

# Installation Instructions for GMCP Motor Circuit Protector



I.L. 15579  
File 29-000

## WARNING

DO NOT ATTEMPT TO INSTALL OR PERFORM MAINTENANCE ON EQUIPMENT WHILE IT IS ENERGIZED. DEATH, SEVERE PERSONAL INJURY, OR SUBSTANTIAL PROPERTY DAMAGE CAN RESULT FROM CONTACT WITH ENERGIZED EQUIPMENT. ALWAYS VERIFY THAT NO VOLTAGE IS PRESENT BEFORE PROCEEDING WITH THE TASK, AND ALWAYS FOLLOW GENERALLY ACCEPTED SAFETY PROCEDURES.

THE WESTINGHOUSE ELECTRIC CORPORATION IS NOT LIABLE FOR THE MISAPPLICATION OR MISINSTALLATION OF ITS PRODUCTS.

## 1. Introduction

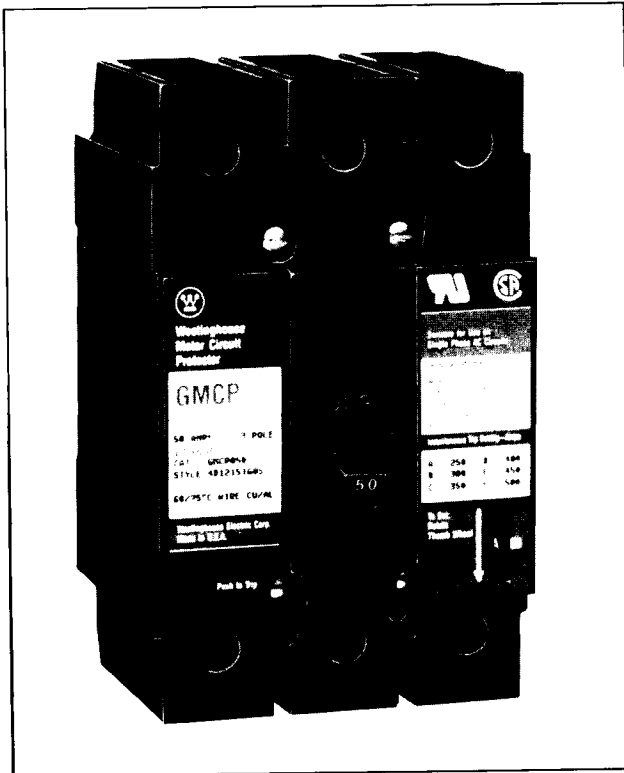


Fig. 1-1. G-Frame Motor Circuit Protector

The user is cautioned to observe all recommendations, warnings, and cautions relating to the safety of personnel and equipment as well as all general and local health and safety laws, codes, and procedures.

The recommendations and information contained herein are based on Westinghouse experience and judgement, but should not be considered to be all-inclusive or covering every application or circumstance which may arise. If any questions arise, contact Westinghouse Electric Corporation for further information or instructions.

## General Information

The G-frame instantaneous-only (magnetic) motor circuit protector (MCP) (Fig. 1-1) is available in ratings from 3A to 63A continuous current for motor starter sizes 0 through 2. The MCP is designed to comply with the applicable requirements of Underwriters Laboratories, Inc. Standard UL489 and the International Electrotechnical Commission Recommendations No. IEC 157-1.

The MCP is a UL recognized component under file E7819. It is used primarily to provide short-circuit protection as part of a combination controller where other circuit protective functions are performed by other devices within the controller. The MCP is suitable for reverse feed applications. For more information, see TD 29-321.

This instruction leaflet (IL) gives procedures for installation, operation, inspection, and field testing of G-frame MCPs.

## 2. Installation

The installation procedure consists of inspecting and mounting the MCP, connecting and torquing the line and load terminations, and attaching terminal shields when required. To install the MCP, perform the following steps:

**Note:** G-frame MCPs are factory sealed. UL489 requires that internal accessories be installed at the factory.

Mounting hardware (where required) is supplied in a separate package.

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.

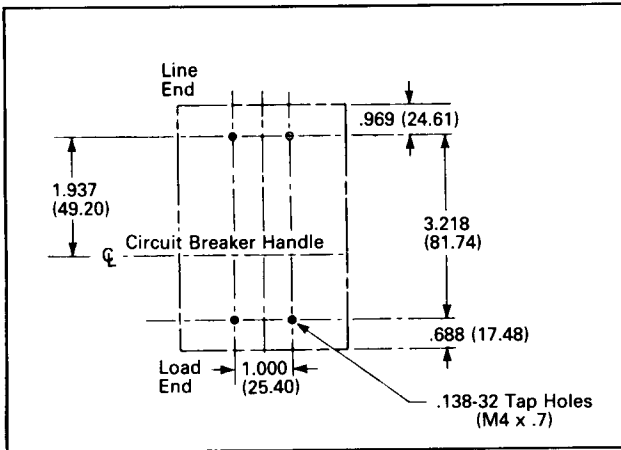


Fig. 2-1. GMCP Mounting Bolt Drilling Plan

- 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.).

**DIN Rail Mounting**

An adapter kit (S#1275C79G01) suitable for use with standard 35 millimeter DIN rail (such as 35 mm x 7.5 or 35 mm x 15 per DIN EN50022), should be preassembled to the rear of the circuit breaker (Fig. 2-2). Position circuit breaker as required by sliding adapter onto DIN rail.

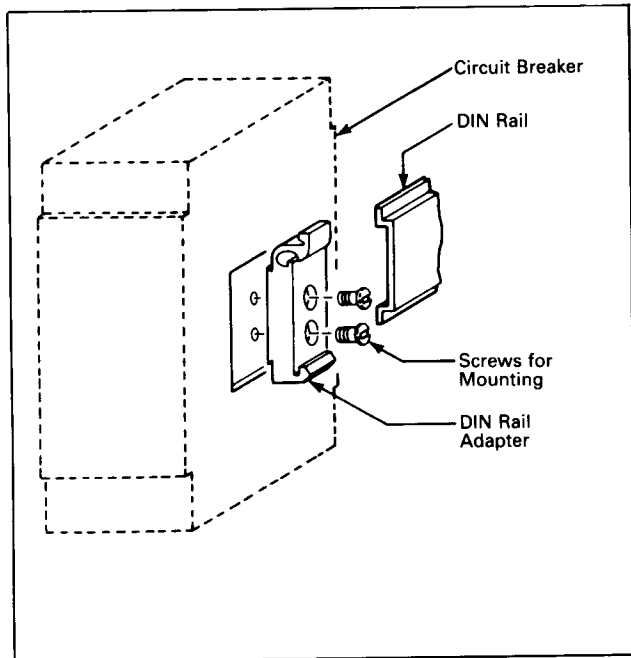


Fig. 2-2. DIN Rail Adapter Mounting

**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.

2-3. 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 is to be installed on the MCP, install after the line and load cables are connected.

2-4. If required, install terminal shield on MCP cover with mounting screws provided.

2-5. 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**

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

Circuit Breaker Amps.	Terminal Type Material	Screw Head Type	Wire Type	AWG Wire Range	Metric Wire <sup>Ⓢ</sup> Range (mm <sup>2</sup> )
3-20	Clamp (Plated Steel)	Slotted	Cu/Al	#14-10	1.5-4
25-63	Pressure (Aluminum Body)	Slotted	Cu/Al	#10-1/0	4-50

<sup>Ⓢ</sup> Not UL Listed sizes.

**Table 2-2. Terminal Torque Values**

AWG Wire Range	Torque Value lb-in	Torque Value N.m
#14-10	20	2.26
#8	40	4.52
#6-1/0	45	5.09

**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 with handle lettering to indicate ON and OFF. Trip status is indicated by white strip on the handle.

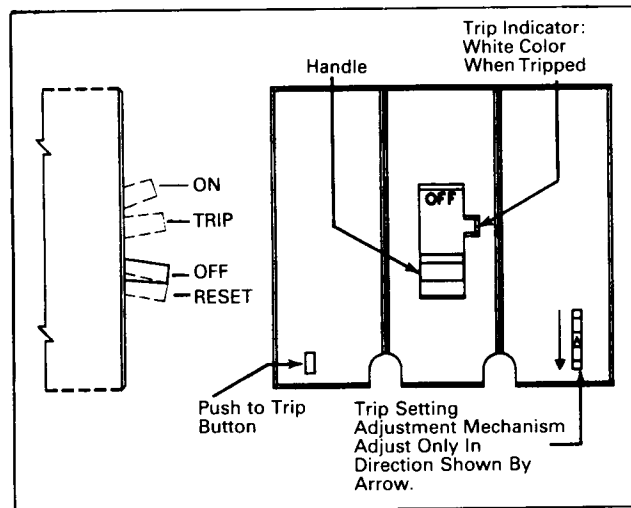


Fig. 3-1. MCP Manual Controls

**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 to be fine tuned to provide more precise protection. The mechanism consists of a cam with six positions for different trip levels. The trip levels are labeled A through F; actual trip values are shown on the MCP cover nameplate and in Tables 3.1. Adjustment is made only in one direction as indicated in Fig. 3.1. A rotation stop prevents the adjustment wheel from being rotated against indicated adjustment direction. The MCP can be damaged if adjustment is forced against indicated adjustment direction. Once the F setting has been reached continue adjusting in the same direction to return to the A setting. To adjust the trip level, perform the following steps:

3-1. Determine the motor full load current from the motor nameplate. Refer to Table 3-1 and select appropriate MCP trip setting. Using a small screwdriver, rotate wheel in direction indicated (See Fig. 3.1) to the appropriate setting.

3-2. For closest protection, turn the adjustment wheel to successively lower settings until the MCP trips when the motor is started. Only adjust in direction indicated (See Fig. 3.1). When this setting has been determined, turn the adjustment wheel 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 wheel at this position.

## 4. Inspection and Field Testing

G Frame 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.

**Table 3-1. GMCP Trip Settings**

Cam Setting	Motor Full Load Current Amperes <sup>①</sup>	NEMA Starter Size	Continuous Amps <sup>②</sup>	GMCP Catalog Number	GMCP Trip Setting
A	1.1 - 1.2				15
B	1.3 - 1.5				18
C	1.6 - 1.7	0	3	GMCP003A0	21
D	1.8 - 1.9				24
E	2.0 - 2.2				27
F	2.3 - 2.5				30
A	2.6 - 3.1				35
B	3.2 - 3.6				42
C	3.7 - 3.9	0	7	GMCP007C0	49
D	4.3 - 4.7				56
E	4.8 - 5.2				63
F	5.3 - 5.7				70
A	5.7 - 6.8				75
B	6.9 - 7.9				90
C	8.0 - 9.1	0	15	GMCP015E0	105
D	9.2 - 10.3				120
E	10.4 - 11.4				135
F	11.5 - 12.6				150
A	11.5 - 13.7				150
B	13.8 - 16.0				180
C	16.1 - 18.3	1	30	GMCP030H1	210
D	18.4 - 20.6				240
E	20.7 - 22.9				270
F	23.0 - 25.2				300
A	19.3 - 22.9				250
B	23.0 - 26.8				300
C	26.9 - 30.6	2	50	GMCO050K2	350
D	30.7 - 34.5				400
E	34.6 - 38.3				450
F	38.4 - 42.1				500
A	23.1 - 27.5				300
B	27.7 - 32.2				360
C	32.3 - 36.7	2	60	GMCP060J2	420
D	36.9 - 41.4				480
E	41.5 - 46.0				540
F	46.2 - 50.5				600
A	24.2 - 32.1				315
B	29.1 - 34.8				380
C	33.9 - 39.4	2	63	GMCP063M2	440
D	38.8 - 46.4				500
E	43.6 - 48.9				570
F	48.5 - 53.7				630

① Motor FLA ranges are typical. The corresponding trip setting is at 13 times the minimum FLA value shown. Where a 13 times setting is required for an intermediate FLA value, alternate cam settings and/or MCP ratings should be used.

② 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.

4-2. 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. 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 AB4-1991.

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