

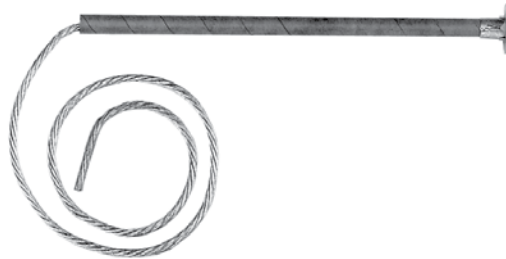
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Edison™ fuse links



General

Eaton's Cooper Power™ series Kearney™ line of fuse links, 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.

All Eaton's Cooper Power series expulsion fuse link designs were 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.

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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 18 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	
	K (silver)	6-100	
	T	1-200	
	S	3-200	
	(Open-type cutout)	H	1-8
		N	2-200
38 kV Distribution	D	1-20	
	EK	1-100	
	ET	1-100	
	(Open-type cutout)	EH	1-5
		15 kV Distribution	K
	T		6-50
(Open-link cutout)	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 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)

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

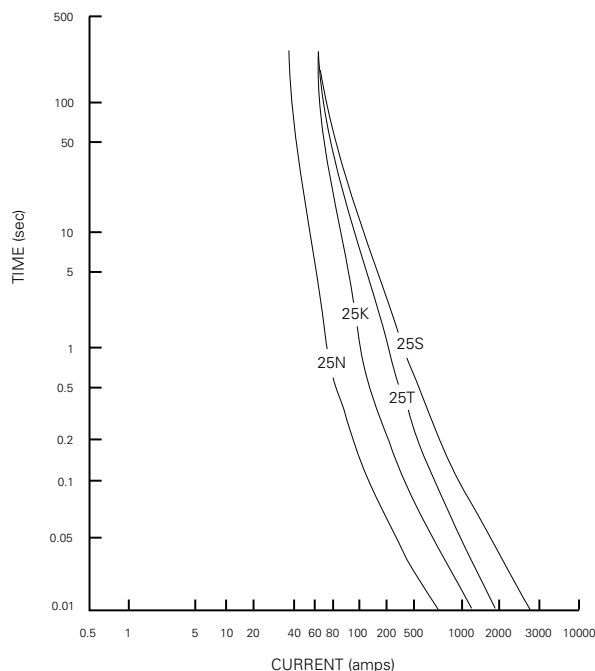
Distribution Systems through 38 kV**

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)

** 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	150
S	100
EK	150
ET	150
EH	100

**Figure 2. Speed ratio comparisons, typical minimum melt curves Type K, T, N and S fuse links.**

Edison fuse link designs

Type K Links – Tin

Type K links are available in ratings from 1-200 A in the buttonhead design and from 6-50 A in the open-link design. The standard Type K link is constructed with a tin fuse element.

Type K Links – Silver

Type K links with a silver fuse element are also available as an option. They are manufactured in removable and non-removable buttonhead designs with ratings from 6-100 A.

Type T Links

Type T links are available in ratings from 1-200 A in the buttonhead design and from 6-50 A in the open-link design. The standard Type T link is constructed with a tin fuse element.

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 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

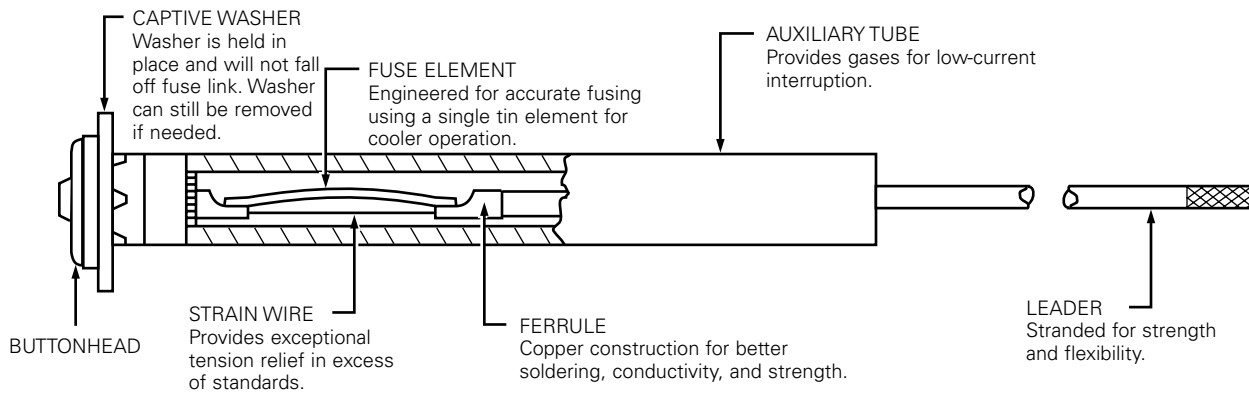


Figure 3. Typical Type K, T, N, and H (8 A) fuse link construction.

Dual element

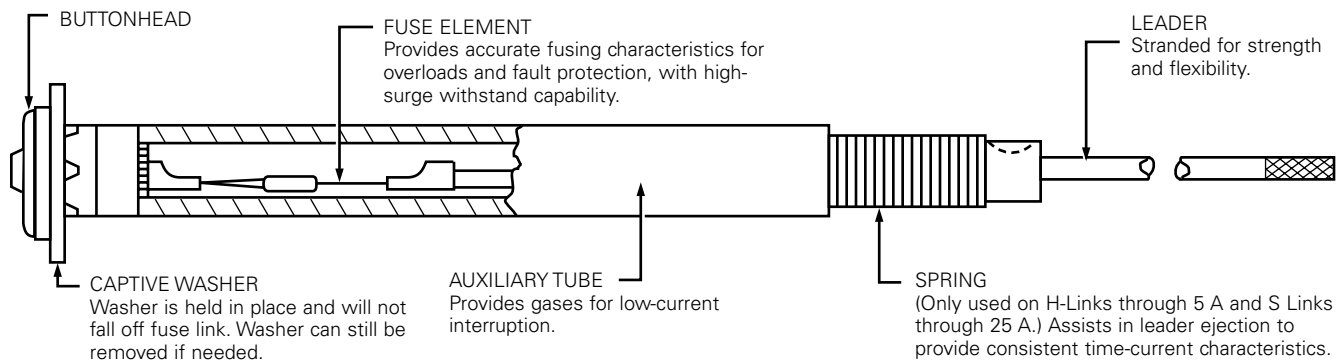


Figure 4. Typical Type D, S, and H (1 A through 5 A) fuse link construction.

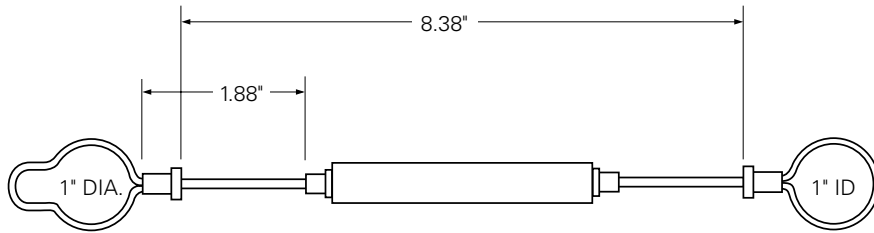


Figure 5. Dimensions of open-link Edison fuse link.

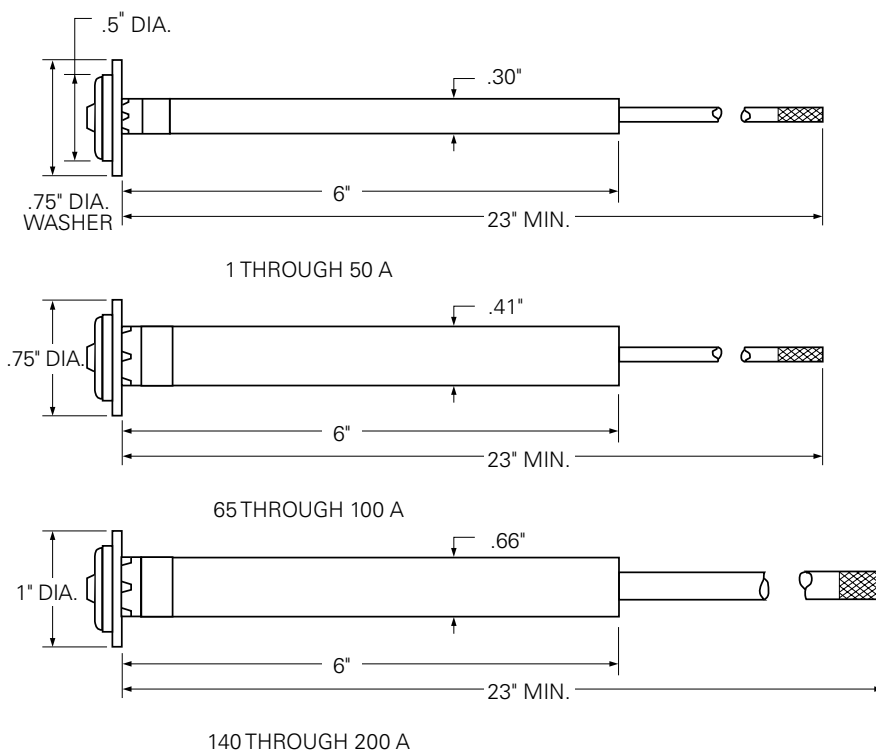


Figure 6. Dimensions of typical Types D, H, K, T, N Edison fuse links (removable buttonhead shown; non-removable buttonhead dimensions are similar).

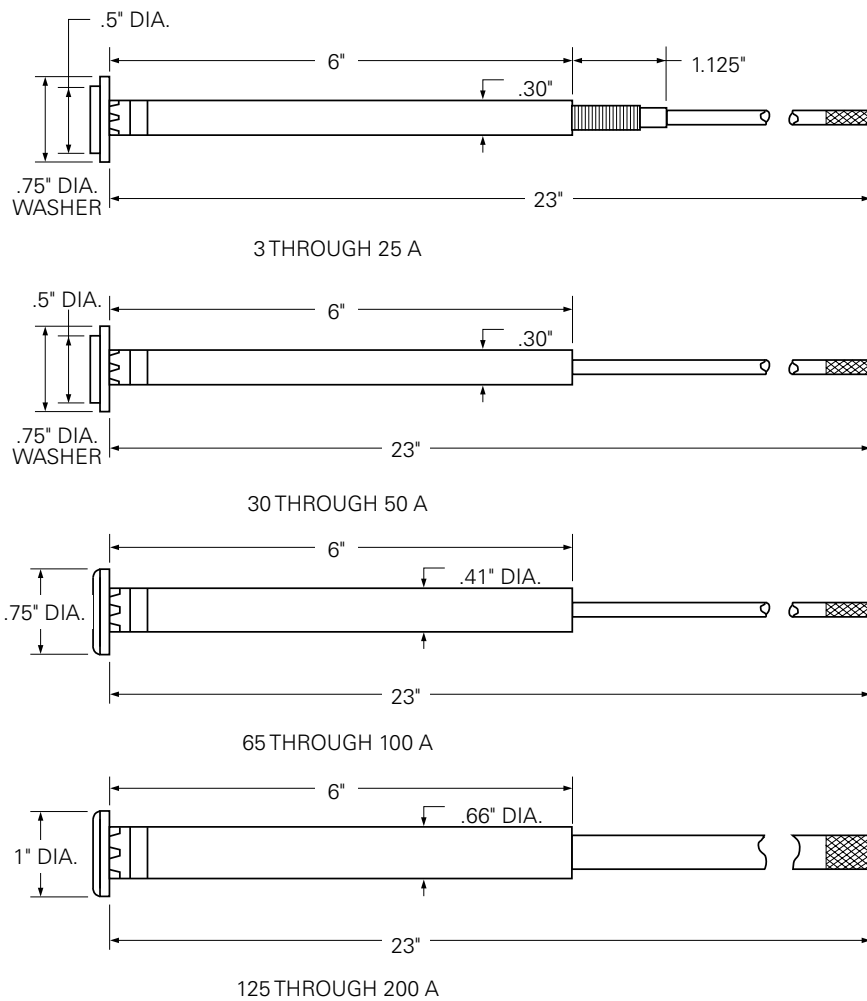
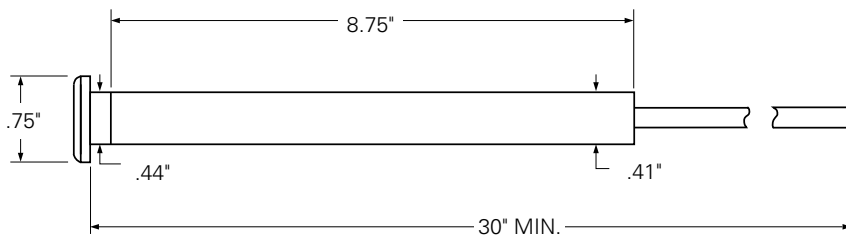


Figure 7. Dimensions of typical Type S Edison fuse links (non-removable buttonhead).



*8.5" for EK and ET 65 through 100 A.

Figure 8. 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 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 27kV

Removable Buttonhead

Current Rating (Amps)	Type H	Type D	Type K (Silver)	Type N	Type S	Type K (Tin)	Type T (Tin)	Standard Box Qty
1	FL3H1	FL3D1				FL3K1 FL27K1*	FL3T1 FL27T1*	
1.5		FL3D105						
2	FL3H2	FL3D2		FL3N2		FL3K2 FL26K2** FL27K2*	FL3T2 FL26T2** FL27T2*	
3	FL3H3	FL3D3			FL2S3	FL3K3 FL26K3** FL27K3*	FL3T3 FL26T3** FL27T3*	
4		FL3D4						
5	FL3H5	FL3D5		FL3N5	FL2S5	FL3K5 FL26K5** FL27K5*	FL3T5 FL26T5** FL27T5*	
6			FL6K6			FL3K6 FL26K6** FL27K6*	FL3T6 FL26T6** FL27T6*	
7		FL3D7		FL3N7	FL2S7			
8	FL3H8		FL6K8	FL3N8		FL3K8 FL26K8** FL27K8*	FL3T8 FL26T8** FL27T8*	
10		FL3D10	FL6K10	FL3N10	FL2S10	FL3K10 FL26K10** FL27K10*	FL3T10 FL26T10** FL27T10*	25
12			FL6K12			FL3K12 FL26K12** FL27K12*	FL3T12 FL26T12** FL27T12*	
15		FL3D15	FL6K15	FL3N15	FL2S15	FL3K15 FL26K15** FL27K15*	FL3T15 FL26T15** FL27T15*	
20		FL3D20	FL6K20	FL3N20	FL2S20	FL3K20 FL26K20** FL27K20*	FL3T20 FL26T20** FL27T20*	
25			FL6K25	FL3N25	FL2S25	FL3K25 FL26K25** FL27K25*	FL3T25 FL26T25** FL27T25*	
30			FL6K30	FL3N30	FL2S30	FL3K30 FL27K30*	FL3T30 FL27T30*	
40			FL6K40	FL3N40	FL2S40	FL3K40 FL27K40*	FL3T40 FL27T40*	
50			FL6K50	FL3N50	FL2S50	FL3K50 FL27K50*	FL3T50 FL27T50*	
60				FL3N60				
65			FL6K65		FL2S65	FL3K65 FL27K65*	*FL3T65 FL27T65**	
75				FL3N75				
80			FL6K80		FL2S80	FL3K80 FL27K80*	FL3T80 FL27T80*	15
85				FL3N85				
100			FL6K100	FL3N100	FL2S100	FL3K100 FL27K100*	FL3T100 FL27T100*	
125				FL3N125	FL2S125			
140						FL3K140 FL27K140* FL43K140†	FL3T140 FL27T140* FL43T140† FL48T140††	
150				FL3N150	FL2S150			10
200				FL3N200	FL2S200	FL3K200 FL27K200* FL43K200†	FL3T200 FL27T200* FL43T200† FL48T200††	

* Length of link is 26"

** Fuse Link has heavy-duty leader

† 23" Double Leader

†† 26" Double Leader

Effective February 2015

Table 5. Non-removable Links Rated Through 27kV

Non-removable Buttonhead

Current Rating (Amps)	Type H	Type D	Type K (Silver)	Type N	Type K (Tin)	Type T	Standard Box Qty	
1	FL11H1 FL24H1*	FL1D1			FL11K1 FL24K1*	FL11T1 FL24T1*	25	
1.5		FL1D105						
2	FL11H2 FL24H2*	FL1D2			FL11K2 FL24K2* FL25K2**	FL11T2 FL24T2* FL25T2**		
3	FL11H3 FL24H3*	FL1D3			FL11K3 FL24K3* FL25K3**	FL11T3 FL24T3* FL25T3**		
4		FL1D4						
5	FL11H5 FL24H5*	FL1D5		FL11N5 FL24N5*	FL11K5 FL24K5* FL25K5**	FL11T5 FL24T5* FL25T5**		
6			FL12K6		FL11K6 FL24K6* FL25K6**	FL11T6 FL24T6* FL25T6**		
7		FL1D7						
8	FL11H8 FL24H8*		FL12K8	FL11N8 FL24N8*	FL11K8 FL24K8* FL25K8**	FL11T8 FL24T8* FL25T8**		
10		FL1D10	FL12K10	FL11N10 FL24N10*	FL11K10 FL24K10* FL25K10**	FL11T10 FL24T10* FL25T10**		
12			FL12K12		FL11K12 FL24K12* FL25K12**	FL11T12 FL24T12* FL25T12**		
15		FL1D15	FL12K15	FL11N15 FL24N15*	FL11K15 FL24K15* FL25K15**	FL11T15 FL24T15* FL25T15**		
20		FL1D20	FL12K20	FL11N20 FL24N20*	FL11K20 FL24K20* FL25K20**	FL11T20 FL24T20* FL25T20**		
25			FL12K25	FL11N25 FL24N25*	FL11K25 FL24K25* FL25K25**	FL11T25 FL24T25* FL25T25**		
30			FL12K30	FL11N30	FL11K30 FL24K30*	FL11T30 FL24T30*		
40			FL12K40	FL11N40 FL24N40*	FL11K40 FL24K40*	FL11T40 FL24T40*		
50			FL12K50	FL11N50 FL24N50*	FL11K50 FL24K50*	FL11T50 FL24T50*		
60				FL11N60 FL24N60*				
65			FL12K65		FL11K65 FL24K65*	FL11T65 FL24T65*		
75				FL11N75 FL24N75*				
80			FL12K80		FL11K80 FL24K80*	FL11T80 FL24T80*		15
85				FL11N85 FL24N85*				
100			FL12K100	FL11N100 FL24N100*	FL11K100 FL24K100*	FL11T100 FL24T100*		
125				FL11N125 FL12N125†				10
140					FL11K140 FL24K140*	FL11T140 FL24T140*		
150				FL11N150 FL24N150* FL12N150†				
200				FL11N200 FL12N200†	FL11K200 FL24K200*	FL11T200 FL24T200*		

* Length of link is 26"

** Fuse Link has heavy-duty leader

† 23" Double Leader

Table 6. Removable Buttonhead for 38 kV Distribution Systems*

Current Rating	Type EH	Type EK	Type ET	Standard Box Qty
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	
65		FL16K65	FL16T65	
80		FL16K80	FL16T80	
100		FL16K100	FL16T100	

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

Table 7. Open-Link Edison Links

Current Rating	H	D	K	T	Standard Box Qty
1	FL4H1	FL4D1		FL4T1	25
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 Tables 2 and 8.

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

Table 8. Edison Fuse Link TCC Curves

Reference No.	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
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 No.	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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