



Minimum Melting Time-Current Characteristic Curves

SMD® Fuse Units—S&C Very Slow Speed

BASIS—These fuse units are tested in accordance with the procedures described in IEEE Standard C37.41, and they are rated to comply with IEEE Standard C37.46. As required by these standards, the minimum melting current is not less than 200% of fuse-unit ampere rating, and the minimum melting curves are based on tests starting with the fuse unit at an ambient temperature of 25°C (77°F) and no initial load.

CONSTRUCTION—Fusible elements are silver, helically coiled, and of soldered construction.

TOLERANCES—Curves are plotted to minimum test points. Maximum variances expressed in current values are plus 10%.

APPLICATION—S&C Very Slow Speed fuse units are for application in circuits where additional time margin in the “protected” fuse is necessary for coordination, but where load conditions do not require fuses of a larger rating.

Like all high-voltage fuses, these fuse units are intended to accommodate overloads, not interrupt them. Accordingly, they feature fusible elements which are designed with a minimum melting current of 200% of the fuse-unit ampere rating (for fuse units rated 100 amperes or less) or 220% of the fuse-unit ampere rating (for fuse units rated over 100 amperes). As a result, these fuse units have considerable peak-load capabilities; however, they should never be exposed to loading in excess of the peak-load capabilities listed in S&C Information Bulletin 210-190.

Because these fuse units have a silver element construction that is not subject to damage by aging or transitional overcurrents, it is unnecessary to replace unblown fuse units in single-phase or three-phase installation when one or more fuse units has blown.

COORDINATION—Any preloading reduces melting time. While this phenomenon is especially pronounced in other makes of fuses, by having minimum melting currents appreciably less than 200% of rating, the effect of preloading must nonetheless be determined for the S&C fuse units represented by these curves (see S&C Information Bulletin 210-190) and adjustment to these curves must be made:

- When close coordination is required
- When, regardless of the preciseness of coordination, the fuse unit is subjected to temporary overloads

There are cases where the coordination requirements may be very exacting, for example, in coordinating a transformer primary fuse with a secondary breaker and a source-side breaker. The time involved between the operating characteristics of the two breakers may be very narrow. Under these circumstances, there must be an extremely short time interval between the minimum melting and the total clearing characteristics of the fuse.

The fuse units represented by these curves possess this short time interval feature because—having a nonmanageable fusible element of precise construction—they require:

- As little as 10% total tolerance in melting current—compared to the 20% tolerance of many fuses (20% and 40% respectively in forms of time)
- No “safety-zone” or setback allowances

This narrow time band normally will provide the desired coordination. If a selected S&C Very Slow Speed fuse unit does not meet the coordination requirements, the selection of another ampere rating for either the protecting or protected fuse usually will satisfy.

Do not assume other fuses that do not use S&C’s silver helically coiled fusible element construction can better resolve a coordination impasse than the use of another ampere rating in one of the S&C speed options. Such other fuses, including “time-lag” speeds, “super-slow” speeds and “high-surge” speeds, require the use of “safety-zone” or setback allowances, and they have larger construction tolerances (plus 20% in current; plus 40% in terms of time). The application of these two factors will give a time interval between the adjusted minimum melting curve and the total clearing curve greater than in the case of the S&C speed options.

Fuse Units Available		
Type	Nom. Ratings (kV)	Ampere Ratings
SMD-1A	34.5 through 69	50E through 200E
SMD-1A	115/138	50E through 100E
SMD-2B	69.6 through 138	50E through 250E
SMD-2C★	34.5 and 46	50E through 250E
SMD-3★	69	50E through 250E

★ These curves are also applicable to previous designs designated SMD-2B and SMD-2C.

