

Fig. 2-1. MCP and HMCP Mounting Bolt Drilling Plans

Mounting hardware and unmounted accessories (where required) are supplied in separate packages.

2-1. Make sure that the MCP is suitable for the intended installation by comparing nameplate data with system requirements. Inspect the MCP for completeness and damage before mounting.

WARNING

Before mounting the MCP in an electrical system, make sure the MCP is switched to the OFF position and that there is no voltage present where work is to be performed. The voltages in energized equipment can cause death or severe personal injury.

2-2. To mount the MCP, perform the following steps:

Note: Depending on the equipment configuration, the MCP can be mounted using different styles of hardware. The following steps describe how to mount the MCP using standard hardware. When special hardware is needed (for example, with handle mechanisms), the instruction leaflet describing the accessory also describes the special mounting arrangements.

- a. For individual mounting panels, make sure that mounting panel is predrilled using drilling plan (Fig. 2-1).
- b. If MCP includes factory installed internal accessories, make sure accessory wiring can be reached when the MCP is mounted.
- c. Position MCP on mounting surface.
- d. Install mounting screws, washers, and nuts. Tighten screws firmly, but do not exceed 28 pound-inches (3.16 N.m.).

2-3. If an optional terminal end cover is to be installed with the MCP (usually line end only), it must be positioned before cable is connected to terminals.

CAUTION

When aluminum conductors are used, the application of a suitable joint compound is recommended to reduce the possibility of terminal overheating. Terminal overheating can cause damage to the MCP.

2-4. After mounting the MCP, line and load cables and accessory leads should be connected. (See accessory schematic diagram on side of MCP.)

Note: If terminal shield or interphase barriers are to be installed on the MCP, install them after the terminals are connected.

2-5. If required, install terminal shield on MCP cover with mounting screws provided.

2-6. If required, install interphase barriers by sliding barriers into dovetail grooves between terminals.

2-7. After the MCP is installed, check all mounting hardware and terminal connecting hardware for correct torque loading. Torque values for line/load terminals are given in Tables 2-1 and 2-2 and on the MCP nameplate.

Table 2-1. Terminal Types

Terminal Style Number	Terminal Body Material	Screw Head Type	AWG Wire Range	Metric Wire Range	Wire Type	Torque Value lb-in (N.m)
Standard Terminals						
624B100G17	Aluminum	Socket (Allen)	#4-4/0	25-95	Cu/Al	120 (13.56)
624B100G19	Aluminum	Slotted	#14-1/0	2.5-50	Cu/Al	See Table 2-2
Optional Terminals						
624B100G02	Steel	Slotted	#14-1/0	2.5-50	Cu/Al	See Table 2-2
624B100G18	Stainless Steel	Slotted	#4-4/0	25-95	Cu	See Table 2-2
624B100G10	Aluminum	Slotted	#14-#4	2.5-16	Cu/Al	See Table 2-2
624B100G21	Aluminum	Socket (Allen)	#6-3/0	16-70	Cu/Al	120 (13.56)

Note: Terminal wire connectors are UL listed for standard stranded wire sizes as defined in UL 486A and UL 486B.

Table 2-2. Terminal Maximum Torque Values

AWG Wire Range	Torque Value lb-in	Torque Value N.m
#14-10	20	2.26
#8	40	4.52
#6-#4	45	5.09
#3-4/0	50	5.65

3. Manual Operation

The MCP is manually operated by the handle or the PUSH-TO-TRIP button. The MCP handle has three indicating positions, two of which are shown on the cover by raised lettering to indicate ON and OFF. On the sliding handle barrier, ON, OFF, and trip are also shown by a color-coded strip for each MCP handle position: red for ON, white for tripped, and green for OFF. On the sliding handle barrier, ON/OFF is also indicated by the international symbols 1/0. (See Fig. 3-1.)

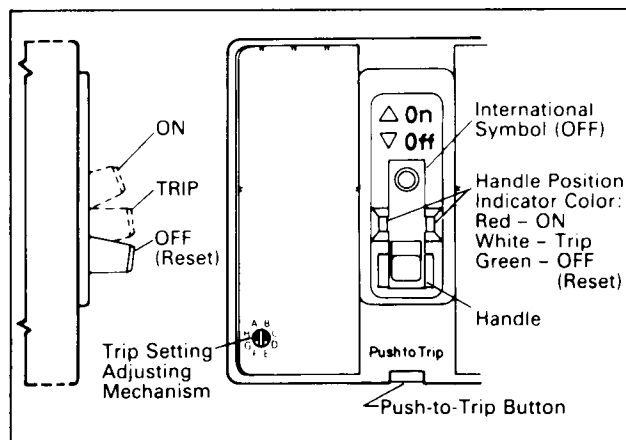


Fig. 3-1. Frame MCP Manual Controls

Circuit Breaker Reset

After tripping, the MCP is reset by moving the MCP handle to the extreme OFF position.

PUSH-TO-TRIP Button

The PUSH-TO-TRIP button checks the tripping function and is used to periodically exercise the operating mechanism. The button is designed to be operated by using a small screwdriver.

Adjustment of Trip Setting

The trip setting adjusting mechanism permits the MCP trip range to be changed. The mechanism consists of a cam with eight positions for different trip levels. The trip levels are labeled A through H. Trip values are shown on the MCP cover nameplate and in Tables 3-1 and 3.2. To adjust the trip level, perform the following steps:

3-1. Determine the motor locked rotor current from the motor nameplate. Refer to Table 3-1 and select appropriate MCP trip setting. Depress and rotate adjustment button clockwise to the setting.

CAUTION

A rotation stop prevents the adjustment button from being rotated counterclockwise beyond position A. The MCP can be damaged if the button is forced past A in the counterclockwise direction.

3-2. For closest protection, turn the adjustment button counterclockwise to successively lower settings until the MCP trips when the motor is started. When this setting has been determined, turn the adjustment button clockwise to the next highest setting. The MCP is now adjusted for normal operation.

3-3. If the MCP does not trip at the lowest setting (A), leave the adjustment button at this position.

Table 3-1. MCP Trip Settings

Cam Setting	Typical Motor Full Load Current Amperes ^①	NEMA Starter Size	Continuous Amps	MCP Catalog Number	MCP Trip Setting ^②
A	.69 - .91				9
B	.92 - 1.0				12
C	1.1 - 1.2				15
D	1.3 - 1.5	0	3	HMCP003A0 or HMCP003A0C	18
E	1.6 - 1.7				21
F	1.8 - 1.9				24
G	2.0 - 2.2				27
H	2.3 - 2.5				30
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A	1.5 - 2.0				21
B	2.1 - 2.5				28
C	2.6 - 3.1				35
D	3.2 - 3.6	0	7	HMCP007C0 or HMCP007C0C	42
E	3.7 - 3.9				49
F	4.3 - 4.7				56
G	4.8 - 5.2				63
H	5.3 - 5.7				70
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A	3.4 - 4.5				45
B	4.6 - 5.6				60
C	5.7 - 6.8				75
D	6.9 - 7.9	0	15	HMCP015E0	90
E	8.0 - 9.1				105
F	9.2 - 10.3				120
G	10.4 - 11.4				135
H	11.5 - 12.6				150

Table 3-1. MCP Trip Settings (continued)

Cam Setting	Typical Motor Full Load Current Amperes ^①	NEMA Starter Size	Continuous Amps	MCP Catalog Number	MCP Trip Setting ^②
A	6.9 - 9.1				90
B	9.2 - 11.4				120
C	11.5 - 13.7				150
D	13.8 - 16.0	1	30	HMCP030H1	180
E	16.1 - 18.3				210
F	18.4 - 20.6				240
G	20.7 - 22.9				270
H	23.0 - 25.2				300
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A	11.5 - 15.2				150
B	15.3 - 19.1				200
C	19.2 - 22.9				250
D	23.0 - 26.8	2	50	HMCP050K2	300
E	26.9 - 30.6				350
F	30.7 - 34.5				400
G	34.6 - 38.3				450
H	38.4 - 42.1				500
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A	16.1 - 21.4				210
B	21.5 - 26.8				280
C	26.9 - 32.2				350
D	32.3 - 37.5	2	70	HMCP070M2	420
E	37.6 - 42.9				490
F	43.0 - 48.3				560
G	48.4 - 53.7				630
H	53.8 - 59.1				700
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A	23.0 - 30.6				300
B	30.7 - 38.3				400
C	38.4 - 46.0				500
D	46.1 - 53.7	3	100	HMCP100R3	600
E	53.8 - 61.4				700
F	61.5 - 69.1				800
G	69.2 - 76.8				900
H	76.9 - 84.5				1000
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A	34.6 - 46.0				450
B	46.1 - 57.5				600
C	57.6 - 69.1				750
D	69.2 - 80.6	4	150	HMCP150T4	900
E	80.7 - 92.2				1050
F	92.3 - 103.7				1200
G	103.8 - 115.2				1350
H	115.3 - 126.7				1500
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A	57.0 - 75.0				750
B	76.0 - 95.0				1000
C	96.0 - 114.0				1250
D	115.0 - 130.0	4	150	HMCP150U4	1500
E	③				1750
F	③				2000
G	③				2250
H	③				2500

Table 3-2. Special Application MCP Trip Settings

Cam Setting	Continuous Ampere Rating	MCP Catalog Number	MCP Trip Setting ^②
A	25A	HMCP025D0	40
B			43
C			46
D			49
E			52
F			55
G			58
H			60
A	50A	HMCP050G2	80
B			87
C			93
D			98
E			103
F			109
G			115
H			120
A	70A	HMCP070J2	115
B			122
C			130
D			139
E			145
F			153
G			160
H			170
A	100A	HMCP100L3	160
B			174
C			185
D			196
E			207
F			218
G			229
H			240

① Motor FLA ranges are typical. The corresponding trip setting is 13 times the FLA value shown. The $\pm 20\%$ trip tolerance can affect trip response and require increase in cam setting per para 3-2.

② For dc applications, actual trip levels may exceed the values shown by as much as 100%. Actual dc trip values are application dependent.

③ Settings above 130 amps are for special applications. N.E.C. Article 430-110(a) requires the ampere rating of the disconnecting means to be not less than 115% of the motor full load ampere rating.

4. Inspection and Field Checks

Series C molded case MCPs are designed to provide years of almost maintenance-free operation. The following procedure describes how to inspect and test a MCP in service.

Inspection

MCPs in service should be inspected periodically. The inspection should include the following checks:

WARNING

Before inspecting the MCP in an electrical system, make sure the MCP is switched to the OFF position and that there is no voltage present where work is to be performed. The voltages in energized equipment can cause death or severe personal injury.

CAUTION

Make sure that cleaning agents or solvents used to clean the MCP are suitable for the job. Some commercial cleaning agents will damage the nameplates or molded parts.

4-1. Remove dust, dirt, soot, grease, or moisture from the surface of the MCP using a lint-free dry cloth, brush, or vacuum cleaner. Do not blow debris into MCP. If contamination is found, look for the source and eliminate the problem.

4-2. Switch MCP to ON and OFF several times to be sure that the mechanical linkages are free and do not bind. If mechanical linkages are not free, replace MCP.

4-3. Press the PUSH-TO-TRIP button to mechanically trip the MCP. Trip, reset, and switch MCP ON several times. If mechanism does not reset each time the MCP is tripped, replace the MCP.

4-4. Check base, cover, and operating handle for cracks, chipping, and discoloration. MCPs should be replaced if cracks or severe discoloration is found.

4-5. Check terminals and connectors for looseness or signs of overheating. Overheating will show as discoloration, melting, or blistering of conductor insulation, or as pitting or melting of conductor surfaces due to arcing. If there is no evidence of overheating or looseness, do not disturb or tighten the connections. If there is evidence of overheating, terminations should be cleaned or replaced. Before reenergizing the MCP, all terminations and cable should be refurbished to the condition when originally installed.

4-6. Check MCP mounting hardware; tighten if necessary.

4-7. Check area where MCP is installed for any safety hazards including personal safety and fire hazards. Exposure to certain types of chemicals can cause deterioration of electrical connections.

Field Testing

Any field testing should be done in accordance with NEMA Standards Publication AB2-1984.

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