Westinghouse Electric Corporation
Low Voltage Breaker Division
Beaver, Pennsylvania 15009

29-360 A WE A
Application Data

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April, 1976
Supersedes Application Data 29-360
dated November, 1973
Mailed to: E,D,C/1901, 1999/DB

3 to 400 Amperes, 600 Volts Ac
Maximum, 3 Poles Only

Motor Circuit Protector

Underwriters' Laboratories, Inc. Listing

The MCP is UL Listed as a recognized component and requires additional listing by the control manufacturer in combination with a contactor and overload relay.

Interrupting Ratings

Maximum application current for starter and MCP shall be determined by testing the MCP in combination with contactor and overload relay. Additional capacity can be obtained by using the current limiter attachment.

The MCP alone is qualified with UL as a recognized component with the following interrupting capacity:

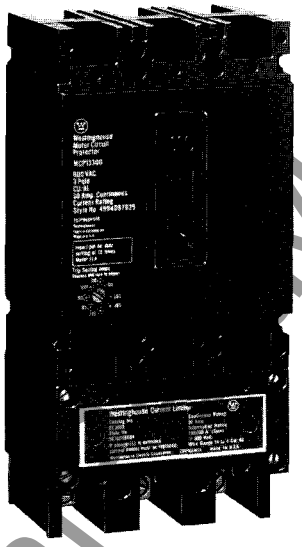
MCP Size	Int. Cap., Sym. Amperes Ac Volts, 60 Hz		
	240	480	600
0-4	14,000	14,000	10,000
5(250A)	25,000	22,000	22,000
5(400A)	42,000	30,000	22,000

Application

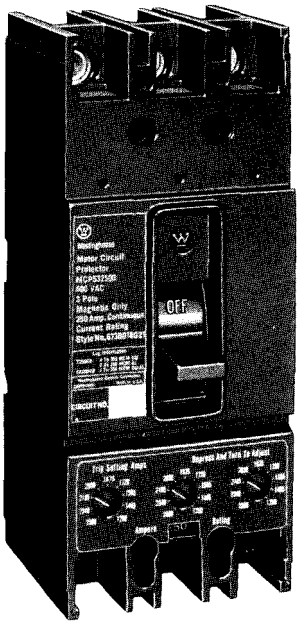
The MCP motor circuit protector is designed for application to individual motor circuits in combination with a magnetic motor starter. MCP's operate on the magnetic principle with a current sensing coil in each of the 3 poles to provide short circuit protection. The magnetic trip setting is adjustable from the front of the device.

The MCP is shipped with the adjusting knob on the low setting. MCP's are sized to correspond with NEMA starter sizes.

The MCP design permits the fastest tripping time possible on low level faults while offering circuit breaker convenience, quick make-quick break action, dead front safety and protection against single phasing.



Size 0-4 MCP with Current Limiter



Size 5 MCP 532500

Ratings and Trip Settings③

Motor Full Load Current, Amperes	MCP Continuous Rating	MCP Catalog Number ③	Use with Starter Size	MCP Trip Settings② Min.	Lock Positions 1	2	3	4	5	6	7	Max.
.62 – 1.8	3	MCP0322R	0	7	8	9	11	13	16	19	....	22
1.5 – 4.9	7	MCP0358R	0	18	20	25	30	36	43	51	....	58
4.2 – 14.0④	15	MCP03150R	0	50	54	62	75	90	110	130	....	150
8.5 – 25.5④	30	MCP13300R	1	100	110	120	150	185	220	265	....	300
13.8 – 40.6④	50	MCP23480R	2	160	180	210	250	320	380	430	....	480
23.0 – 86.5④	100	MCP331000R	3	275	300	400	500	625	725	875	....	1000
38.5 – 130.4④	150	MCP431550R	4	450	500	580	670	825	1000	1250	....	1550
44.2 – 130.4④	150	MCP431800R	4	575	600	750	900	1100	1250	1500	....	1800
96.1 – 204④	250	MCP532500	5	1250	1405	1565	1720	1875	2030	2185	2340	2500
153.8 – 326.9④	400	MCP534000	5	2000	2250	2500	2750	3000	3250	3500	3750	4000

② Calibration tolerances are ±10% on high or low setting.
③ Also applies to MCP's with optional terminals identified by suffix C in catalog number.
④ Max. Full Load Current based on use of 75° C rated conductor and ambients inside the enclosure not exceeding 60° C.

MCP Application Based on Motor Full Load Current

1. Determine motor full load current from the motor nameplate data. Refer to the table and determine appropriate pin position. Take red pin from envelope and push firmly through the dotted circle on the MCP nameplate corresponding to the position derived from the table. Depress white pointer and turn counterclockwise until the pin stops rotation.①

2. No opening appears under the maximum setting. If this position is utilized it is suggested that the pin be retained with the breaker for possible alternate application at a later date.①

3. For maximum protection, the pointer should be turned clockwise to successively lower positions until the MCP trips on motor starting. After this position is determined, turn pointer counterclockwise to the next higher setting for normal operations. If MCP does not trip at minimum setting leave pointer at this setting.

4. MCP is set at minimum trip position when shipped from factory.

The table at right assumes the following conditions:

1. The first ½ cycle asymmetrical inrush current is not more than 11 times motor full load current. This is true for most motors.

2. Continuous rating of the MCP should not be less than 115% of the motor FLC.

Motor Full Load Current, Amperes	NEMA Starter Size	MCP Catalog Number ⑤	MCP Trip Setting ②
.62 – .68			8
.69 – .84			9
.85 – .99			11
1.0 – 1.1	0	MCP0322R	13
1.2 – 1.4			16
1.5 – 1.6			19
1.7 – 1.8			22
1.5 – 1.8			20
1.9 – 2.2			25
2.3 – 2.7			30
2.8 – 3.2	0	MCP0358R	36
3.3 – 3.8			43
3.9 – 4.4			51
4.5 – 4.9			58
4.2 – 4.7			54
4.8 – 5.7			62
5.8 – 6.8			75
6.9 – 8.4	0	MCP03150R	90
8.5 – 9.9			110
10.0 – 11.4			130
11.5 – 14.0⑦			150
8.5 – 9.1			110
9.2 – 11.4			120
11.5 – 14.1			150
14.2 – 16.8	1	MCP13300R	185
16.9 – 20.3			220
20.4 – 22.9			265
23.0 – 25.5⑦			300
13.8 – 16.1			180
16.2 – 19.1			210
19.2 – 24.5			250
24.6 – 29.1	2	MCP23480R	320
29.2 – 33.0			380
33.1 – 36.8			430
36.9 – 40.6⑦			480

Motor Full Load Current, Amperes	NEMA Starter Size	MCP Catalog Number ⑤	MCP Trip Setting ②
23.0 – 30.7			300
30.8 – 38.3			400
38.4 – 47.9			500
48.0 – 55.7	3	MCP331000R	625
55.8 – 67.3			725
67.4 – 76.9			875
77.0 – 86.5⑦			1000
38.5 – 44.5			500
44.6 – 51.4			580
51.5 – 63.4			670
63.5 – 76.8	4	MCP431550R	825
76.9 – 96.1			1000
96.2 – 119.1			1250
119.2 – 130.4⑦			1550
46.1 – 57.5			600
57.6 – 69.1			750
69.2 – 83.9			900
84.0 – 95.9	4	MCP431800R	1100
96.0 – 114.9			1250
115.0 – 130.4⑦			1500
96.1 – 107.9			1250
108.0 – 120.2			1405
120.3 – 132.2			1565
132.3 – 144.1			1720
144.2 – 156.0	5	MCP532500	1875
156.1 – 167.9			2030
168.0 – 179.9			2185
180.0 – 192.2			2340
192.3 – 204⑦			2500
153.8 – 172.9			2000
173.0 – 192.2			2250
192.3 – 211.4			2500
211.5 – 230.6			2750
230.7 – 249.9	5⑥	MCP534000	3000
250.0 – 269.1			3250
269.2 – 288.3			3500
288.4 – 307.5			3750
307.6 – 326.9⑦			4000

Three-Phase Ac Motor Full Load Current③ From Table 430-150, 1975 N.E.C.

Horse-power	Induction Type Squirrel-Cage and Wound Rotor Motors, Amperes				Synchronous Type Motors, Unity Power Factor④, Amperes		
	115 Volts	230 Volts	460 Volts	575 Volts	220 Volts	440 Volts	550 Volts
½	4	2	1	.8	...	...	...
¾	5.6	2.8	1.4	1.1	...	...	...
1	7.2	3.6	1.8	1.4	...	...	...
1½	10.4	5.2	2.6	2.1	...	...	...
2	13.6	6.8	3.4	2.7	...	...	...
3	...	9.6	4.8	3.9	...	...	...
5	...	15.2	7.6	6.1	...	...	...
7½	...	22	11	9	...	...	...
10	...	28	14	11	...	...	...
15	...	42	21	17	...	...	...
20	...	54	27	22	...	...	...
25	...	68	34	27	54	27	22
30	...	80	40	32	65	33	26
40	...	104	52	41	86	43	35
50	...	130	65	52	108	54	44
60	...	154	77	62	128	64	51
75	...	192	96	77	161	81	65
100	...	248	124	99	211	106	85
125	...	312	156	125	264	132	106
150	...	360	180	144	...	158	127
200	...	480	240	192	...	210	168

For full-load currents of 208- and 200-volt motors, increase the corresponding 230 volt motor full-load current by 10 and 15 per cent, respectively. The voltages listed are rated motor voltages. Corresponding nominal system voltages are 110 to 120, 220 to 240, 440 to 480 and 550 to 600 volts.

① Size 5 MCP's are not provided with locking pins and have an adjusting knob for each pole.
② In line with paragraph 430-52 of 1975; National Electric Code, "The setting of an instantaneous trip circuit breaker (without time delay) may be increased over 700% but shall in no case exceed 1300% of the motor full load current." The values of trip setting illustrated in the column are selected per the above.
③ These values of full-load current are for motors running at speeds usual for belted motors and motors with normal torque characteristics. Motors built for especially low speeds or high torques may require more running current, and multi-speed motors will have full load current varying with speed, in which case the nameplate current rating shall be used.
④ For 90 and 80 per cent Power Factor the above figures shall be multiplied by 1.1 and 1.25 respectively.
⑤ Also applies to MCP's with optional terminals.
⑥ May be used on some size 6 applications.
⑦ Max. Full Load Current based on use of 75° C rated conductor and ambients inside the enclosure not exceeding 60° C.

Current Limiter Attachment (Size 0-4)

The current limiter attachment for the MCP is designed to provide increased interrupting capacity. The combination is UL Listed as a recognized component for application at up to 200,000 amps symmetrical at 600 volts Ac making the MCP suitable for use in network distribution systems or other applications where unusually high fault currents are available. The current limiters bolt to the load end of the MCP and are provided with terminals suitable for copper or aluminum conductors.

Limiters are coordinated with the MCP so that normal fault currents will be interrupted automatically by the MCP without any damage to the limiter. Only the rare very high fault will be interrupted by the limiter. Faults that are interrupted by the limiter will also magnetically trip the MCP, opening all 3 poles, preventing single phase operation.

Each of the 3 poles of the limiter is equipped with an indicator that will extend when a fault is interrupted by the limiter quickly identifying the fault circuit.

For proper protection and coordination MCP's and limiters must be applied as follows:

Current Limiter Cat. No.	MCP Used With③	MCP Continuous Current
EL3003R	MCP0322R	3
EL3007R	MCP0358R	7
EL3015R	MCP03150R	15
EL3030R	MCP13300R	30
EL3050R	MCP23480R	50
EL3100R	MCP331000R	100
EL3150R	MCP431800R, MCP431550R	150

Accessories and Modifications

Accessories and modifications for the MCP include shunt trip, auxiliary switch, undervoltage release, handle locks, line terminal shield, motor operator and fungus treatment.

① Except 400 amp size 5. Non-aluminum terminal suitable for copper only.
② Optional on special order for copper cable only.
③ Also applies to MCP's with optional terminals identified by suffix C in catalog number.

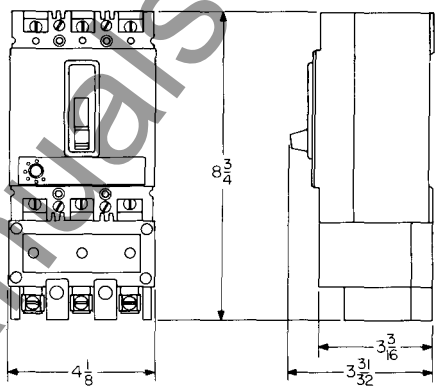
Terminals

Terminals are included with both the MCP and Current Limiter. Standard terminals are aluminum alloy, with non-aluminum terminals optional for use with only the MCP. Both standard and optional terminals will accommodate aluminum or copper conductors.① When using aluminum conductors, use of joint compound is recommended. Wire ranges are listed below.

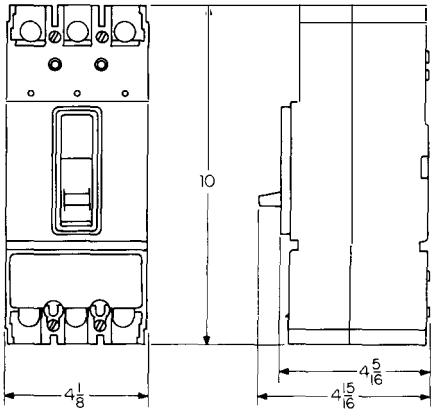
MCP or Limiter	Terminals	
	Standard Alum.	Optional Non-Alum.
Size 0, 1, 2	#14-4	#14-1/0
Size 3	#6-3/0	#14-1/0
Size 4	#4-4/0	#4-4/0
Size 5 (250 amp.)	#4-350 MCM	#4-350 MCM
Size 5 (400 amp.)	(2)-3/0-250 MCM	(2)-3/0-250 MCM
Limiters to 50 amp.	#14-2	#14-2②
Limiters 100 amp.	#1-4/0	. . . . .
Limiters 150 amp.	#1-4/0	. . . . .

Outline Dimensions, Inches

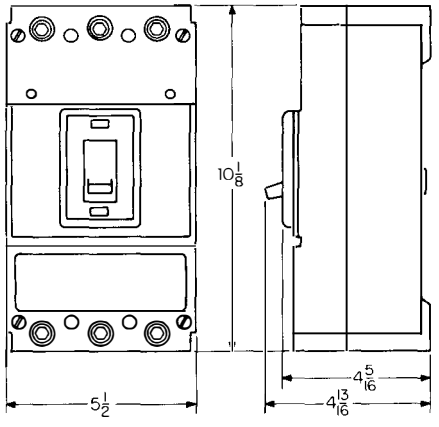
Not to be used for construction purposes unless approved.



Size O-4, 150 Amps Max.



Size 5, 250 Amps Max.

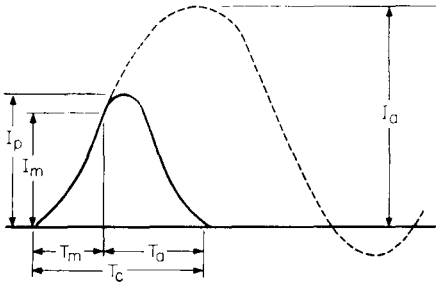


Size 5, 400 Amps Max.

Operating Data for MCP With Current Limiter

Although greatly restraining the magnitude of fault currents, the current limiters must necessarily allow some current to pass for a short period of time in order to cause it to function. Figure A illustrates the operating characteristic of the current limiter used with the MCP.

Figure A



I_a: Available Peak Current
T_m: Melting Time
I_m: Current at Melting time
I_p: Peak Let-thru Current
T_a: Arcing time
T_c: Total Interrupting (Clearing) time

Tables at right have been prepared from actual test data of bolted faults on the load side of MCP's with current limiters. Installations made on basis of these tables allow a margin of safety because any additional apparatus inserted into the system further limits the short circuit current.

It can be seen from the tables that with a current limiter in the system, fault currents are limited before reaching possible peak currents. This action reduces the let-through currents and thus reduces substantially the thermal and magnetic stresses.

Under short circuit conditions, any failure of apparatus will be due to excessive magnetic or thermal stresses. Maximum magmetic stress is proportional to the product of the peak currents in two adjacent conductors; in addition, forces at the contact surface of connected contactors are also proportional to current squared thus limiting this value reduces the possibility of having to replace contacts. Thermal stress is proportional to the square of the rms let-through current multiplied by time (I^2t). When the thermal and magnetic capabilities of the connected apparatus are known, then the data in the tables can be used in designing complete systems.

Available System Currents			MCP with Limiter Operational Data	
Average 3 Phase Sym-metrical RMS Amps	Power Factor, %	Max. Peak Amps	I^2t of Max. Phase x 10^6	Max. Peak Let-thru Amps
MCP0322R With Limiter EL3003R				
10,000	25	20,400	.004	1500
20,000	25	40,800	.006	1800
30,000	15	68,700	.006	1800
40,000	15	91,600	.005	1800
50,000	15	114,500	.005	1800
60,000	8.5	150,000	.005	1800
70,000	8.5	175,000	.006	1800
80,000	8.5	200,000	.006	1800
90,000	8.5	225,000	.007	1800
100,000	8.5	250,000	.008	1800
200,000	8.5	500,000	.008	1800
MCP0358R With Limiter EL3007R				
10,000	25	20,400	.01	2500
20,000	25	40,800	.015	3000
30,000	15	68,700	.015	3000
40,000	15	91,600	.013	3000
50,000	15	114,500	.012	3000
60,000	8.5	150,000	.013	3000
70,000	8.5	175,000	.014	3000
80,000	8.5	200,000	.015	3000
90,000	8.5	225,000	.017	3000
100,000	8.5	250,000	.020	3000
200,000	8.5	500,000	.020	3000
MCP03150R With Limiter EL3015R				
10,000	25	20,400	.024	4000
20,000	25	40,800	.036	4800
30,000	15	68,700	.030	5600
40,000	15	91,600	.024	5600
50,000	15	114,500	.018	6400
60,000	8.5	150,000	.018	6400
70,000	8.5	175,000	.018	6400
80,000	8.5	200,000	.018	7200
90,000	8.5	225,000	.018	7200
100,000	8.5	250,000	.018	7200
200,000	8.5	500,000	.042	8000
MCP13300R With Limiter EL3030R				
10,000	25	20,400	.06	7000
20,000	25	40,800	.06	8000
30,000	15	68,700	.05	8000
40,000	15	91,600	.05	9000
50,000	15	114,500	.05	10,000
60,000	8.5	150,000	.06	10,000
70,000	8.5	175,000	.06	10,000
80,000	8.5	200,000	.07	11,000
90,000	8.5	225,000	.09	11,000
100,000	8.5	250,000	.10	11,000
200,000	8.5	500,000	.10	11,000
MCP23480R With Limiter EL3050R				
10,000	25	20,400	.16	10,000
20,000	25	40,800	.25	13,000
30,000	15	68,700	.22	13,000
40,000	15	91,600	.20	14,000
50,000	15	114,500	.17	14,000
60,000	8.5	150,000	.19	14,000
70,000	8.5	175,000	.20	14,000
80,000	8.5	200,000	.22	14,000
90,000	8.5	225,000	.24	15,000
100,000	8.5	250,000	.25	15,000
200,000	8.5	500,000	.25	17,000

Available System Currents			MCP with Limiter Operational Data	
Average 3 Phase Sym-metrical RMS Amps	Power Factor, %	Max. Peak Amps	I^2t of Max. Phase x 10^6	Max. Peak Let-thru Amps
MCP331000R With Limiter EL3100R				
10,000	25	20,400	.50	15,000
20,000	25	40,800	.70	20,000
30,000	15	68,700	.60	21,000
40,000	15	91,600	.60	21,000
50,000	15	114,500	.50	22,000
60,000	8.5	150,000	.55	22,000
70,000	8.5	175,000	.60	23,000
80,000	8.5	200,000	.60	23,000
90,000	8.5	225,000	.60	24,000
100,000	8.5	250,000	.70	25,000
200,000	8.5	500,000	.70	25,000
MCP431800R or MCP431550R With Limiter EL3150R				
10,000	25	20,400	.50	15,000
20,000	25	40,800	.70	20,000
30,000	15	68,700	.60	21,000
40,000	15	91,600	.60	22,000
50,000	15	114,500	.50	23,000
60,000	8.5	150,000	.55	25,000
70,000	8.5	175,000	.60	25,000
80,000	8.5	200,000	.60	26,000
90,000	8.5	225,000	.60	27,000
100,000	8.5	250,000	.70	28,000
200,000	8.5	500,000	.70	30,000

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3 to 400 Amperes, 600 Volts Ac Maximum, 3 Poles Only

Motor Circuit Protector

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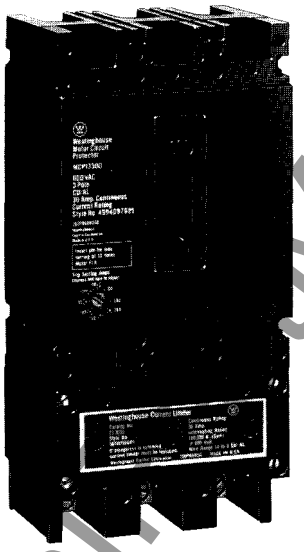
Maximum application current for starter and MCP shall be determined by testing the MCP in combination with contactor and overload relay. Additional capacity can be obtained by using the current limiter attachment.

Application

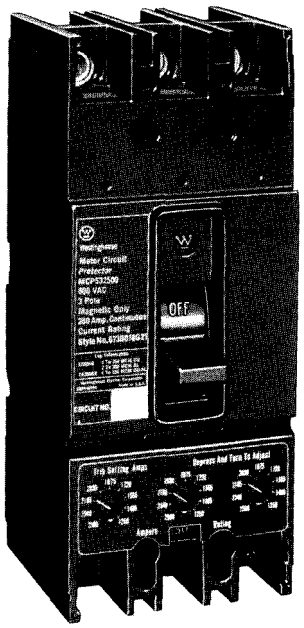
The MCP motor circuit protector is designed for application to individual motor circuits in combination with a magnetic motor starter. MCP's operate on the magnetic principle with a current sensing coil in each of the 3 poles to provide short circuit protection. The magnetic trip setting is adjustable from the front of the device.

The MCP is shipped with the adjusting knob on the low setting. MCP's are sized to correspond with NEMA starter sizes.

The MCP design permits the fastest tripping time possible on low level faults while offering circuit breaker convenience, quick make-quick break action, dead front safety and protection against single phasing.



Size 0-4 MCP with Current Limiter



Size 5 MCP 532500

Ratings and Trip Settings③

Motor Full Load Current, Amperes	MCP Continuous Rating	MCP Catalog Number ③	Use with Starter Size	MCP Trip Settings② Min.	Lock Positions 1	2	3	4	5	6	7	Max.
.62 – 1.8	3	MCP0322R	0	7	8	9	11	13	16	19	....	22
1.5 – 4.9	7	MCP0358R	0	18	20	25	30	36	43	51	....	58
4.2 – 13.0	15	MCP03150R	0	50	54	62	75	90	110	130	....	150
8.5 – 25.5	30	MCP13300R	1	100	110	120	150	185	220	265	....	300
13.8 – 40.6	50	MCP23480R	2	160	180	210	250	320	380	430	....	480
23.0 – 86.5	100	MCP331000R	3	275	300	400	500	625	725	875	....	1000
38.5 – 130.4	150	MCP431550R	4	450	500	580	670	825	1000	1250	....	1550
44.2 – 130.4	150	MCP431800R	4	575	600	750	900	1100	1250	1500	....	1800
96.1 – 204	250	MCP532500	5	1250	1405	1565	1720	1875	2030	2185	2340	2500
153.8 – 326.9	400	MCP534000	5	2000	2250	2500	2750	3000	3250	3500	3750	4000

② Calibration tolerances are ±10% on high or low setting.
③ Also applies to MCP's with optional terminals identified by suffix CR in catalog number.

MCP Application Based on Motor Full Load Current

1. Determine motor full load current from the motor nameplate data. Refer to the table and determine appropriate pin position. Take red pin from envelope and push firmly through the dotted circle on the MCP nameplate corresponding to the position derived from the table. Depress white pointer and turn counterclockwise until the pin stops rotation.①

2. No opening appears under the maximum setting. If this position is utilized it is suggested that the pin be retained with the breaker for possible alternate application at a later date.①

3. For maximum protection, the pointer should be turned clockwise to successively lower positions until the MCP trips on motor starting. After this position is determined, turn pointer counterclockwise to the next higher setting for normal operations. If MCP does not trip at minimum setting leave pointer at this setting.

4. MCP is set at minimum trip position when shipped from factory.

The table at right assumes the following conditions:

1. The first ½ cycle asymmetrical inrush current is not more than 11 times motor full load current. This is true for most motors.

2. Continuous rating of the MCP should not be less than 115% of the motor FLC.

Motor Full Load Current, Amperes	NEMA Starter Size	MCP Catalog Number ⑤	MCP Trip Setting ②
.62 – .68			8
.69 – .84			9
.85 – .99			11
1.0 – 1.1	0	MCP0322R	13
1.2 – 1.4			16
1.5 – 1.6			19
1.7 – 1.8			22
1.5 – 1.8			20
1.9 – 2.2			25
2.3 – 2.7			30
2.8 – 3.2	0	MCP0358R	36
3.3 – 3.8			43
3.9 – 4.4			51
4.5 – 4.9			58
4.2 – 4.7			54
4.8 – 5.7			62
5.8 – 6.8			75
6.9 – 8.4	0	MCP03150R	90
8.5 – 9.9			110
10.0 – 11.4			130
11.5 – 13.0			150
8.5 – 9.1			110
9.2 – 11.4			120
11.5 – 14.1			150
14.2 – 16.8	1	MCP13300R	185
16.9 – 20.3			220
20.4 – 22.9			265
23.0 – 25.5			300
13.8 – 16.1			180
16.2 – 19.1			210
19.2 – 24.5			250
24.6 – 29.1	2	MCP23480R	320
29.2 – 33.0			380
33.1 – 36.8			430
36.9 – 40.6			480

Motor Full Load Current, Amperes	NEMA Starter Size	MCP Catalog Number ⑤	MCP Trip Setting ②
23.0 – 30.7			300
30.8 – 38.3			400
38.4 – 47.9			500
48.0 – 55.7	3	MCP331000R	625
55.8 – 67.3			725
67.4 – 76.9			875
77.0 – 86.5			1000
38.5 – 44.5			500
44.6 – 51.4			580
51.5 – 63.4			670
63.5 – 76.8	4	MCP431550R	825
76.9 – 96.1			1000
96.2 – 119.1			1250
119.2 – 130.4			1550
46.1 – 57.5			600
57.6 – 69.1			750
69.2 – 83.9			900
84.0 – 95.9	4	MCP431800R	1100
96.0 – 114.9			1250
115.0 – 130.4			1500
96.1 – 107.9			1250
108.0 – 120.2			1405
120.3 – 132.2			1565
132.3 – 144.1			1720
144.2 – 156.0	5	MCP532500	1875
156.1 – 167.9			2030
168.0 – 179.9			2185
180.0 – 192.2			2340
192.3 – 204			2500
153.8 – 172.9			2000
173.0 – 192.2			2250
192.3 – 211.4			2500
211.5 – 230.6			2750
230.7 – 249.9	5⑥	MCP534000	3000
250.0 – 269.1			3250
269.2 – 288.3			3500
288.4 – 307.5			3750
307.6 – 326.9			4000

Three-Phase Ac Motor Full Load Current③ From Table 430-150, 1981 N.E.C.

Horse-power	Induction Type Squirrel-Cage and Wound Rotor Motors, Amperes 115 Volts	230 Volts	460 Volts	575 Volts	Synchronous Type Motors, Unity Power Factor④, Amperes 230 Volts	460 Volts	575 Volts
½	4	2	1	.8	...	...	...
¾	5.6	2.8	1.4	1.1	...	...	...
1	7.2	3.6	1.8	1.4	...	...	...
1½	10.4	5.2	2.6	2.1	...	...	...
2	13.6	6.8	3.4	2.7	...	...	...
3	...	9.6	4.8	3.9	...	...	...
5	...	15.2	7.6	6.1	...	...	...
7½	...	22	11	9	...	...	...
10	...	28	14	11	...	...	...
15	...	42	21	17	...	...	...
20	...	54	27	22	...	...	...
25	...	68	34	27	53	26	21
30	...	80	40	32	63	32	26
40	...	104	52	41	83	41	33
50	...	130	65	52	104	52	42
60	...	154	77	62	123	61	49
75	...	192	96	77	155	78	62
100	...	248	124	99	202	101	81
125	...	312	156	125	253	126	101
150	...	360	180	144	302	151	121
200	...	480	240	192	400	201	161

For full-load currents of 208- and 200-volt motors, increase the corresponding 230 volt motor full-load current by 10 and 15 per cent, respectively. The voltages listed are rated motor voltages. Corresponding nominal system voltages are 110 to 120, 220 to 240, 440 to 480 and 550 to 600 volts.

① Size 5 MCP's are not provided with locking pins and have an adjusting knob for each pole.
② In line with paragraph 430-52 of 1981; National Electric Code. "The setting of an instantaneous trip circuit breaker (without time delay) may be increased but shall in no case exceed 1300% of the motor full load current." The values of trip setting illustrated in the column are selected per the above.
③ These values of full-load current are for motors running at speeds usual for belted motors and motors with normal torque characteristics. Motors built for especially low speeds or high torques may require more running current, and multi-speed motors will have full load current varying with speed, in which case the nameplate current rating shall be used.
④ For 90 and 80 per cent Power Factor the above figures shall be multiplied by 1.1 and 1.25 respectively.
⑤ Also applies to MCP's with optional terminals.
⑥ May be used on some size 6 applications.

Current Limiter Attachment (Size 0-4)
The current limiter attachment for the MCP is designed to provide increased interrupting capacity. The combination is UL Listed as a recognized component for application at up to 200,000 amps symmetrical at 600 volts Ac making the MCP suitable for use in network distribution systems or other applications where unusually high fault currents are available. The current limiters bolt to the load end of the MCP and are provided with terminals suitable for copper or aluminum conductors.

Limiters are coordinated with the MCP so that normal fault currents will be interrupted automatically by the MCP without any damage to the limiter. Only the rare very high fault will be interrupted by the limiter. Faults that are interrupted by the limiter will also magnetically trip the MCP, opening all 3 poles, preventing single phase operation.

Each of the 3 poles of the limiter is equipped with an indicator that will extend when a fault is interrupted by the limiter quickly identifying the fault circuit.

For proper protection and coordination MCP's and limiters must be applied as follows:

Current Limiter Cat. No.	MCP Used With③	MCP Continuous Current
EL3003R	MCP0322R	3
EL3007R	MCP0358R	7
EL3015R	MCP03150R	15
EL3030R	MCP13300R	30
EL3050R	MCP23480R	50
EL3100R	MCP331000R	100
EL3150R	MCP431800R, MCP431550R	150

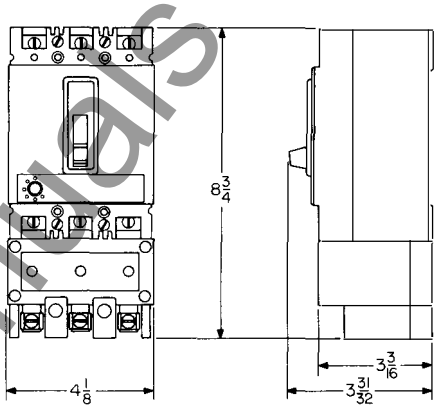
Accessories and Modifications
Accessories and modifications for the MCP include shunt trip, auxiliary switch, undervoltage release, handle locks, line terminal shield, motor operator and fungus treatment.

① Except 400 amp size 5, Non-aluminum terminal suitable for copper only.
② Optional on special order for copper cable only.
③ Also applies to MCP's with optional terminals identified by suffix C in catalog number.

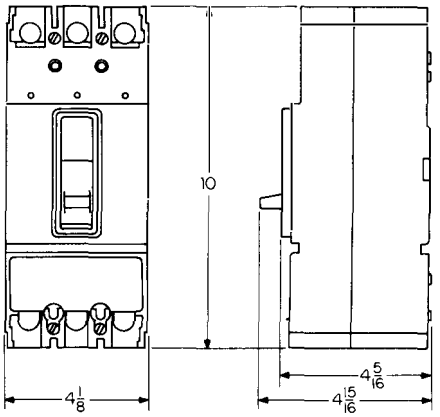
Terminals
Terminals are included with both the MCP and Current Limiter. Standard terminals are aluminum alloy, with non-aluminum terminals optional for use with only the MCP. Both standard and optional terminals will accommodate aluminum or copper conductors.① When using aluminum conductors, use of joint compound is recommended. Wire ranges are listed below.

MCP or Limiter	Terminals	
	Standard Alum.	Optional Non-Alum.
Size 0, 1, 2	#14-4	#14-1/0
Size 3	#6-3/0	#14-1/0
Size 4	#4-4/0	#4-4/0
Size 5 (250 amp.)	#4-350 MCM	#4-350 MCM
Size 5 (400 amp.)	(2)-3/0-250 MCM	(2)-3/0-250 MCM
Limiters to 50 amp.	#14-2	#14-2②
Limiters 100 amp.	#1-4/0	. . . . .
Limiters 150 amp.	#1-4/0	. . . . .

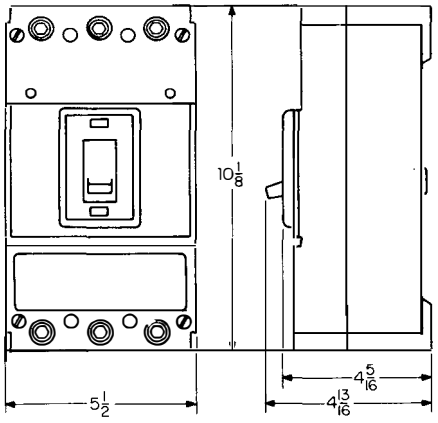
Outline Dimensions, Inches
Not to be used for construction purposes unless approved.



Size 0-4, 150 Amps Max.



Size 5, 250 Amps Max.

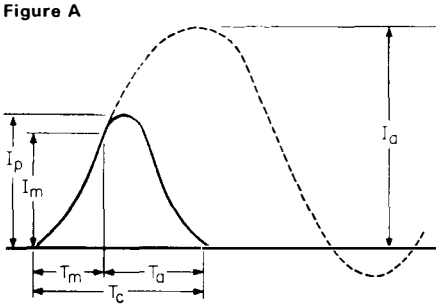


Size 5, 400 Amps Max.

Operating Data for MCP With Current Limiter

Although greatly restraining the magnitude of fault currents, the current limiters must necessarily allow some current to pass for a short period of time in order to cause it to function. Figure A illustrates the operating characteristic of the current limiter used with the MCP.

Figure A



I_a: Available Peak Current
T_m: Melting Time
I_m: Current at Melting time
I_p: Peak Let-thru Current
T_a: Arcing time
T_c: Total Interrupting (Clearing) time

Tables at right have been prepared from actual test data of bolted faults on the load side of MCP's with current limiters. Installations made on basis of these tables allow a margin of safety because any additional apparatus inserted into the system further limits the short circuit current.

It can be seen from the tables that with a current limiter in the system, fault currents are limited before reaching possible peak currents. This action reduces the let-through currents and thus reduces substantially the thermal and magnetic stresses.

Under short circuit conditions, any failure of apparatus will be due to excessive magnetic or thermal stresses. Maximum magmetic stress is proportional to the product of the peak currents in two adjacent conductors; in addition, forces at the contact surface of connected contactors are also proportional to current squared thus limiting this value reduces the possibility of having to replace contacts. Thermal stress is proportional to the square of the rms let-through current multiplied by time (I^2t). When the thermal and magnetic capabilities of the connected apparatus are known, then the data in the tables can be used in designing complete systems.

Available System Currents			MCP with Limiter Operational Data	
Average 3 Phase Sym-metrical RMS Amps	Power Factor, %	Max. Peak Amps	I^2t of Max. Phase x 10^6	Max. Peak Let-thru Amps
MCP0322R With Limiter EL3003R				
10,000	25	20,400	.004	1500
20,000	25	40,800	.006	1800
30,000	15	68,700	.006	1800
40,000	15	91,600	.005	1800
50,000	15	114,500	.005	1800
60,000	8.5	150,000	.005	1800
70,000	8.5	175,000	.006	1800
80,000	8.5	200,000	.006	1800
90,000	8.5	225,000	.007	1800
100,000	8.5	250,000	.008	1800
200,000	8.5	500,000	.008	1800
MCP0358R With Limiter EL3007R				
10,000	25	20,400	.01	2500
20,000	25	40,800	.015	3000
30,000	15	68,700	.015	3000
40,000	15	91,600	.013	3000
50,000	15	114,500	.012	3000
60,000	8.5	150,000	.013	3000
70,000	8.5	175,000	.014	3000
80,000	8.5	200,000	.015	3000
90,000	8.5	225,000	.017	3000
100,000	8.5	250,000	.020	3000
200,000	8.5	500,000	.020	3000
MCP03150R With Limiter EL3015R				
10,000	25	20,400	.024	4000
20,000	25	40,800	.036	4800
30,000	15	68,700	.030	5600
40,000	15	91,600	.024	5600
50,000	15	114,500	.018	6400
60,000	8.5	150,000	.018	6400
70,000	8.5	175,000	.018	6400
80,000	8.5	200,000	.018	7200
90,000	8.5	225,000	.018	7200
100,000	8.5	250,000	.018	7200
200,000	8.5	500,000	.042	8000
MCP13300R With Limiter EL3030R				
10,000	25	20,400	.06	7000
20,000	25	40,800	.06	8000
30,000	15	68,700	.05	8000
40,000	15	91,600	.05	9000
50,000	15	114,500	.05	10,000
60,000	8.5	150,000	.06	10,000
70,000	8.5	175,000	.06	10,000
80,000	8.5	200,000	.07	11,000
90,000	8.5	225,000	.09	11,000
100,000	8.5	250,000	.10	11,000
200,000	8.5	500,000	.10	11,000
MCP23480R With Limiter EL3050R				
10,000	25	20,400	.16	10,000
20,000	25	40,800	.25	13,000
30,000	15	68,700	.22	13,000
40,000	15	91,600	.20	14,000
50,000	15	114,500	.17	14,000
60,000	8.5	150,000	.19	14,000
70,000	8.5	175,000	.20	14,000
80,000	8.5	200,000	.22	14,000
90,000	8.5	225,000	.24	15,000
100,000	8.5	250,000	.25	15,000
200,000	8.5	500,000	.25	17,000

Available System Currents			MCP with Limiter Operational Data	
Average 3 Phase Sym-metrical RMS Amps	Power Factor, %	Max. Peak Amps	I^2t of Max. Phase x 10^6	Max. Peak Let-thru Amps
MCP331000R With Limiter EL3100R				
10,000	25	20,400	.50	15,000
20,000	25	40,800	.70	20,000
30,000	15	68,700	.60	21,000
40,000	15	91,600	.60	21,000
50,000	15	114,500	.50	22,000
60,000	8.5	150,000	.55	22,000
70,000	8.5	175,000	.60	23,000
80,000	8.5	200,000	.60	23,000
90,000	8.5	225,000	.60	24,000
100,000	8.5	250,000	.70	25,000
200,000	8.5	500,000	.70	25,000
MCP431800R or MCP431550R With Limiter EL3150R				
10,000	25	20,400	.50	15,000
20,000	25	40,800	.70	20,000
30,000	15	68,700	.60	21,000
40,000	15	91,600	.60	22,000
50,000	15	114,500	.50	23,000
60,000	8.5	150,000	.55	25,000
70,000	8.5	175,000	.60	25,000
80,000	8.5	200,000	.60	26,000
90,000	8.5	225,000	.60	27,000
100,000	8.5	250,000	.70	28,000
200,000	8.5	500,000	.70	30,000

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