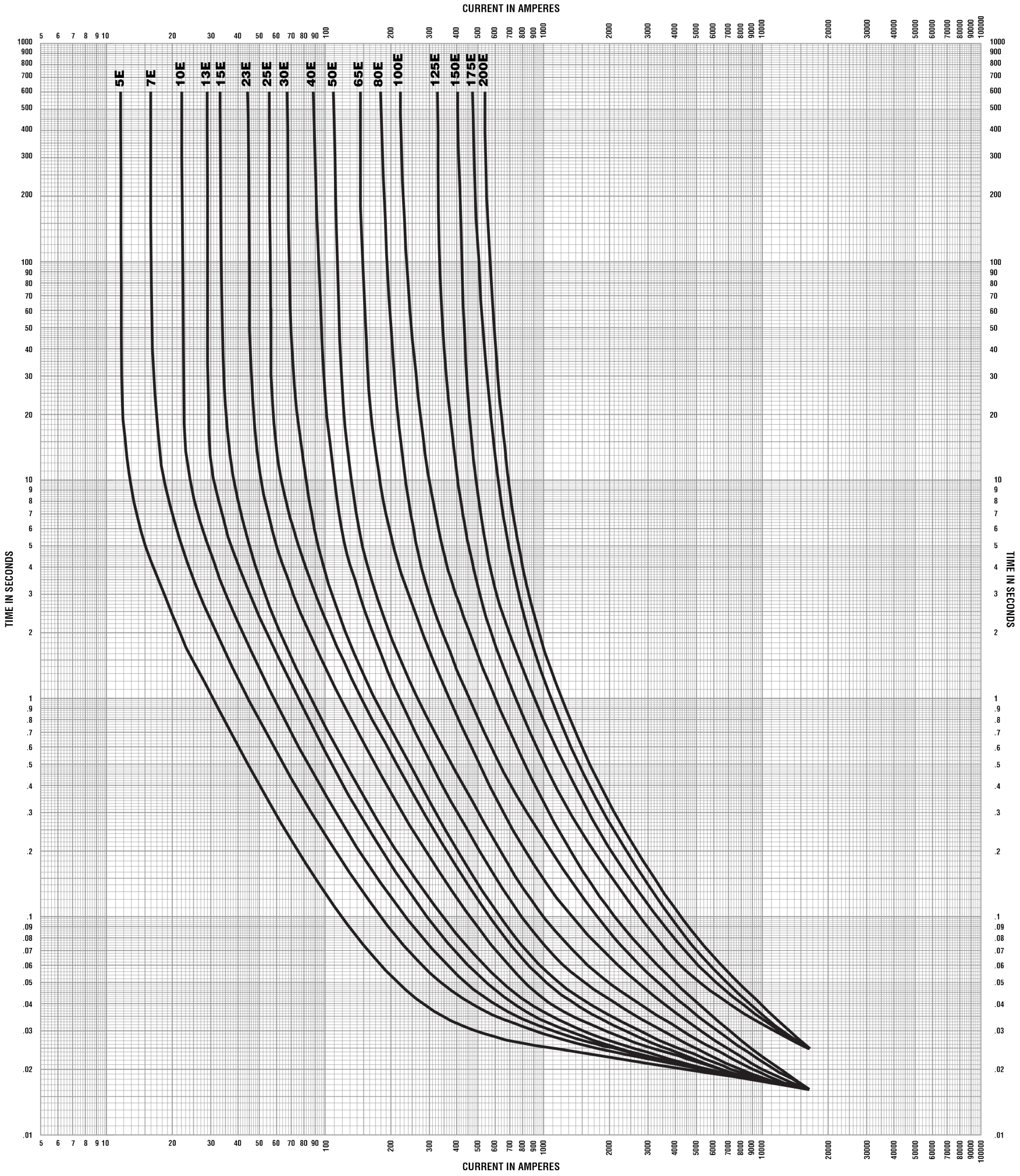

Total Clearing Time–Current Characteristic Curves

SMU Fuse Units–S&C Standard 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 and total clearing 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 for fuse units rated 5E and 7E amperes are nickel-chrome and under controlled tension; fusible elements for fuse units rated 10E through 200E amperes are silver and helically coiled. All are of solderless construction.

TOLERANCES–Curves are plotted to maximum test points. All variations are minus.

APPLICATION–As with all high-voltage fuses, these fuse units are intended to accommodate overloads, not to interrupt them. Accordingly, they feature fusible elements designed with a minimum melting current of 200% of the fuse-unit ampere rating (for fuse units rated 100 amperes or less) or 240% 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 242-190.

Because fuse units having nickel-chrome or silver element construction are not subject to damage by aging or transient overcurrents, it is unnecessary to replace unblown fuse units of either of these constructions in single-phase or three-phase installations when one or more fuse units has blown.

COORDINATION–These curves represent the total time required for a fuse unit to melt and interrupt a fault current, and they should be followed in coordination problems where fuses are applied as "protecting" devices.

Any preloading reduces melting time. With respect to the "protected" fuse, the effect of preloading must be determined and adjustments made to its minimum melting curve when:

- Close coordination is required
- Regardless of the preciseness of coordination, the protected fuse 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 interval 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 nondamageable 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 terms of time)
- No "safety-zone" or setback allowances

This narrow time band normally will provide the desired coordination. If the selected S&C Standard 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 S&C speed options.

FUSE UNITS AVAILABLE

Fuse Unit	kV Nom. Ratings	Ampere Ratings
SMU-20®	25 and 34.5	5E through 200E

© S&C Electric Company 1984–2019, all rights reserved