TOTAL CLEARING TIME-CURRENT CHARACTERISTIC CURVES

SM REFILL UNITS—S&C STANDARD SPEED

Basis—These refill units are tested in accordance with the procedures described in ANSI Standard C37.46-1981. As required by these standards, the minimum melting current is not less than 200% of refill-unit amperes rating, and the minimum melting and total clearing times are based on tests starting with the refill unit at an ambient temperature of 25°C and no initial load.

Construction—Fusible elements for refill units rated 3E through 7E amperes are nickel-chrome, under controlled tension; fusible elements for refill units rated 10E through 400E amperes are silver, helically coiled. All are of subberene construction.

Tolerances—Curves are plotted to maximum test points. All variances are minus.

Application—Like all high-voltage fuses, these refill units are intended to accommodate overloads, not to interrupt them. Accordingly, these refill units are designed with a minimum melting current of 200% of the refill-unit amperes rating (for refill units rated 100 amperes or less) or 220% of the refill-unit amperes rating (for refill units rated over 100 amperes). As a result, these refill units have considerable peak-load capabilities; however, they should never be exposed to loading in excess of the peak-load rating for either the protecting or protected fuse, unless the minimum melting current of 200% of the refill-unit amperes rating (for refill units rated over 100 amperes) or 220% of the refill-unit amperes rating (for refill units rated 100 amperes or less) is used.

These constructions in single-phase or three-phase installations are not subject to damage by aging or transient overvoltages if they are operated within the limits specified above. However, in any installation in which the same refill unit is subjected to temporary overloads, it is unnecessary to replace unfused refill units of either of these constructions if they are protected by fuses that are designed to accommodate overloads.

Coordination—These curves represent the total time required for a refill unit to melt and interrupt a fault current, and should be followed in coordination problems where fuses are applied as “protecting” devices.

Any preblowing reduces melting time. With respect to the “protected” fuse, the effect of preblowing must be determined and adjustments made to its minimum melting curve:
1. When close coordination is required.
2. When, 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 breaker 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 refill units represented by these curves possess this short time interval feature, since—having a nondamagable fusible element of precise construction—they require:
1. As little as 10% tolerance in melting current—compared to the 20% tolerance of many fuses (20% and 40% respectively in terms of time).
2. No “safety-zone” or setback allowances.

This narrow time band normally will provide the desired coordination. If the selected S&C Standard Speed refill unit does not meet the coordination requirements, the selection of another amperes rating for either the protecting or protected fuse usually will suffice.

Do not assume that other fuses that do not employ S&C’s silver, helically coiled fusible element construction can better resolve a coordination impasse than the use of another amperes rating in one of the S&C speed options. Such other fuses, including “time-lag” speed, “super-slow” speed, and “high-surge” speed, require the use of “safety-zone” or setback allowances and, in addition, 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 band normally will provide the desired coordination. If the selected S&C Standard Speed refill unit does not meet the coordination requirements, the selection of another amperes rating for either the protecting or protected fuse usually will suffice.

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