

Technical

Reference Guide

General

In the application of fusible switches and circuit breakers, consideration should be given to the following factors:

1. Voltage of circuit.
2. Ampacity of circuit.
3. Frequency of power source.
4. Operating conditions.
5. Fault current available.

Voltage of Circuit — The system voltage should not exceed the listed voltage rating of the circuit breaker, fuse or switch.

Ampacity of Circuit — The listed continuous current rating of the fuse or circuit breaker should not exceed the allowable ampacity of the conductors. Where the allowable ampacity of the conductor does not correspond to listed current ratings for fuses or circuit breakers, the next larger rating of fuse or circuit breaker is permitted providing it does not exceed the conductor ampacity by more than 25%. An exception to this rule is permitted for motor circuits or other circuits where high inrush currents may persist for an appreciable time.

Frequency of Power Source — Circuit breakers and fusible switches are calibrated for use on direct current or 48–68-Hertz alternating current. For frequencies above 62-Hertz, some fuses, switches and circuit breakers must be derated. The derating varies with each type and size of protective device. Consult your local representative for specific information.

Operating Conditions — Molded case circuit breakers and fuses are calibrated without any enclosure as specified by the Underwriters' Laboratories, Inc. Sound engineering practice dictates that continuous loads should not exceed 80% of the breaker or fuse current rating for most types of enclosures.

Electrical Connections — Molded Case Circuit Breakers are to be connected with 60 or 75°C wire for breakers having a rated ampacity of 125 amperes or less. For circuit breakers having a rated ampacity greater 125 amperes, only 75°C cable shall be used unless otherwise indicated on the circuit breaker label.

Note: Exceptions to this rule are outlined in Article 110-14-C(1) and C(2) of the 2002 National Electric Code.

Conductors should be derated in accordance with the National Electrical Code for both ambient temperature and continuous loading. Table 2 on page 8-3 lists the correction factors to be applied to the allowable current-carrying capacities of conductors for application in temperatures above 30°C. Conductors which are loaded continuously should be derated to 80% of their allowable current-carrying capacity except when supplied by an assembly including its overcurrent device that is listed for continuous operation at 100% of its rating.

When the type of load is unusual, intermittent, or one which involves momentary peak currents such as motor

loads, consideration should be given to the heating effect on the protective device over a period of time. The duty cycle of a motor which is started and stopped frequently may require a circuit breaker or fuses with a higher rating than an infrequently started motor.

The presence of excessive dust, moisture, corrosive fumes, or explosive atmosphere requires the use of enclosures suitable for such atmospheres. For applications in regions where fungus growth may occur, some circuit breakers should be treated with a fungus and moisture resistant material.

Fault Current Available — The interrupting rating of the circuit breaker or fused switch should be greater than the available short circuit current at the point of application. The short circuit current from some power sources, such as engine driven generators, is limited, and the protective device characteristics should be selected to clear such faults without delay.

Some systems require a study of protective device characteristics to assure proper protection and coordination for any possible value of fault current. Your representative is available to assist in making coordination studies.