

Medium Voltage Motor Protection

Fuse Application Guidelines

The guidelines for applying R-Rated fuses are significantly different from those applying to low voltage motor fuses. This is because R-Rated fuses are back-up fuses which are intended to provide short circuit protection only for medium voltage starters and motors.

An R-Rated fuse is not designed to protect itself or other circuit components against long term overloads. This is why these fuses are given an R rating, and not an ampere rating. An R-Rated fuse will safely interrupt any current between its minimum interrupting rating and its maximum interrupting rating. The minimum interrupting rating is verified during UL tests for UL component recognition.

R-Rated fuses must be applied in combination with an overload relay and a contactor. The time current characteristics of the fuse and overload relay should be matched so that the contactor interrupts currents below the fuse's minimum interrupting rating while the fuse interrupts fault currents, thus easing duty on the contactor and extending the interrupting ability of the controller.

A medium voltage starter is usually engineered for a specific motor and application. For this reason the starter manufacturer selects the proper fuse R rating and provides the fuses as part of the starter package. Unless the user has good reason, no deviation should be made from the R rating recommended by the starter manufacturer. If the user has an existing starter which is to be applied to a new or different motor, the application should be reviewed with the starter manufacturer. Recalibration of the overload relay(s) or fuses of a different R rating may be required.

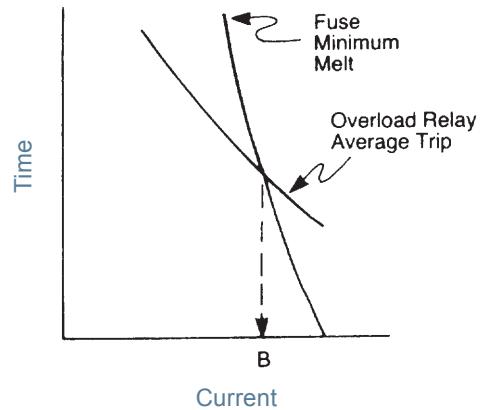
Properly sized R-Rated fuses should provide a service life approaching that of the contactor. If fuse openings are experienced with no faults present, the fuses, overload relay or both may be improperly sized. The table in this section is offered as a guideline and shows the maximum motor full load current appropriate for a given R rating. In addition to this table it is advisable to compare the fuse minimum melt time-current curve and the nominal time-current characteristic curve for the overload relay. These curves should intersect at (B) no less than 120% of motor locked rotor current (see figure). This will assure that the contactor will open before the fuse during locked rotor conditions.

The 10 or 3 Second Start

The 10 or 3 second start listed in the table is a start during which the motor accelerates from standstill to rated speed in 10 (or 3) seconds or less. For reduced voltage starting, motor starting current should not exceed 75% of the fuse minimum melt current for the required motor acceleration time.

Consult the factory for application assistance for ratings above 36R.

Fuse/Overload Relay Crossover Point



Where $B \geq 1.2 \times$ locked rotor amperes

Motor Full Load Currents for R-Rated Fuses*

Fuse R Rating	Max. Motor Full-Load Current For Full Voltage Start - Amperes	
	10 sec. start	3 sec. start
2R	28	32
3R	40	45
4R	55	65
5R	65	75
6R	80	95
9R	125	140
12R	165	190
18R	250	280
24R	330	360
36R	500	550

*Note: Always round up to the next larger R rating.