



APPLICATION OF MOLDED-CASE CIRCUIT BREAKERS IN SERIES WITH AMP-TRAP† CURRENT LIMITERS

For installation where the available fault-current exceeds the interrupting rating of molded-case circuit breakers, consideration should be given to the use of Amp-trap current limiters to reduce the magnitude and duration of short-circuit currents. Selection of proper Amp-trap current limiter rating may be made from the following tables, which are based on tests performed in the I-T-E High Power Test Laboratory for fault-currents up to 100,000 symmetrical rms amperes.

The maximum rating Amp-trap current limiter listed is that which will provide a safe application with the corresponding listed circuit breaker. The minimum rating current limiter listed is that whose characteristic curve coordinates with the characteristic curve for the circuit breaker with the

minimum interference. Although it may occasionally be desirable to use an Amp-trap current limiter with a lower ampere rating than the minimum listed, in no case, should the recommended rating listed under maximum Amp-trap rating be exceeded.

Maximum Amp-trap ratings are listed for installation on the line side and the load side of the circuit breaker.

Minimum Amp-trap ratings are listed for use with the corresponding circuit breaker instantaneous trip set at "Lo" and set at "Hi". Selection of an Amp-trap rating below the minimum listed may cause nuisance operation of the current limiter on low magnitude fault-currents or on harmless transient currents.

Branch Circuit Rating		Minimum Amp-Trap		Maximum Amp-Trap			
		Lo Trip	Hi Trip	240V AC		480 or 600V AC	
				Load Side	Line Side	Load Side	Line Side
Pushmatic	15-20	40			200		
	30-50	80			200		
	70-100	150			200		
EQ-T	15-20	50			100		
	30-40	100			100		
EQ-B or EQ-P	15-20	50			200		
	30-50	100			200		
	60-70	150			200		
	90-100	200			200		
E	15	70		400	400		
	20-40	100		400	400		
	50-100	200		400	400		
	15-20 (277V)	100		200	200		
EH or EF	15	70		400	400	200	300
	20-40	100		400	400	200	300
	50-100	200		400	400	200	300
	125-150	300		400	400	300	300
QJ	125-225	400		400	400		
FJ	70-150	300	400	800	800	600	600
	175-	300	400	1000	1000	600	1000
	200-225	300	600	1000	1000	600	1000
JL or JJ	70-125	300	400	1200	1200	800	1200
	150-175	300	400	1600	1600	800	1600
	200-225	300	600	1600	1600	1200	1600
	250-300	400	600	2000	2000	1200	2000
	350-400	600	800	2000	2000	1200	2000
KM	125-175	300	400	1000	1000	800	1000
	200-225	300	600	1000	1000	800	1000
	250-275	400	600	1000	1000	800	1000
	300	400	600	1200	1200	800	1200
	350	600	800	1200	1200	800	1200
	400	600	800	1200	1200	1200	1200
	500-600	800	800	1200	1200	1200	1200
	700-800	1000	1200	1200	1200	1200	1200

Amp-Traps rated 600A and below are Class J or K1 — Amp-Traps rated 600A and above are form 480 Class L

† Registered Trademark—The Chase-Shawmut Company

(continued)



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Branch Circuit Rating		Minimum Amp-Trap		Maximum Amp-Trap			
		Lo Trip	Hi Trip	240V AC		480 or 600V AC	
				Load Side	Line Side	Load Side	Line Side
KP	600-800	1200	2000	3000	3000	3000	3000
	1000-1200	1600	2500	3000	3000	3000	3000
HQ	15-40	100			300		
	50-100	200			400		
HE	15-40	100		800	800	400	400
	50-100	200		1000	1000	600	800
HF*	15-20	70		1000	1000	400	600
	30-40	100		1000	1000	400	600
	50-70	200		1200	1200	600	800
	90-100	300		1200	1200	600	800
HJ	125	300	400	2000	2000	1200	1200
	150-175	300	400	2500	2500	1600	1600
	200-225	300	600	2500	2500	1600	2000
	250-300	400	600	2500	2500	1600	2000
	350-400	600	800	2500	2500	1600	2000
HM	400	600	800	3000	3000	3000	3000
	500-600	800	1200	3000	3000	3000	3000
	700-800	1000	1200	3000	3000	3000	3000
HP	800	1000	1200	3000	3000	3000	3000
	1000-1200	1600	2000	3000	3000	3000	3000
	1400-1600	2000	3000	3000	3000	3000	3000
HR	1800-2000	2000	3000	4000	4000	4000	4000

Amp-Traps rated 600A and below are Class J or K1

Amp-Traps rated 600A and above are Form 480 Class L

*HF breaker is obsolete, shown for existing systems only.



APPLICATION OF CORDON® CIRCUIT BREAKERS
FOR BACK-UP PROTECTION OF OTHER CIRCUIT BREAKERS

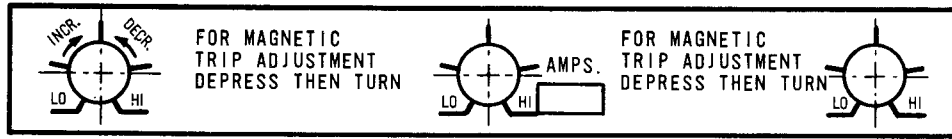
Protected Breaker		Cordon Protector and Current Limiter								
		CC CC60	CE CE04	CE CE06	CF* CF04	CJ 225A CJ06	CJ 400A CJ12	CM CM20	CP CP25	CR CR30
240 VOLTS	EQ-T	X								
	PM-EQ	X	X		X					
	E-EH-EF		X	X	X	X				
	QJ-FJ					X	X			
	JJ-JL					X	X	X		
	KM							X		
	KP								X	
	HE-HQ	X	X	X	X	X				
	HF-HJ					X	X	X		
	HM							X	X	
	HP								X	X
	HR									X
277 VOLTS	E		X	X	X					
600 VOLTS	EF-EH		X	X	X	X				
	FJ				X	X				
	JJ-JL					X	X			
	KM						X			
	KP							X		
	HE		X	X	X	X				
	HF					X				
	HJ						X	X		
	HM							X	X	
	HP								X	X
	HR									X

*CF Breaker is obsolete, shown for existing systems only.



MOLDED-CASE CIRCUIT BREAKERS

ADJUSTABLE ETI DATA



To change instantaneous trip point, depress indicating knob, then rotate to desired position.

The nominal A-C instantaneous trip points are given in the table below. For D-C instantaneous trip points add 15% to nominal values given in table.

Tolerances on all settings are plus or minus 10%.

Instantaneous trip adjustment is made through the breaker cover on all frame breakers except the CM frame size, in which case the cover must first be removed.

Frame	Maximum Continuous Amperes	A-C Adjustable Trip Range					Catalog Number	
		LOW	II	III	IV	HIGH	2-Pole	3-Pole
EF, HE	3	7	10	12	16	21	EF2-A003	EF3-A003
	5	14	18	22	29	41	EF2-A005	EF3-A005
	10	27	36	45	58	84	EF2-A010	EF3-A010
	25	75	105	125	170	210	EF2-A025	EF3-A025
	50	160	210	260	330	470	EF2-L050	EF3-L050
	50	320	400	475	565	670	EF2-H050	EF3-H050
	100	475	630	750	930	1125	EF2-A100	EF3-A100
FJ	225	960	1200	1550	1850	2000	FJ2-A225	FJ3-A225
JL	225	960	1200	1450	1800	2000	JL2-A225	JL3-A225
	400	1900	2300	2700	3100	3500	JL2-L400	JL3-L400
	400	3200	3600	4100	5100	5600	JL2-H400	JL3-H400
KM	600	1900	2300	2700	3100	3500	KM2-A600	KM3-A600
	800	3200	3600	4100	5100	5600	KM2-L800	KM3-L800
	800	5000	6100	6700	7400	8000	KM2-H800	KM3-H800
CE	50	150	200	250	300	350	CE2-L050	CE3-L050
	50	250	320	400	480	570	CE2-H050	CE3-H050
	100	460	560	690	800	890	CE2-L100	CE3-L100
	100	800	1020	1220	1420	1520	CE2-H100	CE3-H100
CJ	225	960	1200	1450	1800	2000	CJ2-A225	CJ3-A225
	400	1900	2300	2700	3100	3500	CJ2-L400	CJ3-L400
	400	3200	3600	4100	5100	5600	CJ2-H400	CJ3-H400
CM	800	3200	3600	4100	5100	5600	—	CM3-L800
	800	5000	6100	6700	7400	8000	—	CM3-H800
CP	1600	3200	3600	4100	5100	5600	—	CP3-L160
	1600	4000	5000	6000	7000	8000	—	CP3-H160
CR	2000	4000	5000	6000	7000	8000	—	CR3-B200



TEST REQUIREMENTS—UNDERWRITERS' LABORATORIES, INC.

I-T-E circuit breakers, bearing Underwriters' labels, conform to Underwriters' test requirements as follows:

- a. The tripping mechanism shall be sealed to prevent tampering.
- b. The operating mechanism shall trip free of the handle on overload.
- c. The breaker must trip at 135% and 200% of rated current carrying capacity (See Table 1).
- d. It must pass a 600% overload test at rated voltage in accordance with Table 3. (In no case must the test current be less than 150 amperes).
- e. Breakers rated 50 amperes or less and 125 or 125/250 volts and less are required to be closed four times on a tungsten lamp load equal to the rating of breaker, at 2-minute intervals, without welding the contacts or tripping.
- f. The breaker must carry 100% rated load continuously without exceeding specified temperature limits.
- g. The breaker must pass endurance test at rated voltage (See Table 2).
- h. After the endurance test, the breaker must again pass a recalibration test at 135% and 200% of its rating as given in Table 1.
- i. It must next pass the short circuit test consisting of two operations per pole, plus one operation across all poles, at the values listed in Table 4.
- j. After the short circuit test, the breaker must again pass a calibration test at 200% of its rating.
- k. After completing all of the above tests, the breaker must pass an insulation test, consisting of 1000 volts, plus twice the rated voltage between live parts and ground; between poles with the breaker closed; and between line and load terminals with the breaker open and in tripped position.
- l. All breakers are calibrated for operation in an ambient of 40°C (104°F).

TABLE 1

Current Rating in Amperes	Maximum Tripping Time*	
	At 135% of Rated Carrying Capacity	At 200% of Rated Carrying Capacity
	HOURS	MINUTES
0-40 41-50	1	2 4
51-100 101-225 226-400 401-600	2	6 8 10 12
601-800 801-1000 1001-1200 1201-1600		12 16 18 20

*25°C (77°F)

TABLE 2

Current Rating	Operations Full Load	Operations No Load	Operations Per Minute
0-100	6000	4000	6
101-225	4000	4000	5
226-600	1000	5000	4
601-800	500	3500	2
801-1600	500	2000	1

TABLE 3

Breaker Type(s)	Power Factor	Number of Operations		Opera- tions Per Minute
		Manual	Electrical	
EQ®-P, EQ-B 100 Amp	0.45-0.50 0.75-0.80	35	15	6
QJ 225 Amp	0.45-0.50	50	—	5
E, EH, EF, HE 100 Amp	0.45-0.50	35	15	6
FJ 225 Amp	0.45-0.50	50	—	5
JJ, JL, HJ 400 Amp	0.45-0.50	50	—	4
KM 800 Amp	0.45-0.50	50	—	2
HP 1600 Amp	0.45-0.50	50	—	1
HR 2000 Amp	0.45-0.50	50	—	1

TABLE 4

Breaker Rating		Test Circuit		
Volts	Amperes	Volts	Amperes	
250 and below	100 and below	Rated	5000	45-50%
250 and below	Over 100	Rated	10,000	45-50%
Over 250	All	Rated	10,000	45-50%

*d-c tests same, except on non-inductive load.