Edison fuse links
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CA132008EN

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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 available in silver and tin in select speeds. The silver element is manufactured to very tight tolerances that allow 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™, IEEE Std C57.42™, and IEC Std 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.

Powering Business Worldwide

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 voltages at 15 kV or less. Edison fuse links are available for the higher system voltages through 38 kV.

Production quality assurance

To ensure 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 their 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 ensure 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 characteristic 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 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 fuse links are packaged in individual bags and then packaged 5 to 25 per box depending on the fuse type and size. See **Table 4** through **Table 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 ①

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 ②		
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)

① **Figure 1** compares the speed ratio of Type K, Type N, Type T, and Type S Edison fuse links.

② Use only in 38 kV rated cutouts with 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

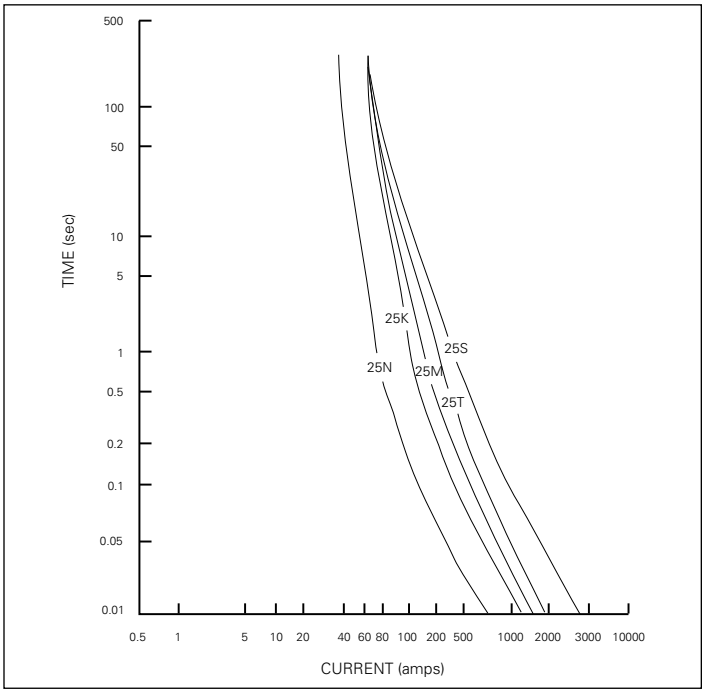

Figure 1. Speed ratio comparisons, typical minimum melt curves Type K, T, N, Type 200(M), and S fuse links

Edison fuse link designs

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

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

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) fuse 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 fuse links

Type D links are multiple-element links of specially designed alloys and are available in ratings of 1 A 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 A to 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 fuse links

Type S links are manufactured in ratings of 3 A to 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 fuse 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 removable buttonhead design with ratings from 1 A to 5 A EH, 1 A to 100 A EK, and 1 A to 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 with 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-inch fuse link lengths and larger-diameter flexible leaders are available.

Construction features

Single element

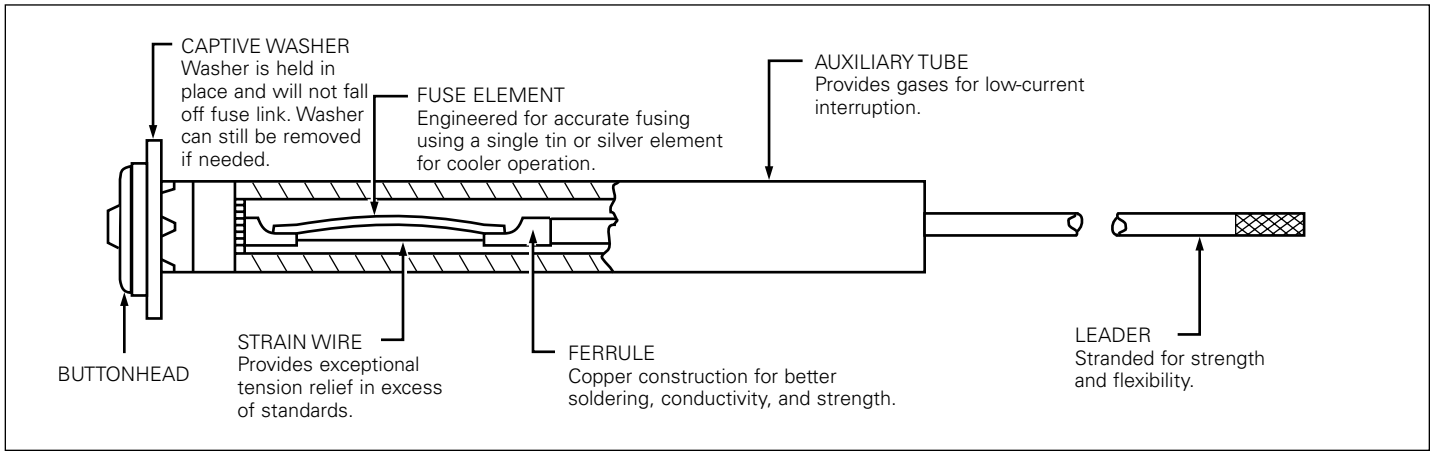

Figure 2. Typical Type K, T, N, Type 200 and H (8 A) fuse link construction

Dual element

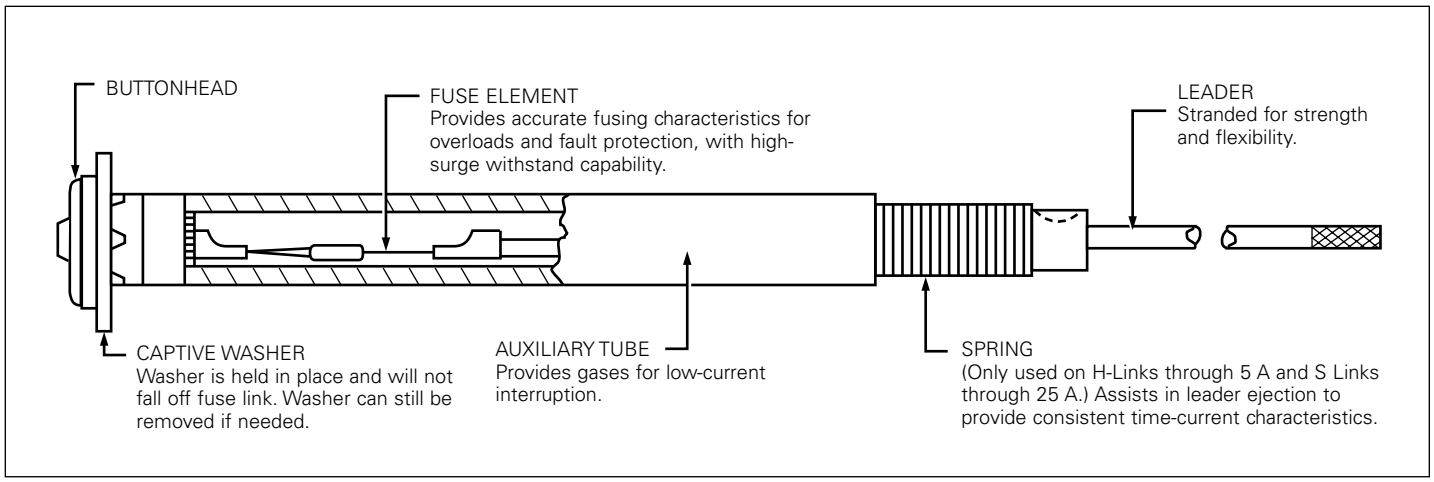

Figure 3. Typical Type D, S, and H (1 A through 5 A) fuse link construction

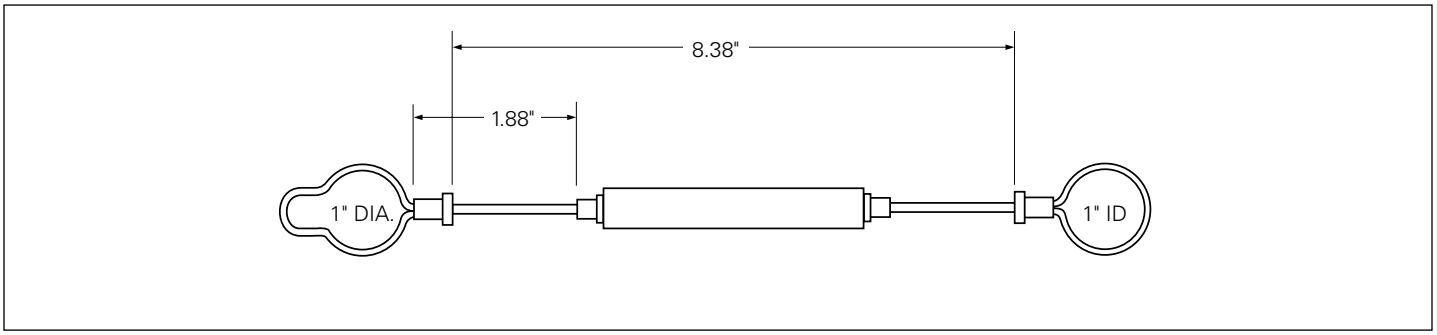

Figure 4. Dimensions of open-link Edison fuse link

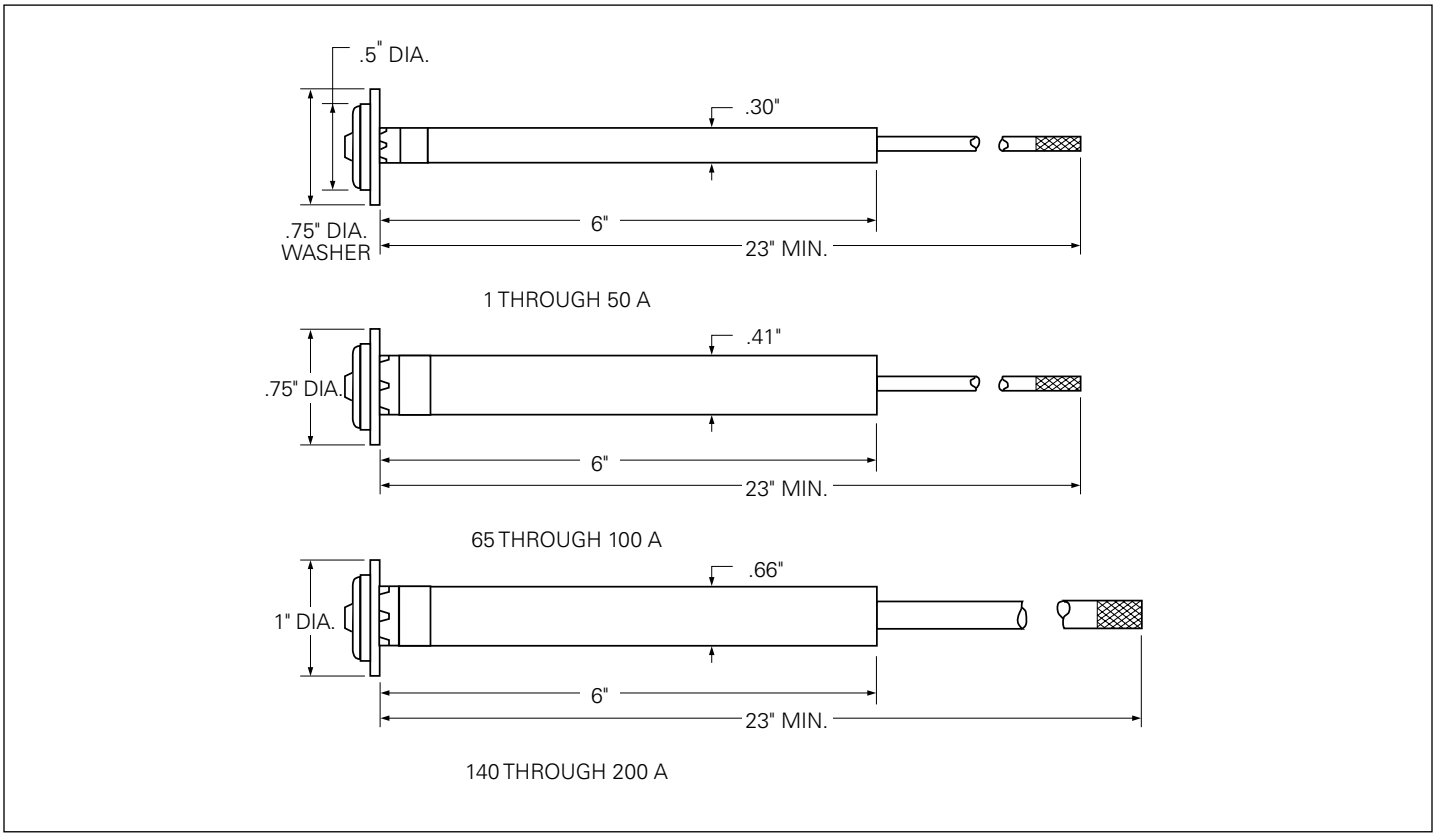

Figure 5. Dimensions of typical Type D, H, K, T, Type 200, N Edison fuse links (removable buttonhead shown; non-removable buttonhead dimensions are similar)

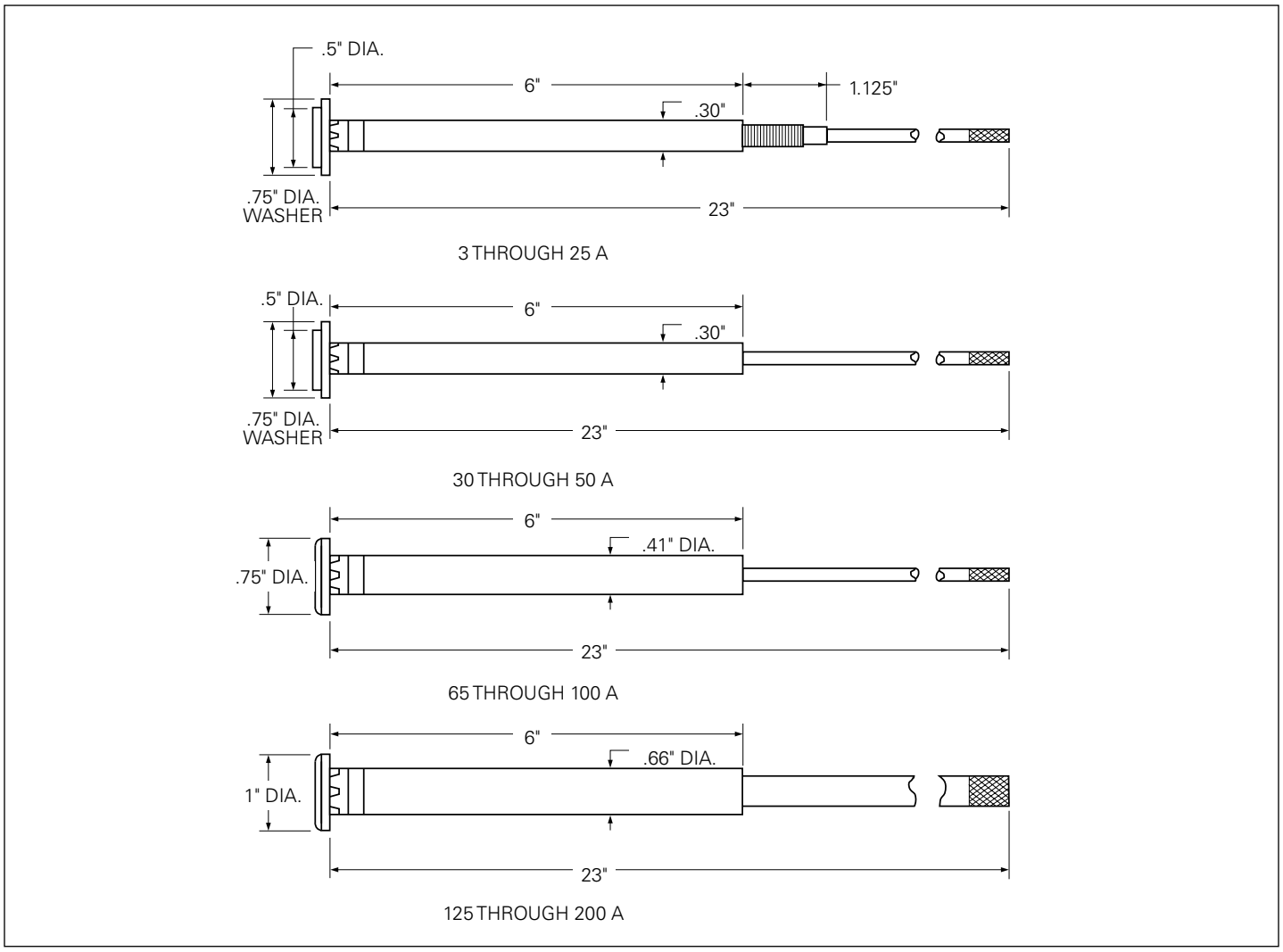

Figure 6. Dimensions of typical Type S Edison fuse links (non-removable buttonhead)

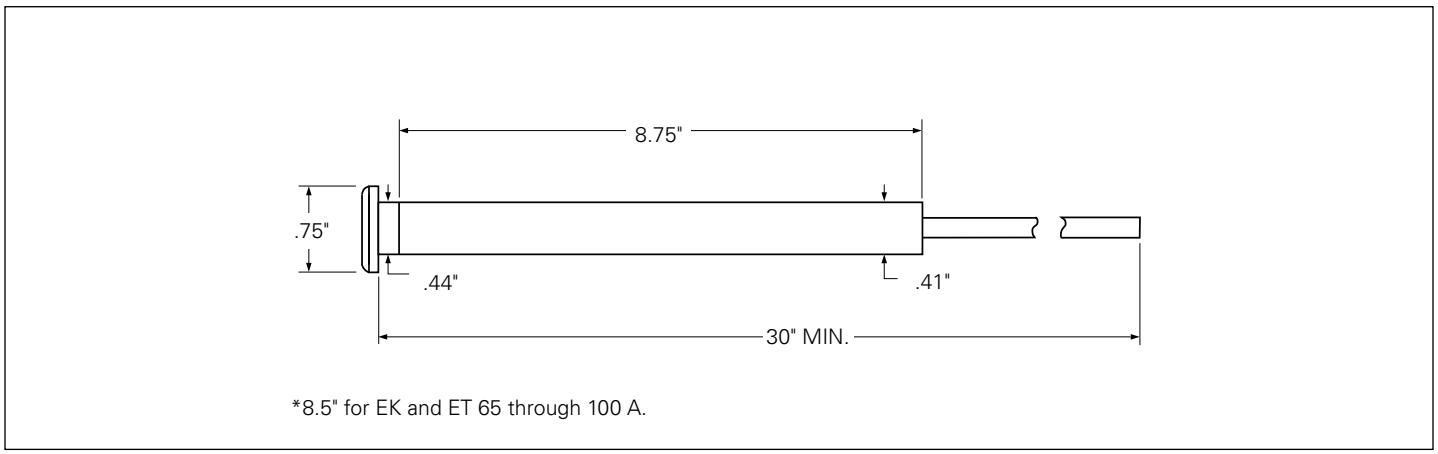

Figure 7. Dimensions for removable buttonhead fuse links for 38 kV distribution systems

Ordering and dimensional information

To build a catalog number, add the Edison fuse link ampere rating required to the catalog number listed in **Table 4** through **Table 7**. 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 7**.)

Table 4. Removable links rated through 27 kV

Removable buttonhead

Current rating (amperes)	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 quantity
1	FL3H1	FL3D1				FL3K1	FL3T1		FL6M1	15
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		
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						10
65			FL6K65		FL2S65	FL3K65	FL3T65	FL6T65	FL6M65	
75				FL3N75						
80			FL6K80		FL2S80	FL3K80	FL3T80	FL6T80	FL6M80	
85				FL3N85						
100			FL6K100	FL3N100	FL2S100	FL3K100	FL3T100	FL6T100	FL6M100	
125				FL3N125	FL2S125					5
140			FL6K140			FL3K140 ①	FL3T140 ①	FL6T140		
150				FL3N150	FL2S150					
200			FL6K200	FL3N200	FL2S200	FL3K200 ①	FL3T200 ①	FL6T200		

① Fuses are double leaders.

Notes:

Fuse links listed above are all 23 inches (584 mm) long. For 26-inch-long (660 mm) fuse links, replace digit 3 with 27. Example: FL3K2 is 23 inches long, FL27K2 is 26 inches long. Exception: Only available on Type K and T removable buttonhead tin fuse links.

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 and T removable buttonhead tin fuse links.

For a fuse link with a 23-inch double leader, replace digit 3 with 43. Example: FL3K100 has a single leader, FL43K100 has a double leader. Exception: Only available on Type K and T removable buttonhead tin fuse links.

Table 5. Non-removable links rated through 27 kV

Non-removable buttonhead

Current rating (amperes)	Type D	Type K (silver)	Type N	Type K (tin)	Type T (tin)	Type T (silver)	Standard box quantity
1	FL1D1			FL11K1	FL11T1		15
1.5	FL1D105						
2	FL1D2			FL11K2	FL11T2		
3	FL1D3			FL11K3	FL11T3		
4	FL1D4						
5	FL1D5		FL11N5	FL11K5	FL11T5		
6		FL12K6		FL11K6	FL11T6	FL12T6	
7	FL1D7						
8		FL12K8	FL11N8	FL11K8	FL11T8	FL12T8	
10	FL1D10	FL12K10	FL11N10	FL11K10	FL11T10	FL12T10	
12		FL12K12		FL11K12	FL11T12	FL12T12	
15	FL1D15	FL12K15	FL11N15	FL11K15	FL11T15	FL12T15	
20	FL1D20	FL12K20	FL11N20	FL11K20	FL11T20	FL12T20	
25		FL12K25	FL11N25	FL11K25	FL11T25	FL12T25	
30		FL12K30	FL11N30	FL11K30	FL11T30	FL12T30	
40		FL12K40	FL11N40	FL11K40	FL11T40	FL12T40	
50		FL12K50	FL11N50	FL11K50	FL11T50	FL12T50	
60			FL11N60				10
65		FL12K65		FL11K65	FL11T65	FL12T65	
75			FL11N75				
80		FL12K80		FL11K80	FL11T80	FL12T80	
85			FL11N85				
100		FL12K100	FL11N100	FL11K100	FL11T100	FL12T100	
125			FL11N125				5
140		FL12K140		FL11K140	FL11T140	FL12T140	
150			FL11N150				
200		FL12K200	FL11N200	FL11K200	FL11T200	FL12T200	

Notes:

Fuse links listed above are all 23 inches (584 mm) long. For 26-inch-long (660 mm) fuse links, replace digits 3 and 4 with 24.
Example: FL11K1 is 23 inches long, FL24K1 is 26 inches long. Exception: Only available on Type L, N, K and T non-removable buttonhead fuse links.

For a fuse link with a heavy-duty leader, replace digits 3 and 4 with 25. Example: FL11K2 has a normal-duty leader, FL25K2 has a heavy-duty leader.
Exception: Only available on Type K and T non-removable buttonhead tin fuse links.

For a fuse link with a 23-inch double leader, replace digits 3 and 4 with 12. Example: FL11N125 has a single leader, FL12N125 has a double leader.
Exception: Only available on Type N non-removable buttonhead fuse links.

Table 6. Removable buttonhead for 38 kV distribution systems ①

Current rating (amperes)	Type EH	Type EK	Type ET	Standard box quantity
1	FL8H1	FL16K1	FL16T1	10
2	FL8H2	FL16K2	FL16T2	
3	FL8H3	FL16K3	FL16T3	
5	FL8H5	FL16K5	FL16T5	
6		FL16K6	FL16T6	
8		FL16K8	FL16T8	
10		FL16K10	FL16T10	
12		FL16K12	FL16T12	
15		FL16K15	FL16T15	
20		FL16K20	FL16T20	
25		FL16K25	FL16T25	
30		FL16K30	FL16T30	
40		FL16K40	FL16T40	
50		FL16K50	FL16T50	5
65		FL16K65	FL16T65	
80		FL16K80	FL16T80	
100		FL16K100	FL16T100	

① Use only in 38 kV rated cutouts without arc shortening rods.

Table 7. Open-link Edison links

Current rating (amperes)	Type H	Type D	Type K	Type T	Standard box quantity
1	FL4H1	FL4D1		FL4T1	15
1.5		FL4D105			
2	FL4H2	FL4D2		FL4T2	
3	FL4H3	FL4D3		FL4T3	
4		FL4D4			
5	FL4H5	FL4D5			
6			FL4K6	FL4T6	
7		FL4D7			
8	FL4H8		FL4K8	FL4T8	
10		FL4D10	FL4K10	FL4T10	
12			FL4K12	FL4T12	
15		FL4D15	FL4K15	FL4T15	
20		FL4D20	FL4K20	FL4T20	
25			FL4K25	FL4T25	
30			FL4K30	FL4T30	
40			FL4K40	FL4T40	
50			FL4K50	FL4T50	

Additional information

Eaton has additional reference information available for Edison fuse link selection and coordination. See **Table 8** and **Table 9**.

For copies of additional literature, contact your local Eaton representative.

Table 8. Edison fuse link TCC curves

Reference number	Fuse type	Description
R240-91-1	Type K	Tin time-current characteristics curves
R240-91-2	Type T	Tin time-current characteristics curves
R240-91-3	Type H	High-surge time-current characteristics curves
R240-91-4	Type K	Silver time-current characteristics curves 6 A to 100 A
TC132003EN	Type K silver	Silver time-current characteristics curves 140 A and 200 A
TC132002EN	Type T	Silver time-current characteristics curves 6 A to 100 A
TC132005EN	Type 200 (M)	Silver time-current characteristics curves
R240-91-5	Type EK	Tin time-current characteristics curves
R240-91-6	Type ET	Tin time-current characteristics curves
R240-91-7	Type EH	High-surge time-current characteristics curves
R240-91-8	Type C	Fuses have been discontinued
R240-91-9	Type N	Tin time-current characteristics curves
R240-91-15	Type S	Time-current characteristics curves
R240-91-16	Type D	Time-current characteristics curves

Table 9. Fuse link reference information

Reference number	Title
TD-311	Comparison of tin and silver fuse links
CP7734	What the rating system on fuses actually means
90016	D-link brochure
91027	Developing a fusing schedule
92024	D-link, new ratings and surge durability
R240-30-2	Coordination tables for T, H, N fuse links
R240-30-3	Coordination of fuse links with oil circuit reclosers
R240-30-5	Fuse links for carrying lightning surges
R240-30-6	Suggested D-link for distribution transformers
R240-30-7	Coordination of D-link with K, T and S links

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