Fusing Equipment
Catalog Data
**CA132059EN**

Effective June 2018
Supersedes February 2016

COOPER POWER SERIES

# K-Limiter high ampere Companion II fuse

## General

Eaton designs its Cooper Power™ series K-Limiter fuse to be conveniently applied as an add-on, back-up, current-limiting fuse and as an extension of Eaton's Cooper Power series NX™ Companion® II fuse. The K-Limiter back-up fuse will interrupt high fault current and at the same time, limit the amount of energy that is let-through to the protected equipment. This fuse is designed to be applied in series with an expulsion or other type of weak link fuse. This series connected fuse must be capable of interrupting both excessive overload currents and low to intermediate fault currents up through the minimum interrupting rating of the K-Limiter fuse. If the expulsion fuse is applied within the recommended guidelines (refer to Table 3), enough current will be let-through to melt the expulsion fuse. When the expulsion fuse is in a cutout, the resulting drop open action provides, in any fault situation, a positive blown fuse indication for operating personnel.

The majority of faults on distribution systems are of low magnitude (such as transformer overloads or incipient faults), and normally only the lower cost expulsion fuse melt and clear the fault. The available fault current on many overhead distribution systems, however, has grown beyond the interrupting ratings of the expulsion fuse. When the K-Limiter fuse is used, and a higher magnitude fault current occurs, the possibility of eventful transformer (or capacitor) failure is greatly reduced.

Every K-Limiter fuse is $I^2t$ tested. This assures operation of the fuse only at published minimum melt $I^2t$ levels and above, guaranteeing that a K-Limiter fuse will not be susceptible to nuisance operations at lower $I^2t$ levels. Eaton's patented quality-control test detects defects that cannot be identified by any other test procedure, including resistance checks and x-rays.

## Minimizes equipment damage

The K-Limiter back-up current-limiting fuse will interrupt high magnitude fault currents while also limiting the amount of current and energy let-through to the transformer. The back-up current-limiting fuse will limit the let-through current to minimize the possibility of transformer tank rupture from high magnitude internal faults or to minimize damage to the tank or bushing that might result from bushing flashovers.

Powering Business Worldwide

## Enhanced power quality and improved service continuity

The operation of the K-Limiter back-up current-limiting fuse will enhance power quality of the system and improve service continuity during high magnitude faults. The duration of the voltage dip associated with system short circuits will be limited to the short melt time of the K-Limiter fuse. Immediately after melting, the arc voltage generated by the current-limiting fuse will support system voltage until the fault is interrupted by the fuse. For high fault currents, the duration of the voltage dip associated with the melt time of the K-Limiter fuse will be well within the allowable limits for sensitive electronic equipment as defined by CBEMA curves.

## Production tests

Tests are conducted in accordance with Eaton requirements.

- 100% Physical Inspection
- 100% $I^2t$ Testing
- 100% Resistance Testing

**Table 1. Electrical Ratings and Characteristics**

| Fuse Type | Voltage and Current Ratings | | Maximum Interrupting Current |
|---|---|---|---|
| Back-up | 4.3 kV | 50-80 K | 50,000 A rms symmetrical |
| | 8.3 kV | 65-140 K | |
| | 15.5 kV | 65-80 K | |

**Table 2. Protective Characteristics**

| Voltage Rating (kV) | K-Limiter Rating* | Maximum Continuous Current | Minimum Melt $I^2t$ ($A^2s$)** | Maximum Let-through $I^2t$ ($A^2s$) |
|---|---|---|---|---|
| 4.3 | 50 | 100 A | 9000 | 265,000 |
| | 80 | 110 A | 26,000 | 400,000 |
| 8.3 | 65 | 100 A | 24,460 | 240,000 |
| | 80 | 110 A | 46,900 | 294,000 |
| | 100 | 130 A | 100,000 | 360,000 |
| | 140 | 150 A | 100,000 | 700,000 |
| 15.5 | 65 | 100 A | 24,460 | 240,000 |
| | 80 | 110 A | 46,900 | 295,000 |

* Coordinates with NEMA® Type K fuse links up through designated rating (amperes). Contact your Eaton representative for coordination assistance with other types of expulsion fuse links.

** Minimum melt $I^2t$ is for the back-up current-limiting fuse section only.

**Table 3. K-Limiter Fuse Voltage Application**

| System Voltage (kV) Nominal | Recommended K-Limiter Rating (kV) Maximum | Four Wire Multi-grounded Neutral | Delta |
|---|---|---|---|
| 2.4 | 2.54 | – | 4.3 |
| 2.4/4.16 | 2.54/4.4 | 4.3 | – |
| 4.16 | 4.4 | – | 4.3 |
| 4.8 | 5.1 | – | 8.3 |
| 4.8/8.32 | 5.1/8.8 | 8.3 | – |
| 6.9 | 7.26 | – | 8.3 |
| 6.93/12.0 | 7.3/12.7 | 8.3 | – |
| 7.2 | 7.62 | – | 8.3 |
| 7.2/12.47 | 7.62/13.2 | 8.3 | – |
| 7.62 | 8.1 | – | 8.3 |
| 7.62/13.2 | 8.1/14.0 | 8.3 | – |
| 7.97 | 8.4 | – | 8.3 |
| 7.97/13.8 | 8.4/14.5 | 8.3 | – |
| 8.32 | 8.8 | – | 8.3 |
| 8.32/14.4 | 8.8/15.2 | 8.3 | – |
| 12/20.8 | 12.7/22.0 | 15.5 | – |
| 12.47 | 13.2* | – | 8.3** |
| 13.2/22.9 | 14/24.2 | 15.5 | – |
| 13.2 | 14* | – | 8.3** |
| 13.8 | 14.5* | – | 8.3** |
| 14.4/24.9 | 15 2/26.4 | 15.5 | – |
| 14.4 | 15.2* | – | 8.3** |

* Fuse voltage ratings recommended for these systems are based on simultaneous operation of the K-Limiter fuses for high current faults.

** For single phase applications on delta systems, one fuse of this rating is required in each phase.

**Table 4. K-Limiter Fuse-Fuse Link Coordination**

| | Coordinates With Fuse Links Up Through | | |
|---|---|---|---|
| K-Limiter Fuse Rating | ANSI Type K | ANSI Type T | M.E. Type N |
| 50 K | 50 | 30 | 60 |
| 65 K | 65 | 30 | 60 |
| 80 K | 80 | 40 | 75 |
| 100 K | 100 | 50 | 75 |
| 140 K | 140 | 80 | 85 |
| | | Kearney Type QA | Kearney Type KS |
| 50 K | | 60 | 20 |
| 65 K | | 75 | 25 |
| 80 K | | 75 | 30 |
| 100 K | | 100 | 30 |
| 140 K | | 150 | 50 |

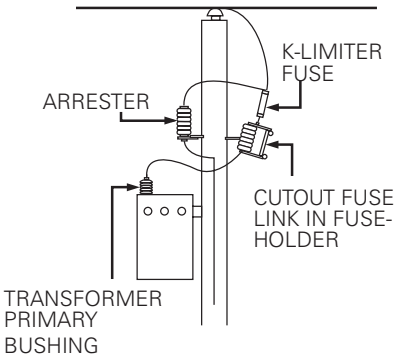


**Figure 1. Source-side cutout installation.**

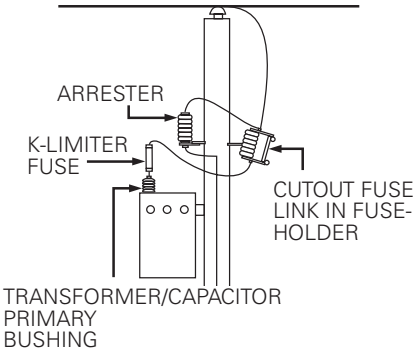


**Figure 2. Bushing mount installation.**

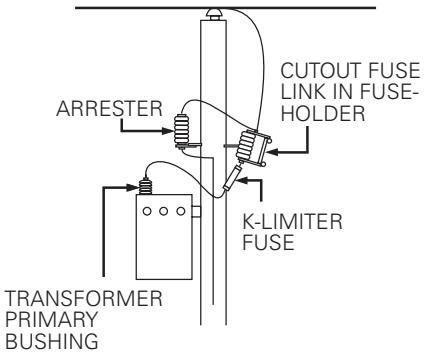


**Figure 3. Load-side cutout installation.**

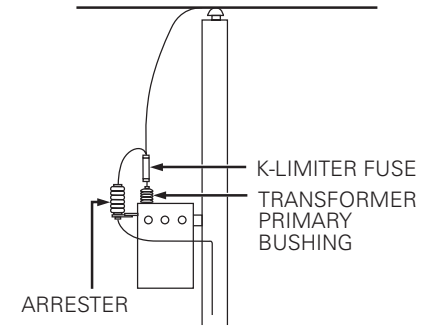


**Figure 4. CSP transformer installation.**

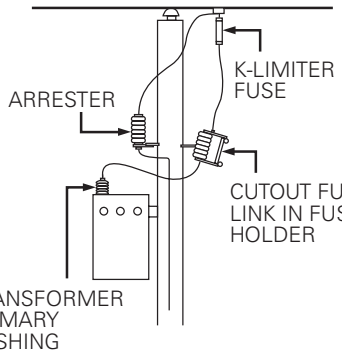


**Figure 5. Hot-line/bail installation.**

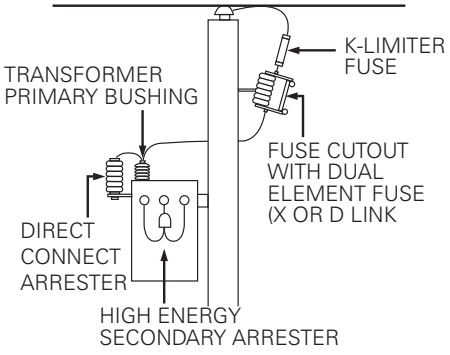


**Figure 6. Lightning-Protected transformer (LPT) installation.**

### Terminal options

The K-Limiter fuse is available with several types of terminal options. Any combination of spline stud, parallel-groove, spade or eyebolt connector is available.

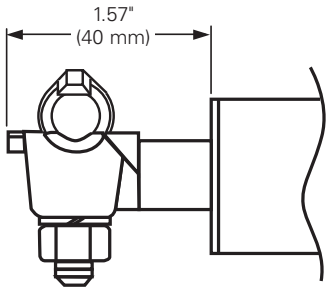


**Figure 7. Eyebolt terminal (#8 through 2/0).**

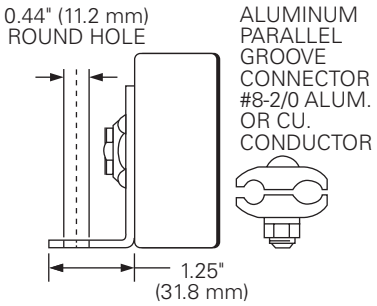


**Figure 8. Spade with Parallel Groove connector terminal.**

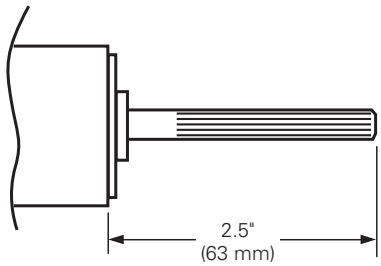


**Figure 9. Spline stud terminal.**

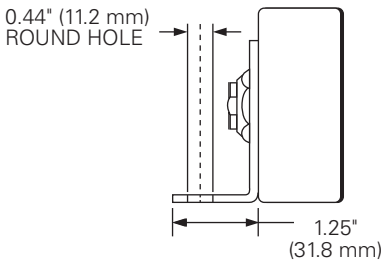


**Figure 10. Spade terminal.**

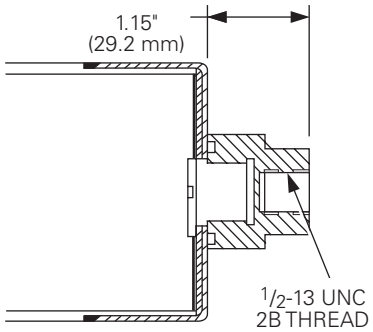


**Figure 11. End boss terminal.**

## Application

### Voltage selection

The K-Limiter fuse has voltage ratings compatible with most common distribution voltages.

Table 2 lists the most common distribution voltages, connections and the corresponding K-Limiter fuse voltage rating. For voltage ratings or connections other than those listed, consult your Eaton representative.

### Current coordination

A 65 K K-Limiter fuse will coordinate with ANSI® Type K fuse links rated 65 A or less. The 80 K K-Limiter fuse will coordinate with ANSI® Type K fuse links rated 80 A or less, the 100 K K-Limiter fuse will coordinate with ANSI® Type K fuse links 100 A or less, and the 140 K K-Limiter fuse will coordinate with ANSI® Type K fuse links 140 A or less. Distribution systems using expulsion fuses other than ANSI® Type K fuse links can also be coordinated with K-Limiter fuses (Table 3). Contact your local Eaton representative for any further assistance.

### Arc voltage considerations

A K-Limiter fuse, when applied correctly, generates arc voltages well below arrester sparkover levels. The protective characteristics in Table 4 are the maximum peak-arc voltages for each K-Limiter fuse at rated voltage. Peak arc voltages will be lower when the fuses are used at system voltages lower than the fuse's rated voltage.

## Installation

A K-Limiter fuse can be added to new or existing distribution equipment installations to provide the energy limiting protection that is needed. The fuse can be mounted in open or enclosed cutout terminals as well as transformer bushing terminals. It can also be suspended in the drop leads or used with hot-line connectors. When installing a K-Limiter fuse, observe the following guidelines:

1. Arrester can be connected on either the source or load side.
2. Direct expulsion gases from cutouts away from any K-Limiter fuse mounted nearby as well as away from adjacent equipment.
3. Maintain normal system phase and ground spacings.

Installation examples are shown in Figures 2 through 6.

## Dimensions and weights

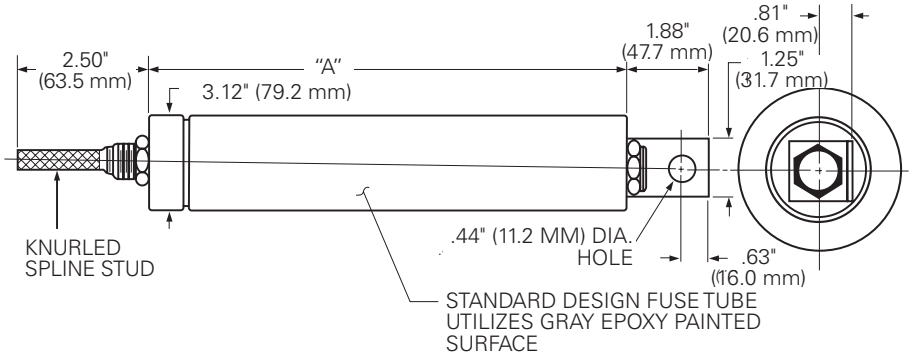


**Figure 12. K-Limiter back-up current-limiting fuse dimensional Information (Refer to Table 3).**

**Table 5. Dimensional Information**

| Voltage Rating | Fuse Ampere Rating | A in. (mm) | Approx. Weight lbs (kg) |
|---|---|---|---|
| 4.3 kV | K50 | 6.42 (163.1) | 3 (1.4) |
| | K80 | | |
| 8.3 kV | K65 | 11.94 (295.6) | 5.5 (2.5) |
| | K80 | | |
| | K100 | | |
| | K140 | | |
| 15 kV | K65 | 16 (406) | 9 (4.0) |
| | K80 | | |

## Ordering information

### Selecting a catalog number

To order a K-Limiter fuse, first choose a fuse voltage and current rating from the Application Section on page 2. After selecting the fuse size choose the appropriate Base Catalog Number from Tables 7, 8 or 9 and add the appropriate terminal option code from Table 6.

**Table 6. Terminal Options***

| Terminal Code | Description |
|---|---|
| "-A1" | Spade and Eyebolt Connector |
| "-B1" | Spline Stud and Spade Connector |
| "-B2" | Spline Stud and Spade with Parallel-Groove Connector |
| "-C1" | Spade and Spade |
| "-C2" | Spade and Spade w/Parallel-Groove Connector |
| "-D1" | End Boss and Spade |
| "-D2" | End Boss and Spade w/Parallel-Groove Connector |
| "-D3" | End Boss and Eyebolt |
| "-E1" | Spline Stud and Eyebolt |

**Table 7. 4.3 kV K-Limiter Fuse**

| Current Rating | Interrupting Rating (kA-Sym) | K-Limiter Fuse Catalog Number | |
|---|---|---|---|
| | | Base Catalog Number | Terminal Code |
| 50K | 50 | 43K050 | Refer to Table 6 |
| 80K | 50 | 43K080 | Refer to Table 6 |

**Table 8. 8.3 kV K-Limiter Fuse**

| Current Rating | Interrupting Rating (kA-Sym) | K-Limiter Fuse Catalog Number | |
|---|---|---|---|
| | | Base Catalog Number | Terminal Code |
| 50K | 50 | 83K050 | Refer to Table 6 |
| 65K | 50 | 83K065 | Refer to Table 6 |
| 80K | 50 | 83K080 | Refer to Table 6 |
| 100K | 50 | 83K100 | Refer to Table 6 |
| 140K | 50 | 83K140 | Refer to Table 6 |

**Table 9. 15.5 kV K-Limiter Fuse**

| Current Rating | Interrupting Rating (kA-Sym) | K-Limiter Fuse Catalog Number | |
|---|---|---|---|
| | | Base Catalog Number | Terminal Code |
| 50K | 50 | 155K050 | Refer to Table 6 |
| 65K | 50 | 155K065 | Refer to Table 6 |
| 80K | 50 | 155K080 | Refer to Table 6 |

## Additional information

Refer to the following reference literature for additional information:

| | |
|---|---|
| MN132001EN | K-Limiter Back-up Current-Limiting Fuse Installation Instructions |

**Eaton**
1000 Eaton Boulevard
Cleveland, OH 44122
United States
Eaton.com

**Eaton's Power Systems Division**
2300 Badger Drive
Waukesha, WI 53188
United States
Eaton.com/cooperpowerseries


Printed in USA
Publication No. CA132059EN /
CSSC-1805-5504
June 2018



For Eaton's Cooper Power series product information call 1-877-277-4636 or visit: www.eaton.com/cooperpowerseries.

Powering Business Worldwide