FACTORS TO CONSIDER WHEN SELECTING OVERCURRENT PROTECTIVE DEVICES FOR ELECTRIC VEHICLE SYSTEMS

1. Fuse/contactor coordination
   For complete protection against all possible overcurrent conditions, EV fuses and contactors must be coordinated and designed together.

2. Selective coordination between upstream and downstream devices
   Selective coordination between auxiliary and primary overcurrent protective devices is of vital importance as the main motor of an electric vehicle is a critical-to-life application.

3. Cylindric loading
   Fuses should always be sized properly to carry the Root Mean Square load of an electrical system, and the pulse profile (magnitude and duration) of a typical electrical load. With electric vehicles, fuses should also be tested and verified to handle a wide range of driving profiles. This can be accomplished through durability testing and simulation analysis.

4. Available fault current
   As the range and performance of electric vehicles continue to increase, so does the size of vehicle batteries and, similarly, the available fault current.

   To ensure safe operation, the maximum interrupting rating of the overcurrent protective device must be greater or equal to the maximum fault current that the battery can produce.

5. Electrical connections and conductor size
   The fuse/conductor interface must be optimized to quickly dissipate heat during high current pulses. Sizing the conductor properly and maximizing the cross sectional area of the fuse/conductor interface can help achieve this.

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