600712M
	15 A	50–180 A FAL3601513M
	30 A	50–180 A FAL3603013M
	30 A	50–180 A FAL3603015M
	50 A	150–580 A FAL3605016M
	100 A	150–580 A FAL3610016M
	100 A	300–1100 A FAL3610018M

▲ UL magnetic trip setting tolerances are -20%/+30% from the nominal values shown.



Adjustable instantaneous-trip circuit breakers are intended for use in combination with motor starters with overload relays for the protection of motor circuits from short circuits. Other specific applications include rectifiers and resistance welders. These circuit breakers contain a magnetic trip element in each pole with the trip point adjustable from the front. Interrupting ratings are determined by testing the instantaneous-trip circuit breakers in combination with a contactor and overload relay.

Select instantaneous-trip circuit breakers as follows:

1. Use selection table for motors, other than NEMA Design E, with locked-rotor indicating code letters per NEC® Table 430.7 (b) as follows:

Horsepower	Motor Code Letters
1/2 or less	A–L
3/4 to 1-1/2	A–K
2 to 3	A–J
5 to 25	A–H
30 to 125	A–G
150 or more	A–F

For other motors order a special thermal-magnetic circuit breaker with magnetic trip settings for the specific motor— specify motor horsepower, voltage, frequency, full-load current and code letter or locked rotor current.

2. Determine motor hp rating from the motor nameplate.
3. Refer to the table at right and select an instantaneous-trip circuit breaker with an Ampere rating recommended for the hp and voltage involved.
4. Select an adjustable trip setting of at least 800%, not to exceed 1300%, of the motor full-load Amperes. (FLA) for other than Design E motors. For Design E motors, select an adjustable trip setting of at least 1100% not to exceed 1700% of FLA.
5. The NEC 1300% maximum setting may be inadequate for instantaneous-trip circuit breakers to withstand current surges typical of the magnetization current of autotransformer type reduced voltage starters, or open transition wye-delta starters during transfer from “start” to “run,” constant hp multi-speed motors, and motors labeled “high efficiency.” Select thermal-magnetic circuit breakers from Digest page 7-32 for those applications.
6. Part-winding motors, per NEC® 430.3, should have two circuit breakers selected from the above at not more than one half the allowable trip setting for the horsepower rating. The two circuit breakers should operate simultaneously as a disconnecting means per NEC 430.103.

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**11 OBSOLETE CIRCUIT BREAKERS**

Table 11.18: Adjustable Instantaneous-Trip Circuit Breakers for Single Motor Circuit Protection

Hp Ratings of Induction Type Squirrel-Cage and Wound Rotor Motors				Full Load Amperes▲	Mag-Gard Circuit Breaker Cat. No.	Magnetic Trip Settings ■	
3Ø 60 Hz ac						MIN	MAX
200 V	230 V	460 V	575 V				
		1/2	1/2	0.8	FAL3600311M▲	100%	3500%
			3/4	1	FAL3600311M▲	800%	2800%
		3/4	1	1.1	FAL3600311M	700%	2500%
		1		1.4	FAL3600311M	600%	2000%
				1.8	FAL3600311M	400%	1600%
	1/2			2	FAL3600311M	400%	1400%
			1-1/2	2.1	FAL3600311M	400%	1300%
1/2				2.3	FAL3600311M	300%	1200%
		1-1/2		2.6	FAL3600712M	700%	2700%
			2	2.7	FAL3600712M	700%	2600%
	3/4			2.8	FAL3600712M	600%	2500%
3/4				3.2	FAL3600712M	600%	2200%
		2		3.4	FAL3600712M	500%	2100%
	1			3.6	FAL3600712M	500%	1900%
			3	3.9	FAL3600712M	500%	1800%
1				4.1	FAL3600712M	400%	1700%
		3		4.8	FAL3600712M	400%	1500%
	1-1/2			5.2	FAL3600712M	300%	1300%
1-1/2				6	FAL3600712M	300%	1200%
			5	6.1	FAL3600712M	300%	1100%
	2			6.8	FAL3601513M	700%	2600%
		5		7.6	FAL3601513M	700%	2400%
2				7.8	FAL3601513M	600%	2300%
			7-1/2	9	FAL3601513M	600%	2000%
	3			9.6	FAL3601513M	500%	1900%
3		7-1/2	10	11	FAL3601513M	500%	1600%
		10		14	FAL3603015M	700%	2500%
	5			15.2	FAL3603015M	700%	2300%
			15	17	FAL3603015M	600%	2100%
5				17.5	FAL3603015M	600%	2000%
		15		21	FAL3603015M	500%	1700%
	7-1/2		20	22	FAL3605016M	700%	2600%
7-1/2				25.3	FAL3605016M	600%	2300%
		20	25	27	FAL3605016M	600%	2100%
	10			28	FAL3605016M	500%	2100%
			30	32	FAL3605016M	500%	1800%
10				32.2	FAL3605016M	500%	1800%
		25		34	FAL3605016M	400%	1700%
		30		40	FAL3605016M	400%	1500%
			40	41	FAL3610018M	700%	2700%
	15			42	FAL3610018M	700%	2600%
15				48.3	FAL3610018M	600%	2300%
		40	50	52	FAL3610018M	600%	2100%
	20			54	FAL3610018M	600%	2000%
20			60	62	FAL3610018M	500%	1800%
		50		65	FAL3610018M	500%	1700%
	25			68	FAL3610018M	400%	1600%
30				92	KAL3625025M	700%	1400%
	40			104	KAL3625026M	700%	1400%
			150	144	KAL3625030M	700%	1400%
50				150	KAL3625030M	700%	1300%
	60			154	KAL3625031M	700%	1500%
		125		156	KAL3625031M	700%	1400%
60				177.1	KAL3625032M	700%	1400%
		150		180	KAL3625032M	700%	1400%
	75		200	192	KAL3625032M	700%	1300%

- ▲ Motor full-load currents are taken from NEC Table 430.150. Select wire and circuit breakers on basis of horsepower rather than nameplate full-load current per NEC 430.6 (A) for general motor applications. Do not use these values to select overload relay thermal units. See Digest Section 15 for selection of thermal units when actual full load current is not known. The voltages listed are rated motor voltages. Corresponding nominal system voltages are 200 to 208, 220 to 240, 440 to 480 and 550 to 600 volts.
- Only MIN and MAX settings are shown, intermediate settings are available on all circuit breakers.

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11 OBSOLETE CIRCUIT BREAKERS

These marine circuit breakers are obsolete. Please refer to Digest 176 for PowerPact™ molded case circuit breakers for new installations or replacement.



For use on vessels over 65 ft. (19,8) in length.  
Para utilizarse en embarcaciones mayores a 65 pies (19,8) de longitud.  
À utiliser sur des navires ayant plus de 65 pi (19,8) de long.

A standard for molded case circuit breakers which are intended to be installed and used aboard a boat or vessel is included in Supplement SA to UL 489, “Standard for Molded Case Circuit Breakers and Circuit Breaker Enclosures” (also referred to as UL product category DKTY). This UL Standard was established in accordance with U.S. Coast Guard regulations, applicable American Boat and Yacht Council Inc. publications, and NFPA® 302 “Standard for Motor Craft (Pleasure and Commercial)”. In order to be UL Listed for marine use, circuit breakers must not use aluminum or aluminum alloys for terminal connections and must be calibrated at an ambient temperature of 40 °C. Standard circuit breakers should not be specified or used in place of marine circuit breakers.

The following table lists those circuit breakers which are UL Marine Listed for use on vessels over 65 ft. (19.8 m) in length. (PowerPact H and J-frame circuit breakers can also be used in vessels under 65 ft. [19.8 m] in length.)

**Table 11.19: Circuit Breakers for Marine Applications**

Cat. No. Prefix	Poles	Ampere Rating	Application	Cat. No.	\$ Price
FC, FCL	2, 3	15–100 A	For use only on vessels over 65 feet (19.8 m) in length.	Add the number “9” after the catalog number prefix of the standard circuit breaker catalog number. Example: Standard FAL36100 Marine FAL936100	There is a 20% adder to the price of the equivalent standard circuit breaker. All marine circuit breakers are supplied with copper lugs.
KA, KAL	2, 3	70–250 A			
KH, KHL	2, 3	70–250 A			
KC, KCL	2, 3	110–250 A			

NQO, NQOB, and NQOD circuit breakers and panelboards are obsolete. Do not use on new applications. Limited service stock is available for replacement or fill purposes. Contact your local Sales Office for product availability.

**Replacing Obsolescent Q1 and Q1B Circuit Breakers In NQO, NQOB and NQOD Panelboards**

Q1 and Q1B circuit breakers have been replaced by QO and QOB circuit breakers.

Table 1 below is used for replacing 1P, 2P or 3P Q1 and Q1B circuit breakers with QO and QOB branch circuit breakers in NQO, NQOB and NQOD panelboards.

Table 2 below is used for replacing Q1 and Q1B main circuit breakers in NQO and NQOB panelboards.

**Table 11.20: Replacing Q1 and Q1B Circuit Breakers with QO and QOB Branch Circuit Breakers**

Panelboard Type	Branch Circuit Breaker		Mounting Assembly Required ♦
	Obsolete	Available	
NQOB	Q1B	QOB	SK5668
NQOD		QO	SKNQOD225 ■
NQOD		QOB	SKNQOD225 ■

**Table 11.21: Replacing Q1 and Q1B Main Circuit Breakers in NQO and NQOB Panelboards**

Panelboard Type	Main Circuit Breaker		Mounting Assembly Required ♦	Retaining Kit Required
	Obsolete	Available		
NQOB	Q1B	QOB	SK5668	—

▲ Mounting assembly SK5669 is used to mount both Q1 and QO circuit breakers. Not required for replacement purposes.

■ 225 A maximum. For 400–600 ampere circuit breaker mounting assembly, see Class 1630 Service Bulletin.

♦ Discount Schedule PE1A.

**Branch Circuit Breakers and Mounting Assemblies for ML Panelboards**

Replacement circuit breakers for ML panelboards are determined by the manufacture date of the panel and the panel depth. (See chart below)

**Table 11.22: Replacement Circuit Breakers in ML Panelboards**

Manufacture Date	Panel Depth		Availability of Replacement Circuit Breakers
	in.	mm	
1948–1956	8.63	219	No Replacements Available
1958–1961	10.00	254	No Replacements Available
1962–1968	10.63	270	Refer to Tables Below

The tables below are used for replacing or adding circuit breakers to 10-5/8 inch deep ML panelboards manufactured from 1962–1968 and for switchboards manufactured from 1962–1968.

**Table 11.23: Replacement of Existing Circuit Breakers**

Existing Circuit Breaker	Ampere Rating	Mounting Height		Cat. No. Prefix	Replacement Circuit Breaker	Mounting Assembly Required	Poles Required	Single or Twin (Mounting Assembly)	Availability
		in.	mm						
ML-1	15–100 A	4.50	114	989 or 999	FAL	SK4515★	3P	Twin	Not Available
ML-3	100–225 A	6.00	152	997	KAL	SK4516★	3P	Twin	
LA (W)	225–400	8.25	210	LA	LAL	SK4517	3P	Single	
MA (W)	125–1000 A	8.25	210	MA	MAL	SK4578	3P	Single	
FAL	15–100 A	4.50	114	FAL	FAL	No Mounting Assembly Required	3P	Twin	
KAL	70–250 A	4.50	114	KAL	KAL		3P	Twin	
LAL	125–400 A	6.00	152	LAL	LAL		3P	Single	
MAL	300–1000 A	9.00	229	MAL	MAL		3P	Single	
MAL	125–250 A	9.00	229	MAL	LAL	SK4517	3P	Single	

**Table 11.24: Adding New Circuit Breakers**

Cat. No. Prefix	Ampere Rating	Mounting Assembly Required	Mounting Height		Poles Required	Single or Twin (Mounting Assembly)
			in.	mm		
FAL	15–100 A	SK4515	4.50	114	3P	Twin
KAL	70–250 A	SK4516	4.50	114	3P	Twin
LAL	125–400 A	SK4517	6.00	152	3P	Single
MAL	300–1000 A	SK4578	9.00	229	3P	Single

★ Mounting assemblies for twin-mounted circuit breakers will only accept the same family and configuration of circuit breakers, i.e., FAL and FAL.

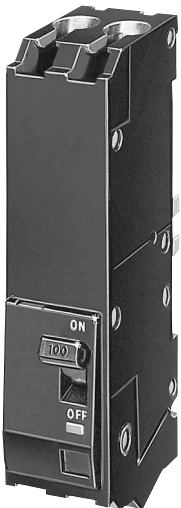
2P QO



2P QOB



2P Q1



11 OBSOLETE CIRCUIT BREAKERS

These rating plugs are for electronic circuit breakers which are obsolete. Please refer to Digest 176 for PowerPact™ circuit breakers for new installations or replacement.

ME Micrologic Circuit Breakers



ME Circuit Breakers Manufactured before Micrologic



PE Micrologic Circuit Breakers



PE Circuit Breakers Manufactured before Micrologic



SE Micrologic Circuit Breakers



Replacement rating plugs for circuit breakers manufactured before Micrologic™.

**Table 11.25: Replacement Rating Plugs for Pre-Micrologic Circuit Breakers**

Circuit Breakers Manufactured Before Micrologic	Frame Size	Ampere Rating	Cat. No.	
ME	225 A	100 A	ME2100	
		110 A	ME2110	
		125 A	ME2125	
		150 A	ME2150	
		175 A	ME2175	
		250 A	ME4250	
	400 A	350 A	ME4350	
		800 A	450 A	ME8450
			500 A	ME8500
			700 A	ME8700
			1200 A	600 A
		700 A		PE120700
800 A	PE120800			
900 A	PE120900			
1200 A	PE121200			
1600 A	1000 A	PE161000		
	1200 A	PE161200		
	1400 A	PE161400		
	2000 A	1000 A	PE161000	
		1200 A	PE161200	
		1400 A	PE161400	
1800 A		PE201800		
2000 A		PE202000		
PE-G/PEC-G Built before June 1, 1982 and all PE/PEC		1200 A	600 A	PEG120600
	700 A		PEG120700	
	800 A		PEG120800	
	1000 A		PEG121000	
	1200 A		PEG121200	
	1600 A		1000 A	PEG161000
		1200 A	PEG161200	
		1400 A	PEG161400	
		2000 A	1000 A	PEG161000
			1200 A	PEG161200
			1400 A	PEG161400
	1800 A		PEG201800	
	2000 A		PEG202000	
	PE-G/PEC-G Built after June 1, 1982		1200 A	600 A
		700 A		PEG120700
		800 A		PEG120800
		1000 A		PEG121000
		1200 A		PEG121200
1600 A		1000 A		PEG161000
		1200 A	PEG161200	
		1400 A	PEG161400	
		2000 A	1000 A	PEG161000
			1200 A	PEG161200
			1400 A	PEG161400
1800 A			PEG201800	
2000 A			PEG202000	

**Table 11.26: Interchangeable Rating Plug Kits for ME, NE, PE and SE Circuit Breakers with Full-Function Micrologic Trip System Manufactured Between December 1989 and September 1992**

Old Cat. No.	New Cat. No.	Multiplier Value
RP040	ARP040	0.400
RP050	ARP050	0.500
RP056	ARP056	0.563
RP058	ARP058	0.583
RP060	ARP060	0.600
RP063	ARP063	0.625
RP067	ARP067	0.667
RP070	ARP070	0.700
RP075	ARP075	0.750
RP080	ARP080	0.800
RP083	ARP083	0.833
RP088	ARP088	0.875
RP090	ARP090	0.900
RP100	ARP100	1.000





**Table 11.27: Replacement Rating Plugs for Micrologic Circuit Breakers**

Circuit Breaker	Frame Size	Ampere Rating	Cat. No. ▼		
Micrologic ME Series 3	225 A	100 A	ME2100RP		
		110 A	ME2110RP		
		150 A	ME2150RP		
		175 A	ME2175RP		
	400 A	250 A	ME4250RP		
		800 A	450 A	ME8450RP	
500 A	ME8500RP				
700 A	ME8700RP				
Micrologic NE Series 1	1200 A		600 A	NE120600RP	
		630 A	NE120630RP		
		700 A	NE120700RP		
		800 A	NE120800RP		
		900 A	NE120900RP		
		1000 A	NE121000RP		
Micrologic PE Series 4	1200 A	600 A	PE120600RP		
		700 A	PE120700RP		
		1000 A	PE121000RP		
		1200 A	PE121200RP		
		1600 A	1000 A	PE161000RP	
			1200 A	PE161200RP	
	2000 A		1000 A	PE201000RP	
			1200 A	PE201200RP	
			1400 A	PE201400RP	
			1600 A	PE201600RP	
		1800 A	PE201800RP		
		Micrologic SE Series 2	200 A	100 A	S9020100RP
125 A	S9020125RP				
150 A	S9020150RP				
175 A	S9020175RP				
200 A	S9020200RP				
400 A	200 A			S9040200RP	
	250 A		S9040250RP		
	300 A		S9040300RP		
	350 A		S9040350RP		
	800 A		450 A	S9080450RP	
			500 A	S9080500RP	
700 A			S9080700RP		
1200 A			800 A	S9120800RP	
			1000 A	S9121000RP	
			1200 A	S9121200RP	
	1600 A		1600 A	S9161600RP	
			2000 A	2000 A	S9202000RP

▼ Contact your nearest local sales office for availability.

**EH/EHB circuit breakers are obsolete. Do not use on new applications. Limited service stock is available for replacement or fill purposes. Contact your local Sales Office for product availability.**

**Table 11.28: E Frame—100 A, Thermal Magnetic (480Y/277 Vac)**

Amp Rating	1P 277 Vac—14 kA 120 Vac—65 kA				2P 480Y/277 Vac—14 kA 120/240 Vac—65 kA		3P 480Y/277 Vac—14 kA 240 Vac—65 kA		Wire Size (AWG)		Wire Temp.
	Plug-On		Bolt-On		Bolt-On		Bolt-On		Al	Cu	
	Cat. No.	Availability	Cat. No.	Availability	Cat. No.	Availability	Cat. No.	Availability			
											
	Requires 1 Space		Requires 1 Space		Requires 2 Spaces		Requires 3 Spaces				
<b>EH/EHB Circuit Breakers</b>											
15 A	Not Available	Not Available	EHB14015 ▲	—	EHB24015	—	EHB34015	—	—	(2) 14–10	60/75 °C
	—	—	—	—	—	—	EHB340151042	—	—	(2) 14–10	60/75 °C
	—	—	EHB140151082	—	—	—	EHB340151082	—	—	(2) 14–10	60/75 °C
20 A	Not Available	Not Available	EHB14020 ▲	—	Not Available	Not Available	EHB34020	—	—	(2) 14–10	60/75 °C
	—	—	—	—	—	—	EHB340201042	—	—	(2) 14–10	60/75 °C
	—	—	Not Available	Not Available	Not Available	Not Available	EHB340201082	—	—	(2) 14–10	60/75 °C
25 A	—	—	—	—	Not Available	Not Available	EHB340201212	—	—	(2) 14–10	60/75 °C
	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	12–8	14–8	60/75 °C
	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	EHB34030	—	12–8	14–8	60/75 °C
30 A	—	—	EHB140301082	—	EHB240301042	—	EHB340301082	—	12–8	14–8	60/75 °C
	—	—	—	—	EHB240301082	—	EHB340301212	—	12–8	14–8	60/75 °C
	—	—	—	—	—	—	EHB3403035	—	12–8	14–8	60/75 °C
35 A	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	EHB34035	—	12–2	14–2	75 °C
	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	12–2	14–2	75 °C
	—	—	—	—	—	—	Not Available	Not Available	12–2	14–2	75 °C
40 A	—	—	—	—	—	—	EHB340401212	—	12–2	14–2	75 °C
	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	12–2	14–2	75 °C
	—	—	—	—	—	—	Not Available	Not Available	12–2	14–2	75 °C
45 A	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	12–2	14–2	75 °C
	Not Available	Not Available	Not Available	Not Available	EHB24050	—	Not Available	Not Available	12–2	14–2	75 °C
	—	—	—	—	—	—	EHB340501042	—	12–2	14–2	75 °C
50 A	—	—	—	—	—	—	EHB340501082	—	12–2	14–2	75 °C
	—	—	—	—	—	—	Not Available	Not Available	12–2	14–2	75 °C
	Not Available	Not Available	Not Available	Not Available	EHB24060	—	Not Available	Not Available	12–2	14–2	75 °C
60 A	—	—	—	—	—	—	Not Available	Not Available	12–2	14–2	75 °C
	—	—	—	—	—	—	Not Available	Not Available	12–2	14–2	75 °C
	—	—	—	—	Not Available	Not Available	Not Available	Not Available	4–2/0	4–2/0	75 °C
70 A	—	—	—	—	Not Available	Not Available	Not Available	Not Available	4–2/0	4–2/0	75 °C
80 A	—	—	—	—	Not Available	Not Available	Not Available	Not Available	4–2/0	4–2/0	75 °C
90 A	—	—	—	—	Not Available	Not Available	Not Available	Not Available	4–2/0	4–2/0	75 °C
100 A	—	—	—	—	EHB24100 ■	—	Not Available	Not Available	4–2/0	4–2/0	75 °C
100 A	—	—	—	—	EHB241001082	—	Not Available	Not Available	4–2/0	4–2/0	75 °C
<b>EH/EHB HID Circuit Breakers — For Use on High Intensity Discharge Lighting Systems</b>											
15 A	Not Available	Not Available	Not Available	Not Available	EHB24015HID	—	Not Available	Not Available	—	(2) 14–10	60/75 °C
20 A	Not Available	Not Available	EHB14020HID ▲	—	Not Available	Not Available	EHB34020HID	—	—	(2) 14–10	60/75 °C
25 A	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	12–8	14–8	60/75 °C
30 A	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	EHB34030HID	—	12–8	14–8	60/75 °C

▲ UL Listed as SWD (switching duty) rated.  
■ For use only in Series 3 or Series E1 panelboards. Contact your nearest local sales office for use in earlier series panelboards

11 OBSOLETE CIRCUIT BREAKERS

FJ 3-pole circuit breakers are obsolete. Please refer to Digest 176 for PowerPact™ molded case circuit breakers for new installations or replacement.

**Table 11.29: Mechanical Lug Kit Information**

Circuit Breaker Application				Number of Wires Per Lug and Wire Range	Kit Cat. No.	Lugs Per Kit
Standard	Ampere Rating	Optional	Ampere Rating			
<b>Al Lugs for Use with Al or Cu Wire</b>						
FJ	35-125 A	FJ	15-30 A	(1) 12-2/0 AWG Al or (1) 14-2/0 AWG Cu	AL100FD	3

**Table 11.30: Handle Accessories**

Circuit Breaker Type	No. of Poles	Cat. No.
<b>Handle Padlock Attachment (locks ON or OFF)</b>		
FJ	1, 2 or 3	HPAFD

QE circuit breakers are obsolete. Please refer to Digest 176 for PowerPact™ molded case circuit breakers for new installations or replacement.

**Table 11.31: Branch Circuit Breakers**

Branch Device			
System Type	Branch Circuit Breaker		
	Ampere Rating	Cat. No.	Availability
<b>1Ø IN – 1Ø OUT or 3Ø IN – 1Ø3W OUT</b>			
200 A Max.	70 A	QE270VH	
	80 A	QE280VH	
	90 A	QE290VH	
	100 A	QE2100VH	
	125 A	QE2125VH	Not Available
	150 A	QE2150VH	
	175 A	QE2175VH	Not Available
	200 A	QE2200VH	Not Available
<b>3Ø IN 3Ø OUT</b>			

**Table 11.31: Branch Circuit Breakers**

Branch Device			
System Type	Branch Circuit Breaker		
	Ampere Rating	Cat. No.	Availability
200 A Max.	70 A	QE370VH	
	80 A	QE380VH	Not Available
	90 A	QE390VH	Not Available
	100 A	QE3100VH	Not Available
	125 A	QE3125VH	Not Available
	150 A	QE3150VH	Not Available
	175 A	QE3175VH	Not Available
	200 A	QE3200VH	Not Available



**KD and KG circuit breakers are obsolete. Please refer to Digest 176 for PowerPact™ molded case circuit breakers for new installations or replacement.**

KDL and KGL  
Circuit Breaker  
3P  
100–250 A



**Table 11.32: PowerPact™ K Frame—250 A, Thermal-Magnetic (240 Vac)**

Continuous Current Rating @ 40° C	AC Magnetic Trip Settings		D Interrupting Level		G Interrupting Level		Terminal Wire Range
	Hold	Trip	Cat. No.	Availability	Cat. No.	Availability	
<b>2P, 240 Vac</b>							
100 A	1100 A	1700 A	KDL22100	Not Available	KGL22100	Not Available	AL250KD 6 AWG–350 kcmil Al or Cu
110 A	1100 A	1700 A	KDL22110	Not Available	KGL22110	Not Available	
125 A	1100 A	1700 A	KDL22125	Not Available	KGL22125	Not Available	
150 A	1100 A	1700 A	KDL22150	Not Available	KGL22150	Not Available	
175 A	1400 A	2400 A	KDL22175	Not Available	KGL22175	Not Available	
200 A	1400 A	2400 A	KDL22200	Not Available	KGL22200	Not Available	
225 A	1400 A	2400 A	KDL22225	Not Available	KGL22225	Not Available	
250 A	1400 A	2400 A	KDL22250	Not Available	KGL22250	Not Available	
<b>3P, 240 Vac</b>							
100 A	1100 A	1700 A	KDL32100	Not Available	KGL32100	Not Available	AL250KD 6 AWG–350 kcmil Al or Cu
110 A	1100 A	1700 A	KDL32110		KGL32110	Not Available	
125 A	1100 A	1700 A	KDL32125	KGL32125	Not Available		
150 A	1100 A	1700 A	KDL32150	KGL32150	Not Available		
175 A	1400 A	2400 A	KDL32175	Not Available	KGL32175	Not Available	
200 A	1400 A	2400 A	KDL32200	Not Available	KGL32200	Not Available	
225 A	1400 A	2400 A	KDL32225	Not Available	KGL32225	Not Available	
250 A	1400 A	2400 A	KDL32250	Not Available	KGL32250	Not Available	

**Table 11.33: Mechanical Lug Kit Information**

Kit Catalog Number	Circuit Breaker Application				Number of Wires Per Lug and Wire Range	Torque	Lugs Per Kit	Availability
	Standard	Ampere Rating	Optional	Ampere Rating				
<b>Al Lugs for Use with Al or Cu Wire</b>								
AL250KD	KDL, KGL	100–250 A	—	—	(1) 6 AWG–350 kcmil	300 lb-in (34 N•m)	3	Not Available
<b>Cu Lugs for Use with Cu Wire Only</b>								
CU250KD	—	—	KDL, KGL	100–250	(1) 6 AWG–350 kcmil	300 lb-in (34 N•m)	3	

**Table 11.34: Handle Accessories**

Circuit Breaker Type	Cat. No.	Availability
<b>Handle Padlock Attachment (locks ON or OFF)</b>		
KDL, KGL	HPAKD	Not Available

**Table 11.35: Interrupting Ratings (kA)**

	KDL
240 V	25

NHL circuit breakers and related accessory products are obsolete. Please refer to Digest 176 for PowerPact™ molded case circuit breakers for new installations or replacement.

NHL Circuit Breaker  
800–1200 A



Table 11.36: NHL Circuit Breaker (1200 A, 480 Vac)

Ampere Rating	AC Magnetic Trip Settings Amperes		2P	3P	Standard Lug Kit Wire Range
	Low	High	Cat. No.	Cat. No.	
800 A	4000 A	8000 A	—	NHF368001021	AL1200NA (4) 350–750-kcmil
1000 A	5000 A	10000 A	—	NHF3610001021	
1200 A	5000 A	10000 A	—	NHF361200	
1200 A	5000 A	10000 A	—	NHF3612001021	
800 A	4000 A	8000 A	—	NHL36800	
1000 A	5000 A	10000 A	NHL261000	NHL361000	
1000 A	5000 A	10000 A	—	NHL3610001021	
1200 A	5000 A	10000 A	NHL261200	NHL361200	
1200 A	5000 A	10000 A	—	NHL3612001021	

Table 11.37: Mechanical Lug Kit

Kit Cat. No.	Circuit Breaker	Ampere Rating	Number of Wires Per Lug and Wire Range▲	Lugs Per Kit
AL1200NA	NH	600–1200	(4) 350–750 kcmil	1

Table 11.38: Compression Lug Kit

Kit Cat. No.	Circuit Breaker	Number of Lugs Per Terminal and Wire Range▲	Lugs Per Kit
VC1200NA5	NH	(1) 2/0 AWG–500 kcmil	1
VC1200NA7	NH	(1) 500–750 kcmil Al or 500 kcmil Cu	1

▲ Unless otherwise specified, wire sizes apply to both aluminum and copper conductors.

Table 11.39: Mechanical Accessories

Cat. No.	Circuit Breaker	Description	No. of Poles
HPANA■	NH	Handle Padlock Attachment	2, 3
NAHEX	NH	Handle Extension	2, 3

■ Use with NAHEX handle extension.

Table 11.40: Control Wire Terminations

Cat. No.	Standard Package Quantity
AL1200NAT	1

**SE circuit breakers and related accessories are obsolete. Please refer to Digest 176 for PowerPact™ molded case circuit breakers for new installations or replacement.**

**Table 11.41: SE Circuit Breaker**

Sensor Size	Ampere Rating	Rating Plug Installed	Fixed-Mounted Circuit Breaker		Drawout Circuit Breaker	
			Cat. No. ▲ ■		Cat. No. ▲ ■	
			Long-Time Short-Time Instantaneous	Long-Time Short-Time Instantaneous w/Ground Fault ♦	Long-Time Short-Time Instantaneous	Long-Time Short-Time Instantaneous w/Ground Fault ♦
<b>Standard Interrupting Rating</b>						
1200 A	1200 A	ARP100	SEF361200LSMR	—	—	—
3000 A	3000 A		SEF363000LS	—	SED363000LS	—
			—	SEF363000LSG	—	SED363000LSG
			SEF363000LSMR	—	SED363000LSMR	—
			—	SEF363000LSGMR	—	SED363000LSGMR
4000 A	4000 A		SEF364000LSZ	—	—	—
			SEF364000LSMRZ	—	—	—
			—	SEF364000LSGMRZ	—	SED364000LSGMR
			—	SEF364000LSAMRZ	—	—
<b>High Interrupting Rating</b>						
1200 A	1200 A	ARP100	—	SEHF361200LSGMR	—	—
3000 A	3000 A		SEHF363000LSMR	—	—	—

- ▲ "MR" (Motor Ready) indicates 120 Vac spring charging motor only already installed. Does not include shunt close or shunt trip option.
- "Z" indicates circuit breaker supplied without terminal connector kit.
- ♦ Substitute (A) in place of (G) for ground-fault alarm (pick-up indication only).

SE circuit breakers and related accessories are obsolete. Please refer to Digest 176 for PowerPact™ molded case circuit breakers for new installations or replacement.

**Table 11.42: Field-Replaceable Electronic Trip Unit Kits (Replaceable by Field Services Only)▲**

Ampere Rating	Trip Unit Function Cat. No.		
	Long-Time Short-Time Instantaneous	Long-Time Short-Time Instantaneous with Ground Fault	Long-Time Short-Time Instantaneous with Ground Fault Alarm
400 A	—	SETU400LSGB	—
800 A	SETU800LSB	—	—
800 A	—	SETU800LSGB	—
1200 A	SETU1200LSB	—	—
1200 A	—	SETU1200LSGB	—
1600 A	—	SETU1600LSGB	SETU1600LSAB
2500 A	—	SETU2500LSGB	—
3000 A	SETU3000LSB	—	—
3000 A	—	SETU3000LSGB	SETU3000LSAB
4000 A	SETU4000LSB	—	—
4000 A	—	SETU4000LSGB	—

▲ Used only with SE circuit breaker Series 3B.

◆ Fixed-mounted circuit breakers only. Does not include key interlock.

**Table 11.43: SE Drawout Cell Keying Kit**

Cell Key Positions Table						Availability	
Cell Keying Kit Cat. No.	Frame Size	Drawout Carriage Cell Key Position					
		A	B	C	D	E	
SECK0400	400 A		X			X	Not Available
SECK0800	800 A			X	X		Not Available
SECK1200	1200 A	X	X				
SECK1600	1600 A				X	X	
SECK2000	2000 A	X			X		
SECK2500	2500 A	X				X	
SECK3000	3000 A		X	X			

**Table 11.44: Field-Replaceable Accessory Kits**

Description	Kit Cat. No.
Spring Charging Motor Replacement Kit	S3MOT120AC2 — S3MOT125DC2
Shunt Close Replacement Kit	S3SC120AC2 S3SC024DC2 S3SC048DC2 S3SC125DC2
Shunt Trip Replacement Kit	S3ST120AC2 S3ST024DC2 S3ST048DC2 S3ST125DC2
Undervoltage Trip Replacement Kit	—
Auxiliary Switch Replacement Kit	S34DCB2 S34DCT2 S34AC2 S38AC2
Alarm Switch Replacement Kit	S3AS2

■ Also field-installable on Series 3 and newer, and for Series 2 ground fault circuit breakers.

**Table 11.45: Field-Installable External Accessory Kits**

Description	Kit Cat. No.
Padlock Attachment	SE2PA
Close Button Cover	SE1CBC
Key Interlock Bracket	SE1KI
Series 1 Primary Injection Test Plug	SEPITK1
Series 2 Primary Injection Test Plug	SEPITK2
SE Drawout Crank	SEDC
Fan Monitoring Switch Kit	SE40FAN

**Table 11.46: Neutral Current Transformers**

Cat. No.	Sensor	Where Used
SE12NCT	800	SE, SEH
SE12NCT	1200	SE, SEH
SE30NCT	1600	SE, SEH
SE30NCT	2000	SE, SEH
SE30NCT	2500	SE, SEH
SE30NCT	3000	SE, SEH
SE40NCT	4000	SE, SEH

**Electric Joint Compound**

SE drawout circuit breakers are supplied with factory-applied joint compound on the plug-on connectors. The compound should not be removed because it contributes to the overall performance of the connection.

Whenever one of these units is removed and reinstalled, the joint compound should be reapplied.

PJC 8311 is a two-ounce container of compound specially formulated for the SE drawout connections. This compound **MUST BE USED ON SE DRAWOUT CONNECTIONS**. No other type of commercially available joint compound should be used.

**Table 11.47: Electric Joint Compound**

Used With	Cat. No.
SED Drawout Circuit Breakers	PJC8311

11 OBSOLETE CIRCUIT BREAKERS

M-frame thermal-magnetic circuit breakers are obsolete. Please refer to Digest 176 for PowerPact™ molded case circuit breakers for new installations or replacement.

MAL/MHL 2P and 3p  
300–1000 A



**Table 11.48: M-Frame—Thermal-Magnetic, Individually-Mounted Circuit Breakers, 600 Vac**

Ampere Rating	AC Magnetic Trip Settings▲		Standard Interrupting		High Interrupting		Terminal Wire Range
	Low	High	Cat. No.	Availability	Cat. No.	Availability	
<b>2P, 600 Vac, 250 Vdc</b>							
300 A	1500 A	3000 A	MAL26300	Not Available	MHL26300	Not Available	AL900MA (3) 3/0 AWG–500 kcmil
350 A	1750 A	3500 A	MAL26350	Not Available	MHL26350	Not Available	
400 A	2000 A	4000 A	MAL26400	Not Available	MHL26400	Not Available	
450 A	2250 A	4500 A	MAL26450	Not Available	MHL26450	Not Available	
500 A	2500 A	5000 A	MAL26500	Not Available	MHL26500	Not Available	
600 A	3000 A	6000 A	MAL26600	Not Available	MHL26600	Not Available	
700 A	3500 A	7000 A	MAL26700	Not Available	MHL26700	Not Available	
800 A	4000 A	8000 A	MAL26800	Not Available	MHL26800	Not Available	
900 A	4500 A	9000 A	MAL26900	Not Available	MHL26900	Not Available	
1000 A	5000 A	10000 A	MAL261000	Not Available	MHL261000	Not Available	
1200 A	5000 A	10000 A	MAL261200	Not Available	MHL261200	Not Available	
<b>3P, 600 Vac, 250 Vdc</b>							
300 A	1500 A	3000 A	MAL36300	Not Available	MHL36300	Not Available	AL900MA (3) 3/0 AWG–500 kcmil
350 A	1750 A	3500 A	MAL36350	Not Available	MHL36350	Not Available	
400 A	2000 A	4000 A	MAL36400	Not Available	MHL36400	Not Available	
450 A	2250 A	4500 A	MAL36450	Not Available	MHL36450	Not Available	
500 A	2500 A	5000 A	MAL36500	Not Available	MHL36500	Not Available	
600 A	3000 A	6000 A	MAL36600	Not Available	MHL36600	Not Available	
700 A	3500 A	7000 A	MAL36700	Not Available	MHL36700	Not Available	
800 A	4000 A	8000 A	MAL36800	Not Available	MHL36800	Not Available	
900 A	4500 A	9000 A	MAL36900	Not Available	MHL36900	Not Available	
1000 A	5000 A	10000 A	MAL361000	Not Available	MHL361000	Not Available	
1200 A	5000 A	10000 A	MAL361200	Not Available	MHL361200	Not Available	

- ▲ UL magnetic trip setting tolerances are ±25% for low and ±20% for high from nominal values shown.
- The AL1000MA lug is the only lug available for the 1200 A MA and MH circuit breakers.

**Table 11.49: M-Frame—Thermal-Magnetic, I-Line™ Construction Circuit Breakers, 600 Vac**

Ampere Rating	AC Magnetic Trip Settings♦		Standard Interrupting		High Interrupting		Terminal Wire Range	
	Low	High	Cat. No.	Availability	Cat. No.	Availability		
<b>2P, 600 Vac, 250 Vdc★</b>								
300 A	1500 A	3000 A	MA26300()	Not Available	MH26300()	Not Available	AL900MA (3) 3/0 AWG–500 kcmil	
350 A	1750 A	3500 A	MA26350()	Not Available	MH26350()	Not Available		
400 A	2000 A	4000 A	MA26400()	Not Available	MH26400()	Not Available		
450 A	2250 A	4500 A	MA26450()	Not Available	MH26450()	Not Available		
500 A	2500 A	5000 A	MA26500()	Not Available	MH26500()	Not Available		
600 A	3000 A	6000 A	MA26600()	Not Available	MH26600()	Not Available		
700 A	3500 A	7000 A	MA26700()	Not Available	MH26700()	Not Available		
800 A	4000 A	8000 A	MA26800()	Not Available	MH26800()	Not Available		
<b>3P, 600 Vac, 250 Vdc</b>								
300 A	1500 A	3000 A	MA36300	Not Available	MH36300	Not Available		AL900MA (3) 3/0 AWG–500 kcmil
350 A	1750 A	3500 A	MA36350	Not Available	MH36350	Not Available		
400 A	2000 A	4000 A	MA36400	Not Available	MH36400	Not Available		
450 A	2250 A	4500 A	MA36450	Not Available	MH36450	Not Available		
500 A	2500 A	5000 A	MA36500	Not Available	MH36500	Not Available		
600 A	3000 A	6000 A	MA36600	Not Available	MH36600	Not Available		
700 A	3500 A	7000 A	MA36700	Not Available	MH36700	Not Available		
800 A	4000 A	8000 A	MA36800	Not Available	MH36800	Not Available		

- ♦ UL magnetic trip setting tolerances are ±25% for low and ±20% for high from nominal values shown.
- ★ 2P circuit breaker catalog numbers are completed by adding required phase connection letters as suffix to catalog numbers. See Phase Options table.

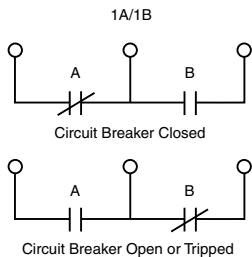
**Table 11.50: Interrupting Ratings**

Voltage	MA/MAL	MH/MHL
240 Vac	42 kA	65 kA
480 Vac	30 kA	65 kA
600 Vac	22 kA	25 kA

Accessories ..... Page 11-28  
 Optional Lugs ..... Page 11-23  
 Dimensions ..... Page 11-5  
 Enclosures: see Digest Section 7

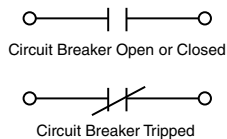
**Auxiliary Switch Contact Configuration**

Color Code:  
\*A\* Contact - Yellow Leads  
\*B\* Contact - Blue Leads  
Common-Striped Leads



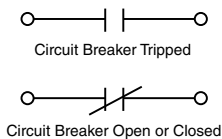
**1A Alarm Switch Configuration**

Color Code: Red Leads

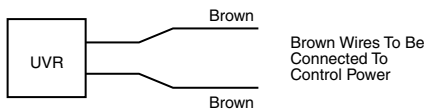


**1B Alarm Switch Configuration**

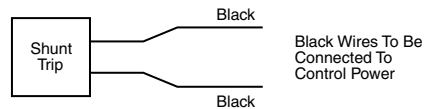
Color Code: Red Leads



**Undervoltage Trip Wiring Diagram**



**Shunt Trip Wiring Diagram**



**Field-Installable Electrical Accessories**

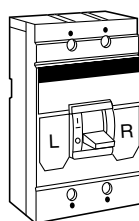
Complete field-installable accessory catalog number by inserting suffix from Digest page 7-36 between the parentheses in the catalog numbers shown in the table below. (Example: LA11212) See Digest page 7-36 for accessory pricing; add 20% to factory-install field-installable devices.

**Table 11.51: Field-Installable Accessories for Thermal-Magnetic and Electronic Trip Circuit Breakers**

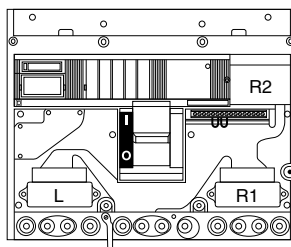
Circuit Breaker	Shunt Trip	Ground-Fault Shunt Trip▲	Undervoltage Trip	Auxiliary Switches	Alarm Switch
MA, MH Series 2	MA1( )	MA1G	MA1( )	MA1( )	Factory-Installed Only Center Pole
ME, MX	Factory-Installed Only	Factory-Installed Only	Factory-Installed Only	Factory-Installed Only	Factory-Installed Only
NA, NC, NE, NX Series 1, 2, 3	NA1( )	NA1( )	NA1( )	NA1( )	NA1( )
PA, PH, PC Series 4	PA1( )	Factory-Installed Only	PA11121	PA1( )	Factory-Installed Only
PE, PX Series 4, 5, 6	PA1( )	Factory-Installed Only	PA11121	PA1( )	Factory-Installed Only

▲ Used with obsolete GP Ground-Censor™ system or add-on ground-fault modules.

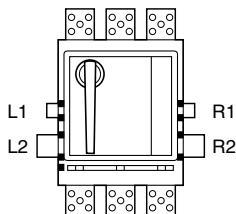
**Table 11.52: Accessory Mounting Locations**



MA, MH Series 2 circuit breakers or newer = Field-installable accessories  
ME/MX circuit breakers = Not field-installable accessories



NA, NC, NE, NX circuit breakers - Field-installable accessories  
“L” port and “R” port will accept shunt trips, alarm switches and UVRs; “R2” port will accept auxiliary switches. Maximum of one device per port.



PA, PH, PC, PE, PX Series 4 circuit breakers or newer = Field-installable accessories.

“L1” and “L2” or “R1” and “R2” port combinations are required to mount a single shunt trip. Both “L2” and “R2” ports will accept a UVR. Both “L1” and “R1” ports will accept auxiliary switches. If alarm switch is factory installed in PA or PC circuit breaker, it will be installed in “R2” port. For a PE or PX circuit breaker, the alarm switch will be factory installed in “L2” port.

OBSOLETE CIRCUIT BREAKERS

AL900MA



AL800MA7



AL1000MA



AL2500PA



**Table 11.53: Mechanical Lug Kit Information**

Circuit Breaker Application				(Number of Wires Per Lug) Wire Range▲	Cat. No.	Lugs Per Kit	Availability Per Kit
Standard	Ampere Rating	Optional	Ampere Rating				
<b>Al Lugs for Use with Al or Cu Wire</b>							
—	—	LC, LI, LE, LX, LXI	—	(1) 500–750 kcmil	AL600L17	1	
MA, MH	300–1000 A	—	—	(3) 3/0 AWG–500 kcmil	AL900MA	1	
—	—	MA, MH	300–1000 A	(2) 500–750 kcmil	AL800MA7	1	
—	—	MA, MH	300–1200 A	(4) 1/0 AWG–350 kcmil	AL1000MA	1	
ME, MX	100–250 A	—	—	(1) 6 AWG–350 kcmil	AL250ME	3	Not Available
—	—	ME, MX	250–400 A	(1) 350–750 kcmil	AL400ME7	1	Not Available
—	—	ME, MX	100–800 A	(2) 500–750 kcmil	AL800MA7	1	
ME, MX	300–800 A	ME, MX	100–250 A	(3) 3/0 AWG–500 kcmil	AL900MA	1	
—	—	ME, MX	300–1200 A	(4) 1/0 AWG–350 kcmil	AL1000MA	1	
NA, NC, NE, NX	600–1200 A	—	—	(4) 3/0 AWG–600 kcmil	AL1200NE6	1	Not Available
—	—	PAF, PHF, PEF, PCF, PCF	600–2500 A	(1) 1/0 AWG–750 kcmil	AL2500PA	2	
<b>Cu Lugs for Use with Cu Wire Only ♦</b>							
—	—	MA, MH	300–1000 A	(3) 3/0 AWG–500 kcmil Cu	CU1000MA	1	
—	—	ME, MX	125–250 A	(1) 4 AWG–250 kcmil Cu	CU250ME	3	Not Available
—	—	ME, MX	100–800 A	(3) 3/0 AWG–500 kcmil Cu	CU1000MA	1	
—	—	NA, NC, NE, NX	600–1200 A	(4) 3/0 AWG–600 kcmil Cu	CU1200NE6	1	Not Available

- ▲ Unless otherwise specified, wire sizes apply to both aluminum and copper conductors.
- For use in the OFF end only, when the OFF end is the load end.
- ♦ Use suffix 8002 for factory-installed Cu lugs. (20% adder.)

**Compression Lug Kits**

**Table 11.54: Field-installable Compression Lug Kits▲**

Circuit Breaker Type	Wire Range ■	Dimension A (In)	Max. Lugs Per Terminal	Cat. No.	Lug Qty. Per Kit	Availability
<b>Aluminum Compression Lug Kits</b>						
MA, MH	2/0 AWG–500 kcmil	1.9	2	VC600MA5	2	Not Available
	500–750 kcmil	2.1	2	VC800MA7	2	Not Available
ME2, MX2	4 AWG–300 kcmil	1.5	1	VC250ME3	3	Not Available
	250–350 kcmil	1.5	1	VC250ME35	3	Not Available
ME4, MX4	2/0 AWG–500 kcmil	2.2	1	VC400ME5	1	Not Available
	500–750 kcmil Al or 500 kcmil Cu	2.5	1	VC400ME7	1	Not Available
ME, MX, MA, MH	2/0 AWG–500 kcmil	1.9	2	VC600MA5	2	Not Available
	500–750 kcmil Al or 500 kcmil Cu	2.1	2	VC800MA7	2	Not Available
NA, NC, NE, NX	2/0 AWG–500 kcmil	3.3	4	VC1200NE5	4	Not Available
	500–750 kcmil Al or 500 kcmil Cu	3.6	4	VC1200NE7	4	Not Available
PAF, PHF, PCF, PEF	2/0 AWG–500 kcmil	♦	6–8	VC2000PA5	4	Not Available
	2/0 AWG–500 kcmil	♦	6–8	VC2500PA7	4	Not Available
<b>Copper Compression Lug Kits Not Available</b>						
ME4, MX4	250–500 kcmil Cu	2.6	1	CVC400ME5	1	Not Available
ME, MX	250–500 kcmil Cu	2.4	2	CVC600MA5	2	Not Available
NA, NC, NE, NX	250–500 kcmil Cu	3.3	4	CVC1200NE5	4	Not Available
	500–750 kcmil Cu	3.6	4	CVC1200NE7	4	Not Available

- ▲ See instruction bulletins for recommended tools.
- Unless otherwise specified, wire sizes apply to both aluminum and copper conductors.
- ♦ All P-frame circuit breakers require terminal pads for mounting lugs of any type.

**Power Distribution Connectors (PDC) for Circuit Breakers—for Field Replacement of Mechanical Lugs**

Can be used for multiple load connections on one circuit breaker. Use in place of standard distribution blocks to save space and time.

Field-installable kits, including tin-plated aluminum connectors and all necessary mounting hardware are available for Square D FA, LA and Q4-frame molded case circuit breakers.

Connectors are UL Listed:

- For use on load end of circuit breaker only
- For use in UL508 Industrial Control applications only
- For use in UL 1995/CSA C22.2 No. 236 heating and cooling equipment
- For copper wire only

**Table 11.55: PDC Lugs**

Use With Circuit Breaker★	Circuit Breaker Ampere Rating	Wires Per Terminal & Wire Range▼ Cu	Cat. No.	Lug Quantity Per Kit	Dimension A (In)	Availability
MAL, MHL, MEL, MXL	125–1000 A	(6) 12–2/0 AWG Cu	PDC6MA20	1	0.0	Not Available
		(12) 14–4 AWG Cu	PDC12MA4	1	0.0	

- ★ Not for use with I-Line circuit breakers.
- ▼ When using fine stranded wire, increased cross sectional area may cause maximum wire size to be reduced.
- △ OFF end only when OFF end is the load end.

**NOTE:** Listed below are the catalog numbers and the components required for testing the entire family of Micrologic trip systems. The listing includes obsolete series trip systems.

**Micrologic Series B Trip Systems**

Identified by label on front of trip unit  
(LE/LX/LXI, ME/MX, NE/NX and PE/PX circuit breaker 9/92 to present)  
(SE circuit breaker 10/92 to present)

This is the latest series of standard (LX/LXI, MX, NX and PX) and full-function (LE, ME, NE, PE and SE) Micrologic trip systems.

**Table 11.56: Universal Test Set**

Description	Cat. No.
Universal Test Set includes the following: 1. Self-test module (CBTMT) 2. Standard and full-function Micrologic Series B module (CBTMB) includes rating plug adapter 3. Power cord 4. Ribbon cable for making the connection from the test set to the rating plug adapter 5. Instruction manual	UTS3
For those customers who already own the Universal Test Set and want to test the latest standard and full-function (Series B) trip systems, all that is needed is Micrologic Series B module (CBTMB). Included is the rating plug adapter and instruction manual.	CBTMB
Replacement ribbon cable and rating plug adapter for CBTMB	CBTMBRK
Long-time and ground-fault memory reset module (Series B Electronics)	MTMB



**Micrologic Series 3 and Series A Trip Systems**

Identified by two rows of rotary switches  
(ME/MX, NE/NX and PE/PX circuit breakers 11/89 to 9/92)  
(SE circuit breakers 5/90 to 10/92)

For those customers who already own the Universal Test Set (CBTU1 or UTS3) and want to test these earlier series Micrologic trip systems, see the following chart.

**Table 11.57: Micrologic Series 3 and Series A Circuit Breaker Test Module**

Circuit Breaker Test Module	Cat. No.
Includes rating plug adapter and instruction manual	CBTM4A
Replacement ribbon cable and rating plug adapter for CBTM4A	CBTM4RK

**Micrologic Series 2 Trip Systems**

Identified by only one row of rotary switches  
Micrologic Series 2 Test Modules are obsolete and no longer available.

**Table 11.58: Micrologic Series 2 Circuit Breaker Test Module**

Circuit Breaker Test Modules	Cat. No.	Availability
SE (5/85-5/90) includes rating plug adapter and instruction pages	CBTM1	Not Available
Replacement ribbon cable and rating plug for CBTM1	CBTM1A	Not Available
ME, PE (4/85-11/89) CBTM2 obsolete, no longer available	CBTM2	Not Available
ME, NE, PE (10/86-11/89) includes rating plug adapter and instruction manual	CBTM3	Not Available
Replacement ribbon cable and rating plug for CBTM3	CBTM3A	Not Available

**Table 11.59: Micrologic Series 1 Trip Systems for Circuit Breakers Manufactured Before Micrologic**

Trip System	Test Set
ME/PE (8/78-4/85) Identified by slide type switches instead of rotary switches. The very first series ME and PE electronic trip circuit breakers offered by Square D.	Test Set Not Available
SE (7/83-5/85) The very first series of SE electronic trip circuit breakers had rotary switches and can be identified by a three-digit serial number.	Test Set Not Available

Note: For trip systems of this type that require testing, contact Technical Services toll free at 1-800-634-2003.

**Table 11.60: Neutral Current Transformers**

Cat. No.	Availability	Sensor	Where Used
ME25CT2 ME4CT2 ME8CT2	Not Available Not Available Not Available	250 A 400 A 800 A	MXL, MEL
NE12CT2		1200 A	NXL, NEL
PE12CT2 PE16CT2 PE20CT2 PE25CT2	Not Available Not Available Not Available Not Available	1200 A 1600 A 2000 A 2500 A	PXF, PEF

11 OBSOLETE CIRCUIT BREAKERS



GFM250



The Micrologic ground-fault module (GFM) is a UL Listed circuit breaker accessory for equipment protection. It is a combination ground-fault relay and ground-fault sensing device.

**Micrologic Add-On Ground-Fault Module Features:**

- Used in combination with the FA, KA, FC, KC, FI, and KI type circuit breakers with a ground-fault shunt trip factory installed (add the suffix "G" to the circuit breaker)
- Adjustable ground-fault pickup levels
- Adjustable ground-fault time delays
- Integral ground fault push-to-test feature and ground-fault indicator
- All GFMs supplied for I-Line™ mounting, easily convertible to unit mount by removing the I-Line brackets
- Neutral current transformer is supplied for 3-phase 4-wire applications. Refer to instructions for proper installation
- Zone-selective interlocking capability is standard with upstream Micrologic trip system circuit breakers. The GFM can also be zone interlocked with the GC ground-fault system by using a restraint interface module. See Supplementary Digest
- 120 Vac control power is required for integral test feature. Meets NEC 230-95(c)

**NOTE:** Ground-fault modules cannot be reverse fed.

**RIM32 Restraint Interface Module**

**Table 11.62: ZSI Combinations**

ZSI Combinations (Where All Inputs Driven Are Same Column)								
Circuit Breaker Series Inputs Output	SE 2 (Ground Fault)	SE 2 (Short Time)	ME 3, NE1, PE 4	ME 4, 5, NE 2 & 3 PE 5 & 6, SE 3	ME 5A, NE 3A, PE 6A, SE 3A	LE 1B, ME 5B, NE 3B, PE 6B, SE 3B	GC100	RIM 32
	SE 2 (Ground Fault)	50		R	R	R	R	R
SE 2 (Short Time)		1	R	R	R	R	R	50
ME 3, NE1, PE 4			15	2	13	47	R	50
ME 4, 5 & 5A, NE 2, 3 & 3A, PE 5, 6 & 6A, SE 3, 3A	50	R	R	1	1	7	R	14
LE 1B, ME 5B, NE 3B, PE 6B, SE 3B	50	R	10	1	R	26	R	44
GC 100	R	R	R	R	R	R	R	7 50
GFM▲	50		2	1	1	5	R	10
RIM32	50	6	50	7	37	50	15	50

▲ GFM is an output device only.

**Table 11.61: Module/Enclosure Selection Chart**

Companion Circuit Breaker Prefix	Cat. No.	Enclosure Space Required		Ground-Fault Pickup Adjustment Range	Availability
		I-Line Switchboard	Individual Enclosure ▲		
FAL, FHL, FCL, FA, FH, FC	GFM100FA	LA	KA	20–100 A	
FI	GFM100FI	LA	—	20–100 A	Not Available
KAL, KHL, KI, KA, KH, KC	GFM250	LA	LA	40–200 A	

▲ Use NEMA 1 or 3R enclosures only. See page 11-5 for dimensions.

- # Maximum inputs without RIM32. Self-restraint counts as one input.
- R RIM32(s) required to restrain any devices.
- Present design.
- Invalid combination.

The RIM32 Restraint Interface Module is used to interface the restraint signals between various Square D Micrologic™ circuit breakers, Micrologic ground-fault modules, and GC-100 ground-fault protection systems.

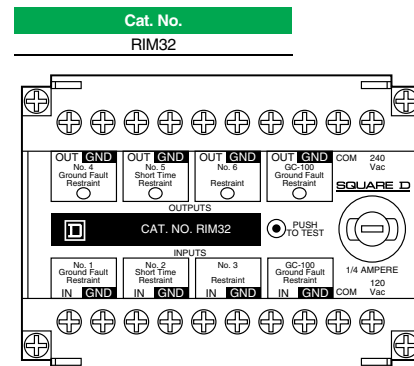
The restraint interface module operates on either 120 or 240 Vac, 50/60 Hz. The module is protected by a 1/4 A fuse.

Allowable ZSI combinations are shown in Table 11.62. (Series numbers for current design circuit breakers end in B, for example NE Series 3B.) For double-ended or larger systems, or systems which contain devices from different columns in Table 11.62, contact your local Sales Office for combination information.

If more inputs or outputs are needed, another restraint interface module is necessary. Contact your local Sales Office for information on multiple module installations.

**NOTE:** The maximum distance between devices is 1000 ft. (305 m).

**Table 11.63: RIM32**



Masterpact™ M/MP/MC circuit breakers and related accessories are obsolete. Use Masterpact NT/NW for new applications. See Digest 176. Limited service stock is available for replacement or fill purposes. Contact your local sales office for product availability.

**To order a complete circuit breaker, order:**

1. Circuit breaker fixed or drawout frame.....page 11-26  
or cradle only.....page 11-32  
or circuit breaker without cradle.....page 11-26
2. Connections.....page 11-23
3. Control unit.....page 11-27
4. Rating plug.....page 11-27
5. Accessories.....page 11-28

Fixed and Drawout breakers listed below are complete with STR58U Trip unit which includes Long time, short time, instantaneous and ground fault as well as options T (residual) and I (ammeter).

**Table 11.64: UL Listed Masterpact MP Circuit Breaker Frame**

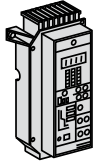
	Rating	AIR/ 480 V	Fixed 3P	Drawout without Cradle 3P	Cradle Only 3P	\$ Price
<b>MP16 to MP30— UL 489/NEMA AB1 Standards</b>	<b>High Interrupting (H2)</b>					
	MP16H2	1600 A	100 kA	MP100135	MP100136	Contact Schneider Electric Cedar Rapids Plant Customer Service Group for current pricing and availability.
	MP20H2	2000 A	100 kA	MP100137	MP100138	
	MP30H2	3000 A	100 kA	MP100139	MP100140	

■ Not UL Listed

Additional information: Catalog **0631CT9501**, Data Sheet **0631HO9701**

Masterpact™ M/MP/MC circuit breakers and related accessories are obsolete. Use Masterpact NT/NW for new applications. See Digest 176. Limited service stock is available for replacement or fill purposes. Contact your local sales office for product availability.

Table 11.65: Control Units

	Control Unit	Ground-Fault Protection▲	Without Ground-Fault Protection▲
	STR 58U (long-time, short-time and instantaneous protection)		
	STR58U (long-time = 0.4x1 sensor rating)	Includes Residual Type T — and Ammeter — I	
		External neutral sensor (TCE) ■ – see page 11-28	
		M1008H2	M1008H2NG
		M10H2	M10H2NG
		M1612H2	M1612H2NG
		M16H2	M16H2NG
		M20H2	M20H2NG
		M25H2	M25H2NG
		M3230H2	M3230H2NG
		M32H2	M32H2NG
		M6340H2	M6340H2NG
	M6350H2	M6350H2NG	
	M63H2	M63H2NG	

- ▲ External neutral sensor not included.
- External AD module (see page 11-28) is required if load is below 20% or if setting is red zone.

Table 11.66: Rating Plug (RL)

Sensor Rating	Plug Rating	Cat. No.
250 A	150 A	54732
	200 A	54733
	250 A	54734
400 A	200 A	54735
	250 A	54736
	300 A	54737
	400 A	54738
600 A	300 A	54739
	400 A	54740
	500 A	54741
	600 A	54742
800 A	400 A	54743
	500 A	54744
	600 A	54745
	800 A	54746
1200 A	600 A	54747
	800 A	54748
	1200 A	54750
2500 A	1200 A	54759
5000 A	3000 A	54772
	4000 A	54773
	5000 A	54774

**For pricing contact your local Schneider Electric distributor.**

**NOTE:** Mandatory for UL Listed Masterpact MP circuit breakers with STR 28D, STR 38S and STR 58U control units. Not required on IEC Rated Masterpact circuit breakers.

Masterpact™ M/MP/MC circuit breakers and related accessories are obsolete. Use Masterpact NT/NW for new applications. See Digest 175. Limited service stock is available for replacement or fill purposes. Contact your local sales office for product availability.

**Table 11.67: Neutral Sensor for 3ØH4W Systems (TCE)**

**NOTE:** External neutral transformer (TCE) must have the same rating as the circuit breaker current sensor.

	Rating	Cat. No.
	800 A	54422
	1250 A	54426
	2000 A	54427

▲ Discount Schedule DE2G.

**For pricing contact your local Schneider Electric distributor.**

**Table 11.68: Accessories (Must be ordered as separate items)**

	Accessory	Description	Discount Schedule	Cat. No.
<b>Power Supply Module (AD)</b>				
	For STR 18M to STR 58U control units <b>Output voltage:</b> 24 Vdc	Input voltage	DE2F	
		24/30 Vdc		54440
		48/60 Vdc		54441
		10 Vac 50/60 Hz		54443
		220 Vac 50/60 Hz		54444
380 Vac 50/60 Hz	54446			
<b>Battery Module (BAT)</b>				
	Battery back-up power supply for AD module		DE2F	54446




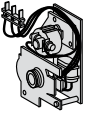



**Table 11.69: Accessories for Cradle**

	Accessory	Cat. No.
<b>Position Switches</b>		
	Four SPDT connected position switches (CE)	54590
	Two SPDT disconnected position switches (CD)	54591
<b>Door Escutcheon</b>		
	Can be used with fixed or drawout circuit breakers	54594■

■ Discount Schedule DE2F

Masterpact™ M/MP/MC circuit breakers and related accessories are obsolete. Use Masterpact NT/NW for new applications. See Digest 175. Limited service stock is available for replacement or fill purposes. Contact your local sales office for product availability.

**Table 11.70: Accessories for Circuit Breaker Frame**




		Volts (V)	Cat. No. (XF)	Cat. No. (MX)
<ul style="list-style-type: none"> <li>Maximum 2 shunt trips or 1 shunt trip + 1 undervoltage trip.</li> </ul>				
<b>Closing Coil (XF)/Shunt Trip (MX)</b>				
	AC 50/60 Hz	110/127	54449	54449
		220/250	54503	54503
		277 ▲	54504	54504
	DC	24	54495	54495
		48	54497	54497
		100/110 ▲	54449	54449
		200/220 ▲	54503	54503
	250	54504▲	54504	
<b>Undervoltage Trip (MN)</b>				
	AC 50/60 Hz	440/480		54481
		24		54470
	DC	100/110 ▲		54474
		200/220▲		54478
<b>Time Delayed Undervoltage Trip (MNR) – Not UL Listed</b>				
	AC 50/60 Hz	110/127		54486
		220/250		54488
<b>Spring Charging Motor (MCH)—Includes Spring Charged Switch</b>				
	AC 50/60 Hz	100/127		54512
		200/240		54513
		480▲		54518
	DC	48/60		54511
Two Standard (2a+2b) Auxiliary Switches				Standard
<b>Four Auxiliary Switches (OF)</b>				
	Four changeovers (SPDT)			54525
<b>One Ready to Close Switch (PF)</b>				
	One ready to close switch			54528
<b>One Overcurrent Trip Switch (SDE)</b>				
Not available on switch version				Standard
<b>"OFF" Position Lock by Key Lock</b>				
	Provision for KIRK key lock		VKA	54536
	Ronis (1 key lock) with provision		VSRA1	54533

▲ Not UL Listed.

**For pricing contact your local Schneider Electric distributor.**

Masterpact™ M/MP/MC circuit breakers and related accessories are obsolete. Use Masterpact NT/NW for new applications. See Digest 175. Limited service stock is available for replacement or fill purposes. Contact your local sales office for product availability.

Table 11.71: Spare Parts

Spare Parts		Cat. No.	
<b>Clusters for Cradle (Set of 2)</b>			
	MP25–MP30 3P	M20–M25L 3P	54063 (3)
	MP25–MP30 4P	M20–M25L 4P	54063 (4)
		M32H 3P	54063 (3)
		M32H 4P	54063 (4)
	MP40–MP50 3P	M50H 3P	54063 (6)
		M50H 4P	54063 (7)
<b>Charging Handle</b>			
	One piece	685713	
<b>Racking Handle</b>			
	One piece	685631	
<b>Vertical UL 489—UL 1066 Connectors</b>			
	MP25–MP30 3P (set of three top or bottom connectors)	54107 (2)	

For pricing contact your local  
Schneider Electric distributor.