Instruction Leaflet **IL29C115D**

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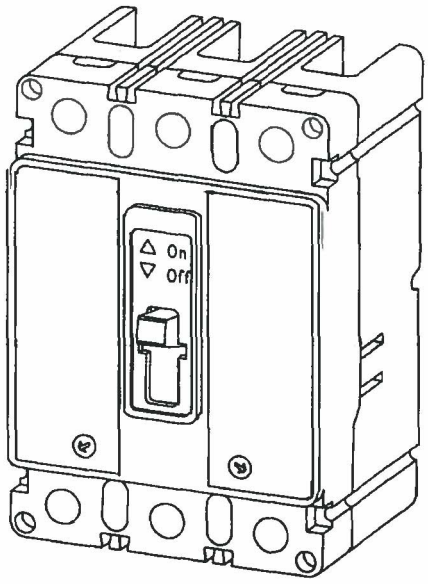
Installation Instructions for Series C F-Frame Motor Protector Types FWMP, HFWMP, FDMP, and HFDMP



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Powering Business Worldwide

Installation Instructions for Series C F-Frame Motor Protector Types FWMP, HFWMP, FDMP, and HFDMP

⚠ 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.

EATON IS NOT LIABLE FOR THE MISAPPLICATION OR MISINSTALLATION OF ITS PRODUCTS.

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 Eaton experience and judgment, but should not be considered to be all-inclusive or covering every application or circumstance which may arise. If any questions arise, contact Eaton for further information or instructions.

1 Introduction

The F-Frame Series C motor protector (see Figure 1) is available in a 3-pole style with four rated currents (80 A, 100 A, 160 A, and 205 A), two interrupting capacities, and with or without phase unbalance protection. For single-phase applications, two poles must be connected in series. Throughout this document, the Motor Protector Circuit Breaker will be referred to as an MPCB. The MPCB is equipped with an electronic sensing and tripping mechanism which makes the inverse time delay releases independent of ambient temperature.

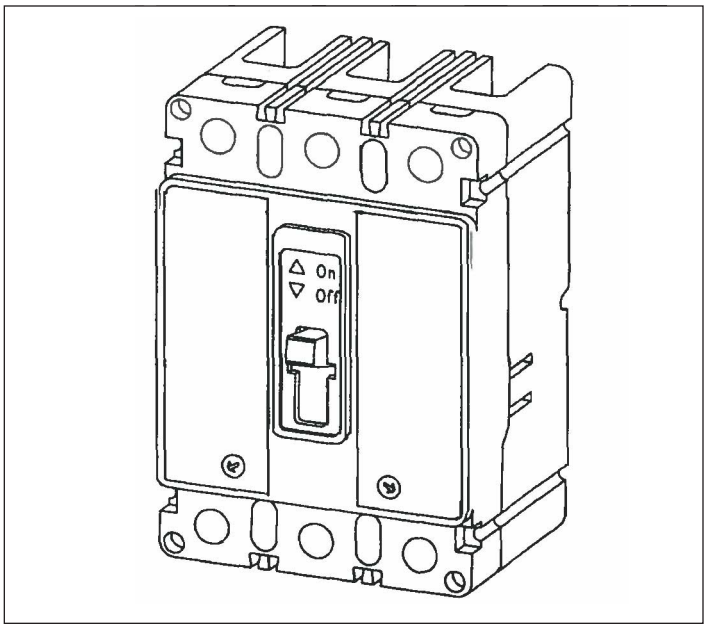

Figure 1. Series C Motor Protector Circuit Breaker.

A thermal memory is incorporated which prevents power operation immediately after an overload trip. The nominal instantaneous trip current is 15 x I_e (current setting), but this value is limited to maximum 2670 amperes.

Styles with phase unbalance protection have two customer accessible adjustments which allow a field setting of current (Ie) and over load class (T_c). The 205 A rating has a fixed class setting only. The adjustment knobs for the overload current setting and overload class setting (when applicable) are set on the front face of the MPCB. The left knob provides adjustment for the current setting and the right knob adjusts the class setting.

The overload class setting is the maximum trip time for a motor current of 7.2 x I_e (current setting). A class 10 is used for the fixed class styles and the adjustable styles range from 5 to 20. The value of I_e which is selected by the customer corresponds to the balanced three phases current value. A motor protector with phase imbalance protection internally modifies the customer selected I e to a lower value when a phase unbalance condition exists. A phase unbalance occurs when there is a 40% difference in one phase current relative to the average of all three phase currents.

The FWMP and HFWMP are designed to comply with the applicable requirements of the International Electrotechnical Commission Standard IEC 947-2. The FDMP and HFDMP are designed to comply with the applicable requirements of U.L. 489.

2 Installation

The installation procedure consists of inspecting and mounting the MPCB, connecting and torquing the line and load terminations, and attaching terminal shields or barriers, when supplied. To install the MPCB, perform the following steps.

NOTICE

THE FWMP, HFWMP, FDMP, AND HFDMP ARE FACTORY SEALED. ACCESSORY INSTALLATION SHOULD BE DONE BEFORE THE MPCB IS MOUNTED AND CONNECTED.

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

1. Make sure that the MPCB is suitable for the installation by comparing nameplate data with system requirements. Inspect the MPCB for completeness, and check for damage before mounting.

⚠ WARNING

BEFORE MOUNTING THE MPCB IN AN ELECTRICAL SYSTEM, MAKE SURE THERE IS NO VOLTAGE PRESENT WHERE WORK IS TO BE PERFORMED. THE VOLTAGES IN ENERGIZED EQUIPMENT CAN CAUSE INJURY OR DEATH.

2. Depending on the equipment configuration, the MPCB can be mounted using different styles of hardware. The following steps describe how to mount the MPCB using standard hardware. When special hardware is needed, for example with the electrical operator, the instruction leaflet describing the accessory also describes the special mounting arrangements.

NOTICE

BEFORE MOUNTING THE MPCB, CHECK IF THE TERMINATION DEVICES SHOULD BE INSTALLED FIRST. SEE THE TERMINATIONS INSTRUCTIONS.

3. To mount the MPCB, perform the following steps:

   A. For individual mounting panels, make sure that mounting panel is predrilled using bolt drilling plan (see Figure 2). For panelboard mounting, only the load end support mounting holes are required. For deadfront cover applications, make sure the panel cover is cut out to the correct escutcheon dimensions (see Figure 3).

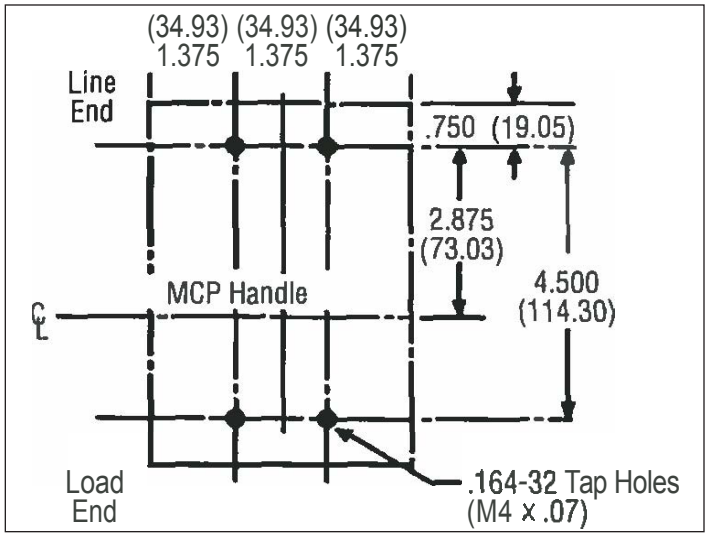

Figure 2. MPCB Mounting Bolt Drilling Plan.

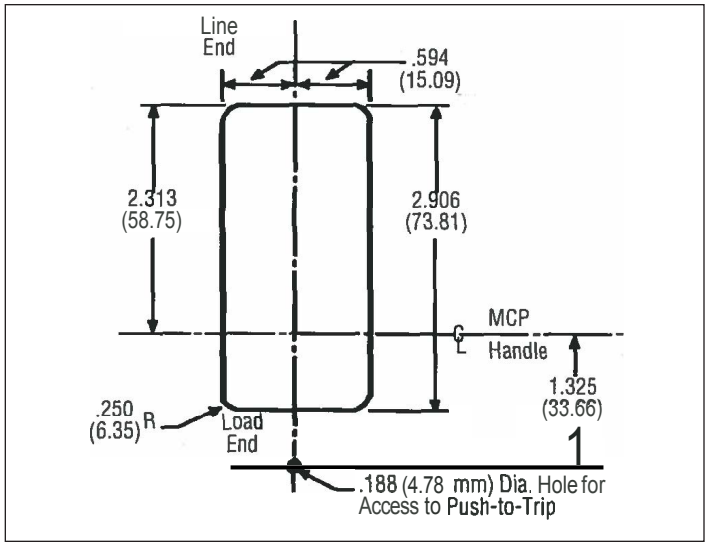

Figure 3. MPCB Escutcheon Dimensions.

B. If the MPCB includes factory installed internal accessories, make sure the accessory wiring can be reached when the MPCB is mounted

C. Position the MPCB on the mounting surface.

D. Install the mounting screws, washers, and nuts. Tighten the screws firmly, but do not exceed 28 pound-inches (3.16 N.m).

4. If an optional terminal end cover is to be installed with the MPCB (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 NUISANCE TRIPPING AND DAMAGE TO THE MPCB.

5. After mounting the MPCB, line and load terminals and accessory leads should be connected (see the Accessory Schematic Diagram on the side of the MPCB).

NOTICE

IF A TERMINAL SHIELD OR INTERPHASE BARRIERS ARE TO BE INSTALLED ON THE MPCB, INSTALL THEM AFTER THE TERMINALS ARE CONNECTED.

6. If required, install the terminal shield on MPCB cover with mounting screws provided.

7. If required, install an interphase barrier by sliding the barrier into the dovetail grooves between terminals.

8. After the MPCB is installed, check all mounting hardware and terminal connecting hardware for correct torque loading. Torque values for line/load terminals are given in Tables 1, 2, and 3.

Table 1. Terminal Types.

Terminal Catalog Number	Terminal Body Material	Screw Head Type	AWG Wire Range	Metric Wire Range	Wire Type	Torque Value lb.in. (N.m)
3TA225FD[1]	Aluminum	3/16 Socket Hex	#4 - 4/0	25 - 95	Cu/Al	120 (13.6)
3TA225FDM[1]	Aluminum	5 mm Socket Hex	#4 - 4/0	25 - 95	Cu/Al	120 (13.6)
3TA225FDK[1, 2]	Aluminum	5/16 Socket Hex	#6 - 300	16 - 150	Cu/Al	275 (31)
3TA100FD[1]	Aluminum	Slotted	#14 - 1/0	2.5 - 50	Cu/Al	See Table 2
3TA50FB[1]	Aluminum	Slotted	#l4 - #4	2.5 - 16	Cu/Al	See Table 2
3T100FB[1]	Steel	Slotted	#14 – 1/0	2.5 - 50	Cu/Al	See Table 2
3T150FB[1]	Stainless Steel	Slotted	#4 – 4/0	25 - 95	Cu Only	See Table 2

Note: Terminal wire connectors are UL listed for standard wire size as defined in UL 486A and UL 486B.
1 Package of three.
2 Individual terminal identified as TA225FD1.

Table 2. Terminal Torque Values for Slotted Head

Metric Wire Range	Torque Value (N.m)	AWG Wire Range	Torque Value lb.in.
2.5 – 6	3.96	#14 - #10	35
10	4.52	#8	40
16 – 25	5.09	#6 - #4	45
35 - 95	5.65	#3 – 4/0	50

Table 3. Bolted Connections (Keeper Nut or End Cap).

Termination Catalog Number	Screw Head Type	Nut Thread Size	Torque Value lb.in (N.m)
KPR1A/KPR1AM	User Supplied	10-32/M5	35 (4.0)
KPEKxxx	Slotted	10-32/M5	35 (4.0)

3 Manual Operation

Manual operation of the MPCB is controlled by the handle and the PUSH-TO-TRIP button. The MPCB has three indicated handle positions, two of which are shown on the cover with raised lettering to indicate ON and OFF. The sliding handle barrier has color-coded indicators red for ON, green for OFF, and white for TRIPPED as well as the international symbols I/0 for ON and OFF (see Figure 4).

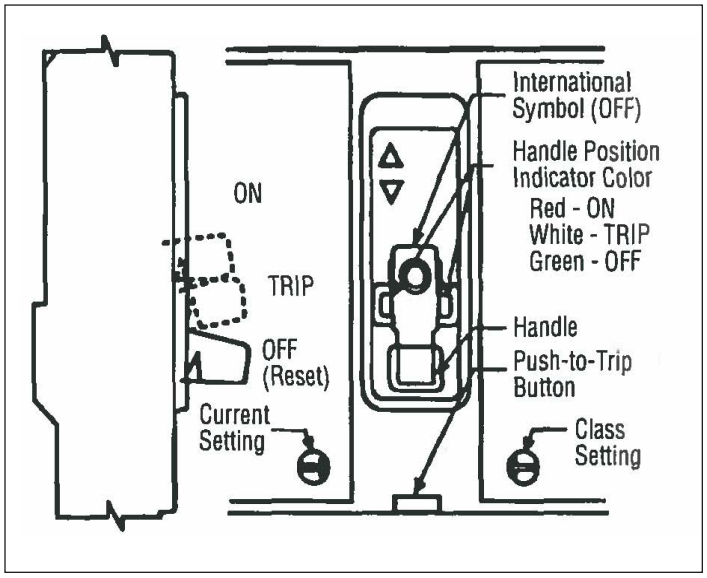

Figure 4. MPCB Manual Controls.

3.1 MPCB Reset

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

NOTICE

IN THE EVENT OF AN OVERLOAD TRIP, WAIT TWO MINUTES BEFORE SWITCHING TO ON. THE WAIT WILL CLEAR A DESIGNED THERMAL DELAY.

3.2 Push-To-Trip

The Push-To-Trip button checks the tripping function and is used to periodically exercise the operating mechanism.

4 Inspection and Field Testing

Series C MPCBs are designed to provide years of almost maintenance-free operation. The following procedure describes how to inspect and test an MPCB in service.

4.1 Inspection

MPCB in service should be inspected periodically. The inspection should include the following checks in Steps 1 through 7 in this section.

⚠ WARNING

BEFORE INSPECTING THE MPCB IN AN ELECTRICAL SYSTEM, MAKE SURE THE MPCB IS SWITCHED TO THE OFF POSITION AND THERE IS NO VOLTAGE PRESENT WHERE WORK IS TO BE PERFORMED. SPECIAL ATTENTION SHOULD BE PAID TO REVERSE FEED APPLICATIONS TO ENSURE NO VOLTAGE IS PRESENT. THE VOLTAGES IN ENERGIZED EQUIPMENT CAN CAUSE INJURY OR DEATH

⚠ CAUTION

MAKE SURE THAT CLEANING AGENTS OR SOLVENTS USED TO CLEAN THE MPCB ARE SUITABLE FOR THE JOB. SOME COMMERCIAL CLEANING AGENTS WILL DAMAGE THE NAMEPLATES OR MOLDED PARTS.

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

2. Switch the MPCB 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 the MPCB.

3. Press the Trip-To-Push button to mechanically trip the MPCB. Trip, reset, and switch the MPCB ON several times. If the mechanism does not reset each time the MPCB is tripped, replace the MPCB.

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

5. Check the 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 re-energizing the MPCB, all terminations and cables should be refurbished to the condition when originally installed.

6. Check the MPCB mounting hardware. Tighten if necessary.

7. Check the area where the MPCB is installed for any safety hazards, including personal safety and fire hazards. Exposure to certain types of chemical can cause deterioration of electrical connections.

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The instructions for installation, testing, maintenance, or repair herein are provided for the use of the product in general commercial applications and may not be appropriate for use in nuclear applications. Additional instructions may be available upon specific request to replace, amend, or supplement these instructions to qualify them for use with the product in safety-related applications in a nuclear facility.

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