

### Edison® Links

#### GENERAL

Cooper Power Systems Kearney™ line of fuse links, Edison 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 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 nonremovable buttonhead, and open-link styles.

All Cooper Power Systems expulsion fuse link designs were tested in accordance with ANSI standard C37.41, Section 12, and IEC Standard 282-2-1970, Section 15.8. Data from these tests have been utilized to plot the time-current characteristics for each fuse rating. Publication of minimum melting and total clearing TCCs certifies compliance with testing fuse links in accordance with these standards.

#### EDISON LINK FUSES

Edison Links are manufactured in removable and nonremovable 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 Links are available for systems up to 38 kV.

In addition, Cooper Power Systems 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 Links are available for the higher system voltages through 18 kV.



**Figure 1.**  
Non-removable buttonhead Edison Links.

**TABLE 1**  
Edison Link Fuse Designs

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

\*140 and 200 coordinating links.

#### PRODUCTION QUALITY ASSURANCE

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

## EDISON 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 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 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.

Edison Links' melting characteristics curves are determined without preload and at an ambient operating temperature of 20° to 30° C, as specified in ANSI C37.41 and IEC 232-2.

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

**TABLE 2**  
Speed Ratios\*

Edison Link	Description	Average Speed Ratio
-------------	-------------	---------------------

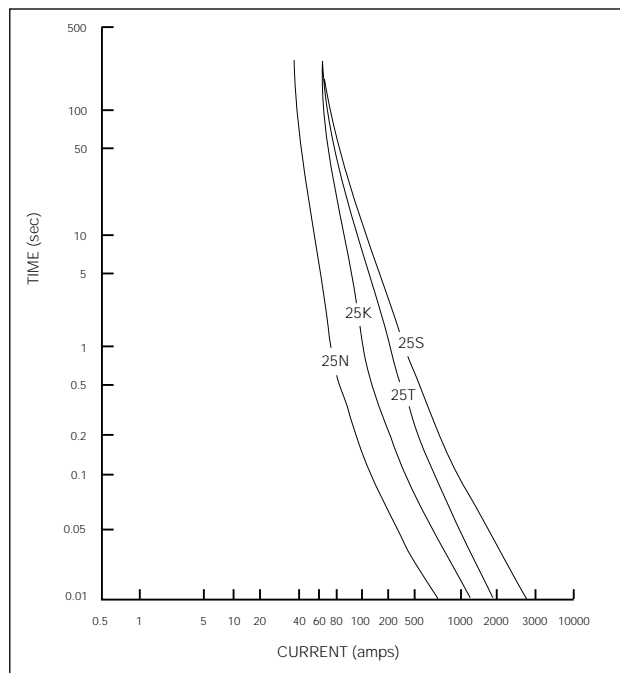
### Distribution Systems through 27 kV

Type K	Fast	6 through 8.1 (meets ANSI 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 ANSI 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)
Type C	Slow	18 through 26 (time-current characteristics similar to 140 and 200 A Type T links in high-current range)

\*Figure 3 compares the speed ratios of McGraw-Edison 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)



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

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.

Cooper Power Systems application engineers are available to assist in the proper application of Edison Links for these operating conditions.

**TABLE 3**  
Continuous Current Ratings

Edison Link Type	Allowable Continuous Current (% of rating)
K-tin	150
K-silver	100
N	100
H	100
D	100
T	150
S	150*
C	100
EK	150
ET	150
EH	100

\*Except 125, 150, and 200 A – 100%

## EDISON LINK FUSE 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 nonremovable 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 5-200 A. Type N links conform to applicable ANSI 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.

### Type C Coordinating Links

Type C links are available in removable buttonhead design rated 100 A and can be used in standard 100 A distribution cutouts. They exhibit time-current characteristics in the high-current range similar to 140 A and 200 A Type T links. Time-current characteristics in the low-current range are similar to 100 A Type T fuse links.

Type C links are used in coordination schemes where the high-current, short-duration characteristics of 140 A and 200 A links are desired, but where the load current does not exceed 100 A.

### Types EH, EK, and ET Links

These Edison Links are designed for use on 38 kV distribution systems. Types EH, EK, and ET Edison Links are manufactured in a nonremovable buttonhead design with ratings from 1-5 A EH, 3-100 A EK and 6-100 A ET. These links exhibit the same time-current characteristics as similarly rated Types H, K, and T Edison Links.

### ADDITIONAL OPTIONS

Edison Links are also available with a number of options including those listed below. Contact your Cooper Power Systems representative for information on availability and pricing.

#### Ferrule Adapter

Converts removable buttonhead links into a double-leader link for use in older-style, double-vented cutouts with clamping-type leader connections at both the upper and the lower fuse leader connection.

#### Wedge Adapter

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

#### Leader Options

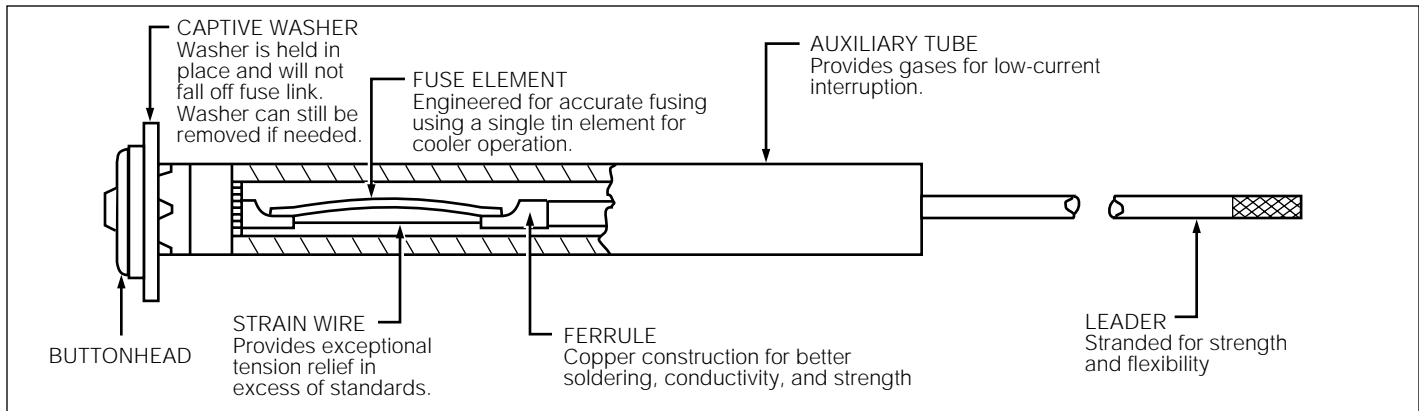
26-and 30-in. fuse link lengths and larger-diameter flexible leaders are available.

#### Packaging

Buttonhead type Edison Links rated 27 kV, 1-100 A are packaged in individual bags. All other Edison Links are available with individual bag packaging only. Five individual boxed fuses fit in one larger box, which is of a compact size for ease of storage and handling. There are perforations on the sides of each individual box, which allows the line person to easily break the box and remove the Edison Link. To order Edison Links packaged in boxes rather than bags, a "B" suffix is added to the catalog number.

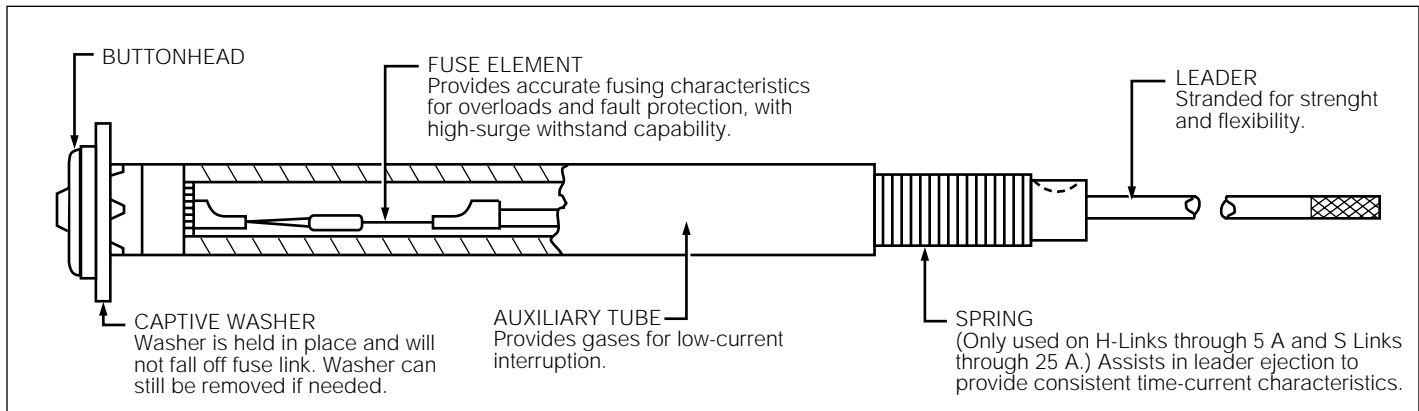
## CONSTRUCTION FEATURES

### Single Element

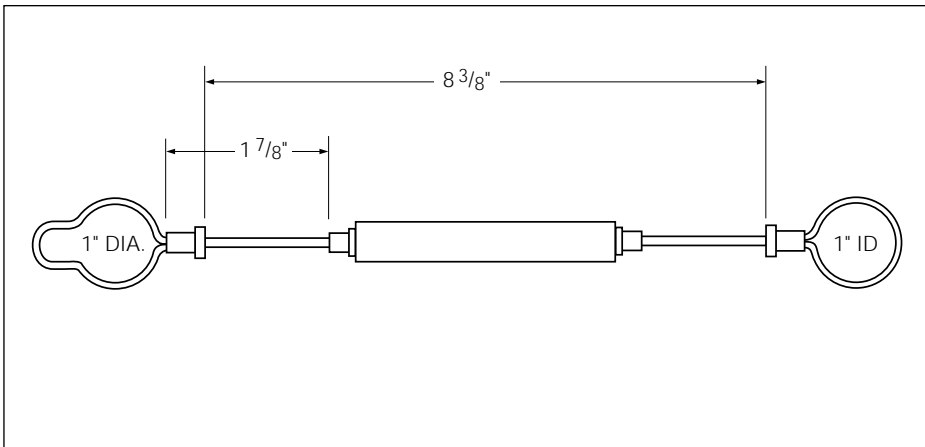


**Figure 3.**  
Typical Types K, T, N, and H (8 A) link construction.

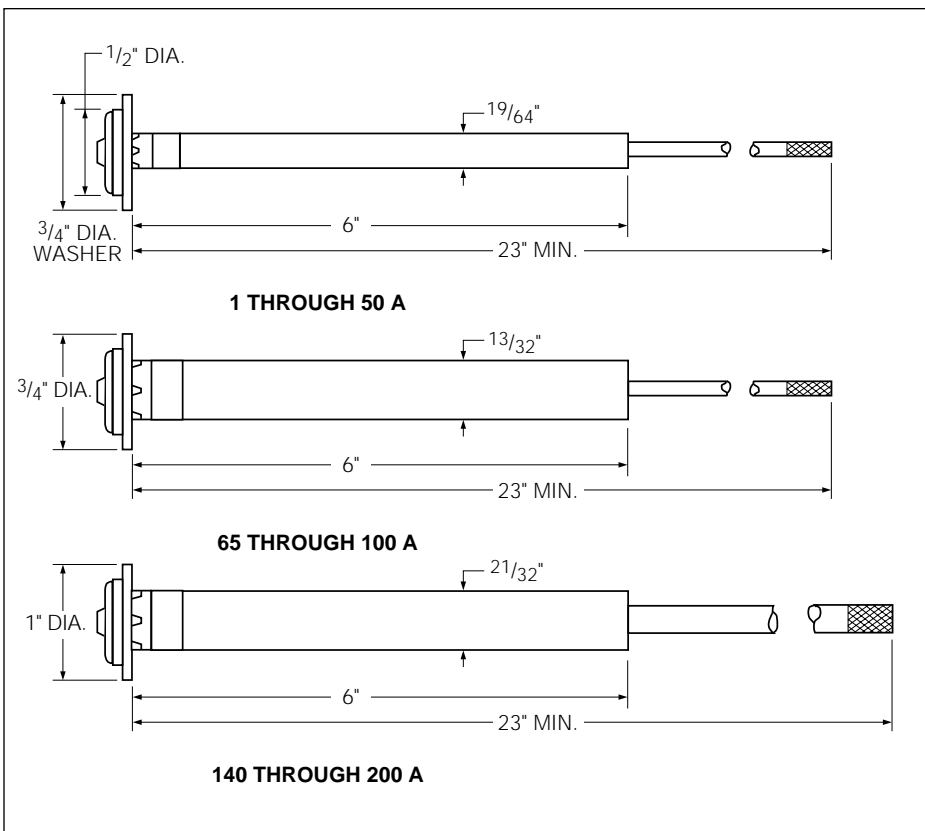
### Dual Element



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

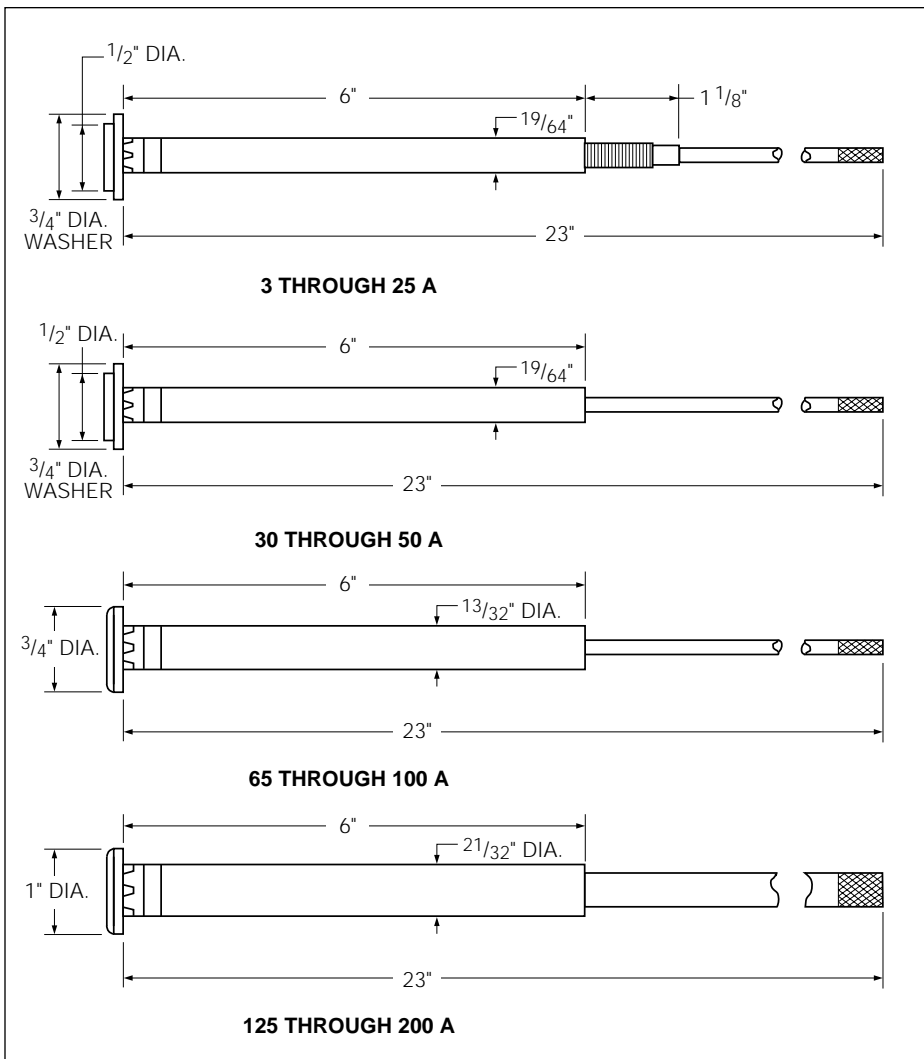


**Figure 5.**  
**Dimensions of open-link Edison Link.**

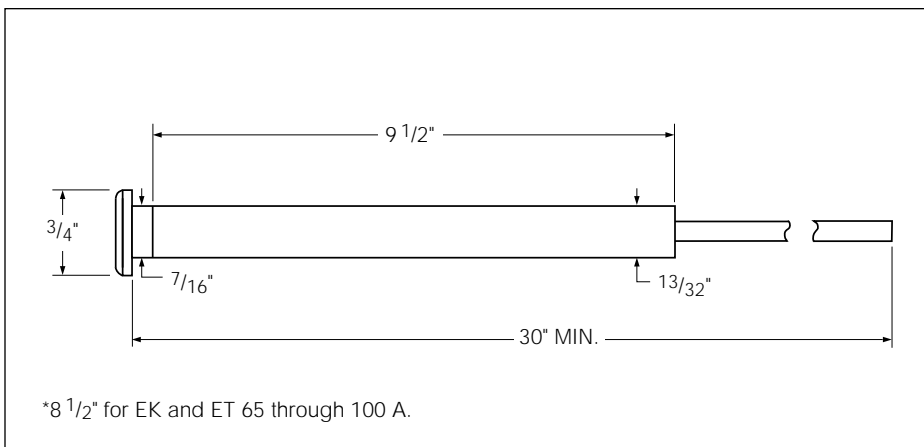


**Figure 6.**  
**Dimensions of typical Types D, H, K, T, N Edison Links (removable buttonhead shown; nonremovable buttonhead dimensions are similar).**

140 A and 200 A Type C fuse links (Table 7) are the same size as the 65 through 100 A fuse links.



**Figure 7.**  
Dimensions of typical Types S Edison Links (nonremovable buttonhead).



**Figure 8.**  
Dimensions for nonremovable buttonhead links for 38 kV distribution systems.

## ORDERING AND DIMENSIONAL INFORMATION

To build a catalog number, add the Edison Link ampere rating required to the catalog number listed in Tables 4 through 7. For example: the catalog number for a 25 A Type K open-link Edison Link used with a 7.8 kV-rated fuse cutout is FL4K25. (Refer to Table 6.)

**TABLE 4**  
Removable and Nonremovable Buttonhead Edison Links for Distribution Systems Rated through 27 kV (23" Length)

Edison Link		Buttonhead	Catalog Number
Type	Rating (A)		
H-tin (high surge)	1,2,3,5,8	Removable Nonremovable Nonremovable	FL3H_ FL11H_ FL24H_*
D-tin (high surge)	1,1.5,2,3,4,5,7,10,15,20	Nonremovable Removable	FL1D_ FL3D_
K-tin (fast)	1 through 200	Removable Nonremovable Nonremovable Removable Removable	FL3K_ FL11K_ FL24K_* FL25K_** FL26K_** FL27K_*
K-silver (fast)	6 through 100	Removable Nonremovable	FL6K_ FL12K_
N-tin (fast)	5 through 200 5 through 200	Removable Nonremovable	FL3N_ FL11N_
T-tin (slow)	1 through 200	Removable Nonremovable Nonremovable Nonremovable Removable Removable	FL3T_ FL11T_ FL24T_* FL25T_** FL26T_** FL27T_*
S-copper (very slow)	3 through 200	Removable	FL2S_

\* Length of link is 26".

\*\*Fuse link has heavy-duty leader.

**TABLE 5**  
Removable Buttonhead Edison Links for 38 kV Distribution Systems

Edison Link		Catalog Number
Type	Rating (A)	
EH-tin (high surge)	1,2,3,5	FL8H_
EK-tin (fast)	6 through 100**	FL16K_
ET-tin (slow)	6 through 100**	FL16T_

\* Length of link is 26".

\*\*Fuse link has heavy-duty leader.

**TABLE 6**  
Open-Link Edison Links

Edison Link		Cutout Rating (kV)	Catalog Number
Type	Rating (A)		
H (high surge)	1,2,3,5,8	7.8 through 15	FL4H_
D (high surge)	1,1.5,2,3,4,5,7,10,15,20	7.8 through 15	FL4D_
K (fast)	6 through 50	7.8 through 15	FL4K_
T (slow)	6 through 50	7.8 through 15	FL4T_

**TABLE 7**  
**Type C Universal Edison Links**

Link Rating Continuous (ampere)	Rating for Coordination Purposes (ampere)	Catalog Number
100	140	FL1C140
100	200	FL1C200

**ADDITIONAL INFORMATION**

Cooper Power Systems has additional reference information available for Edison Link selection and coordination. See Tables 8 and 9.

For copies of additional literature, contact your local Cooper Power Systems representative.

**TABLE 8**  
**Edison Link TCC Curves**

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	Tin time-current characteristics curves
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
240-91	Index of TCC's
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 (PD Update 12)
92024	D-Link, New Ratings and Surge Durability (PD Update)
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

