Molded Case Circuit Breakers

Motor Circuit Protectors and High Efficiency Motors
Technical Data

Effective: October 2006

Eaton Series C and Series G motor circuit protectors (HMCP) are specifically engineered to deliver higher interrupting ratings and greater application flexibility. These breakers incorporate the design technology found in Series C and Series G molded case circuit breakers and offer selective motor circuit protection over a wide application range, previously requiring physically larger devices and/or current limiter attachments. HMCP breakers are instantaneous (magnetic) trip only, as opposed to standard molded case circuit breakers that are thermal-magnetic.

High efficiency motors can have a high peak current spike on the first half cycle during startup. This peak can be over 18 times normal full load motor current. Since this spike is of short duration, it is not easily measured by normal instrumentation. A shunt resistor in the circuit and an oscilloscope to measure voltage across the resistor are needed to measure the current spike. An HMCP set to trip at 13 times the motor full load current will trip when such a current spike occurs. This large current spike does not always occur, because its value is dependent on the voltage phase angle, rotor position, and motor loading when voltage is applied to the motor.

The NEC has a requirement that the limits the maximum trip setting to 13 times normal full load current. Article 430.51 (3) Exception No. 1 of the National electric Code (2005) allows the trip setting to be as high as 17 times the full load motor current for Design B energy-efficient motors.

To set an HMCP for maximum protection, select the lowest trip setting that does not trip during motor startup. In some cases the resulting HMCP setting may be above the NEC recommended maximum value, but the tripping tolerance for the HMCP standard allows –20% tolerance, which may result in a higher required nominal HMCP trip setting for some applications.

Note: When ordering Eaton Cutler-Hammer Series C motor circuit protectors, a “Special Note” suffix of 11 can be added to the end of the catalog number and order notes would specify special trip unit calibration. For example – On a K-frame HMCP400W5C11 - Calibrate 2500 A to the high side +20% tolerance. This is not necessary for every order, just an option for those on the border.

Time Current Curves: For HMCP time current curves, the following are available for download from www.eatonelectrical.com.

MCP Type	Time Current Curve Pub #
Series C	
GMCP	AD29167
HMCP 150, 250, 400, 600 A	AD29167
HMCP 800 ampere	TC01209008E
HMCP 1200 ampere	TC01209007E

MCP Type	Time Current Curve Pub #
Series G	
HMCPE	TC01203007E
HMCPJ	TC01204002E

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Printed in USA
Publication No. AP01211001E
October 2006