

S&C Positrol® Fuse Links . . .

bring out the best in your
distribution cutouts



enia
energy networks & industrial applications

Αποστολοπούλου 59B
15231 Χαλάνδρι
Τηλ: 210 6754801, Fax: 210 6754804
info@enia.gr
www.enia.gr



S&C ELECTRIC COMPANY
Specialists in Electric Power Switching and Protection

Descriptive Bulletin 352-30
April 26, 2004
Supersedes Descriptive Bulletin 352-30 dated 6-26-00 ©2004

Features

On today's power distribution systems, fuse cutouts are assigned an essential role in system and equipment protection. However, a key determinant in any cutout's ability to function properly is the fuse link, and failure of the fuse link to perform as planned can result in fuse miscoordination, nuisance fuse operations (sneakouts), and needless outages. To a utility, that's dollars and cents . . . and not limited merely to the cost of a replacement fuse link. Although use of other makes of fuse links may result in small economies up front, the expense of finding and replacing fuse links that sneak out can cost many times the initial savings. In addition, the low-current fault-interrupting capabilities essential to a reliable fuse are provided not so much by the cutout, but by the fuse link. Proper application of nondamageable S&C Positrol Fuse Links will eliminate nuisance fuse operations and, at the same time, provide reliable protection in the event of a fault within the fuse's zone of protection. The following features of S&C Positrol Fuse Links provide benefits unobtainable in any other make of fuse link.

Nondamageability

S&C Standard Speed, S&C "K" Speed, and S&C "T" Speed Positrol Fuse Links rated 6 amperes through 100 amperes, and S&C "QR" Speed, S&C "DR" Speed, and S&C "N" Speed Positrol Fuse Links rated 10 amperes through 100 amperes employ nickel-chrome or helically coiled silver or silver-copper eutectic fuse elements that are not affected by mechanical shock or vibration, nor by transient surges that may heat the element nearly to the severing point. Consequently, these fuse links are nondamageable—eliminating nuisance fuse operations and providing the permanently accurate time-current characteristics essential to the integrity of carefully engineered system coordination plans. Also, because S&C Positrol Fuse Links are nondamageable, there is no need to replace companion Positrol Fuse Links on suspicion of damage following an adjacent-fuse operation.

Close Tolerance

S&C Positrol Fuse Links incorporating silver or silver-copper eutectic fusible elements have a total melting-current tolerance of 10% within the coordinating range (i.e., melting times less than 10 seconds), compared to the 20% tolerance for tin-element fuse links. The close tolerance is possible because of physical properties inherent to silver and silver-copper eutectic fuse-element materials and, also, because of the meticulous care exercised in the manufacture, handling, and assembly of S&C Positrol Fuse Links. (Fuse-element wire is inspected at S&C using a sophisticated laser micrometer to ensure diametral tolerances as small as 0.0002 inch.) The narrow tolerance band for precision-manufactured S&C Positrol Fuse Links

not only permits closer fusing for improved protection, but also more precise series coordination of fuse links with other fuse links or with reclosers for enhanced service reliability.

Superior Fault-Interrupting Performance

The superior fault-interrupting performance of S&C Positrol Fuse Links—particularly with respect to low-current transformer secondary-side faults—has been conclusively demonstrated in extensive testing performed by S&C with Positrol Fuse Links installed in S&C Type XS Fuse Cutouts as well as cutouts of other manufacturers. In all of these tests, S&C Positrol Fuse Links provided superior performance across the full range of secondary-fault current levels and under realistic transient-recovery-voltage (TRV) conditions. The outstanding fault-interrupting performance of S&C Positrol Fuse Links is attributable to the fuse-link sheath and, with respect to low-current transformer secondary-side faults typically handled by fuse links rated 50 amperes and below, attributable to a special *high-strength* filament-wound fiberglass sheath. The fiberglass sheath is essential in the lower-ampere-rated fuse links because low-current transformer secondary-side faults are not only the most difficult to clear, but also the most frequently experienced. S&C Universal Style Positrol Fuse Links provide unsurpassed secondary-fault performance for applications through 14.4 kV . . . S&C Extra-Performance Style Positrol Fuse Links extend that superior performance to three-phase applications through 24.9 kV, and to single-phase-to-neutral applications through 38 kV.

Styles

S&C Positrol Fuse Links are available in Universal, Extra-Performance, Indicating, and Open Styles. Typical construction features for the Universal Style are illustrated on the facing page. Extra-Performance Style fuse links employ the same basic construction details as the Universal Style, with the exception that these fuse links rated 50 amperes and below make use of a longer filament-wound fiberglass sheath and a stronger bonding adhesive to ensure unexcelled fault-interrupting performance on higher-voltage systems. Extra-Performance Style fuse links rated more than 50 amperes incorporate resin-impregnated sheaths having additional layers of vulcanized-fiber lining to improve fault-interrupting performance in 27-kV cutouts. All Extra-Performance Style fuse links, and Universal Style fuse links in "N" and "QR" Speeds, have an overall length of 29 inches (737 mm). All other Universal Style fuse links have an overall length of 23 inches (584 mm).

For a complete listing of fuse-link styles, speeds, ampere ratings, and catalog numbers, refer to the table on page 4.

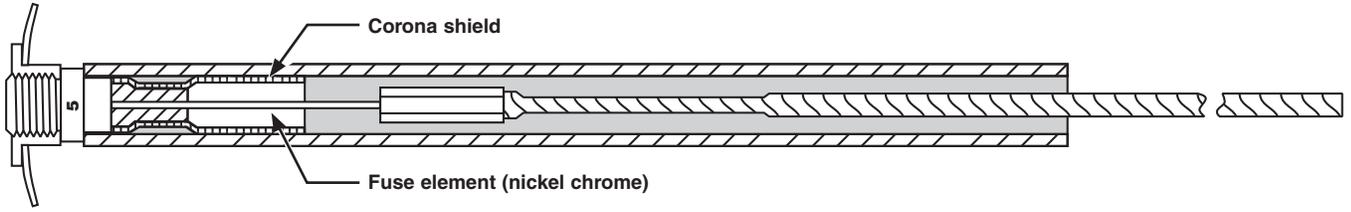


Figure 1. S&C Standard Speed Fuse Links rated less than 6 amperes; S&C “QR” Speed and S&C “N” Speed Fuse Links rated less than 10 amperes

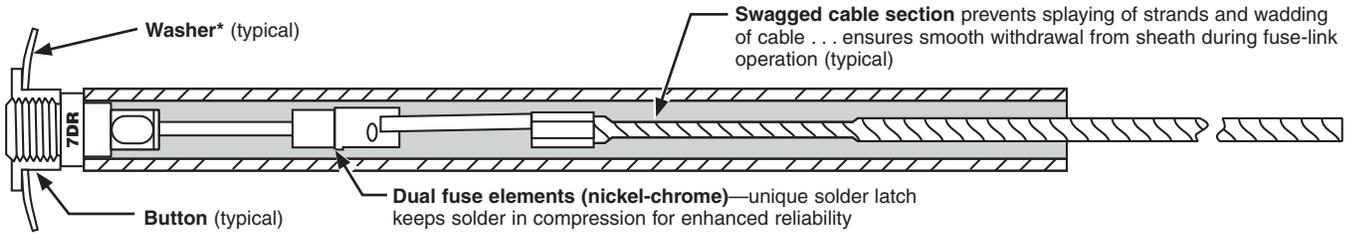


Figure 2. S&C “DR” Speed Fuse Links rated less than 10 amperes

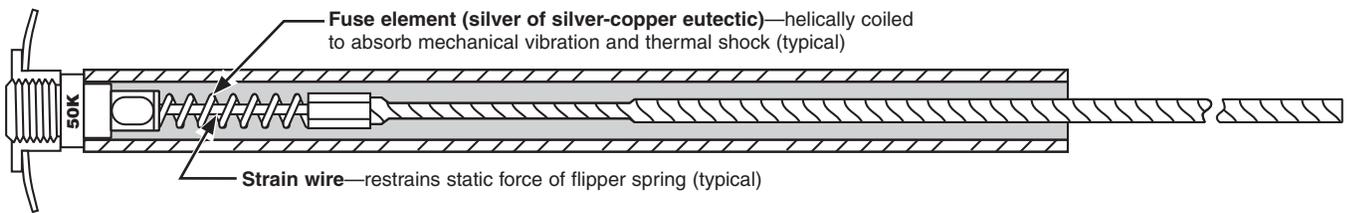


Figure 3. S&C Standard Speed, S&C “K” Speed, and S&C “T” Speed Fuse Links rated 6 amperes through 100 amperes; S&C “QR” Speed, S&C “DR” Speed, and S&C “N” Speed Fuse Links rated 10 amperes through 100 amperes

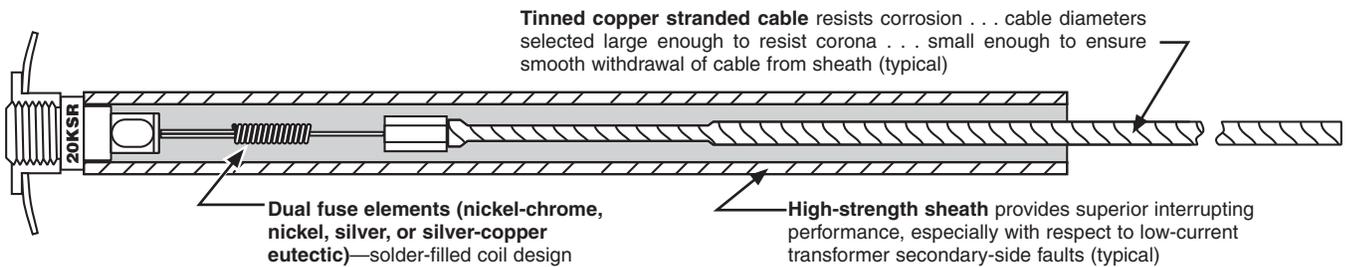


Figure 4. S&C “KSR” Speed Fuse Links rated 3 amperes through 200 amperes

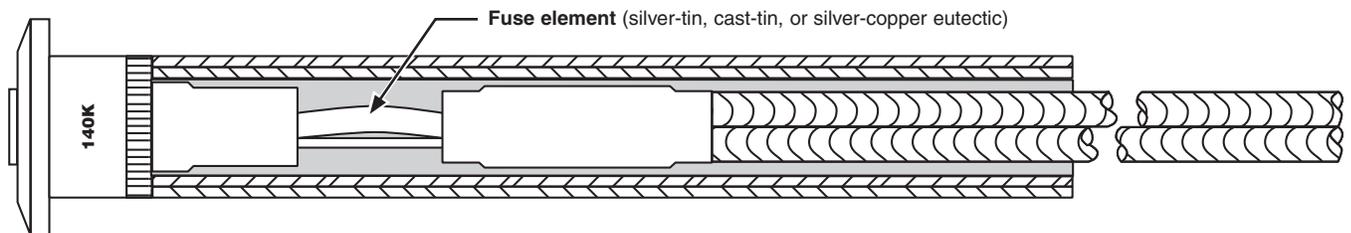
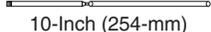


Figure 5. S&C Standard Speed, S&C “K” Speed, S&C “T” Speed, S&C “QR” Speed, S&C “N” Speed, and S&C Coordinating Speed Fuse Links rated greater than 100 amperes

*Not furnished with fuse links rated 60 amperes through 100 amperes.

Style	Speed	Rating, Amperes	Catalog Number ^①
Universal (Not Usable in Positect®)  23-Inch (584-mm) Overall Length	S&C Standard	1 through 100 125 through 200	64xxx 64xxxR1■
	S&C “K”	6K through 100K▲ 140K and 200K	265xxx 265xxxR1■
	S&C “T”	6T through 200T▲	279xxx■
	S&C “KSR” ^④	3 KSR through 200KSR	347xxx■
	S&C “QR” ^{⑤⑥}	1QR through 100QR 125QR through 200QR	338xxx 355xxx■
	S&C “DR” ^⑦	3DR through 20DR	345xxx
	S&C “N” ^{⑤⑥}	5N through 200N	267xxxR3■
	S&C Coordinating	101 through 103	179xxx●
Extra-Performance ^{②③} (Not Usable in Positect®)  29-Inch (737-mm) Overall Length	S&C Standard	1 through 100	334xxx
	S&C “K”	6K through 200K▲	335xxx■
	S&C “T”	6T through 200T▲	336xxx■
	S&C “KSR” ^④	3 KSR through 200KSR	348xxx■
	S&C “QR” ^{⑤⑥}	1QR through 100QR 125QR through 200QR	337xxx 356xxx■
	S&C “DR” ^⑦	3DR through 20DR	346xxx
Universal (Usable in Positect®)  23-Inch (584-mm) Overall Length	S&C Standard	1 through 100	364xxx
Indicating (Usable in Positect® Only)  10-Inch (254-mm) Overall Length	S&C Standard	3 through 100	115xxx
Open  8-Inch (203-mm) Overall Length	S&C Standard	1 through 25	774xx

① The ampere rating of the fuse link is represented in the catalog number by “xxx” (e.g., 1-ampere Standard Speed, Universal Style = 64001, 25-ampere Standard Speed, Universal Style = 64025, 100-ampere Standard Speed, Universal Style = 64100).

② For use only in cutouts rated 27-kV maximum design.

③ Fuse links are the key determinant of a cutout’s ability to interrupt secondary faults and low-magnitude primary faults (in the range of approximately 1000 amperes and below). While S&C Universal Style Positrol Fuse Links provide excellent protection from these types of faults on overhead distribution systems through 14.4 kV, and broad protection under most fault conditions encountered on 24.9-kV systems, S&C Extra-Performance Style Positrol Fuse Links are specially constructed to provide superior protection on 24.9-kV systems against all levels of secondary faults, including those in the low-fault-current range typically experienced with transformers of low kVA ratings. S&C Extra-Performance Style Positrol Fuse Links, further, are suitable for use on 26.4-kV through 34.5-kV systems for protection of single-phase-to-neutral circuits (lines or transformers) only, and grounded-*wye* connected capacitor banks.

④ These fuse links are interchangeable mechanically—and functionally equivalent with respect to time-current characteristics—with Kearney Type “KS” fuse links.

⑤ All S&C “N” and “QR” Speed Universal Fuse Links have a 29-inch (737-mm) overall length.

⑥ These fuse links are interchangeable mechanically—and with respect to time-current characteristics—with Kearney Type “QA” fuse links. For optional cable adapters for use with S&C “QR” Speed Fuse Links, add Suffix “-U” to catalog number of link. This adaptation of the fuse link is for use with cutouts having bolt-type connections for upper as well as lower fuse-link cables. Overall length of all “QR” Speed Positrol Fuse Links equipped with Suffix “-U” cable adapter is 26 inches (660 mm).

⑦ These fuse links are interchangeable mechanically—and functionally equivalent with respect to time-current characteristics—with Cooper Power Systems Type “D” fuse links.

⑧ These fuse links are interchangeable (with respect to time-current characteristics) with discontinued GE Models 9F1C and 9F51AAN series fuse links.

▲ The 1-, 2-, and 3-ampere S&C Standard Speed Positrol Fuse Links meet requirements for coordination with fuse links rated 6K and 6T amperes as specified in ANSI Standard C37.42, and are recommended for use in “K” and “T” Speed fuse-link coordination schemes.

■ Fuse links rated 125-200 Std., 140K, 200K, 140T, 200T, 125KSR-200KSR, 125QR-200QR, and 125N-200N are for use in 200-ampere cutouts.

● For use in 100-ampere cutouts.