Edison fuse links
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COOPER POWER SERIES

Edison tin and silver fuse links

General

Eaton's Cooper Power™ series Edison™ fuse links can be applied to a variety of applications requiring overcurrent protection of distribution systems and equipment. When properly coordinated with other overcurrent protective devices, sectionalizing to isolate faulted feeder branches or equipment can be accomplished. Edison fuse links are manufactured in a variety of styles, link speeds, and voltage ratings to ensure effective system coordination and overcurrent protection. They are available in non-removable buttonhead, and open-link styles.

Edison fuse links are now available in silver as well as tin in select speeds. The silver element is manufactured to very tight tolerances which allows for tighter coordination. Silver fuse links are manufactured to our same exacting standards and controls as our tin links, which have a long history of reliable service. Silver links, with their natural surge durability, are manufactured with a red tube and will sit in any interchangeable cutout.

All Eaton Cooper Power series expulsion fuse link designs have been tested in accordance with IEEE Std C37.41™ and IEEE Std C57.42™ standards, and IEC Standard 60282-2. Data from these tests have been utilized to plot the time current characteristics (TCC) for each fuse rating. Publication of minimum melting and total clearing TCCs certifies compliance with testing fuse links in accordance with these standards.

Edison fuse links

Edison fuse links are manufactured in removable and non-removable buttonhead designs for use in open or enclosed distribution cutouts. Standard links are usable where the system voltage is 27 kV or less. For higher voltages, Edison fuse links are available for systems up to 38 kV.

In addition, Eaton provides open-link (STF) designs for use in open-link style distribution cutouts. A wide variety of open-links are available for system voltage at 15 kV or less. Edison fuse links are available for the higher system voltages through 38 kV.

Production quality assurance

To assure Edison fuse link reliability, all incoming material must pass rigid material specifications. Each completed Edison fuse link must pass a 15 lb. pull strength test (IEEE Std requires 10 lb.) and simultaneously pass a resistance check for element verification and quality of current interchanges.

Edison fuse link selection

Coordination of a power system requires selective operation of the fuse with other protective equipment such as reclosers, sectionalizers, power circuit breakers, and other fuses. All electrical equipment, such as transformers, switches, conductors, and those mentioned above can withstand various levels of current for different intervals of time. This ability is usually shown as a time-current characteristic and, generally, the device will permit high current for a short period of time and low current for longer periods of time without thermal or mechanical damage. Proper coordination and protection can only be accomplished when the system designer has a variety of fuses with a wide range of time current characteristics at his disposal.

The speed ratio (Table 2) of a fuse link design (for fuse links 100 A and below) can be determined by calculating the ratio between the current that melts the fuse in 0.1 second to the current that melts the fuse in 300 seconds. For fuse links rated greater than 100 A, the ratio is calculated between melting currents at 0.1 second and 600 seconds. Refer to Figure 2 for a comparison of minimum melt curves for Types K, T, N and S fuse links.

Current capacity

When properly applied, Edison fuse links can be operated continuously at their current rating. Certain links can be operated at levels higher than rating (see Table 3) without damaging the fusible element. Care must be exercised to assure that the maximum current the Edison fuse link carries does not exceed the continuous current rating of the cutout. It may be possible for the cutout to carry higher continuous current levels than its rating. In these cases, the cutout manufacturer should be consulted.

Additional continuous current-carrying capacity is particularly useful in applications where coordination requires greater load-carrying ability for specific time periods.

The melting characteristics curves of Edison fuse links are determined without preload and at an ambient operating temperature of 25 °C, as specified in IEEE Std C37.41™ standard and IEC 232-2.

Both preload and ambient operating temperatures can affect the melting characteristics of a fuse link.

While many applications can overlook these factors as negligible, they should be considered when the preload on the fuse link is at a high percentage level and/or when the fuse link may be exposed to a high ambient operating temperature.

Eaton application engineers are available to assist in the proper application of Edison fuse links for these operating conditions.

Packaging

All Edison links are packaged in individual bags and then packaged 5 to 25 per box depending on the fuse type and size. See Tables 4, 5, 6, and 7. The bags, as well as the box are marked with Catalog Number, Fuse Link Type, Amp Rating, and Date of Manufacture.

Table 1. Edison fuse link designs

System Rating	Fuse Type	Ampere Rating
27 kV Distribution	K (tin)	1-200
(Open-type cutout)	K (silver)	6-200
	T (tin)	1-200
	T (silver)	6-200
	200 (silver)	1-100
	S	3-200
	H	1-8
	N	2-200
	D	1-20
38 kV Distribution	EK	1-100
(Open-type cutout)	ET	1-100
	EH	1-5
15 kV Distribution	K	6-50
(Open-link cutout)	T	6-50
	H	1-8
	D	1-20

Table 2. Speed ratios*

Edison Fuse Link	Description	Average Speed Ratio
Distribution Systems through 27 kV		
Type K	Fast	6 through 8.1 (meets IEEE standards for a fast fuse)
Type N	Fast	6 through 11 (universal fuse link similar to Type K link)
Type 200	Medium	Medium speed fuse with a speed ratio of 8
Type T	Slow	10 through 13.1 (meets IEEE standards for a slow fuse)
Type H	Very Slow	6 through 18 (high-surge withstand characteristics)
Type D	Very Slow	7 through 46 (high-surge withstand characteristics)
Type S	Very Slow	15 through 20 (high-surge withstand characteristics)
Distribution Systems through 38 kV**		
Type EK	Fast	6 through 8.1
Type ET	Slow	10 through 13.1
Type EH	Very Slow	13 through 22 (high-surge fuse link)

* Figure 3 compares the speed ratio of Type K, Type N, type T, and Type S Edison links.

** Use only in 38 kV rated cutouts without arc shortening rods.

Table 3. Continuous current ratings

Edison fuse link type	Allowable continuous current (% of rating)
K-tin	150
K-silver	100
N	100
H	100
D	100
T-tin	150
T-silver	100
S	100
EK	150
ET	150
EH	100

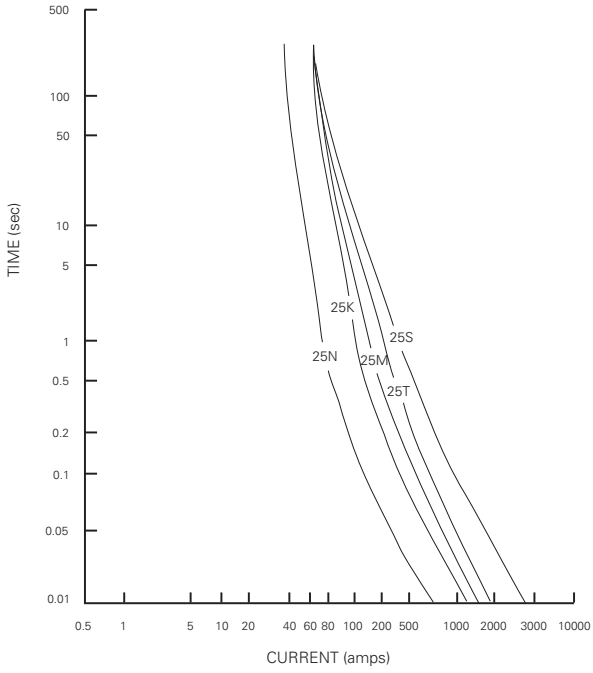

Figure 2. Speed ratio comparisons, typical minimum melt curves Type K, T, N, Type 200(M) and S fuse links.

Edison fuse link designs

Type K Links

Type K links are available with a silver fuse element or tin fuse element. Fuse links with a silver fuse element are available in ratings from 6-200 A in removable and non-removable buttonhead designs. Fuse links with a tin fuse element are available in ratings from 1-200A in the buttonhead design and from 6-50A in the open-link design.

Type T Links

Type T links are available with a silver fuse element or tin fuse element. Fuse links with a silver fuse element are available in ratings from 6-200A in removable and non-removable buttonhead designs. Fuse links with a tin fuse element are available in ratings from 1-200A in buttonhead design and from 6-50A in the open-link design.

Type T links exhibit the same overload characteristics as similarly rated Type K links at the 300- or 600-second points. The time-current characteristics differ below these points. Hence, the T link is slower at the high-current end than the same size K link.

Type 200 Silver

The Type 200 silver link is classified as a medium-speed fuse that is slower than a K link but faster than a T link. The silver Type 200 has high surge durability and good coordination characteristics with many relays and reclosers.

Type H (High Surge) Links

Type H links are manufactured in ratings of 1, 2, 3, 5 and 8 A. Type H high-surge links are designed principally for primary fusing of small distribution transformers. These fuse links are designed specifically to provide the overload protection normally associated with fuse links of 1, 2, 3, 5, and 8 A, yet avoid unnecessary operation during short-time transient current surges such as those resulting from motor starting, lightning, or other causes.

The Type H links are constructed of multiple elements of specially selected alloys. In addition, open link designs are available for use in open link distribution cutouts.

Type D Links

Type D links are multiple-element links of specially designed alloys, and are available in ratings of 1 through 20 A. The D link is similar in design to the H high-surge link except it is slower at the high-current end. The superior surge withstand makes the probability of lightning damage very small, making the D link ideal for protection of small-to medium kVA distribution transformers. The link can be mounted in series and on the source side of the arrester, freeing the arrester for mounting directly on the transformer.

Type N Fuse Links

Type N links are manufactured in ratings of 2-200 A. Type N links conform to applicable IEEE® standards for mechanical interchangeability. They exhibit speed ratios approximately the same as the Type K link.

The Type N link features a tin fuse element.

Type S Links

Type S links are manufactured in ratings of 3-200 A with removable buttonheads. These links exhibit very slow time-current characteristics, making them ideal for protecting equipment from faults and overloads requiring a slow-speed, high-surge application. Type S links coordinate particularly well with reclosers.

Types EH, EK, and ET Links

These Edison fuse links are designed for use on 38 kV distribution systems. Types EH, EK, and ET Edison fuse links are manufactured in a non-removable buttonhead design with ratings from 1-5 A EH, 1-100 A EK and 1-100 A ET. These links exhibit the same time-current characteristics as similarly rated Types H, K, and T Edison fuse links and should only be used in 38 kV rated cutouts without arc shortening rods.

Additional options

Edison fuse links are also available with a number of options including those listed below. Contact your Eaton representative for information on availability and pricing.

Wedge adapter

Provides positive leader termination in distribution fuse cutouts designed with a wedge-type fuse leader connection.

Leader options

26-and 30-in. fuse link lengths and larger-diameter flexible leaders are available.

Construction features

Single element

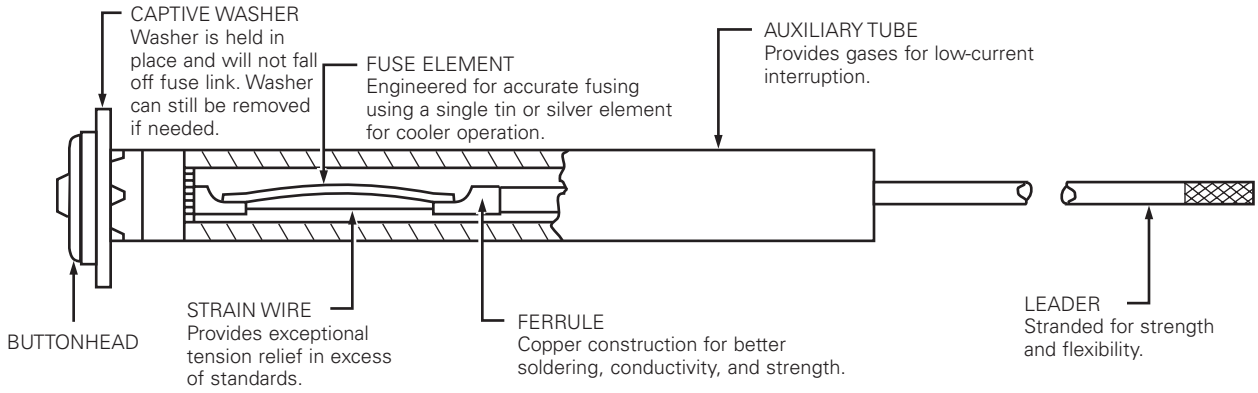

Figure 3. Typical type K, T, N, Type 200 and H (8 A) fuse link construction.

Dual element

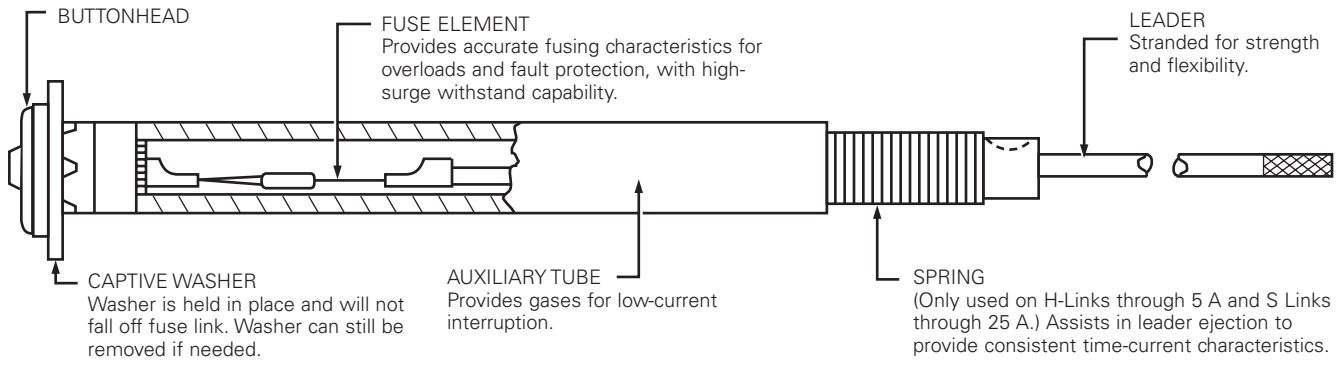

Figure 4. Typical type D, S, and H (1 A through 5 A) fuse link construction.

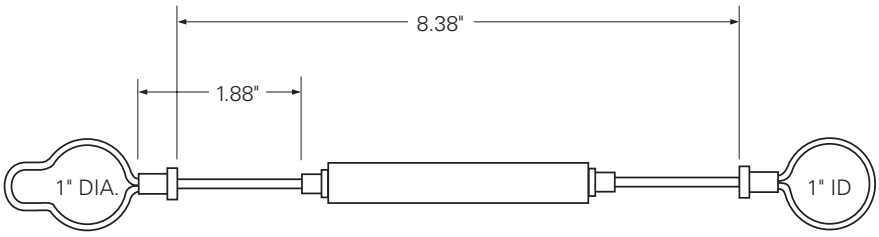

Figure 5. Dimensions of open-link Edison fuse link.

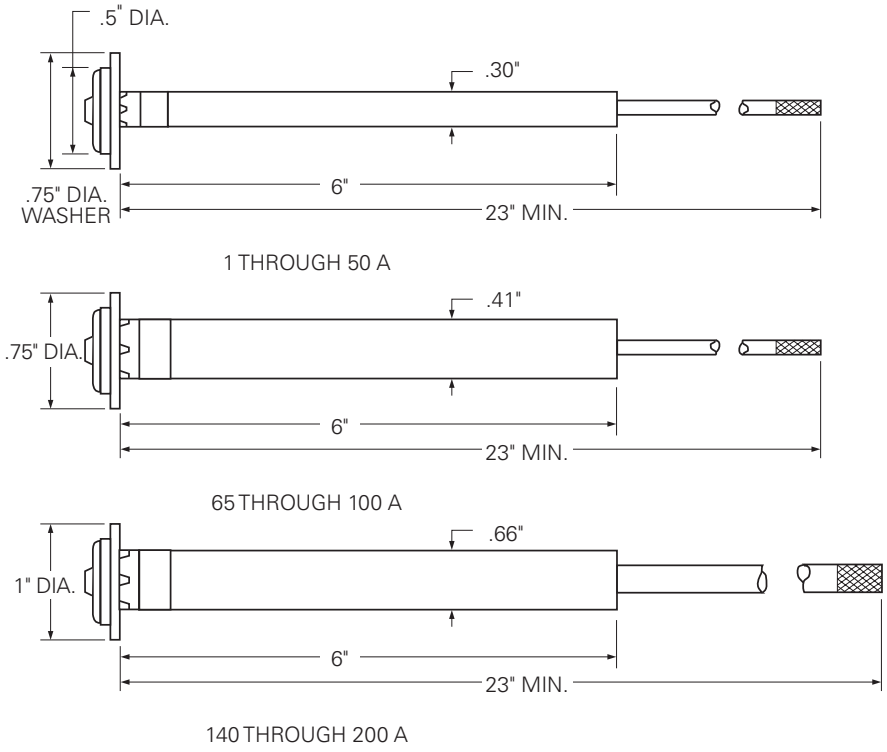

Figure 6. Dimensions of typical Types D, H, K, T, Type 200, N Edison fuse links (Removable buttonhead shown; non-removable buttonhead dimensions are similar).

Ordering and dimensional information

To build a catalog number, add the Edison fuse link ampere rating required to the catalog number listed in Tables 4 through 6. For example: the catalog number for a 25 A Type K open-link Edison fuse link used with a 7.8 kV-rated fuse cutout is FL4K25. (Refer to Table 6.)

Table 4. Removable links rated through 27 kV

Removable buttonhead

Current rating (Amps)	Type H	Type D	Type K (Silver)	Type N	Type S	Type K (Tin)	Type T (Tin)	Type T (Silver)	Type 200 (Silver)	Standard box Qty
1	FL3H1	FL3D1				FL3K1	FL3T1		FL6M1	
1.5		FL3D105								
2	FL3H2	FL3D2		FL3N2		FL3K2	FL3T2		FL6M2	
3	FL3H3	FL3D3			FL2S3	FL3K3	FL3T3		FL6M3	
4		FL3D4								
5	FL3H5	FL3D5		FL3N5	FL2S5	FL3K5	FL3T5		FL6M5	
6			FL6K6			FL3K6	FL3T6	FL6T6		
7		FL3D7		FL3N7	FL2S7				FL6M7	
8	FL3H8		FL6K8	FL3N8		FL3K8	FL3T8	FL6T8		15
10		FL3D10	FL6K10	FL3N10	FL2S10	FL3K10	FL3T10	FL6T10	FL6M10	
12			FL6K12			FL3K12	FL3T12	FL6T12		
15		FL3D15	FL6K15	FL3N15	FL2S15	FL3K15	FL3T15	FL6T15	FL6M15	
20		FL3D20	FL6K20	FL3N20	FL2S20	FL3K20	FL3T20	FL6T20	FL6M20	
25			FL6K25	FL3N25	FL2S25	FL3K25	FL3T25	FL6T25	FL6M25	
30			FL6K30	FL3N30	FL2S30	FL3K30	FL3T30	FL6T30	FL6M30	
40			FL6K40	FL3N40	FL2S40	FL3K40	FL3T40	FL6T40	FL6M40	
50			FL6K50	FL3N50	FL2S50	FL3K50	FL3T50	FL6T50	FL6M50	
60				FL3N60						
65			FL6K65		FL2S65	FL3K65	FL3T65	FL6T65	FL6M65	
75				FL3N75						10
80			FL6K80		FL2S80	FL3K80	FL3T80	FL6T80	FL6M80	
85				FL3N85						
100			FL6K100	FL3N100	FL2S100	FL3K100	FL3T100	FL6T100	FL6M100	
125				FL3N125	FL2S125					
140			FL6K140			FL3K140*	FL3T140*	FL6T140		5
150				FL3N150	FL2S150					
200			FL6K200	FL3N200	FL2S200	FL3K200*	FL3T200*	FL6T200		

Notes:

1. Fuse links listed above are all 23" (584 mm) long. For 26" (660 mm) long fuse links replace digit "3" with 27. Example: FL3K2 is 23" long, FL27K2 is 26" long. Exception: Only available on Type K & T removable buttonhead tin fuse links.
2. For a fuse link with a heavy duty leader replace digit "3" with 26. Example: FL3K2 has a normal duty leader, FL26K2 has a heavy duty leader. Exception: Only available on Type K & T removable buttonhead tin fuse links.
3. For a fuse link with a 23" double leader replace digit "3" with 43. Example: FL3K100 has a single leader, FL43K100 has a double leader. Exception: Only available on Type K & T removable buttonhead tin fuse links.
4. * Fuses are double leaders.