

POWR-GARD™ PRODUCTS CATALOG





## Littelfuse®

### The World's Leading Provider of Circuit Protection Solutions

Littelfuse is committed to providing every one of our customers with the right solutions to meet all of your circuit protection needs. That is why we carry the broadest range of technologies available on the market today.

The breadth of our offering, combined with our depth of product and application expertise, gives us the freedom to provide objective, comprehensive solutions to meet the specific needs of each application. This allows for a true partnership with our customers.

#### The Industries We Serve

Solutions from Littelfuse can be found in virtually every application that uses electrical energy, including:

- Automotive applications
- Digital consumer electronics
- Industrial/Electrical applications
- Telecom/Datacom circuits

#### An Exceptional Portfolio Makes All the Difference

When you work with Littelfuse, you are working with the broadest and deepest circuit protection portfolio available. We leverage 7 different technologies, giving you access to an unparalleled selection – helping you find the right solution for your application.

- Fuses, Holders & Accessories
- PTCs
- GDTs
- SIDACTors®
- Varistors
- Diodes
- Polymer ESD devices

#### Commitment to Circuit Protection

For over 75 years Littelfuse has maintained its focus on circuit protection. As we expand in global reach and technical sophistication, you can continue to count on us for solid circuit protection solutions, innovative technologies, and industry-leading expertise. It is a commitment that only a world-class leader with staying power can support.

## Contents

|                                      |           |                                         |            |
|--------------------------------------|-----------|-----------------------------------------|------------|
| <b>POWR-PRO® Fuses</b>               | <b>3</b>  | <b>Special Purpose Fuses</b>            | <b>83</b>  |
| Indicator® Introduction              | 4         | Semiconductor Fuses                     | 84-106     |
| Global Pro™ Introduction             | 5         | Fork-Lift Fuses                         | 107        |
| MROplus™                             | 6         | Cable Limiters                          | 108        |
| POWR-PRO® Introduction               | 7         | LMF, LGR, LHR                           | 109        |
| KLPC                                 | 8-10      |                                         |            |
| LLSRK_ID                             | 11-13     | <b>Blocks &amp; Holders</b>             | <b>110</b> |
| LLNRK, LLSRK                         | 14-16     | Class H/K5 & R                          | 111-116    |
| JTD_ID                               | 17-19     | Class J                                 | 117-119    |
| CCMR                                 | 20-21     | Class T                                 | 120-123    |
| IDSR                                 | 22        | Class G                                 | 124        |
| LDC                                  | 23-24     | Class CC & Midget                       | 125-126    |
|                                      |           | Class CC & Midget Accessories           | 127        |
| <b>General Purpose Fuses</b>         | <b>25</b> | POWR-SAFE Fuseholders                   | 128-129    |
| KLJU                                 | 26-28     | POWR-Covers                             | 130        |
| FLNR_ID/FLSR_ID                      | 29-32     | Pullers, POWR-JAW                       | 131        |
| FLNR/FLSR                            | 33        | 571 Fuseholder                          | 132        |
| KLNR/KLSR                            | 34-35     | LFFB Limiter Block                      | 133        |
| NLN/NLS                              | 36-37     | LHFB Inline 3AG Holder                  | 133        |
| RLN/RLS                              | 38        | Semiconductor Blocks                    | 134-136    |
| JLS                                  | 39-40     | POWR-BLOCKS™                            |            |
| JLLN/JLLS                            | 41-43     | Distribution/Splicer                    | 137-141    |
| SLC                                  | 44        | Dimensions                              | 142-144    |
| CCMR, KLDR, KLKR                     | 45-47     | In-Line Watertight Fuseholders          | 145-150    |
| Plug Fuses                           | 48        |                                         |            |
|                                      |           | <b>Miscellaneous Products</b>           | <b>151</b> |
| <b>Midget &amp; Electronic Fuses</b> | <b>49</b> | POWR-Switch and LPMP Panel              | 152-155    |
| Midget Fuses                         | 50-54     | Disconnect Switches                     | 156        |
| Electronic Fuses                     |           | Fuse Reducers                           | 157        |
| 3AG/3AB                              | 55        | Box Covers                              | 158-159    |
| Indicating                           | 56        | Fuse Cabinet, Display                   | 160        |
| 5x20 mm IEC Type                     | 57        |                                         |            |
| 5x20 mm & 2AG                        | 58        | <b>International Products</b>           | <b>161</b> |
| Subminiature                         | 59        | Global Pro Fuses                        | 162        |
| Automotive Fuses                     |           | Global Pro Fuseholders                  | 163        |
| SFE & Blade Type                     | 60        | NH Fuse Links                           | 164-165    |
| Bolt-on Type                         | 61        | Diazed/Neozed Fuse                      | 166-167    |
| Miscellaneous Types                  | 62        | Cylindrical Fuses                       | 168        |
|                                      |           | British Dimension                       | 169        |
| <b>Medium Voltage Fuses</b>          | <b>63</b> |                                         |            |
| Medium Voltage Fuses                 | 64-75     | <b>Overvoltage Suppression Products</b> | <b>170</b> |
|                                      |           | Introduction                            | 171-172    |
| <b>Telecom Products</b>              | <b>76</b> | Industrial Varistor Products            | 173        |
| L17T                                 | 77        | LVSP                                    | 174        |
| TUN                                  | 78        |                                         |            |
| TLS                                  | 79        | <b>Fuseology</b>                        | <b>175</b> |
| 70 Series                            | 80        | Terms and Definitions                   | 177-181    |
| 481 Series                           | 80        | Electrical Safety                       | 182-183    |
| LTFD 101                             | 81        | Fuse Application Guide                  | 184-203    |
| LTFD 6001                            | 82        | Motor Protection Tables                 | 204-206    |
| LTFD 1200                            | 82        | Condensed Cross Reference               | 207        |
|                                      |           | Alphanumeric Index                      | 208        |

| UL Class                  | Fuse Overload Characteristics                        | Interrupting Rating, Amperes | AC Voltage Rating | Available Ampere Ratings               | Littelfuse Series Number                     | Page Number             |
|---------------------------|------------------------------------------------------|------------------------------|-------------------|----------------------------------------|----------------------------------------------|-------------------------|
| <b>L</b>                  | Time-Delay                                           | 200,000<br>300,000**         | 600               | 200 – 6000<br>601 – 4000<br>150 – 2000 | KLPC**<br>KLLU<br>LDC*                       | 8-10<br>26-28<br>23-24  |
| <b>RK1</b>                | Time-Delay                                           | 200,000<br>300,000**         | 250<br>600<br>600 | 1/10 – 600                             | LLNRK**<br>LLSRK**<br>LLSRK_ID**             | 14-16<br>14-16<br>11-13 |
|                           | Fast-Acting                                          | 200,000                      | 250<br>600        | 1 – 600                                | KLNR<br>KLSR                                 | 34-35                   |
| <b>RK5</b>                | Time-Delay                                           | 200,000<br>300,000**         | 250<br>600<br>600 | 1/10 – 600                             | FLNR/FLNR_ID**<br>FLSR/FLSR_ID**<br>IDSR**,* | 29-32<br>29-32<br>22    |
| <b>T</b>                  | Fast-Acting                                          | 200,000                      | 300<br>600        | 1 – 1200                               | JLLN<br>JLLS                                 | 41-43                   |
| <b>J</b>                  | Time-Delay                                           | 200,000/300,000**            | 600               | 8/10 – 600                             | JTD/JTD_ID**                                 | 17-19                   |
|                           | Fast-Acting                                          | 200,000                      | 600               | 1 – 600                                | JLS                                          | 39-40                   |
| <b>CC</b>                 | Time-Delay                                           | 200,000<br>300,000**         | 600               | 1/10 – 30<br>2/10 – 30                 | KLDR<br>CCMR**                               | 45-47<br>20-21          |
|                           | Fast-Acting                                          | 200,000                      | 600               | 1/10 – 30                              | KLKR                                         | 45-47                   |
| <b>CD</b>                 | Time-Delay                                           | 200,000/300,000**            | 600               | 35 – 60                                | CCMR**                                       | 20-21                   |
| <b>G</b>                  | Time-Lag                                             | 100,000                      | 600<br>480        | 1/2 – 20<br>25 – 60                    | SLC<br>SLC                                   | 44                      |
| <b>K5</b>                 | “One-Time” Fuses<br>Fast-Acting                      | 50,000                       | 250<br>600        | 1 – 600<br>1 – 600                     | NLN<br>NLS                                   | 36-37                   |
| <b>H</b>                  | Renewable Fuses<br>Fast-Acting<br>Time-Delay         | 10,000                       | 250<br>600        | 1 – 600<br>1 – 600                     | RLN<br>RLS                                   | 38                      |
| <b>Plug</b>               | Time-Delay                                           | 10,000                       | 125               | 1/4 – 30                               | S00, T00                                     | 48                      |
|                           | Medium Time-Delay                                    | 10,000                       | 125               | 15 – 30                                | SLO, TLO                                     | 48                      |
| <b>Supplementary</b>      | Midget Fuses<br>Electronic Fuses<br>Automotive Fuses | Varies                       | 32 to 1000        | 1/10 – 30<br>1/500 – 30<br>1-250       | See Product Listings                         | 50-54<br>55-59<br>60-62 |
| <b>Telecommunications</b> | Fast-Acting                                          | 100,000                      | 170VDC            | 70 – 1200<br>1 – 600<br>1 – 70         | L17T<br>TLN<br>TLS                           | 77<br>78<br>79          |

\* LDC and IDSR are rated 600 volts AC/DC.

\*\* Series are UL Listed with I.R. of 200,000 amps and Littelfuse self-certified with 300,000A I.R.

## POWR-PRO® Fuses



|                                                           |              |
|-----------------------------------------------------------|--------------|
| <i>Littelfuse Indicator® Fuses</i>                        | <b>4</b>     |
| <i>Littelfuse Global Pro™ System</i>                      | <b>5</b>     |
| <i>Littelfuse MROplus™</i>                                | <b>6</b>     |
| <i>Littelfuse POWR-PRO System</i>                         | <b>7</b>     |
| <i>KLPC Series POWR-PRO Class L Fuses</i>                 | <b>8-10</b>  |
| <i>LLSRK_ID Series Indicator POWR-PRO Class RK1 Fuses</i> | <b>11-13</b> |
| <i>LLNRK/LLSRK Series POWR-PRO Class RK1 Fuses</i>        | <b>14-16</b> |
| <i>JTD_ID Series Indicator POWR-PRO Class J Fuses</i>     | <b>17-19</b> |
| <i>CCMR Series POWR-PRO Class CC and CD Fuses</i>         | <b>20-21</b> |
| <i>IDSR Series Indicator POWR-PRO Class RK5 Fuses</i>     | <b>22</b>    |
| <i>LDC Series POWR-PRO Class L Fuses</i>                  | <b>23-24</b> |

## Littelfuse Indicator® Fuses

### Complete Circuit Protection Plus Time Saving Indication.

Indicator fuses combat one of the most common and frustrating obstacles to productivity: downtime. Every time a fuse opens and production stops, money is wasted. Locating a blown fuse used to take 20 minutes or more. Blown Littelfuse Indicator fuses can be spotted quickly and safely, while the power is turned off.

Now it couldn't be easier to locate the blown fuse. Simply look at the Indicator window. When the fuse blows, the window turns from clear to dark instantly, indicating which fuse needs to be replaced without headaches or hassles.

These technologically advanced fuses feature solid-state designs that improve overall performance and increase fuse life. When properly applied, Indicator fuses provide superior protection and improved time-delay over conventional fuse designs. The patented solid-state overload section provides consistent and reliable operation by eliminating moving parts which are subject to fatigue. This provides longer fuse life by eliminating needless fuse openings due to motor inrush currents. The superior performance allows you to consolidate your inventories by replacing older, conventional fuses which have limited performance characteristics.

#### **LLSRK\_ID** *see pages 11-13*

- **Class RK1**
- **600 VAC**
- **Dual-Element, Time-Delay**
- **1/10-600 Amperes**

#### **FLNR\_ID/FLSR\_ID** *see pages 29-32*

- **Class RK5**
- **250/600 VAC**
- **Dual-Element, Time-Delay**
- **1/10-600 Amperes**

#### **IDSR** *see page 22*

- **Class RK5**
- **600 V AC/DC**
- **Dual-Element, Time-Delay**
- **1/10-600 Amperes**

#### **JTD\_ID** *see pages 17-19*

- **Class J**
- **600 VAC**
- **Dual-Element, Time-Delay**
- **8/10-600 Amperes**

#### **313\_ID** *see page 56*

- **Electronic 3AG**
- **125/32 VAC**
- **Slo-Blo®**
- **1/2-10 Amperes**

Use Indicator fuses and you can:

- **Reduce Downtime**
- **Reduce Nuisance Opening**
- **Reduce Fuse Inventory**
- **Reduce Equipment Damage**
- **Reduce Accidents**
- **Reduce Housekeeping Headaches**

The Indicator® Solution Software



This easy to use software analyzes your plant operations and calculates six areas of cost savings when you use Indicator fuses.

To calculate your savings, call 1-800-TEC-FUSE for a free copy of the Indicator Solution software.



## Littelfuse Global Pro™ System

### Introducing the Global Pro System

Offering World Class Performance and Global Acceptance

#### The International Challenge

Engineers and equipment designers are faced with a dilemma when choosing the right circuit protection for their globally distributed equipment. They need to worry about which markets the product will be used in, what appropriate electrical standards apply in each of those markets, and what fuses should be used so that users can find replacements easily. These can be daunting questions particularly because some of this information often is not available to the engineer when a particular piece of equipment is being designed.

The Global Pro system resolves these design issues by incorporating North American standards to fit internationally accepted IEC fuse dimensions. This allows use of touchsafe fuseholders that can be used in virtually any market and permits equipment to be easily adapted by simply replacing the fuse with one that meets local standards. It's that simple.

The benefits of the Global Pro system include:

- Global acceptance
- UL and IEC approval
- Universal voltages
- Touch-safe components
- Integrated lockout/tagout device for compliance
- Pin-indication
- Design versatility for OEMs

#### Global Acceptance – Total Protection

The Littelfuse Global Pro circuit protection system combines fuses, fuse holders and fusible disconnect switches in a simple, integrated package designed to comply with UL and IEC requirements. The result is the single best solution for your worldwide circuit protection needs. No matter where your product is used, Global Pro will be accepted. More significantly, it's easy too! It meets universal voltage standards, offers universal fuse sizes and uses universally understood product labels and part numbers.

#### Flexible Components

The components of the Global Pro system are vital to its revolutionary performance, and the key component within the system is the fuse. The Littelfuse Global Fuse is designed to offer UL Class J performance, but with the compact size and the international compatibility associated with fuses manufactured to IEC dimensions.

#### More Protection In Less Space

Littelfuse Global Pro fuses are significantly smaller in size than 30 amp, 60 amp, and 100 amp Class J fuses. But their small size does not limit their performance. All Global Pro fuses offer the following:

- Extremely compact size
- Pop-up indication
- Performance to UL Class J fuse requirements
- Compatibility with IEC style fuseholders

*Note: For more information refer to pages 162–163 of this catalog.*



# MRO<sup>TM</sup> PLUS

## Material Reduction Opportunity Program

## Circuit Protection Simplified!

The Littelfuse exclusive MROplus (Material Reduction Opportunity Plus) program is designed to help lower costs, reduce inventory and improve circuit protection performance. A team of Littelfuse technical experts will analyze inventory and generate a variety of detailed reports including: a total cost savings report, a cross reference report and a duplicate or obsolete inventory report. On average, customers who use the Littelfuse MROplus program are able to reduce their inventory by 28%. All you have to do is supply a list of current inventory and the Littelfuse MROplus program will do the rest. And, best of all, it is absolutely FREE!



- 1 Reduce Inventory by 28%, on average**
- 2 Upgrade Your Circuit Protection**
- 3 Improve Plant Safety**
- 4 Lower Operational Costs**

**For more information call 1-800-TEC-FUSE**

## Littelfuse POWR-PRO® System



*The Littelfuse POWR-PRO System of fuses gives you all the fuses you need for complete circuit protection coverage while reducing inventory and controlling costs.*

### The POWR-PRO System will:

- Provide superior current-limiting protection with innovative, tested designs to prevent or reduce electrical system damage.
- Reduce inventory by standardizing system protection.
- Provide visual blown fuse indication with LLSRK\_ID, and JTD\_ID Indicator® fuses.
- Reduce fuse replacement downtime with simple color coded fuse labels.

See for yourself why the POWR-PRO System gives you the widest range of circuit protection available today when compared to other systems.

### Minimize Arc-Flash Hazards

Some of the factors that determine the severity of an Arc-Flash are the magnitude of the fault current and the time the current is allowed to flow. Current-limiting fuses applied within their current-limiting range minimize the current flow and clear the fault in 0.00833 seconds or less. The more current-limiting the device and the faster it clears the fault minimizes Arc-Flash hazards and potentially reduces the amount of personal protective equipment (PPE) required. Using Littelfuse POWR-PRO Fuses will not only minimize Arc-Flash hazards with superior current limitation, but also provide maximum protection to equipment.

One of the quickest and easiest ways to reduce Arc-Flash hazards is to replace UL Class H, K5, and Class RK5 fuses with POWR-PRO current-limiting Class RK1 or Class J fuses. For a given current and voltage rating, Class H, K5, RK5, and RK1 fuses are the same physical size. Therefore, it is easy to upgrade to better fuse protection and increased safety. To insure that only the most current-limiting fuse is used, it is recommended to change fuse clips to a rejection style for Class R or Class J fuses. Class J fuses provides the best option by assuring non-interchangeability with non-current-limiting fuses. Whichever your choice, the equipment should be labeled to inform maintenance personnel of the proper fuse replacement. The Littelfuse MROplus™ Program can assist with analyzing and upgrading from non-current-limiting fuses.

| UL Fuse Class | POWR-PRO®      | Low Peak      | System 2000 |
|---------------|----------------|---------------|-------------|
| Class L       | KLPC           | KRPC          | A4BQ        |
| Class RK1     | LLNRK/LLSRK_ID | LPNRK/LPSRK   | A2DR/A6DR   |
| Class J       | JTD/JTD_ID     | LPJ           | AJT         |
| Class CC      | CCMR (2/10–60) | LPCC (1/2–30) | ATDR (0–30) |

### COLOR COORDINATED FOR EASE OF IDENTITY AND REPLACEMENT



### Green label fuses provide all the inventory you need for:

- Superior current-limitation from 1/10 – 6000 amperes.
- Type 2 “No Damage” coordination with NEMA and IEC motor circuits.
- Blown fuse indication (LLSRK\_ID and JTD\_ID).
- Compact protection for motor circuits (JTD, JTD\_ID, and CCMR).
- 300,000 AIR to meet future trends toward higher available short circuit currents.

## KLPC Series POWR-PRO® Class L Fuses

600 VAC • Time-Delay • 200 – 6000 Amperes



KLPC series POWR-PRO fuses provide ideal overcurrent protection for circuits from 200 through 6000 amperes. KLPC series POWR-PRO fuses specification-grade construction and performance meet or exceed the most stringent project specifications: 99.9% pure silver links, silver-plated copper end bells, glass-reinforced melamine bodies, O-ring seals between body and end bells, and granular quartz fillers.

KLPC series POWR-PRO fuses are the only UL listed Class L fuses that provide a minimum of ten seconds time delay at 500% rated

current and are also as current-limiting as the fastest Class L fuse on the market. On average, the peak let-through currents of KLPC series fuses are 10% less than any other time-delay Class L fuse.

### Applications

Service switches  
Switchboard mains and feeders  
Bolted pressure contact switches  
Motor control center mains  
Large motor branch circuits  
UL Listed series-rated protection for molded case circuit breaker panelboards and loadcenters. (See panelboard manufacturers' literature for recommended fuse rating.)  
Primary and secondary protection for transformers  
Protection of power circuit breakers

### Features and Benefits

- Eliminate unnecessary downtime — KLPC POWR-PRO series time-delay withstands system surges and keeps your circuits in service.
- Best protection for system components — Maximum current limitation means less equipment and system damage when short circuits occur. Reduced damage means that electrical service can be restored quickly, reducing costly downtime, and often permitting equipment repair rather than replacement.
- Coordinates with other system components — KLPC series fuses provide maximum coordination with fuses and circuit breakers both on the line and load side of the fuses. See the Fuseology section of this catalog for additional information.
- Eliminate need to oversize fuses — This may permit the use of smaller, less expensive switches. Since lower rated fuses are more current-limiting, equipment receives even better protection.
- 300kA Interrupting Rating — Littelfuse self-certified to 300,000 amperes as standard. Meets future trend towards higher available short circuit currents.

### Specifications

|                              |                                                                                                                                                                                                                                                                             |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Voltage Ratings:</b>      | AC: 600 Volts<br>DC: 480 Volts                                                                                                                                                                                                                                              |
| <b>Interrupting Ratings:</b> | AC: 200,000 amperes rms symmetrical<br>300,000 amperes rms symmetrical (Littelfuse self-certified)<br>DC: 20,000 amperes                                                                                                                                                    |
| <b>Ampere Range:</b>         | 200 – 6000 amperes                                                                                                                                                                                                                                                          |
| <b>Approvals:</b>            | AC: Standard 248-10, Class L<br>UL Listed 601 – 6000 amps (File No: E81895)<br>UL Recognized 200 – 600 amps (File No: E71611)<br>CSA Certified 200 – 6000 amps (File No: LR29862)<br>QPL Federal Specifications WF-1814<br>700 – 6000 amps<br>DC: Littelfuse self-certified |

### Ampere Ratings

|     |     |      |      |      |      |
|-----|-----|------|------|------|------|
| 200 | 500 | 800  | 1350 | 2000 | 3500 |
| 250 | 600 | 900  | 1400 | 2100 | 4000 |
| 300 | 601 | 1000 | 1500 | 2200 | 4500 |
| 350 | 650 | 1100 | 1600 | 2300 | 5000 |
| 400 | 700 | 1200 | 1800 | 2500 | 6000 |
| 450 | 750 | 1300 | 1900 | 3000 |      |

Example part number (series & amperage): KLPC 1000

## KLPC Series POWR-PRO® Class L Fuses

600 VAC • Time-Delay • 200 – 6000 Amperes

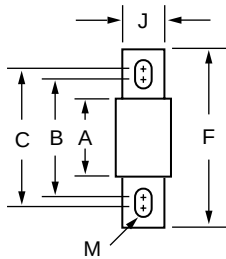


FIG. 1

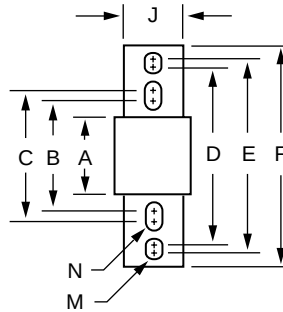


FIG. 2

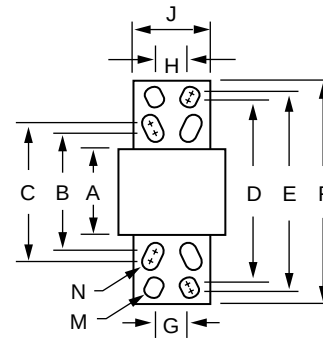


FIG. 3

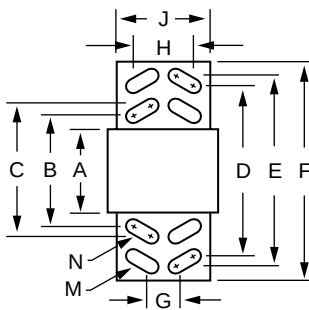


FIG. 4

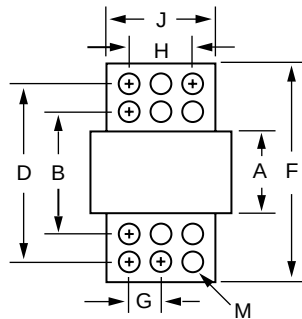
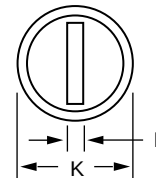


FIG. 5



| Amperes     | Fig. No. | Dimensions in Inches (mm in parentheses) |                                          |                                          |                                          |                                          |                                           |                                         |                                         |                                          |                                          |                                          |                                                                                  |                                                                                  |
|-------------|----------|------------------------------------------|------------------------------------------|------------------------------------------|------------------------------------------|------------------------------------------|-------------------------------------------|-----------------------------------------|-----------------------------------------|------------------------------------------|------------------------------------------|------------------------------------------|----------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
|             |          | A                                        | B                                        | C                                        | D                                        | E                                        | F                                         | G                                       | H                                       | J                                        | K                                        | L                                        | M                                                                                | N                                                                                |
| 200 – 800   | 1        | 3 <sup>3</sup> / <sub>4</sub><br>(95.3)  | 5 <sup>3</sup> / <sub>4</sub><br>(146.1) | 6 <sup>3</sup> / <sub>4</sub><br>(171.5) | —                                        | —                                        | 8 <sup>5</sup> / <sub>8</sub><br>(219.1)  | —                                       | —                                       | 2<br>(50.8)                              | 2 <sup>1</sup> / <sub>2</sub><br>(63.5)  | 3 <sup>5</sup> / <sub>8</sub><br>(9.5)   | 5 <sup>5</sup> / <sub>8</sub> X 1 <sup>1</sup> / <sub>8</sub><br>(15.9) X (28.6) | —                                                                                |
| 801 – 1200  | 2        | 3 <sup>3</sup> / <sub>4</sub><br>(95.3)  | 5 <sup>3</sup> / <sub>4</sub><br>(146.1) | 6 <sup>3</sup> / <sub>4</sub><br>(171.5) | 9 <sup>1</sup> / <sub>4</sub><br>(235.0) | 9 <sup>1</sup> / <sub>2</sub><br>(241.3) | 10 <sup>3</sup> / <sub>4</sub><br>(273.1) | —                                       | —                                       | 2<br>(50.8)                              | 2 <sup>1</sup> / <sub>2</sub><br>(63.5)  | 3 <sup>5</sup> / <sub>8</sub><br>(9.5)   | 5 <sup>5</sup> / <sub>8</sub> X 3 <sup>3</sup> / <sub>4</sub><br>(15.9) X (19.1) | 5 <sup>5</sup> / <sub>8</sub> X 1 <sup>1</sup> / <sub>8</sub><br>(15.9) X (28.6) |
| 1201 – 1600 | 2        | 3 <sup>3</sup> / <sub>4</sub><br>(95.3)  | 5 <sup>3</sup> / <sub>4</sub><br>(146.1) | 6 <sup>3</sup> / <sub>4</sub><br>(171.5) | 9 <sup>1</sup> / <sub>4</sub><br>(235.0) | 9 <sup>1</sup> / <sub>2</sub><br>(241.3) | 10 <sup>3</sup> / <sub>4</sub><br>(273.1) | —                                       | —                                       | 2 <sup>3</sup> / <sub>8</sub><br>(60.3)  | 3<br>(76.2)                              | 7 <sup>1</sup> / <sub>16</sub><br>(11.1) | 5 <sup>5</sup> / <sub>8</sub> X 3 <sup>3</sup> / <sub>4</sub><br>(15.9) X (19.1) | 5 <sup>5</sup> / <sub>8</sub> X 1 <sup>1</sup> / <sub>8</sub><br>(15.9) X (28.6) |
| 1601 – 2000 | 2        | 3 <sup>3</sup> / <sub>4</sub><br>(95.3)  | 5 <sup>3</sup> / <sub>4</sub><br>(146.1) | 6 <sup>3</sup> / <sub>4</sub><br>(171.5) | 9 <sup>1</sup> / <sub>4</sub><br>(235.0) | 9 <sup>1</sup> / <sub>2</sub><br>(241.3) | 10 <sup>3</sup> / <sub>4</sub><br>(273.1) | —                                       | —                                       | 2 <sup>3</sup> / <sub>4</sub><br>(69.9)  | 3 <sup>1</sup> / <sub>2</sub><br>(88.9)  | 1 <sup>1</sup> / <sub>2</sub><br>(12.7)  | 5 <sup>5</sup> / <sub>8</sub> X 3 <sup>3</sup> / <sub>4</sub><br>(15.9) X (19.1) | 5 <sup>5</sup> / <sub>8</sub> X 1 <sup>1</sup> / <sub>8</sub><br>(15.9) X (28.6) |
| 2001 – 2500 | 3        | 4<br>(101.6)                             | 5 <sup>3</sup> / <sub>4</sub><br>(146.1) | 6 <sup>3</sup> / <sub>4</sub><br>(171.5) | 9 <sup>1</sup> / <sub>4</sub><br>(235.0) | 9 <sup>1</sup> / <sub>2</sub><br>(241.3) | 10 <sup>3</sup> / <sub>4</sub><br>(273.1) | 1 <sup>1</sup> / <sub>8</sub><br>(41.3) | 1 <sup>3</sup> / <sub>4</sub><br>(44.5) | 3 <sup>1</sup> / <sub>2</sub><br>(88.9)  | 5<br>(127.0)                             | 3 <sup>3</sup> / <sub>4</sub><br>(19.1)  | 5 <sup>5</sup> / <sub>8</sub> X 3 <sup>3</sup> / <sub>4</sub><br>(15.9) X (19.1) | 5 <sup>5</sup> / <sub>8</sub> X 1 <sup>1</sup> / <sub>8</sub><br>(15.9) X (28.6) |
| 2501 – 3000 | 3        | 4<br>(101.6)                             | 5 <sup>3</sup> / <sub>4</sub><br>(146.1) | 6 <sup>3</sup> / <sub>4</sub><br>(171.5) | 9 <sup>1</sup> / <sub>4</sub><br>(235.0) | 9 <sup>1</sup> / <sub>2</sub><br>(241.3) | 10 <sup>3</sup> / <sub>4</sub><br>(273.1) | 1 <sup>1</sup> / <sub>8</sub><br>(41.3) | 1 <sup>3</sup> / <sub>4</sub><br>(44.5) | 4<br>(101.6)                             | 5<br>(127.0)                             | 3 <sup>3</sup> / <sub>4</sub><br>(19.1)  | 5 <sup>5</sup> / <sub>8</sub> X 3 <sup>3</sup> / <sub>4</sub><br>(15.9) X (19.1) | 5 <sup>5</sup> / <sub>8</sub> X 1 <sup>1</sup> / <sub>8</sub><br>(15.9) X (28.6) |
| 3001 – 4000 | 4        | 4<br>(101.6)                             | 5 <sup>3</sup> / <sub>4</sub><br>(146.1) | 6 <sup>3</sup> / <sub>4</sub><br>(171.5) | 9 <sup>1</sup> / <sub>4</sub><br>(235.0) | 9 <sup>1</sup> / <sub>2</sub><br>(241.3) | 10 <sup>3</sup> / <sub>4</sub><br>(273.1) | 1 <sup>3</sup> / <sub>4</sub><br>(44.5) | 3 <sup>3</sup> / <sub>4</sub><br>(82.6) | 4 <sup>3</sup> / <sub>4</sub><br>(120.7) | 5 <sup>3</sup> / <sub>4</sub><br>(146.1) | 3 <sup>3</sup> / <sub>4</sub><br>(19.1)  | 5 <sup>5</sup> / <sub>8</sub> X 1 <sup>3</sup> / <sub>8</sub><br>(15.9) X (34.9) | 5 <sup>5</sup> / <sub>8</sub> X 1 <sup>3</sup> / <sub>8</sub><br>(15.9) X (34.9) |
| 4001 – 5000 | 5        | 4<br>(101.6)                             | 5 <sup>3</sup> / <sub>4</sub><br>(146.1) | —                                        | 9 <sup>1</sup> / <sub>4</sub><br>(235.0) | —                                        | 10 <sup>3</sup> / <sub>4</sub><br>(273.1) | 1 <sup>1</sup> / <sub>8</sub><br>(41.3) | 3 <sup>3</sup> / <sub>4</sub><br>(82.6) | 5 <sup>1</sup> / <sub>4</sub><br>(133.4) | 7 <sup>7</sup> / <sub>8</sub><br>(181.0) | 1<br>(25.4)                              | 5 <sup>5</sup> / <sub>8</sub> DIA.<br>(15.9)                                     | —                                                                                |
| 5001 – 6000 | 5        | 4<br>(101.6)                             | 5 <sup>3</sup> / <sub>4</sub><br>(146.1) | —                                        | 9 <sup>1</sup> / <sub>4</sub><br>(235.0) | —                                        | 10 <sup>3</sup> / <sub>4</sub><br>(273.1) | 1 <sup>1</sup> / <sub>8</sub><br>(41.3) | 3 <sup>3</sup> / <sub>4</sub><br>(82.6) | 5 <sup>3</sup> / <sub>4</sub><br>(146.1) | 7 <sup>7</sup> / <sub>8</sub><br>(181.0) | 1<br>(25.4)                              | 5 <sup>5</sup> / <sub>8</sub> DIA.<br>(15.9)                                     | —                                                                                |

## KLPC Series POWR-PRO® Class L Fuses

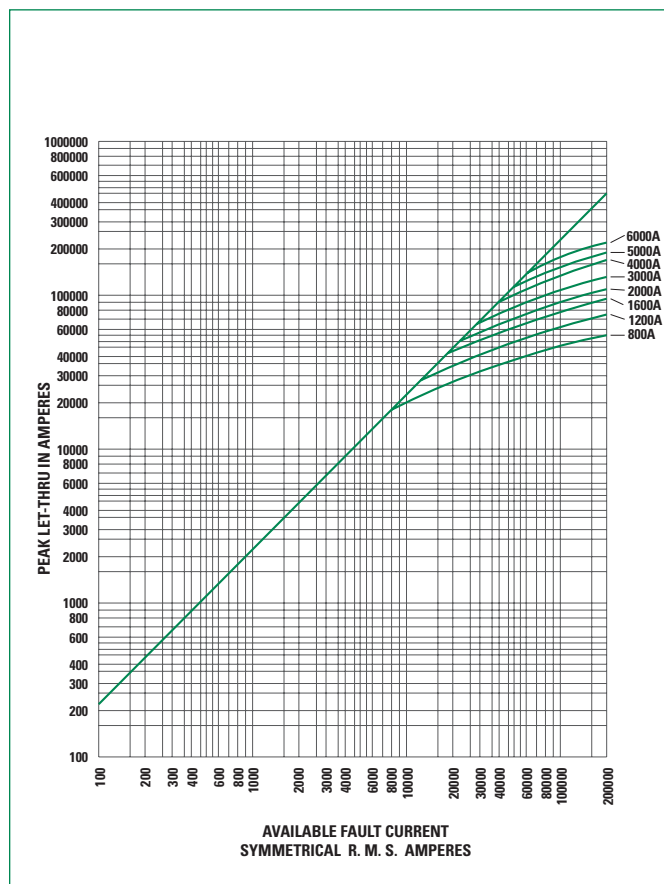
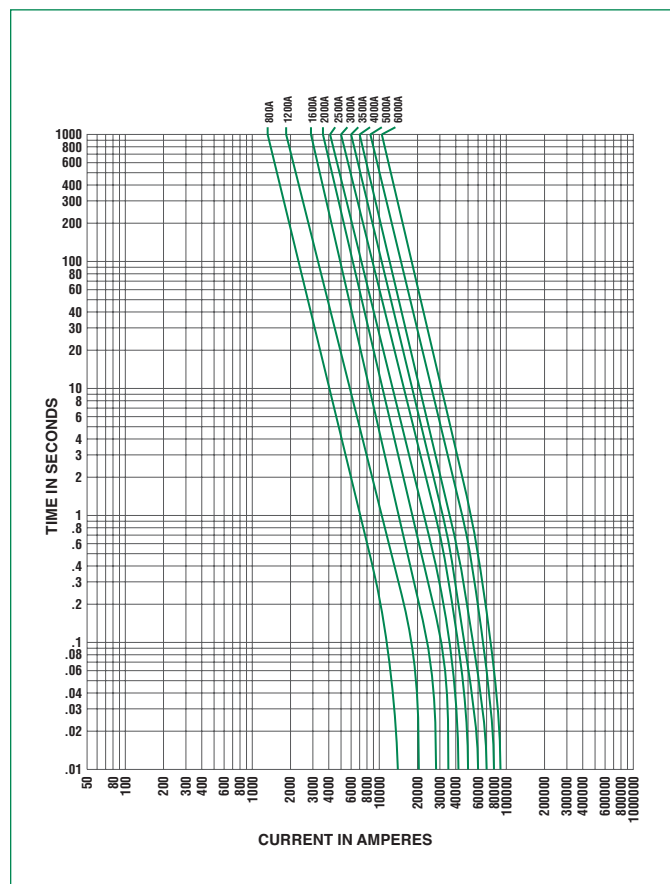
600 VAC • Time-Delay • 200 – 6000 Amperes

### Current-Limiting Effects of KLPC (600V) fuses

| Short Circuit Current* | Apparent RMS Symmetrical Current for Various Fuse Ratings |        |        |        |        |        |        |        |
|------------------------|-----------------------------------------------------------|--------|--------|--------|--------|--------|--------|--------|
|                        | 800A                                                      | 1200A  | 1600A  | 2000A  | 3000A  | 4000A  | 5000A  | 6000A  |
| 5,000                  | 5,000                                                     | 5,000  | 5,000  | 5,000  | 5,000  | 5,000  | 5,000  | 5,000  |
| 10,000                 | 8,800                                                     | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 |
| 15,000                 | 10,500                                                    | 13,500 | 15,000 | 15,000 | 15,000 | 15,000 | 15,000 | 15,000 |
| 20,000                 | 12,000                                                    | 15,000 | 19,000 | 20,000 | 20,000 | 20,000 | 20,000 | 20,000 |
| 25,000                 | 13,000                                                    | 16,000 | 21,000 | 24,000 | 25,000 | 25,000 | 25,000 | 25,000 |
| 30,000                 | 14,000                                                    | 18,000 | 23,000 | 26,000 | 30,000 | 30,000 | 30,000 | 30,000 |
| 35,000                 | 15,000                                                    | 19,000 | 24,000 | 27,000 | 32,000 | 35,000 | 35,000 | 35,000 |
| 40,000                 | 16,000                                                    | 20,000 | 25,000 | 28,000 | 34,000 | 40,000 | 40,000 | 40,000 |
| 50,000                 | 17,000                                                    | 22,000 | 27,000 | 31,000 | 37,000 | 42,500 | 50,000 | 50,000 |
| 60,000                 | 18,000                                                    | 24,000 | 29,000 | 34,000 | 40,000 | 46,000 | 52,000 | 60,000 |
| 80,000                 | 20,000                                                    | 26,000 | 32,000 | 37,000 | 44,000 | 51,000 | 57,000 | 70,000 |
| 100,000                | 21,000                                                    | 27,000 | 34,000 | 40,000 | 46,000 | 57,000 | 65,000 | 75,000 |
| 150,000                | 23,000                                                    | 31,000 | 38,000 | 44,000 | 54,000 | 67,000 | 75,000 | 87,000 |
| 200,000                | 24,000                                                    | 34,000 | 42,000 | 46,000 | 57,000 | 70,000 | 80,000 | 95,000 |

\* Prospective RMS Symmetrical Amperes Short-Circuit Current

Note: Data derived from Peak Let-Thru Curves



## LLSRK\_ID Series Indicator® POWR-PRO® Class RK1 Fuses

600 VAC • Dual-Element, Time-Delay • 1/10 – 600 Amperes



The all new LLSRK\_ID series fuse is the most advanced Class RK1 fuse available today providing unparalleled performance and protection to modern circuits. The patented Indicator technology provides instant identification of a blown fuse greatly enhancing system up-time, while the precision formed short-circuit elements virtually eliminate damage to components from unexpected electrical faults. In addition, the all new solid-state overload section has no moving parts, stopping unnecessary fatigue failures commonly found in other spring loaded fuses.

### Applications

All general purpose circuits  
Motors  
Transformers  
Solenoids  
Fluorescent lighting  
All system components with high in-rush currents

### Features/Benefits

- Reduce downtime — The indicating window of the LLSRK\_ID immediately identifies the open fuse. If the indicating strip is black, the fuse has opened. It's that simple. Maintenance personnel can immediately determine that there is an open fuse.
- Reduce fuse inventory — The superior performance of the LLSRK\_ID allows it to be used in a variety of applications, thus decreasing fuse inventory.
- Reduce nuisance opening — Indicator fuses offer superior time-delay and cycling characteristics, which can lengthen fuse life.
- Reduce equipment damage — Indicator fuses provide superior overload and short-circuit protection that can reduce equipment damage. The LLSRK\_ID is extremely current-limiting and provides IEC Type 2 "No Damage" protection to IEC and NEMA type motor starters.
- Reduce accidents — The LLSRK\_ID Indicator fuse improves safety by minimizing exposure to live circuits. Unlike other forms of blown fuse indication, once the indicating strip darkens, it stays dark. Other forms of indication require the power to remain on, which causes a potential safety hazard to personnel.

### Ordering Information

For online ordering use part number LSRK.

### Specifications

|                              |                                                                                                                                    |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| <b>Voltage Rating:</b>       | 600 VAC/300 VDC                                                                                                                    |
| <b>Interrupting Ratings:</b> | AC: 200,000 amperes rms symmetrical<br>300,000 amperes rms symmetrical<br>(Littelfuse self-certified)                              |
|                              | DC: 20,000 amperes                                                                                                                 |
| <b>Ampere Range:</b>         | 1/10 – 600 amperes                                                                                                                 |
| <b>Approvals:</b>            | AC: Standard 248-12, Class RK1<br>UL Listed (File No: E81895)<br>CSA Certified (File No: LR29862)<br>DC: Littelfuse self-certified |

### Ampere Ratings

|        |        |        |        |    |     |     |
|--------|--------|--------|--------|----|-----|-----|
| 1/10   | 1      | 2 8/10 | 6 1/4  | 25 | 80  | 250 |
| 15/100 | 1 1/8  | 3      | 7      | 30 | 90  | 300 |
| 2/10   | 1 1/4  | 3 3/10 | 8      | 35 | 100 | 350 |
| 1/4    | 1 4/10 | 3 1/2  | 9      | 40 | 110 | 400 |
| 3/10   | 1 6/10 | 4      | 10     | 45 | 125 | 450 |
| 4/10   | 1 8/10 | 4 1/2  | 12     | 50 | 150 | 500 |
| 1/2    | 2      | 5      | 15     | 60 | 175 | 600 |
| 6/10   | 2 1/4  | 5 6/10 | 17 1/2 | 70 | 200 |     |
| 8/10   | 2 1/2  | 6      | 20     | 75 | 225 |     |

Example part number (series & amperage): LLSRK30ID.

*NOTE: All fuses rated 1 amp and above are Indicator fuses.*

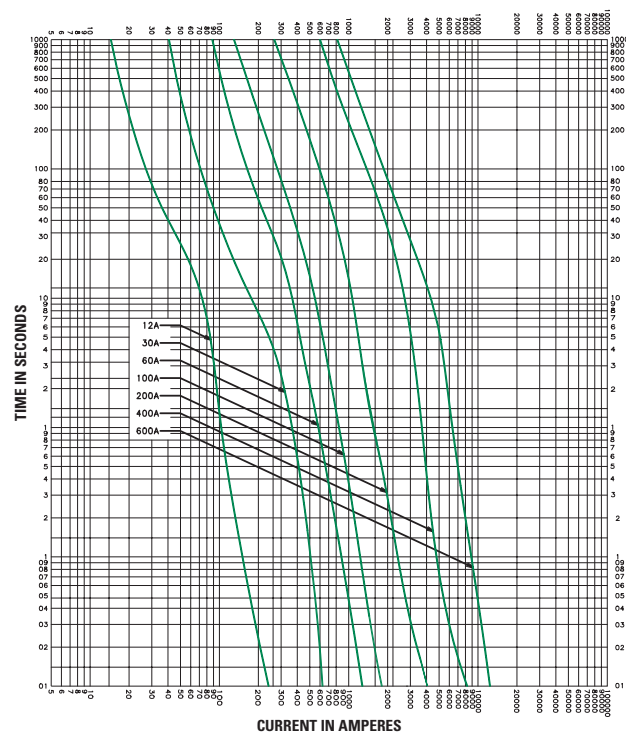
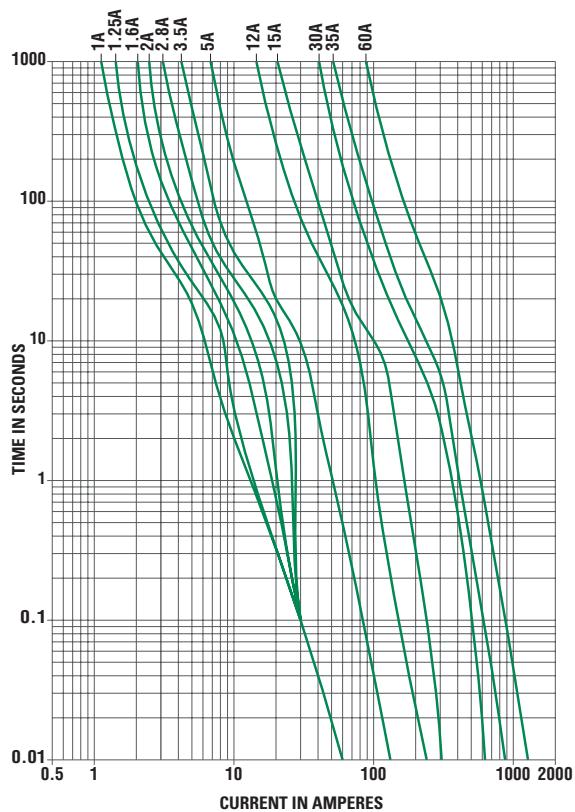
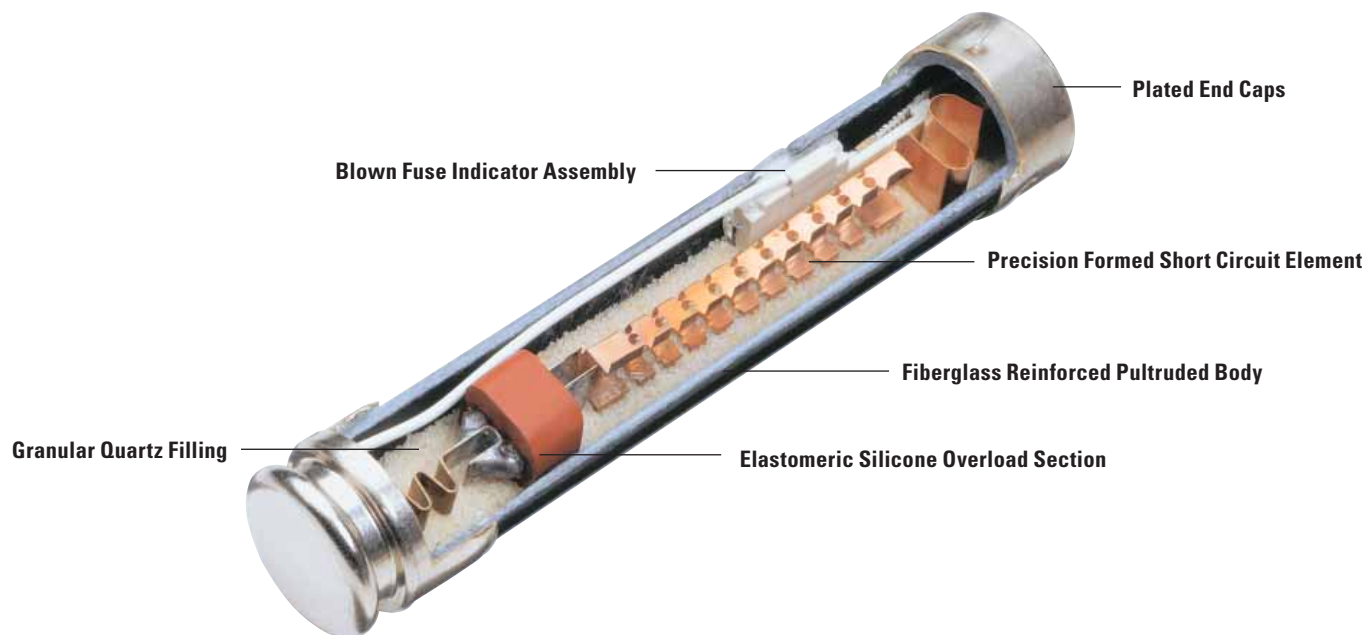
### Recommended Fuse Blocks

LR600 Series

Refer to the Blocks & Holders section of this catalog for additional information.

## LLSRK\_ID Series Indicator® POWR-PRO® Class RK1 Fuses

600 VAC • Dual-Element, Time-Delay • 1/10 – 600 Amperes



Contact Littelfuse for additional fuse curves.

## LLSRK\_ID Series Indicator® POWR-PRO® Class RK1 Fuses

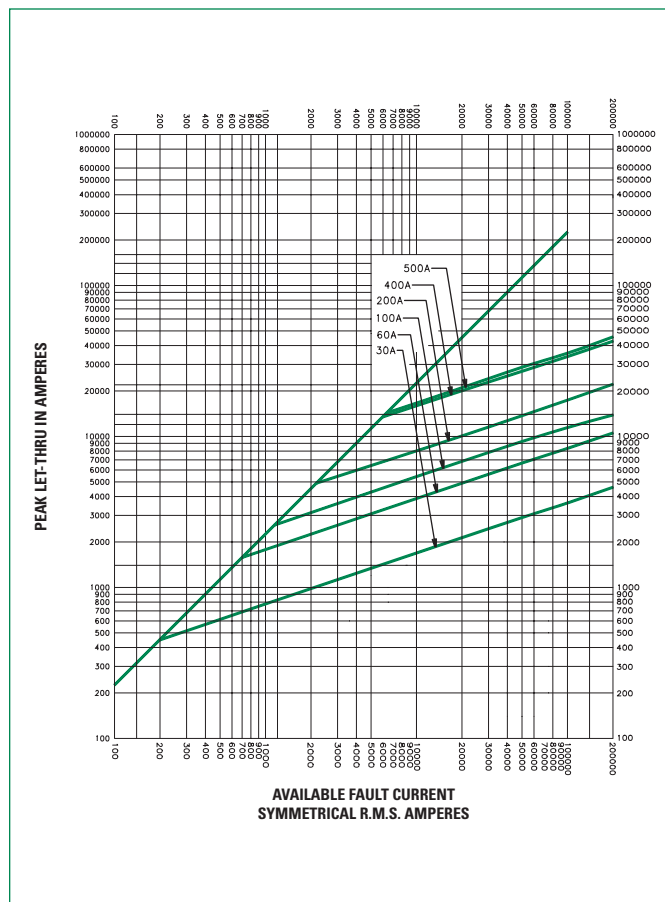
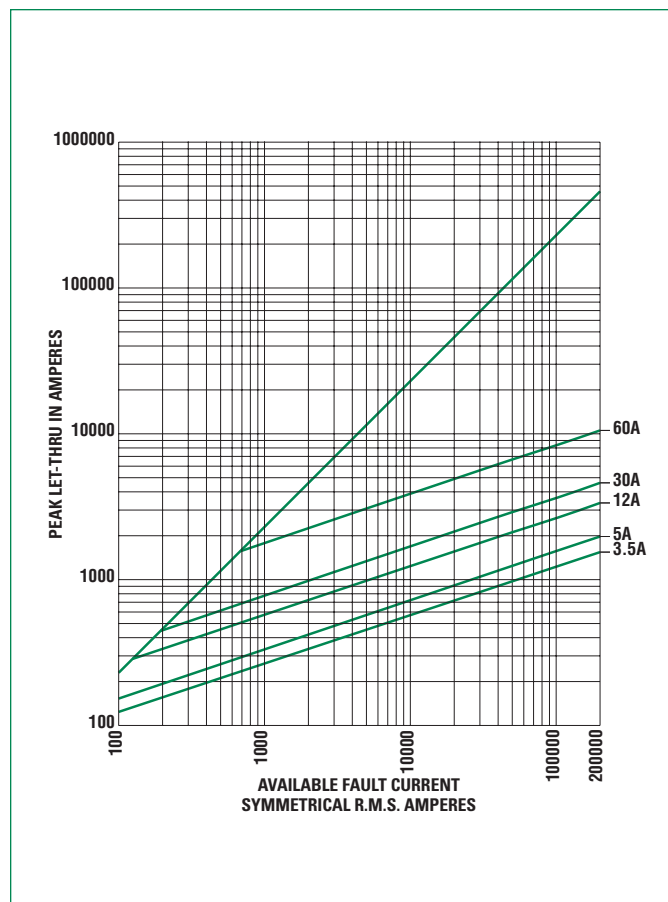
600 VAC • Dual-Element, Time-Delay • 1/10 – 600 Amperes

### Current-Limiting Effects of LLSRK\_ID (600V) Fuses

| Short Circuit Current* | Apparent RMS Symmetrical Current for Various Fuse Ratings |       |       |        |        |        |
|------------------------|-----------------------------------------------------------|-------|-------|--------|--------|--------|
|                        | 30A                                                       | 60A   | 100A  | 200A   | 400A   | 600A   |
| 5,000                  | 1,060                                                     | 1,600 | 2,100 | 2,600  | 4,100  | --     |
| 10,000                 | 1,350                                                     | 2,000 | 2,800 | 3,400  | 5,250  | 8,000  |
| 15,000                 | 1,600                                                     | 2,300 | 3,200 | 3,900  | 6,000  | 9,000  |
| 20,000                 | 1,700                                                     | 2,600 | 3,600 | 4,500  | 6,700  | 10,000 |
| 25,000                 | 1,900                                                     | 2,800 | 3,800 | 4,800  | 7,500  | 11,000 |
| 30,000                 | 2,000                                                     | 3,000 | 4,100 | 5,200  | 8,000  | 12,000 |
| 35,000                 | 2,100                                                     | 3,100 | 4,400 | 5,700  | 8,500  | 12,500 |
| 40,000                 | 2,200                                                     | 3,300 | 4,600 | 6,000  | 9,000  | 13,000 |
| 50,000                 | 2,400                                                     | 3,500 | 4,900 | 6,500  | 9,500  | 14,000 |
| 60,000                 | 2,500                                                     | 3,800 | 5,200 | 7,000  | 10,000 | 15,000 |
| 80,000                 | 2,700                                                     | 4,000 | 5,700 | 7,750  | 11,000 | 17,000 |
| 100,000                | 2,900                                                     | 4,200 | 6,200 | 8,500  | 12,000 | 18,000 |
| 150,000                | 3,200                                                     | 4,600 | 7,300 | 10,000 | 14,000 | 21,000 |
| 200,000                | 3,300                                                     | 4,700 | 8,000 | 11,000 | 16,000 | 23,000 |

\* Prospective RMS Symmetrical Amperes Short-Circuit Current

Note: Data derived from Peak Let-Thru Curves



## LLNRK/LLSRK Series POWR-PRO® Class RK1 Fuses

250/600 VAC • Dual-Element, Time-Delay • 1/10 – 600 Amperes



Littelfuse LLNRK and LLSRK series POWR-PRO fuses provide superior overload and short-circuit protection for service entrance, main, feeder and general-purpose branch circuits up to 600 amperes.

LLNRK/LLSRK series fuses can be installed in existing Class H fuse blocks to upgrade systems containing lower interrupting rating Class H one-time or renewable fuses.

### Applications

All general purpose circuits  
Motors  
Transformers  
Solenoids  
Fluorescent lighting  
All system components with high in-rush currents

### Features/Benefits

- Extremely current-limiting — Reduces damage to circuits and equipment under short-circuit conditions. Stops damaging short-circuits faster than any mechanical protective device.
- 300kA Interrupting Rating — Littelfuse self-certified to 300,000 amperes as standard. Meets future trend towards higher available short-circuit currents.
- Reduced costs — Current-limiting design often permits use of readily available, less costly equipment. Low resistance design reduces power consumption and utility bills.
- Excellent time-delay — True dual-element construction, with separate non-fatiguing thermally-reversible spring-loaded thermal overload element, withstands repeated surges within rated time delay without opening needlessly. Eliminates needless downtime caused by power surges or equipment demands.

### Specifications

|                              |                                                             |
|------------------------------|-------------------------------------------------------------|
| <b>Voltage Ratings:</b>      | AC: 250 Volts (LLNRK)                                       |
|                              | 600 Volts (LLSRK)                                           |
|                              | DC: 125 Volts (LLNRK)                                       |
|                              | 300 Volts (LLSRK)                                           |
| <b>Interrupting Ratings:</b> | AC: 200,000 amperes rms symmetrical                         |
|                              | 300,000 amperes rms symmetrical (Littelfuse self-certified) |
|                              | DC: 20,000 amperes                                          |
|                              | 1/10 – 600 amperes                                          |
| <b>Ampere Range:</b>         | 1/10 – 600 amperes                                          |
| <b>Approvals:</b>            | AC: Standard 248-12, Class RK1                              |
|                              | UL Listed (File No: E81895)                                 |
|                              | CSA Certified (File No: LR29862)                            |
|                              | QPL: Federal Specification No. WF-1814                      |
|                              | DC: Littelfuse self-certified                               |

### Ampere Ratings

|        |       |        |        |     |     |     |
|--------|-------|--------|--------|-----|-----|-----|
| 1/10   | 1     | 2 8/10 | 6 1/4  | 25  | 80  | 250 |
| 15/100 | 1 1/8 | 3      | 7      | 30  | 90  | 300 |
| 2/10   | 1 1/4 | 3 1/2  | 8      | 35  | 100 | 350 |
| 1/4*   | 1 1/2 | 4      | 9      | 40  | 110 | 400 |
| 3/10   | 1 3/4 | 5      | 10     | 45  | 125 | 450 |
| 4/10   | 2     | 6      | 12     | 50  | 150 | 500 |
| 1/2    | 2 1/4 | 7      | 15     | 60  | 175 | 600 |
| 5/10   | 2 1/2 | 8      | 17 1/2 | 70  | 200 |     |
| 3/4    | 3     | 9      | 20     | 75* | 225 |     |

\* LLSRK Only.

Example part number (series & amperage): LLNRK 450.

For online ordering, use numbers LNRK and LSRK for LLNRK/LLSRK.

### Recommended Fuse Blocks

LR250 series (LLNRK Series)

LR600 series (LLSRK Series)

Refer to the Blocks & Holders section of this catalog for additional information.

## LLNRK/LLSRK Series POWR-PRO® Class RK1 Fuses

250/600 VAC • Dual-Element, Time-Delay • 1/10 – 600 Amperes

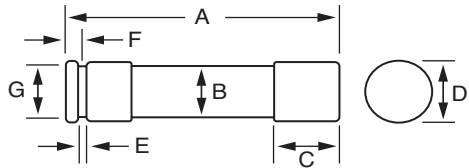


FIG. 1

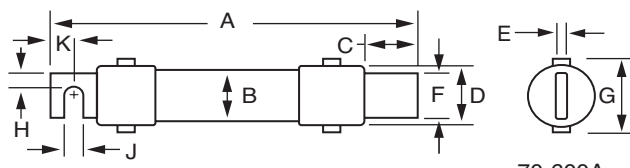
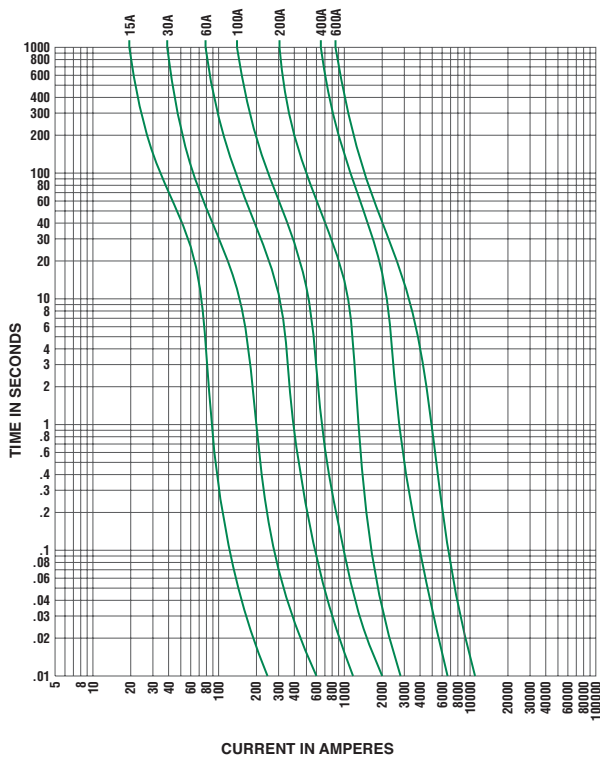


FIG. 2

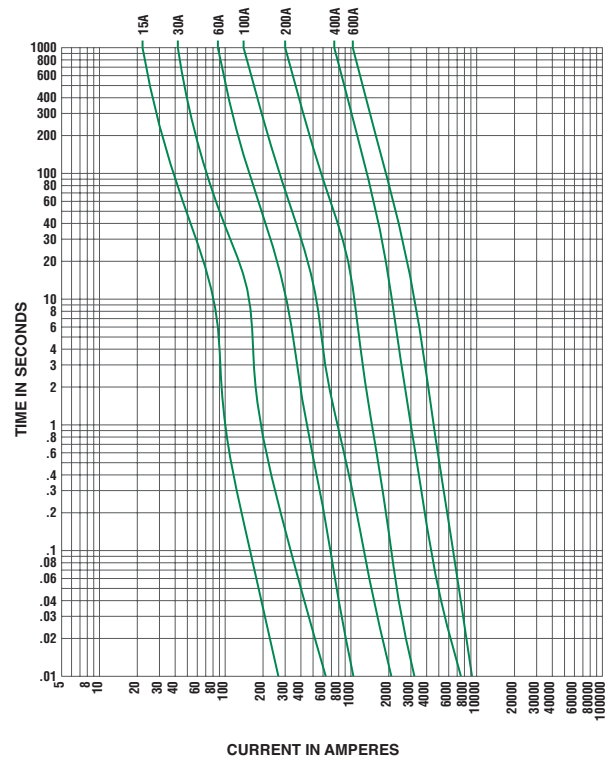
70-600A

| Amperes   | Refer to Fig. No. | Series | Dimensions in Inches (mm in parentheses) |              |                |                |            |              |                |             |               |               |
|-----------|-------------------|--------|------------------------------------------|--------------|----------------|----------------|------------|--------------|----------------|-------------|---------------|---------------|
|           |                   |        | A                                        | B            | C              | D              | E          | F            | G              | H           | J             | K             |
| 1/10 – 30 | 1                 | LLNRK  | 2 (50.8)                                 | 1/2 (12.7)   | 1/2 (12.7)     | 9/16 (14.3)    | 5/64 (2.0) | 5/32 (4.0)   | 3/8 (9.5)      | —           | —             | —             |
|           |                   | LLSRK  | 5 (127.0)                                | 3/4 (19.1)   | 5/8 (15.9)     | 3/16 (20.6)    | 3/32 (2.4) | 3/16 (4.8)   | 5/8 (15.9)     | —           | —             | —             |
| 35 – 60   | 1                 | LLNRK  | 3 (76.2)                                 | 3/4 (19.1)   | 5/8 (15.9)     | 3/16 (20.6)    | 3/32 (2.4) | 3/16 (4.8)   | 5/8 (15.9)     | —           | —             | —             |
|           |                   | LLSRK  | 5 1/2 (139.7)                            | 1 (25.4)     | 5/8 (15.9)     | 1 1/16 (27.0)  | 3/32 (2.4) | 1/4 (6.4)    | 7/8 (22.2)     | —           | —             | —             |
| 70 – 100  | 2                 | LLNRK  | 5 7/8 (149.2)                            | 1 (25.4)     | 1 1/16 (27.0)  | 1 1/16 (27.0)  | 1/8 (3.2)  | 3/4 (19.1)   | 1 1/4 (31.8)   | 1/4 (6.4)   | 9/32 (7.1)    | 1/2 (12.7)    |
|           |                   | LLSRK  | 7 7/8 (200.0)                            | 1 1/4 (31.8) | 1 1/16 (27.0)  | 1 5/16 (33.3)  | 1/8 (3.2)  | 3/4 (19.1)   | 1 1/2 (38.1)   | 1/4 (6.4)   | 9/32 (7.1)    | 1/2 (12.7)    |
| 110 – 200 | 2                 | LLNRK  | 7 7/8 (181.0)                            | 1 1/2 (38.1) | 1 15/32 (37.3) | 1 19/32 (40.5) | 3/16 (4.8) | 1 1/8 (28.6) | 1 27/32 (46.8) | 7/16 (11.1) | 9/32 (7.1)    | 1 1/16 (17.5) |
|           |                   | LLSRK  | 9 5/8 (244.5)                            | 1 3/4 (44.5) | 1 15/32 (37.3) | 1 27/32 (46.8) | 3/16 (4.8) | 1 1/8 (28.6) | 2 3/32 (53.2)  | 7/16 (11.1) | 9/32 (7.1)    | 1 1/16 (17.5) |
| 225 – 400 | 2                 | LLNRK  | 8 5/8 (219.1)                            | 2 (50.8)     | 1 15/16 (49.2) | 2 3/32 (53.2)  | 1/4 (6.4)  | 1 5/8 (41.3) | 2 11/32 (59.5) | 5/8 (15.9)  | 1 3/32 (10.3) | 1 5/16 (23.8) |
|           |                   | LLSRK  | 11 5/8 (295.3)                           | 2 1/2 (63.5) | 2 (50.8)       | 2 19/32 (65.9) | 1/4 (6.4)  | 1 5/8 (41.3) | 2 27/32 (72.2) | 5/8 (15.9)  | 1 3/32 (10.3) | 1 5/16 (23.8) |
| 450 – 600 | 2                 | LLNRK  | 10 3/8 (263.5)                           | 2 1/2 (63.5) | 2 3/8 (60.3)   | 2 19/32 (65.9) | 1/4 (6.4)  | 2 (50.8)     | 2 27/32 (72.2) | 3/4 (19.1)  | 1 7/32 (13.5) | 1 1/8 (28.6)  |
|           |                   | LLSRK  | 13 3/8 (339.7)                           | 3 (76.2)     | 2 13/32 (61.1) | 3 3/32 (78.6)  | 1/4 (6.4)  | 2 (50.8)     | 3 11/32 (84.9) | 3/4 (19.1)  | 1 7/32 (13.5) | 1 1/8 (28.6)  |

### LLNRK



### LLSRK



## LLNRK/LLSRK Series POWR-PRO® Class RK1 Fuses

250/600 VAC • Dual-Element, Time-Delay • 1/10 – 600 Amperes

### Current-Limiting Effects of LLNRK (250V) fuses

| Short Circuit Current* | Apparent RMS Symmetrical for Various Fuse Ratings |       |       |       |        |        |
|------------------------|---------------------------------------------------|-------|-------|-------|--------|--------|
|                        | 30A                                               | 60A   | 100A  | 200A  | 400A   | 600A   |
| 5,000                  | 900                                               | 1,400 | 2,000 | 2,700 | 4,800  | 5,000  |
| 10,000                 | 1,100                                             | 1,900 | 2,700 | 3,500 | 6,200  | 8,500  |
| 15,000                 | 1,250                                             | 2,100 | 3,100 | 4,200 | 7,000  | 9,500  |
| 20,000                 | 1,400                                             | 2,400 | 3,500 | 4,600 | 8,000  | 10,800 |
| 25,000                 | 1,500                                             | 2,600 | 3,900 | 5,000 | 8,300  | 11,500 |
| 30,000                 | 1,600                                             | 2,800 | 4,000 | 5,250 | 9,000  | 12,000 |
| 35,000                 | 1,700                                             | 2,850 | 4,300 | 5,500 | 9,500  | 12,500 |
| 40,000                 | 1,800                                             | 3,000 | 4,600 | 5,800 | 9,800  | 13,500 |
| 50,000                 | 1,900                                             | 3,200 | 4,800 | 6,300 | 10,200 | 14,000 |
| 60,000                 | 2,000                                             | 3,500 | 5,200 | 6,700 | 11,000 | 15,000 |
| 80,000                 | 2,200                                             | 3,900 | 5,700 | 7,200 | 12,200 | 16,000 |
| 100,000                | 2,300                                             | 4,000 | 6,000 | 8,100 | 12,700 | 17,000 |
| 150,000                | 2,500                                             | 4,500 | 6,700 | 9,100 | 14,000 | 19,000 |
| 200,000                | 2,600                                             | 4,800 | 7,000 | 9,700 | 15,000 | 20,000 |

\* Prospective RMS Symmetrical Amperes Short-Circuit Current

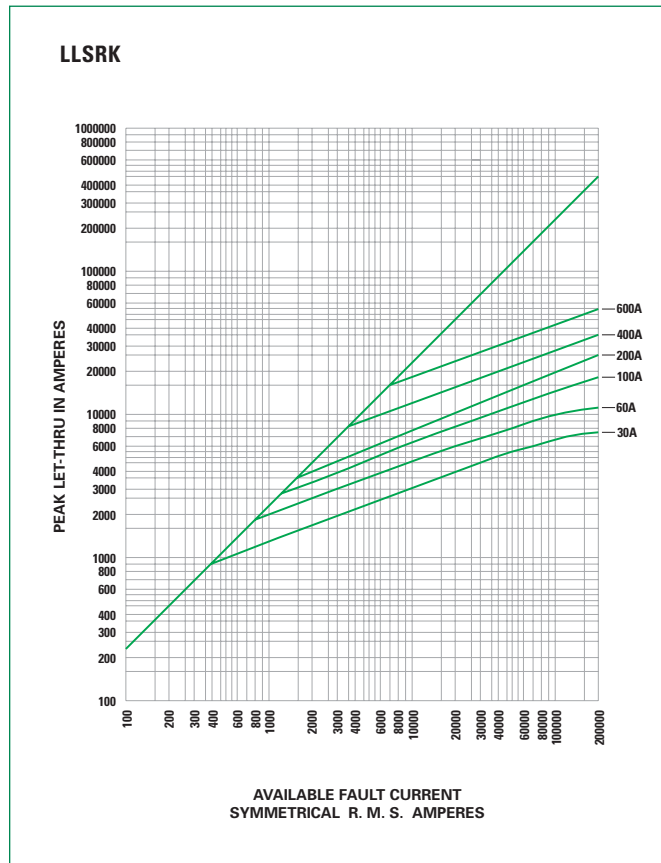
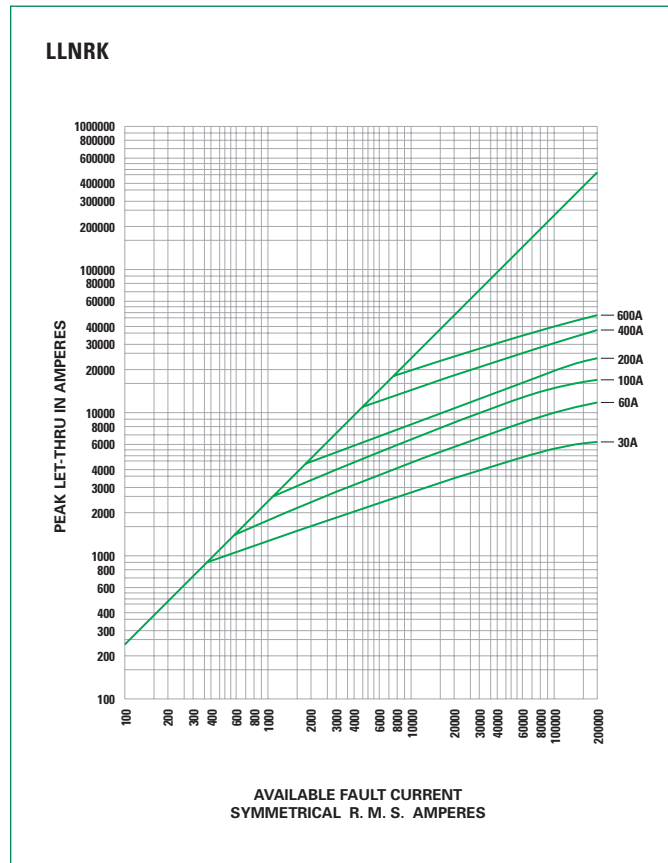
Note: Data derived from Peak Let-Thru Curves

### Current-Limiting Effects of LLSRK (600V) fuses

| Short Circuit Current* | Apparent RMS Symmetrical for Various Fuse Ratings |       |       |        |        |        |
|------------------------|---------------------------------------------------|-------|-------|--------|--------|--------|
|                        | 30A                                               | 60A   | 100A  | 200A   | 400A   | 600A   |
| 5,000                  | 1,060                                             | 1,600 | 2,100 | 2,600  | 4,100  | —      |
| 10,000                 | 1,350                                             | 2,000 | 2,800 | 3,400  | 5,250  | 8,000  |
| 15,000                 | 1,600                                             | 2,300 | 3,200 | 3,900  | 6,000  | 9,000  |
| 20,000                 | 1,700                                             | 2,600 | 3,600 | 4,500  | 6,700  | 10,000 |
| 25,000                 | 1,900                                             | 2,800 | 3,800 | 4,800  | 7,500  | 11,000 |
| 30,000                 | 2,000                                             | 3,000 | 4,100 | 5,200  | 8,000  | 12,000 |
| 35,000                 | 2,100                                             | 3,100 | 4,400 | 5,700  | 8,500  | 12,500 |
| 40,000                 | 2,200                                             | 3,300 | 4,600 | 6,000  | 9,000  | 13,000 |
| 50,000                 | 2,400                                             | 3,500 | 4,900 | 6,500  | 9,500  | 14,000 |
| 60,000                 | 2,500                                             | 3,800 | 5,200 | 7,000  | 10,000 | 15,000 |
| 80,000                 | 2,700                                             | 4,000 | 5,700 | 7,750  | 11,000 | 17,000 |
| 100,000                | 2,900                                             | 4,200 | 6,200 | 8,500  | 12,000 | 18,000 |
| 150,000                | 3,200                                             | 4,600 | 7,300 | 10,000 | 14,000 | 21,000 |
| 200,000                | 3,300                                             | 4,700 | 8,000 | 11,000 | 16,000 | 23,000 |

\* Prospective RMS Symmetrical Amperes Short-Circuit Current

Note: Data derived from Peak Let-Thru Curves



## JTD\_ID Series Indicator® POWR-PRO® Class J Fuses

600 VAC • Time Delay • 8/10 – 600 Amperes



The Littelfuse POWR-PRO JTD\_ID Indicator Class J fuse provides visual blown fuse indication and maximum protection in a compact package. The compact Class J package was designed specifically for circuits where space is at a premium. The current-limiting time delay JTD\_ID offers a patented, true dual-element design that is ideal for use in circuits with high, in-rush currents. The Superior performance characteristics of JTD\_ID Indicator fuses reduce nuisance fuse opening, and the blown fuse indication reduces downtime while increasing safety.

### Applications

Fused combination motor controllers to provide IEC Type 2 (“No Damage”) motor branch circuit short-circuit and ground fault protection  
 Motor control centers  
 Transformer protection  
 Protection for UL Listed series rated molded case circuit breaker panels  
 General purpose circuits — mains, feeders and branch circuits — especially when space is limited.

### Features/Benefits

- Reduce downtime — A glance at the indicating window of a JTD\_ID Indicator fuse pinpoints open fuses immediately. If the indicating window is dark, the fuse has opened. It’s that simple.
- Reduce nuisance opening — Indicator fuses have superior time-delay and cycling characteristics which can lengthen fuse life and decrease needless opening.
- Reduce fuse inventory — JTD\_ID Indicator fuses have superior performance characteristics, which means they can be used on a variety of applications; therefore, decreasing fuse inventory.
- Reduce equipment damage — Indicator fuses provide superior overload and short-circuit protection that can reduce equipment damage. Indicator fuses also provide IEC Type 2 “No Damage” protection to IEC and NEMA type motor starters.
- Reduce accidents — The JTD\_ID Indicator fuse improves safety by minimizing exposure to live circuits. Unlike other forms of blown fuse indication, once the indicating window darkens, it stays dark. It does not matter if the power is on or off or if the fuse is in a tool box. Other forms of indication require the power to remain on, which is a safety hazard for personnel.

### Specifications

|                              |                                                             |
|------------------------------|-------------------------------------------------------------|
| <b>Voltage Ratings:</b>      | AC: 600 Volts                                               |
|                              | DC: 300 Volts ( $\frac{1}{10}$ – 100A)                      |
|                              | 500 Volts (110 – 600A)                                      |
| <b>Interrupting Ratings:</b> | AC: 200,000 amperes rms symmetrical                         |
|                              | 300,000 amperes rms symmetrical (Littelfuse self-certified) |
| <b>Ampere Range:</b>         | 8/10 – 600 amperes                                          |
| <b>Approvals:</b>            | AC: Standard 248-8, Class J                                 |
|                              | UL Listed (File No: E81895)                                 |
|                              | CSA Certified (File No: LR29862)                            |
|                              | DC: Littelfuse self-certified                               |
|                              | $\frac{1}{10}$ – 100A: 300VDC self certified                |
|                              | 110 – 600A: 500VDC self certified                           |

### Ampere Ratings

|                 |                 |                 |    |     |     |
|-----------------|-----------------|-----------------|----|-----|-----|
| $\frac{8}{10}$  | $2\frac{8}{10}$ | 7               | 30 | 100 | 350 |
| 1               | 3               | 8               | 35 | 110 | 400 |
| $1\frac{1}{4}$  | $3\frac{2}{10}$ | 9               | 40 | 125 | 450 |
| $1\frac{1}{2}$  | $3\frac{1}{2}$  | 10              | 45 | 150 | 500 |
| $1\frac{9}{10}$ | 4               | 12              | 50 | 175 | 600 |
| $1\frac{8}{10}$ | $4\frac{1}{2}$  | 15              | 60 | 200 |     |
| 2               | 5               | $17\frac{1}{2}$ | 70 | 225 |     |
| $2\frac{1}{4}$  | $5\frac{5}{10}$ | 20              | 80 | 250 |     |
| $2\frac{1}{2}$  | 6               | 25              | 90 | 300 |     |

Example part number (series & amperage): JTD 60 ID

### Recommended Fuse Blocks

LJ600 series, LPSJ series  
 Refer to Blocks & Holders section of this catalog for additional information.

## JTD\_ID Series Indicator® POWR-PRO® Class J Fuses

600 VAC • Time-Delay • 8/10 – 600 Amperes

### An Inside Look . . .

#### Superior Short-Circuit Elements

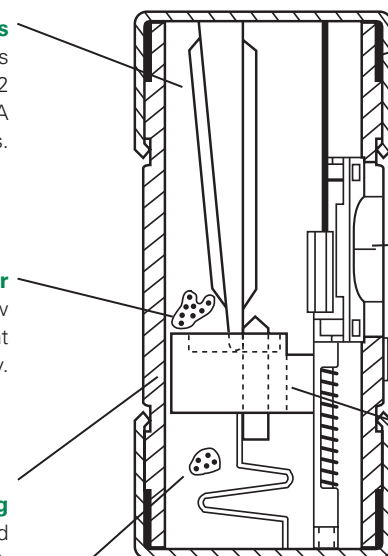
Reduce damage to equipment and enables the Littelfuse JTD\_ID to provide IEC Type 2 “No Damage” protection to IEC and NEMA motor starters.

#### Stone-Sand Filler

Helps provide  $I^2t$  and  $I_{peak}$  values well below UL maximum limits and improves heat dissipation and reliability.

#### Elastomeric Silicone EPR Plug

A space-age material used in the patented overload section of the Littelfuse JTD\_ID.



#### Plated End Caps

Help reduce corrosion and provide superior contact for lower heat generation.

#### Blown Fuse Indicator

Incorporates precision wound elements to provide consistent and reliable blown fuse indication.

#### Solid State Overload Section

Patented thermally reversible design utilizes high-tech aircraft grade polymers to ensure reliable operation every time.

#### Granular Quartz Filler

Assists in quenching the arc that occurs during overload conditions.

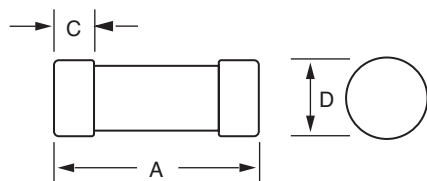


FIG. 1

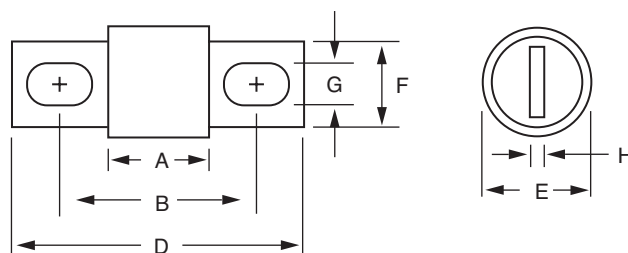


FIG. 2

| Amperes | Refer to Fig. No. | Dimensions in Inches (mm in parentheses) |            |            |              |           |           |              |         |
|---------|-------------------|------------------------------------------|------------|------------|--------------|-----------|-----------|--------------|---------|
|         |                   | A                                        | B          | C          | D            | E         | F         | G            | H       |
| 8/10–30 | 1                 | 2¼ (57.2)                                | —          | ½ (12.7)   | 13⁄16 (20.6) | —         | —         | —            | —       |
| 35–60   | 1                 | 2¾ (60.3)                                | —          | 5⁄8 (15.9) | 1¼ (27.0)    | —         | —         | —            | —       |
| 70–100  | 2                 | 2⅝ (66.7)                                | 3⅝ (92.1)  | —          | 4⅝ (117.5)   | 1⅝ (28.6) | ¾ (19.1)  | 9⁄32 (7.1)   | ⅞ (3.2) |
| 110–200 | 2                 | 3 (76.2)                                 | 4⅝ (111.1) | —          | 5¾ (146.1)   | 1⅝ (41.3) | 1⅝ (28.6) | 9⁄32 (7.1)   | ¾ (4.8) |
| 225–400 | 2                 | 3⅝ (85.7)                                | 5¼ (133.4) | —          | 7⅞ (181.0)   | 2⅝ (54.0) | 1⅝ (41.3) | 13⁄32 (10.3) | ¼ (6.4) |
| 450–600 | 2                 | 3¾ (95.3)                                | 6 (152.4)  | —          | 8 (203.2)    | 2⅝ (66.7) | 2 (50.8)  | 17⁄32 (13.5) | ¾ (9.5) |

## JTD\_ID Series Indicator® POWR-PRO® Class J Fuses

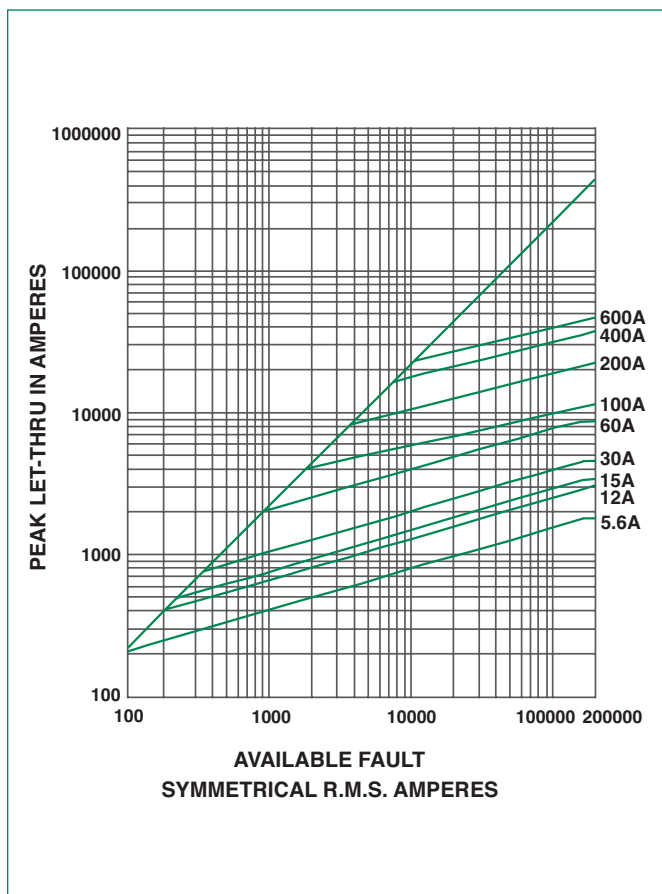
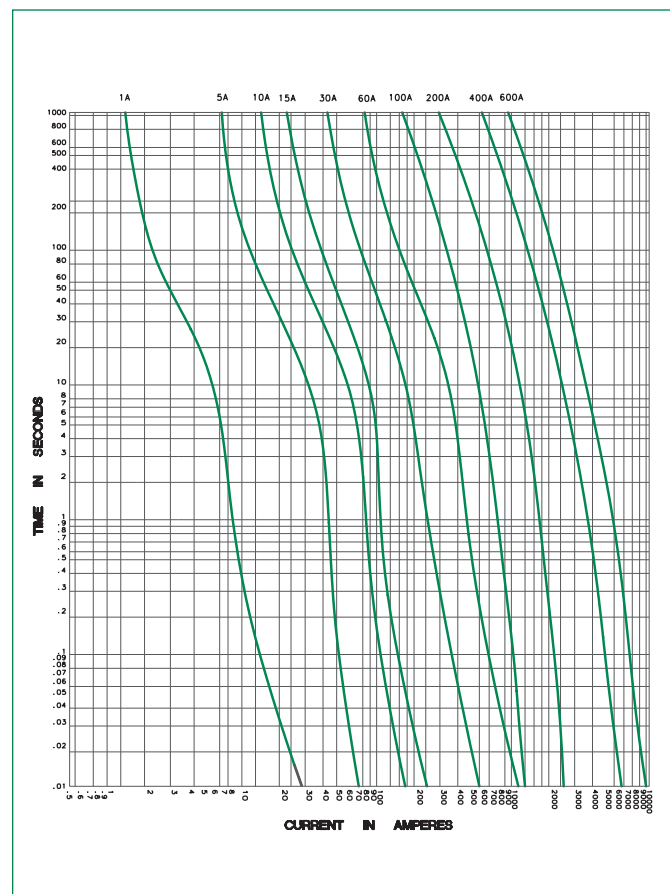
600 VAC • Time-Delay • 8/10 – 600 Amperes

### Current-Limiting Effects of JTD\_ID (600V) fuses

| Short Circuit Current* | Apparent RMS Symmetrical for Various Fuse Ratings |       |       |       |        |        |        |
|------------------------|---------------------------------------------------|-------|-------|-------|--------|--------|--------|
|                        | 15A                                               | 30A   | 60A   | 100A  | 200A   | 400A   | 600A   |
| 5,000                  | 565                                               | 750   | 1,500 | 1,800 | 2,800  | 4,800  | 5,000  |
| 10,000                 | 675                                               | 925   | 1,900 | 2,450 | 3,600  | 5,700  | 7,750  |
| 15,000                 | 775                                               | 1,050 | 2,100 | 2,800 | 4,100  | 6,500  | 9,000  |
| 20,000                 | 825                                               | 1,125 | 2,300 | 3,000 | 4,400  | 7,250  | 9,700  |
| 25,000                 | 900                                               | 1,200 | 2,500 | 3,300 | 5,000  | 8,000  | 10,500 |
| 30,000                 | 950                                               | 1,300 | 2,600 | 3,500 | 5,100  | 8,400  | 11,000 |
| 35,000                 | 1,000                                             | 1,350 | 2,700 | 3,700 | 5,400  | 9,000  | 12,000 |
| 40,000                 | 1,050                                             | 1,400 | 2,800 | 3,900 | 5,600  | 9,200  | 12,500 |
| 50,000                 | 1,100                                             | 1,500 | 3,000 | 4,200 | 6,000  | 10,000 | 13,000 |
| 60,000                 | 1,200                                             | 1,600 | 3,200 | 4,500 | 6,400  | 10,500 | 14,000 |
| 80,000                 | 1,300                                             | 1,700 | 3,400 | 4,900 | 7,200  | 11,200 | 15,500 |
| 100,000                | 1,375                                             | 1,800 | 3,600 | 5,200 | 7,800  | 12,200 | 16,500 |
| 150,000                | 1,500                                             | 2,000 | 3,950 | 6,000 | 9,000  | 14,500 | 19,000 |
| 200,000                | 1,600                                             | 2,175 | 4,000 | 6,500 | 10,000 | 16,000 | 20,500 |

\* Prospective RMS Symmetrical Amperes Short-Circuit Current

Note: Data derived from Peak Let-Thru Curves



## CCMR Series POWR-PRO® Class CC and CD Fuses

**600 VAC • Dual-Element, Time-Delay • 2/10 – 60 Amperes**



For space saving protection of motor circuits up to 40 HP\*, we recommend Littelfuse POWR-PRO CCMR series fuses. These fuses are the only true dual-element, time-delay fuses that come in a small package specifically engineered for motor branch circuit protection. CCMR series fuses provide Type 2 “No Damage” protection to both NEMA-rated and the more sensitive IEC (International Electrotechnical Commission) type motor circuit components.

Rating for rating, CCMR fuses are the most current-limiting fuses available. They also provide superior short-circuit protection since their time-delay characteristics permit the use of smaller fuse ratings in motor

circuits than would be possible if using fast-acting fuses. CCMR series fuses provide superior protection in a fraction of the space required by other fuse classes. For example, when 600V three pole, 30 ampere Class R fuse blocks are replaced by Littelfuse Class CC fuse blocks, mounting space requirements may be reduced 70% or more. This is especially important when a panel contains control devices for many motors.

In addition to the UL Listed smaller sizes, Littelfuse CCMR series fuses are now available in larger sizes — from 35 to 60 amperes! **No other fuse is available with this current carrying capacity in a package this small. In fact, the 60 ampere CCMR fuse is the smallest 60A fuse available rated at 600 volts.**

### Applications

CCMR series fuses are specifically designed to withstand sustained starting currents of small motors  
Provide short-circuit protection for motor branch circuits  
Use with IEC- and NEMA-rated motor controllers and contactors  
General purpose circuits up to 60 amps

### Features/Benefits

- Space savings — No other fuse class approved for branch circuit protection has a 600 volt rating and 300,000 A.I.R. in such a small package.
- Extremely current-limiting — Reduces damage caused by heating and magnetic effects of short-circuit currents. Stops damaging short-circuit currents faster than any mechanical protective device.
- Excellent time-delay — Eliminates needless downtime caused by power surges or equipment demands. Permits selection of fuse sizes closer to actual load conditions, which provides better protection.
- 300kA Interrupting Rating — Littelfuse self-certified to 300,000 amperes as standard. Meets future trend towards higher available short-circuit currents.

*\*Consult the Motor Protection Tables in the Fuseology section for specific motor sizing information*

### Specifications

|                              |                                                                                                       |
|------------------------------|-------------------------------------------------------------------------------------------------------|
| <b>Voltage Ratings:</b>      | AC: 600 Volts                                                                                         |
|                              | DC: 250 Volts (CCMR 2/10 — 2A)<br>(CCMR 4½ — 10A)<br>(CCMR 35 — 60A)                                  |
|                              | 300 Volts (CCMR 2½ — 4A)                                                                              |
|                              | 500 Volts (CCMR 12 — 30A)                                                                             |
| <b>Interrupting Ratings:</b> | AC: 200,000 amperes rms symmetrical<br>300,000 amperes rms symmetrical<br>(Littelfuse self-certified) |
|                              | DC: 20,000 amperes                                                                                    |
| <b>Ampere Range:</b>         | 2/10 — 60 amperes                                                                                     |
| <b>Approvals:</b>            | AC: Standard 248-4, Class CC                                                                          |
|                              | UL Listed 2/10 — 30 amps (File No: E81895)                                                            |
|                              | Standard 248, Class CD                                                                                |
|                              | UL Listed 35 — 60 amps (File No: E81895)                                                              |
|                              | CSA Certified 2/10 — 60 amps<br>(File No: LR29862)                                                    |
|                              | DC: Littelfuse self-certified                                                                         |

### Ampere Ratings

|      |    |    |    |    |     |    |
|------|----|----|----|----|-----|----|
| 2/10 | 1  | 2  | 3½ | 6¼ | 12  | 35 |
| ¼    | 1¼ | 2¼ | 4  | 7  | 15  | 40 |
| 3/10 | 1½ | 2½ | 4½ | 7½ | 17½ | 45 |
| ½    | 1½ | 2¾ | 5  | 8  | 20  | 50 |
| 5/10 | 1¾ | 3  | 5½ | 9  | 25  | 60 |
| 8/10 | 1¾ | 3½ | 6  | 10 | 30  |    |

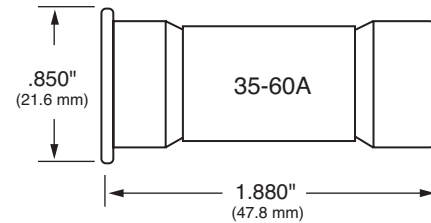
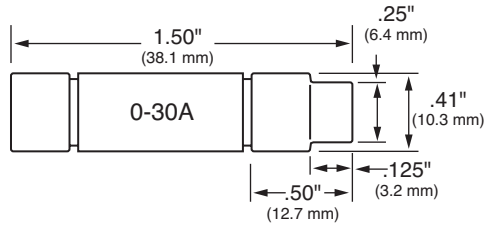
Example part number (series & amperage): CCMR 40

### Recommended Fuse Blocks

LPSC (CCMR 2/10 — 30A)  
L60030C series (CCMR 2/10 — 30A)  
L60060C series (CCMR 35 — 60A)  
Refer to Blocks & Holders section of this catalog for additional information.

## CCMR Series POWR-PRO® Class CC and CD Fuses

600 VAC • Dual-Element, Time-Delay • 2/10 – 60 Amperes



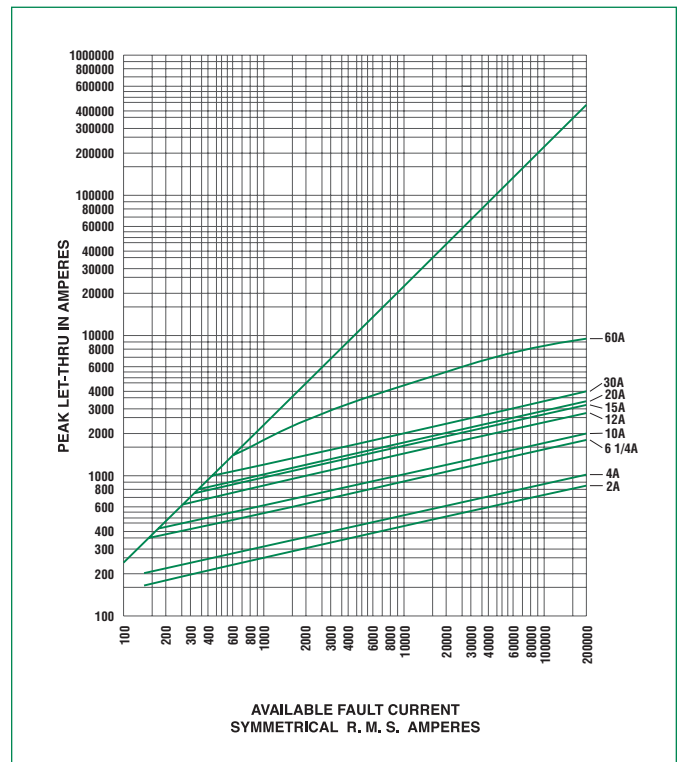
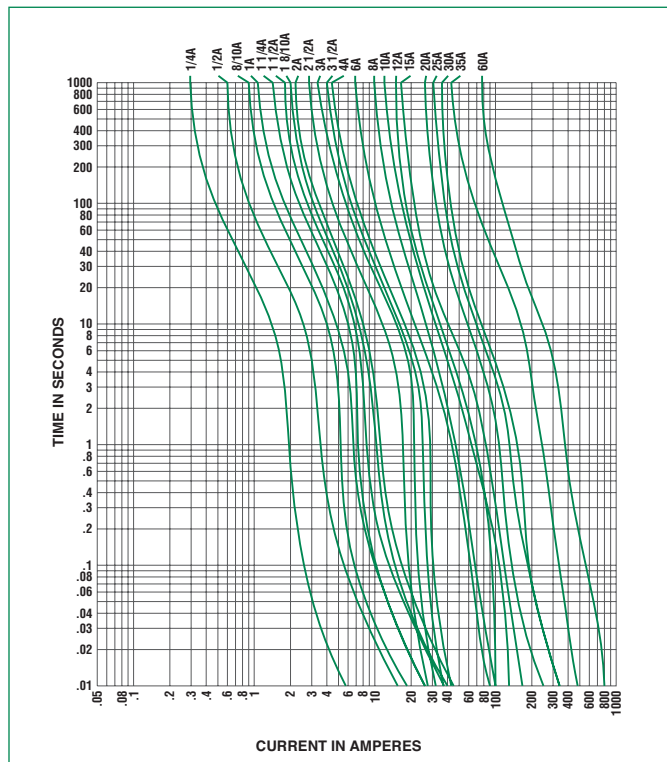
POWR-PRO® Fuses

### Current-Limiting Effects of CCMR (600V) fuses

| Short Circuit Current* | Apparent RMS Symmetrical For Various Fuse Ratings |     |        |     |       |       |       |       |
|------------------------|---------------------------------------------------|-----|--------|-----|-------|-------|-------|-------|
|                        | 2A                                                | 4A  | 6 1/4A | 10A | 12A   | 15A   | 20A   | 30A   |
| 5,000                  | 160                                               | 190 | 330    | 370 | 525   | 600   | 625   | 750   |
| 10,000                 | 180                                               | 220 | 400    | 440 | 600   | 700   | 725   | 875   |
| 15,000                 | 200                                               | 250 | 430    | 480 | 675   | 775   | 800   | 950   |
| 20,000                 | 220                                               | 260 | 460    | 520 | 720   | 825   | 850   | 1,000 |
| 25,000                 | 230                                               | 280 | 480    | 550 | 750   | 850   | 900   | 1,050 |
| 30,000                 | 240                                               | 290 | 500    | 570 | 800   | 900   | 950   | 1,125 |
| 35,000                 | 245                                               | 300 | 520    | 590 | 825   | 925   | 975   | 1,175 |
| 40,000                 | 255                                               | 310 | 550    | 600 | 850   | 975   | 1,000 | 1,200 |
| 50,000                 | 260                                               | 330 | 570    | 640 | 875   | 1,000 | 1,100 | 1,300 |
| 60,000                 | 280                                               | 340 | 600    | 670 | 900   | 1,050 | 1,125 | 1,350 |
| 80,000                 | 300                                               | 360 | 625    | 700 | 1,000 | 1,125 | 1,200 | 1,400 |
| 100,000                | 310                                               | 380 | 650    | 750 | 1,050 | 1,200 | 1,250 | 1,500 |
| 150,000                | 340                                               | 420 | 700    | 800 | 1,150 | 1,300 | 1,400 | 1,600 |
| 200,000                | 350                                               | 440 | 750    | 850 | 1,200 | 1,400 | 1,450 | 1,750 |

\*Prospective RMS Symmetrical Amperes Short-Circuit Current

Note: Data Derived from Peak Let-Thru Curves



## IDSr Series Indicator® POWR-PRO® Class RK5 Fuse

600 V AC/DC • Time-Delay • 1/10 – 600 Amperes



The Littelfuse IDSr Indicator fuse offers a patented solid-state design and provides state-of-the-art reliability along with the convenience of blown fuse indication. The unique design of the IDSr also features a 600 volt AC/DC rating making it ideal for DC applications.

Money is wasted each time a circuit opens and halts production. The indicator window of the IDSr allows maintenance personnel to pinpoint blown fuses immediately. The circuit can then be tested and any problem corrected without unnecessary delay, minimizing costly downtime.

### Applications

DC circuits  
All general purpose circuits  
Motors  
Transformers  
Solenoids  
Fluorescent lighting  
All system components with high in-rush currents

### Features/Benefits

- Superior Performance – Littelfuse leading edge metallurgy eliminates all moving parts in a true dual-element design. The IDSr also provides superior time-delay to withstand minor current surges without sacrificing protection for sustained overloads or short-circuit conditions.
- 600 Volt AC/DC Rating – The IDSr is UL Listed for 600 volts AC/DC, which makes it ideal for a variety of applications. It is also MSHA approved.
- Reduce Downtime – Costly downtime is minimized using Littelfuse Indicator fuses. A glance at the indicator window tells if the fuse has blown. If the window is dark, the fuse has opened. It's that simple.
- Increase Safety – Littelfuse Indicator Fuses minimize exposure to "live" circuit parts while searching for a blown fuse. Other forms of indication require current to power a light. Littelfuse Indicator fuses can be identified with the power off.

### Specifications

|                              |                                                                                                                                    |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| <b>Voltage Ratings:</b>      | AC: 600 Volts<br>DC: 600 Volts                                                                                                     |
| <b>Interrupting Ratings:</b> | AC: 200,000 amperes rms symmetrical<br>300,000 amperes rms symmetrical<br>(Littelfuse self-certified)<br>DC: 20,000 amperes        |
| <b>Ampere Range:</b>         | 1/10 – 600 amperes                                                                                                                 |
| <b>Approvals:</b>            | Standard 248-12 and UL 198M, Class RK5<br>UL Listed (File No: E81895)<br>CSA Certified (File No: LR29862)<br>MSHA 600 Volt Listing |

### Dimensions

Please refer to the FLSR\_ID dimensions.

### Ampere Ratings

|        |        |        |        |        |    |     |     |
|--------|--------|--------|--------|--------|----|-----|-----|
| 1/10   | 6/10   | 1 8/10 | 4      | 8      | 30 | 80  | 225 |
| 1/8    | 9/10   | 2      | 4 1/2  | 9      | 35 | 90  | 250 |
| 15/100 | 1      | 2 1/4  | 5      | 10     | 40 | 100 | 300 |
| 2/10   | 1 1/8  | 2 1/2  | 5 5/10 | 12     | 45 | 110 | 350 |
| 1/4    | 1 1/4  | 2 9/10 | 6      | 15     | 50 | 125 | 400 |
| 3/10   | 1 1/10 | 3      | 6 1/4  | 17 1/2 | 60 | 150 | 450 |
| 4/10   | 1 1/2  | 3 3/10 | 7      | 20     | 70 | 175 | 500 |
| 1/2    | 1 6/10 | 3 1/2  | 7 1/2  | 25     | 75 | 200 | 600 |

Example part number (series & amperage): IDSr 30

*Note: All fuses rated 1 amp and above are Indicator® fuses.*

### Recommended Fuse Blocks

LR600 series

Refer to the Blocks & Holders section of this catalog for additional information. Contact Littelfuse for characteristic curves.

## LDC Series POWR-PRO® Class L Fuses

600 V AC/DC Time-Delay • 150 – 2000 Amperes



Littelfuse POWR-PRO LDC series Class L fuses represent another first in fuse protection. LDC series fuses are the first UL Listed 600 volts AC and DC Class L fuses. Since they may be used for both AC and DC, they eliminate the concern that AC only fuses may be inserted into DC circuits.

While LDC series fuses UL Listed DC interrupting rating is more than adequate for most applications (50,000 amperes at a 16 millisecond time constant), tests in our high power laboratory have shown that this remarkable fuse is capable of performing at much longer time

constants. This makes the fuse uniquely suited for applications such as crane rail circuits and mass transit systems. Contact the factory for application information.

For AC only systems, consider the use of POWR-PRO KLPC series fuses. They have a full 10 seconds time-delay at 500% rated current, and have a wider range of ratings.

### Applications

UPS protection, especially for large battery circuits  
 DC distribution  
 DC variable speed drives  
 Protection of crane rail circuits and other large DC equipment such as electrical power shovels, ship and dock cranes, etc.  
 Mass transit systems, including new light rail applications  
 General purpose AC/DC circuits for mains, feeders, and branch circuits

### Features/Benefits

- 600 Volt AC/DC rated — “All-purpose” Class L fuses reduce inventory requirements because the need for separate AC and DC fuses is eliminated.
- UL Listed 200,000 A.I.R. AC – 50,000 A.I.R. DC — Reliable interruption of all overcurrents up to their ratings. Minimizes the need for time consuming and expensive short-circuit studies.
- Moderate time-delay — Four seconds time-delay at 500% current provides adequate time-delay for many AC applications and most DC applications. They will withstand most harmless overloads or line surges. If your needs exceed the LDC capabilities, consider the use of KLPC fuses for AC applications.
- Selective coordination — LDC series fuses coordinate well with all Littelfuse fuses rated 600 amperes or less. A combination of LDC and IDSR series fuses provide a complete 600 volt rated DC system.
- Extremely current-limiting — Maximum current limitation reduces damage to circuits and equipment under short-circuit conditions. Stops damaging short-circuits faster than any mechanical protective device.

### Specifications

|                              |                                                                                                                                                                                     |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Voltage Ratings:</b>      | AC: 600 Volts<br>DC: 600 Volts                                                                                                                                                      |
| <b>Interrupting Ratings:</b> | AC: 200,000 amperes rms symmetrical<br>DC: 50,000 amperes<br>(16 millisecond time-constant)                                                                                         |
| <b>Ampere Range:</b>         | 150 – 2000 amperes                                                                                                                                                                  |
| <b>Approvals:</b>            | Standard 248-10, Class L<br>UL Listed 601 – 2000 amps (File No: E81895)<br>UL Recognized 150 – 600 amps<br>(File No: E71611)<br>CSA Certified 150 – 2000 amps<br>(File No: LR29862) |

### Ampere Ratings

|     |     |      |      |      |
|-----|-----|------|------|------|
| 150 | 450 | 750  | 1300 | 1900 |
| 200 | 500 | 800  | 1350 | 2000 |
| 250 | 600 | 900  | 1400 |      |
| 300 | 601 | 1000 | 1500 |      |
| 350 | 650 | 1100 | 1600 |      |
| 400 | 700 | 1200 | 1800 |      |

Example part number (series & amperage): LDC 1200

### Dimensions

Please refer to the KLPC dimensions

## LDC Series POWR-PRO® Class L Fuses

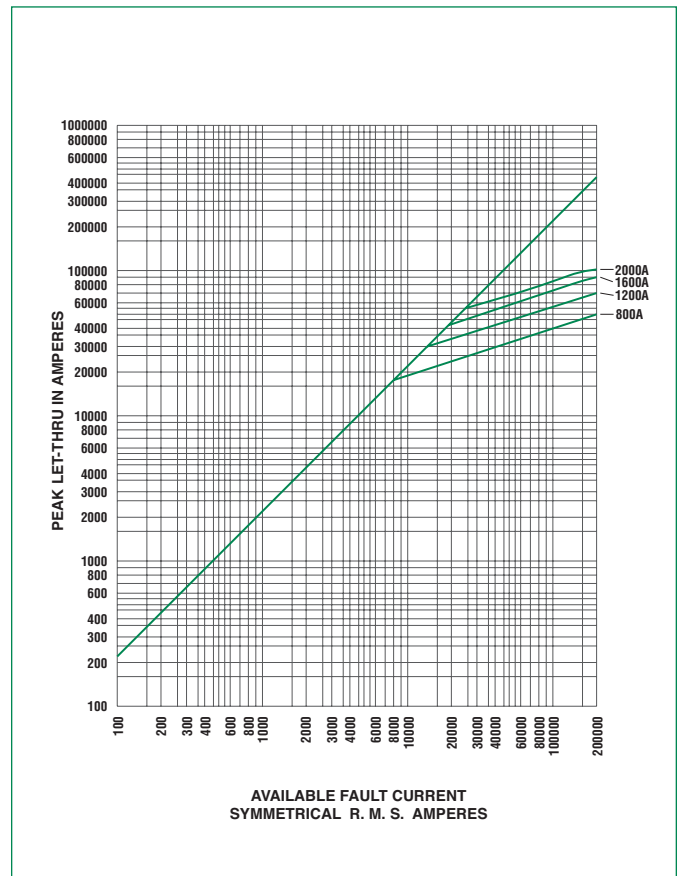
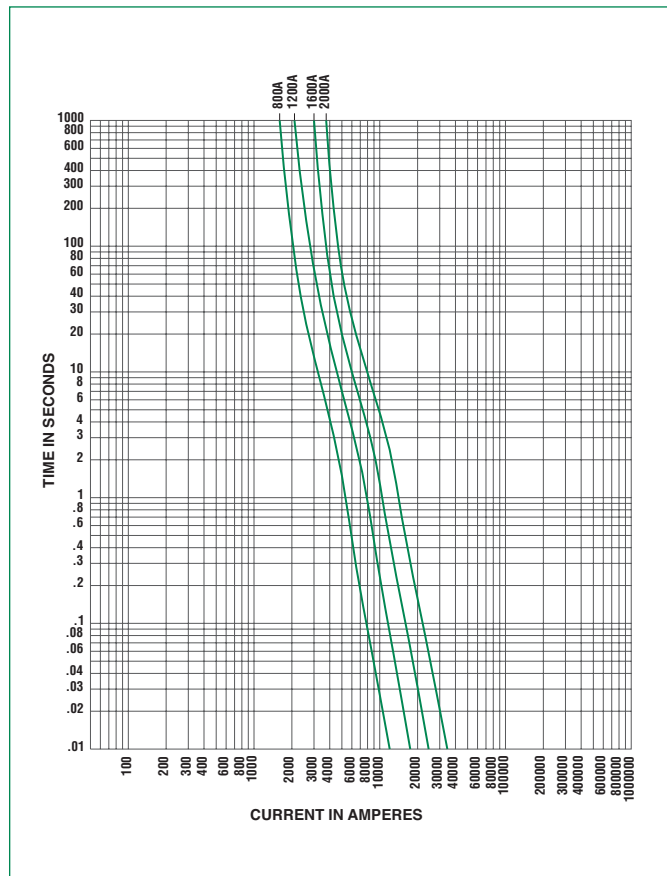
600 V AC/DC Time-Delay • 150 – 2000 Amperes

### Current-Limiting Effects of LDC (600V) Fuses

| Short-Circuit Current* | Apparent RMS Symmetrical for Various Fuse Ratings |        |        |        |
|------------------------|---------------------------------------------------|--------|--------|--------|
|                        | 800A                                              | 1200A  | 1600A  | 2000A  |
| 5,000                  | 5,000                                             | 5,000  | 5,000  | 5,000  |
| 10,000                 | 8,500                                             | 10,000 | 10,000 | 10,000 |
| 15,000                 | 9,750                                             | 14,000 | 15,000 | 15,000 |
| 20,000                 | 10,500                                            | 15,000 | 19,000 | 20,000 |
| 25,000                 | 11,500                                            | 16,000 | 21,000 | 25,000 |
| 30,000                 | 12,000                                            | 17,000 | 22,000 | 26,000 |
| 35,000                 | 12,500                                            | 18,000 | 23,000 | 28,000 |
| 40,000                 | 13,500                                            | 19,000 | 24,000 | 30,000 |
| 50,000                 | 14,000                                            | 21,000 | 26,000 | 32,000 |
| 60,000                 | 15,000                                            | 22,000 | 28,000 | 34,000 |
| 80,000                 | 16,000                                            | 24,000 | 30,000 | 36,000 |
| 100,000                | 18,000                                            | 25,000 | 33,000 | 40,000 |
| 150,000                | 20,000                                            | 30,000 | 38,000 | 44,000 |
| 200,000                | 23,000                                            | 32,000 | 41,000 | 46,000 |

\* Prospective RMS Symmetrical Amperes Short-Circuit Current

Note: Data Derived from Peak Let-Thru Curves



## General Purpose Fuses



|                                                   |              |
|---------------------------------------------------|--------------|
| <i>KLLU Class L Fuses</i>                         | <i>26-28</i> |
| <i>FLNR_ID/FLSR_ID Indicator® Class RK5 Fuses</i> | <i>29-32</i> |
| <i>FLNR/FLSR Class RK5 Fuses</i>                  | <i>33</i>    |
| <i>KLNR/KLSR Class RK1 Fuses</i>                  | <i>34-35</i> |
| <i>NLN/NLS Class K5 Fuses</i>                     | <i>36-37</i> |
| <i>RLN/RLS Class H Fuses</i>                      | <i>38</i>    |
| <i>JLS Class J Fuses</i>                          | <i>39-40</i> |
| <i>JLLN/JLLS POWR-T™ Class T Fuses</i>            | <i>41-43</i> |
| <i>SLC Class G Fuses</i>                          | <i>44</i>    |
| <i>Class CC and Class CD Fuses</i>                | <i>45-47</i> |
| <i>Plug Fuses</i>                                 | <i>48</i>    |

## KLLU Class L Fuses

600 VAC • Time-Delay • 601 – 4000 Amperes



KLLU series UL Listed, time-delay, Class L fuses are quality fuses, developed to provide a somewhat lower priced alternate to the POWR-PRO® KLPC series fuses. KLLU series fuses meet or exceed all UL requirements for Class L fuses. For superior protection and performance, specification-grade POWR-PRO KLPC series fuses are the recommended fuse. Complete information on KLPC fuses may be found in the POWR-PRO Fuse section of this catalog.

### Applications

Service switches  
Switchboard mains and feeders  
Bolted pressure contact switches  
Motor control center mains  
Large motor branch circuits  
UL Listed series rated protection for molded case circuit breaker panelboards and loadcenters. See panelboard manufacturers' literature for recommended fuse rating.

### Safety

- 200,000 A.I.R. — Provides reliable interruption of all overcurrents up to 200,000 amperes.
- When used for motor branch circuit protection, KLLU fuses may be sized close to the motor full load current, providing excellent protection to branch circuit conductors, motor control equipment and motors.

### Longer Equipment Life

- Current-Limiting — Reduces short-circuit damage to systems and equipment.
- Reduced downtime.
- Ten second minimum time-delay at 500% current eliminates needless downtime caused by heavy starting currents of large motors and other inductive loads.
- Selective coordination — KLLU fuses coordinate well with other Class L fuses and with all current-limiting Littelfuse fuses rated 600 amps or less. This means less time spent trying to locate short-circuits or overloaded equipment, because only the fuse immediately on the line side of the affected circuit opens.

### Easy To Use

- 200,000 A.I.R. rating minimizes need for short-circuit calculations, while meeting present and future system requirements.
- KLLU fuse time-current characteristics closely match typical time-current curves of circuit breakers. Although fuse/circuit breaker systems can seldom be 100% coordinated, KLLU series fuses permit use of a wider range of breaker setting than fast acting Class L fuses. Excellent protection for a single breaker or a group of breakers.

### Specifications

**Voltage Ratings:** AC: 600 Volts  
DC: Contact factory  
**Interrupting Ratings:** 200,000 amperes rms symmetrical  
**Ampere Range:** 601 – 4000 amperes  
**Approvals:** Standard 248-10, Class L  
UL Listed (File No: E81895)  
CSA Certified (File No: LR29862)

### Ampere Ratings

|     |     |      |      |      |      |
|-----|-----|------|------|------|------|
| 601 | 750 | 1000 | 1400 | 1800 | 3000 |
| 650 | 800 | 1200 | 1500 | 2000 | 3500 |
| 700 | 900 | 1350 | 1600 | 2500 | 4000 |

Example part number (series & amperage): KLLU 1000

## KLLU Class L Fuses

600 VAC • Time-Delay • 601 – 4000 Amperes

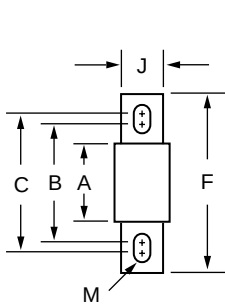


FIG. 1

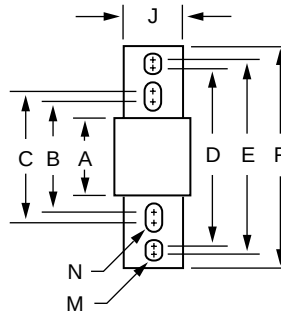


FIG. 2

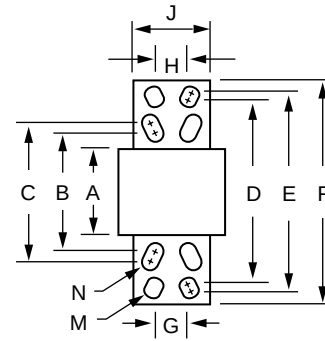


FIG. 3

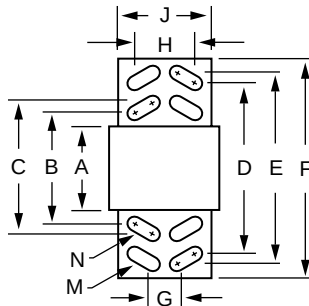
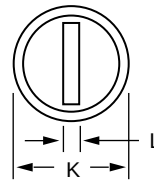


FIG. 4



| Amperes     | Fig. No. | Dimensions In Inches (mm in parentheses) |                                          |                                          |                                          |                                          |                                           |                                         |                                         |                                          |                                          |                            |                                                                    |                                                                    |
|-------------|----------|------------------------------------------|------------------------------------------|------------------------------------------|------------------------------------------|------------------------------------------|-------------------------------------------|-----------------------------------------|-----------------------------------------|------------------------------------------|------------------------------------------|----------------------------|--------------------------------------------------------------------|--------------------------------------------------------------------|
|             |          | A                                        | B                                        | C                                        | D                                        | E                                        | F                                         | G                                       | H                                       | J                                        | K                                        | L                          | M                                                                  | N                                                                  |
| 601 – 800   | 1        | 3 <sup>3</sup> / <sub>4</sub><br>(95.3)  | 5 <sup>3</sup> / <sub>4</sub><br>(146.1) | 6 <sup>3</sup> / <sub>4</sub><br>(171.5) | —                                        | —                                        | 8 <sup>5</sup> / <sub>8</sub><br>(219.1)  | —                                       | —                                       | 2<br>(50.8)                              | 2 <sup>1</sup> / <sub>2</sub><br>(63.5)  | 3/ <sub>8</sub><br>(9.5)   | 5/ <sub>8</sub> x 1 <sup>1</sup> / <sub>8</sub><br>(15.9) x (28.6) | —                                                                  |
| 801 – 1200  | 2        | 3 <sup>3</sup> / <sub>4</sub><br>(95.3)  | 5 <sup>3</sup> / <sub>4</sub><br>(146.1) | 6 <sup>3</sup> / <sub>4</sub><br>(171.5) | 9 <sup>1</sup> / <sub>4</sub><br>(235.0) | 9 <sup>1</sup> / <sub>2</sub><br>(241.3) | 10 <sup>3</sup> / <sub>4</sub><br>(273.1) | —                                       | —                                       | 2<br>(50.8)                              | 2 <sup>1</sup> / <sub>2</sub><br>(63.5)  | 3/ <sub>8</sub><br>(9.5)   | 5/ <sub>8</sub> x 3/ <sub>4</sub><br>(15.9) x (19.1)               | 5/ <sub>8</sub> x 1 <sup>1</sup> / <sub>8</sub><br>(15.9) x (28.6) |
| 1201 – 1600 | 2        | 3 <sup>3</sup> / <sub>4</sub><br>(95.3)  | 5 <sup>3</sup> / <sub>4</sub><br>(146.1) | 6 <sup>3</sup> / <sub>4</sub><br>(171.5) | 9 <sup>1</sup> / <sub>4</sub><br>(235.0) | 9 <sup>1</sup> / <sub>2</sub><br>(241.3) | 10 <sup>3</sup> / <sub>4</sub><br>(273.1) | —                                       | —                                       | 2 <sup>3</sup> / <sub>8</sub><br>(60.3)  | 3<br>(76.2)                              | 7/ <sub>16</sub><br>(11.1) | 5/ <sub>8</sub> x 3/ <sub>4</sub><br>(15.9) x (19.1)               | 5/ <sub>8</sub> x 1 <sup>1</sup> / <sub>8</sub><br>(15.9) x (28.6) |
| 1601 – 2000 | 2        | 3 <sup>3</sup> / <sub>4</sub><br>(95.3)  | 5 <sup>3</sup> / <sub>4</sub><br>(146.1) | 6 <sup>3</sup> / <sub>4</sub><br>(171.5) | 9 <sup>1</sup> / <sub>4</sub><br>(235.0) | 9 <sup>1</sup> / <sub>2</sub><br>(241.3) | 10 <sup>3</sup> / <sub>4</sub><br>(273.1) | —                                       | —                                       | 2 <sup>3</sup> / <sub>4</sub><br>(69.9)  | 3 <sup>1</sup> / <sub>2</sub><br>(88.9)  | 1/ <sub>2</sub><br>(12.7)  | 5/ <sub>8</sub> x 3/ <sub>4</sub><br>(15.9) x (19.1)               | 5/ <sub>8</sub> x 1 <sup>1</sup> / <sub>8</sub><br>(15.9) x (28.6) |
| 2001 – 2500 | 3        | 4                                        | 5 <sup>3</sup> / <sub>4</sub><br>(146.1) | 6 <sup>3</sup> / <sub>4</sub><br>(171.5) | 9 <sup>1</sup> / <sub>4</sub><br>(235.0) | 9 <sup>1</sup> / <sub>2</sub><br>(241.3) | 10 <sup>3</sup> / <sub>4</sub><br>(273.1) | 1 <sup>5</sup> / <sub>8</sub><br>(41.3) | 1 <sup>3</sup> / <sub>4</sub><br>(44.5) | 3 <sup>1</sup> / <sub>2</sub><br>(88.9)  | 5<br>(127.0)                             | 3/ <sub>4</sub><br>(19.1)  | 5/ <sub>8</sub> x 3/ <sub>4</sub><br>(15.9) x (19.1)               | 5/ <sub>8</sub> x 1 <sup>1</sup> / <sub>8</sub><br>(15.9) x (28.6) |
| 2501 – 3000 | 3        | 4                                        | 5 <sup>3</sup> / <sub>4</sub><br>(146.1) | 6 <sup>3</sup> / <sub>4</sub><br>(171.5) | 9 <sup>1</sup> / <sub>4</sub><br>(235.0) | 9 <sup>1</sup> / <sub>2</sub><br>(241.3) | 10 <sup>3</sup> / <sub>4</sub><br>(273.1) | 1 <sup>5</sup> / <sub>8</sub><br>(41.3) | 1 <sup>3</sup> / <sub>4</sub><br>(44.5) | 4<br>(101.6)                             | 5<br>(127.0)                             | 3/ <sub>4</sub><br>(19.1)  | 5/ <sub>8</sub> x 3/ <sub>4</sub><br>(15.9) x (19.1)               | 5/ <sub>8</sub> x 1 <sup>1</sup> / <sub>8</sub><br>(15.9) x (28.6) |
| 3001 – 4000 | 4        | 4                                        | 5 <sup>3</sup> / <sub>4</sub><br>(146.1) | 6 <sup>3</sup> / <sub>4</sub><br>(171.5) | 9 <sup>1</sup> / <sub>4</sub><br>(235.0) | 9 <sup>1</sup> / <sub>2</sub><br>(241.3) | 10 <sup>3</sup> / <sub>4</sub><br>(273.1) | 1 <sup>3</sup> / <sub>4</sub><br>(44.5) | 3 <sup>1</sup> / <sub>4</sub><br>(82.6) | 4 <sup>3</sup> / <sub>4</sub><br>(120.7) | 5 <sup>3</sup> / <sub>4</sub><br>(146.1) | 3/ <sub>4</sub><br>(19.1)  | 5/ <sub>8</sub> x 1 <sup>3</sup> / <sub>8</sub><br>(15.9) x (34.9) | 5/ <sub>8</sub> x 1 <sup>3</sup> / <sub>8</sub><br>(15.9) x (34.9) |

## KLLU Class L Fuses

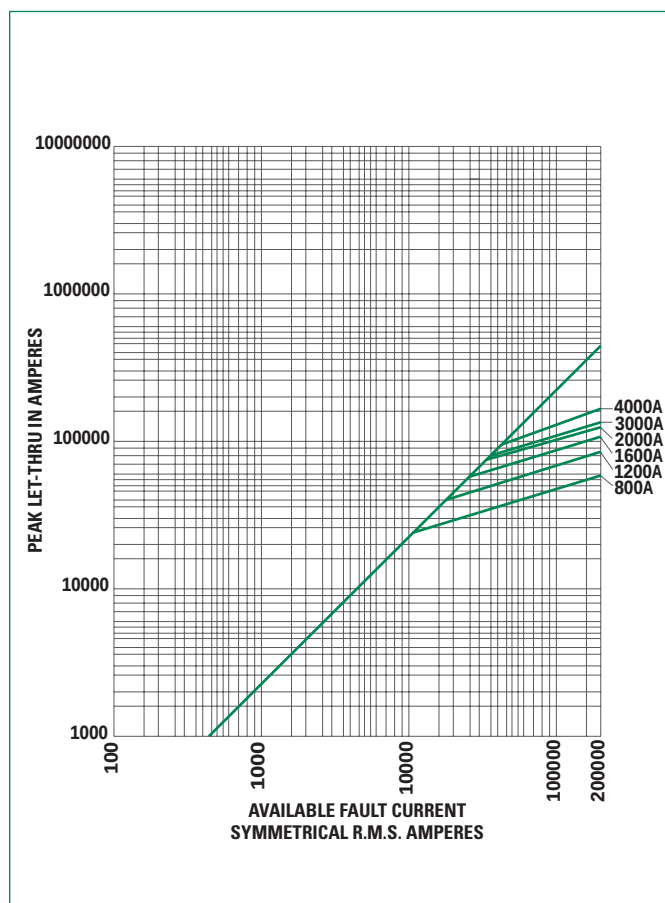
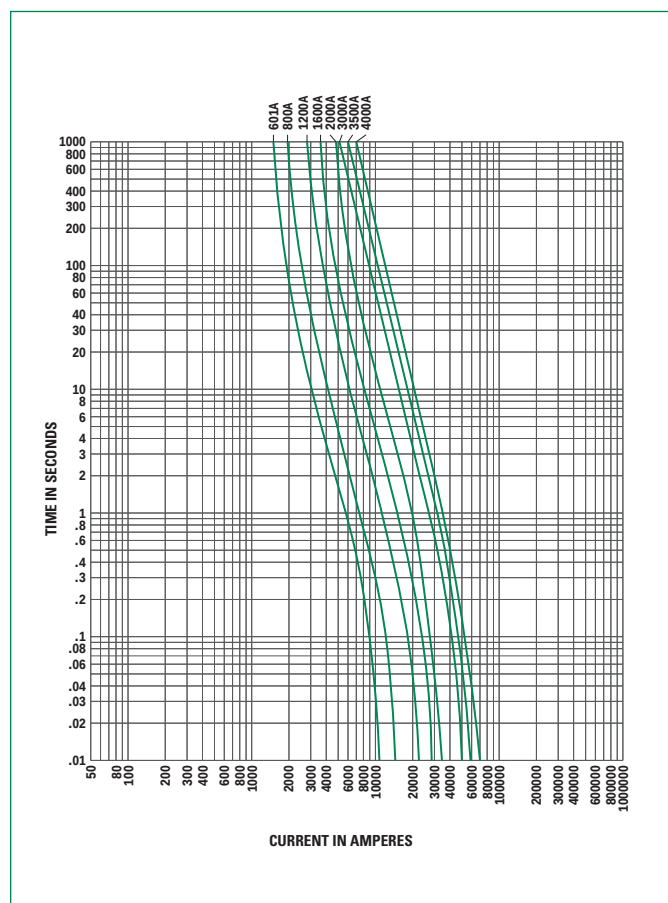
600 VAC • Time-Delay • 601 – 4000 Amperes

### Current-Limiting Effects of KLLU (600V) fuses

| Short-Circuit Current* | Apparent RMS Symmetrical Current for Various Fuse Ratings |        |        |        |        |        |
|------------------------|-----------------------------------------------------------|--------|--------|--------|--------|--------|
|                        | 800A                                                      | 1200A  | 1600A  | 2000A  | 3000A  | 4000A  |
| 5,000                  | 5,000                                                     | 5,000  | 5,000  | 5,000  | 5,000  | 5,000  |
| 10,000                 | 10,000                                                    | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 |
| 15,000                 | 11,900                                                    | 15,000 | 15,000 | 15,000 | 15,000 | 15,000 |
| 20,000                 | 13,000                                                    | 18,500 | 20,000 | 20,000 | 20,000 | 20,000 |
| 25,000                 | 14,000                                                    | 20,000 | 25,000 | 25,000 | 25,000 | 25,000 |
| 30,000                 | 14,500                                                    | 21,000 | 26,500 | 30,000 | 30,000 | 30,000 |
| 35,000                 | 15,000                                                    | 22,000 | 28,500 | 34,000 | 35,000 | 35,000 |
| 40,000                 | 16,000                                                    | 23,000 | 30,000 | 35,000 | 37,000 | 40,000 |
| 50,000                 | 17,000                                                    | 24,000 | 32,000 | 38,000 | 39,000 | 44,000 |
| 60,000                 | 18,000                                                    | 26,000 | 34,000 | 42,000 | 43,000 | 50,000 |
| 80,000                 | 19,000                                                    | 28,000 | 36,000 | 44,000 | 46,000 | 54,500 |
| 100,000                | 21,000                                                    | 30,000 | 38,000 | 46,000 | 48,000 | 57,500 |
| 150,000                | 24,000                                                    | 35,000 | 44,000 | 50,000 | 51,000 | 68,000 |
| 200,000                | 26,000                                                    | 38,000 | 48,000 | 53,000 | 60,000 | 74,000 |

\* Prospective RMS Symmetrical Amperes Short-Circuit Current

Note: Data Derived from Peak Let-Thru Curves



## FLNR\_ID/FLSR\_ID Indicator® Class RK5 Fuses

250/600 VAC • Dual-Element, Time Delay • 1/10 – 600 Amperes



Littelfuse FLNR\_ID/FLSR\_ID Indicator fuses provide blown fuse indication at a glance. The patented state-of-the-art solid state design provides maximum reliability and superior performance characteristics in a true dual-element design. The use of Indicator fuses reduces downtime and nuisance openings, increases safety, and can save thousands of dollars in lost production time.

### Applications

Service entrance switches  
Switchboard main and feeder switches  
Motor control center mains and motor branch circuits  
Individual fused combination motor controllers  
Distribution panelboards  
Industrial control panels  
Protection of fully rated panelboards and loadcenters  
All general purpose circuits

### Features/Benefits

- **Reduce Downtime** — A glance at the indicating window of a FLNR\_ID or FLSR\_ID Indicator fuse pinpoints open fuses. If the indicating strip is black, the fuse has opened. It's that simple.
- **Reduce Nuisance Opening** — FLNR\_ID and FLSR\_ID Indicator fuses have superior time-delay and cycling characteristics which can lengthen fuse life and decrease needless opening.
- **Reduce Fuse Inventory** — Because FLNR\_ID and FLSR\_ID Indicator fuses have superior performance characteristics, they can be used on a variety of applications, thus decreasing fuse inventory.
- **Reduce Equipment Damage** — FLNR\_ID and FLSR\_ID Indicator fuses have superior overload and short-circuit protection which can reduce equipment damage.
- **Reduce Accidents** — The FLNR\_ID and FLSR\_ID Indicator fuses improve safety by minimizing exposure to live circuits. Unlike other forms of blown fuse indication, it doesn't matter if the power is on or off. No second guessing whether a light means a fuse is good or bad, and no current going across a blown fuse to power a lighted accessory.

### Specifications

|                              |                                                                                                       |
|------------------------------|-------------------------------------------------------------------------------------------------------|
| <b>Voltage Ratings:</b>      | AC: 250 Volts (FLNR_ID);<br>600 Volts (FLSR_ID)                                                       |
|                              | DC: 125 Volts (FLNR 1/10 – 30A);<br>125 Volts (FLNR_ID 35 – 600A);<br>300 Volts (FLSR_ID)             |
| <b>Interrupting Ratings:</b> | AC: 200,000 amperes rms symmetrical<br>300,000 amperes rms symmetrical<br>(Littelfuse self-certified) |
|                              | DC: 20,000 amperes                                                                                    |
| <b>Ampere Range:</b>         | 1/10 – 600 amperes                                                                                    |
| <b>Approvals:</b>            | Standard 248-12, Class RK5                                                                            |
|                              | UL Listed (File No: E81895)                                                                           |
|                              | CSA Certified (File No: LR29862)                                                                      |
|                              | MSHA 300 Volt Listing (FLSR_ID)<br>QPL: Federal Specification WF-1814                                 |

### Ampere Ratings

|         |        |        |        |        |     |     |     |
|---------|--------|--------|--------|--------|-----|-----|-----|
| 1/10**  | 6/10   | 1 9/10 | 4      | 8      | 30  | 80  | 225 |
| 1/6     | 8/10   | 2      | 4 1/2  | 9      | 35  | 90  | 250 |
| 1 5/100 | 1      | 2 1/4  | 5      | 10     | 40  | 100 | 300 |
| 3/10    | 1 1/8  | 2 1/2  | 5 5/10 | 12     | 45  | 110 | 350 |
| 1/4     | 1 1/4  | 2 3/10 | 6      | 15     | 50  | 125 | 400 |
| 3/10    | 1 4/10 | 3      | 6 1/4  | 17 1/2 | 60  | 150 | 450 |
| 1/2     | 1 1/2  | 3 1/10 | 7      | 20     | 70  | 175 | 500 |
| 1/2     | 1 9/10 | 3 1/2  | 7 1/2  | 25     | 75* | 200 | 600 |

\*FLSR\_ID only \*\*FLNR only

Example part number (series & amperage): FLSR100ID

*NOTE: For 1/10 – 30 ampere 250 volt fuses, order non-indicating FLNR series fuses.*

*NOTE: All FLNR\_ID fuses rated 35 – 600A are Indicator fuses.*

*NOTE: All FLSR\_ID fuses rated 1 amp and above are Indicator fuses.*

### Recommended Fuse Blocks

LR250 series (for FLNR\_ID series fuses)

LR600 series (for FLSR\_ID series fuses)

Refer to Blocks & Holders section of this catalog for additional information.

## FLNR\_ID/FLSR\_ID Indicator® Class RK5 Fuses

250/600 VAC • Dual-Element, Time Delay • 1/10 – 600 Amperes

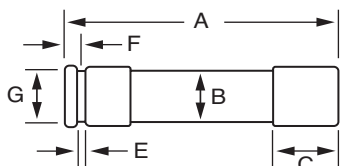


FIG. 1

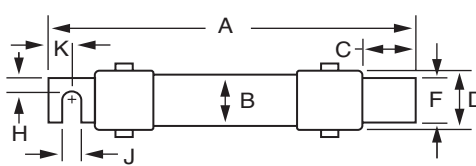


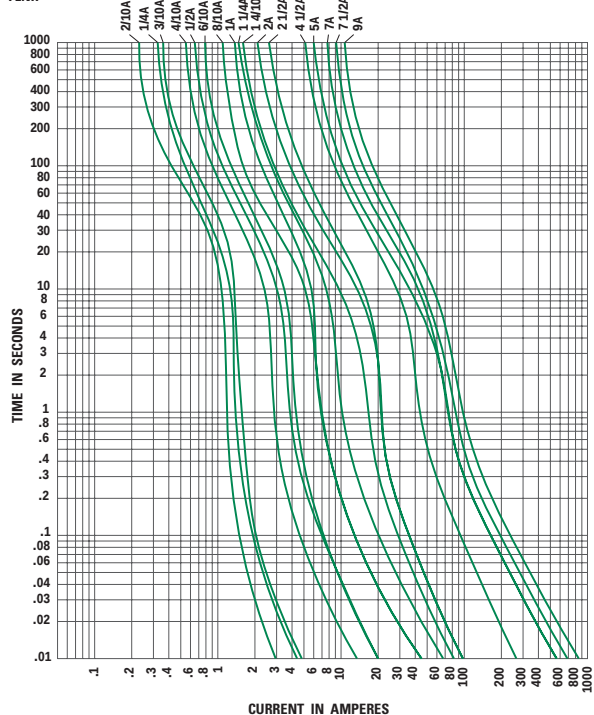
FIG. 2

70-600A

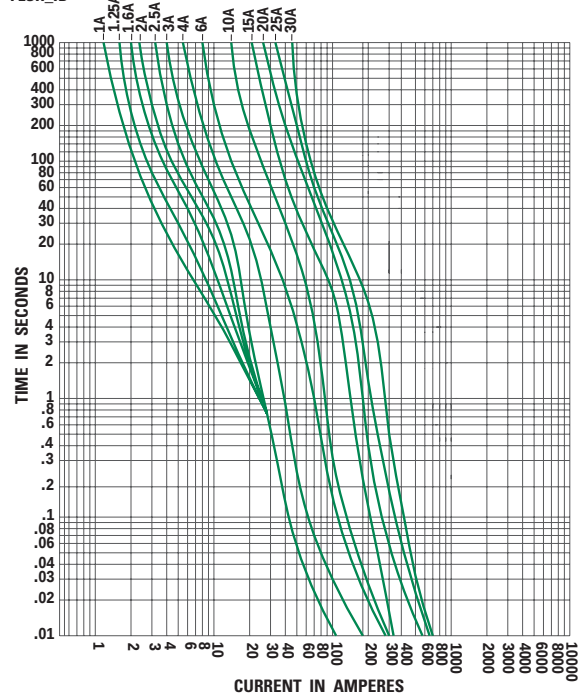
| Amperes   | Refer To Fig. No. | Series  | Dimensions In Inches (mm in parentheses) |              |                |                |            |              |                |             |               |               |
|-----------|-------------------|---------|------------------------------------------|--------------|----------------|----------------|------------|--------------|----------------|-------------|---------------|---------------|
|           |                   |         | A                                        | B            | C              | D              | E          | F            | G              | H           | J             | K             |
| 1/10 – 30 | 1                 | FLNR    | 2 (50.8)                                 | 1/2 (12.7)   | 1/2 (12.7)     | 9/16 (14.3)    | 5/64 (2.0) | 5/32 (4.0)   | 3/8 (9.5)      | —           | —             | —             |
|           |                   | FLSR_ID | 5 (127.0)                                | 3/4 (19.1)   | 5/8 (15.9)     | 13/16 (20.6)   | 3/32 (2.4) | 3/16 (4.8)   | 5/8 (15.9)     | —           | —             | —             |
| 35 – 60   | 1                 | FLNR_ID | 3 (76.2)                                 | 3/4 (19.1)   | 5/8 (15.9)     | 13/16 (20.6)   | 3/32 (2.4) | 3/16 (4.8)   | 5/8 (15.9)     | —           | —             | —             |
|           |                   | FLSR_ID | 5 1/2 (139.7)                            | 1 (25.4)     | 5/8 (15.9)     | 1 1/16 (27.0)  | 3/32 (2.4) | 1/4 (6.4)    | 7/8 (22.2)     | —           | —             | —             |
| 70 – 100  | 2                 | FLNR_ID | 5 7/8 (149.2)                            | 1 (25.4)     | 1 1/16 (27.0)  | 1 1/16 (27.0)  | 1/8 (3.2)  | 3/4 (19.1)   | 1 1/4 (31.8)   | 1/4 (6.4)   | 9/32 (7.1)    | 1/2 (12.7)    |
|           |                   | FLSR_ID | 7 7/8 (200.0)                            | 1 1/4 (31.8) | 1 1/16 (27.0)  | 1 5/16 (33.3)  | 1/8 (3.2)  | 3/4 (19.1)   | 1 1/2 (38.1)   | 1/4 (6.4)   | 9/32 (7.1)    | 1/2 (12.7)    |
| 110 – 200 | 2                 | FLNR_ID | 7 7/8 (181.0)                            | 1 1/2 (38.1) | 1 15/32 (37.3) | 1 19/32 (40.5) | 3/16 (4.8) | 1 1/8 (28.6) | 1 27/32 (46.8) | 7/16 (11.1) | 9/32 (7.1)    | 1 1/16 (17.5) |
|           |                   | FLSR_ID | 9 5/8 (244.5)                            | 1 3/4 (44.5) | 1 15/32 (37.3) | 1 27/32 (46.8) | 3/16 (4.8) | 1 1/8 (28.6) | 2 3/32 (53.2)  | 7/16 (11.1) | 9/32 (7.1)    | 1 1/16 (17.5) |
| 225 – 400 | 2                 | FLNR_ID | 8 5/8 (219.1)                            | 2 (50.8)     | 1 15/16 (49.2) | 2 3/32 (53.2)  | 1/4 (6.4)  | 1 5/8 (41.3) | 2 11/32 (59.5) | 5/8 (15.9)  | 13/32 (10.3)  | 1 5/16 (23.8) |
|           |                   | FLSR_ID | 11 5/8 (295.3)                           | 2 1/2 (63.5) | 2 (50.8)       | 2 19/32 (65.9) | 1/4 (6.4)  | 1 5/8 (41.3) | 2 27/32 (72.2) | 5/8 (15.9)  | 13/32 (10.3)  | 1 5/16 (23.8) |
| 450 – 600 | 2                 | FLNR_ID | 10 3/8 (263.5)                           | 2 1/2 (63.5) | 2 3/8 (60.3)   | 2 19/32 (65.9) | 1/4 (6.4)  | 2 (50.8)     | 2 27/32 (72.2) | 3/4 (19.1)  | 1 7/32 (13.5) | 1 1/8 (28.6)  |
|           |                   | FLSR_ID | 13 3/8 (339.7)                           | 3 (76.2)     | 2 13/32 (61.1) | 3 3/32 (78.6)  | 1/4 (6.4)  | 2 (50.8)     | 3 11/32 (84.9) | 3/4 (19.1)  | 1 7/32 (13.5) | 1 1/8 (28.6)  |

For additional application information request Product Bulletin EL-4

FLNR



FLSR\_ID



## FLNR\_ID/FLSR\_ID Indicator® Class RK5 Fuses

250/600 VAC • Dual-Element, Time Delay • 1/10 – 600 Amperes

### Current-Limiting Effects of FLNR\_ID (250V) fuses

| Short-Circuit Current* | Apparent RMS Symmetrical Current for Various Fuse Ratings |       |       |        |        |        |
|------------------------|-----------------------------------------------------------|-------|-------|--------|--------|--------|
|                        | 30A                                                       | 60A   | 100A  | 200A   | 400A   | 600A   |
| 5,000                  | 1,400                                                     | 2,100 | 3,100 | 5,000  | 5,000  | 5,000  |
| 10,000                 | 1,550                                                     | 2,500 | 3,900 | 6,500  | 9,500  | 10,000 |
| 15,000                 | 2,000                                                     | 3,150 | 4,400 | 7,250  | 10,500 | 14,000 |
| 20,000                 | 2,250                                                     | 3,400 | 5,000 | 8,250  | 12,000 | 16,000 |
| 25,000                 | 2,400                                                     | 3,750 | 5,250 | 9,000  | 12,500 | 16,500 |
| 30,000                 | 2,550                                                     | 4,100 | 5,600 | 9,500  | 13,500 | 18,000 |
| 35,000                 | 2,650                                                     | 4,300 | 5,800 | 9,750  | 14,000 | 19,000 |
| 40,000                 | 2,800                                                     | 4,400 | 6,250 | 10,250 | 15,000 | 20,000 |
| 50,000                 | 3,000                                                     | 5,000 | 6,500 | 10,500 | 16,000 | 21,000 |
| 60,000                 | 3,200                                                     | 5,250 | 7,000 | 11,500 | 17,000 | 23,000 |
| 80,000                 | 3,400                                                     | 5,750 | 7,500 | 12,500 | 19,000 | 25,500 |
| 100,000                | 3,850                                                     | 6,000 | 8,000 | 13,500 | 21,000 | 27,500 |
| 150,000                | 4,100                                                     | 7,000 | 9,000 | 15,200 | 24,000 | 31,500 |
| 200,000                | 4,300                                                     | 7,500 | 9,750 | 16,500 | 26,000 | 34,000 |

\* Prospective RMS Symmetrical Amperes Short-Circuit Current

Note: Data Derived from Peak Let-Thru Curves

### Current-Limiting Effects of FLSR\_ID (600V) fuses

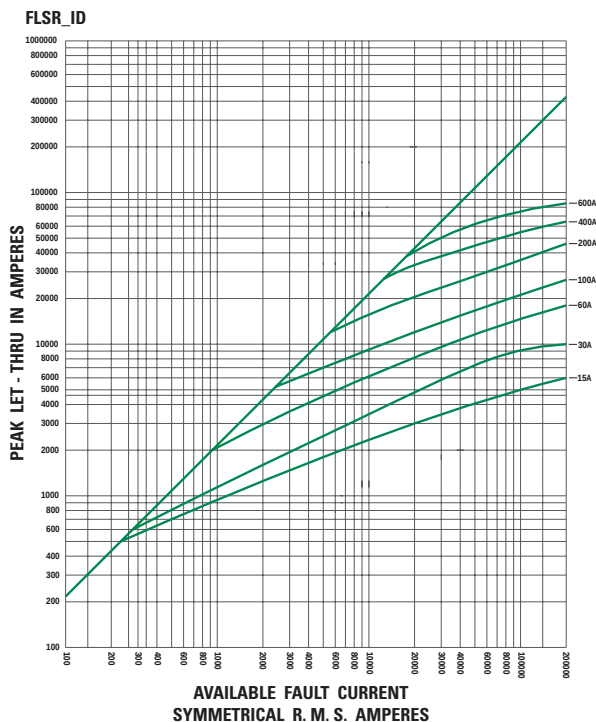
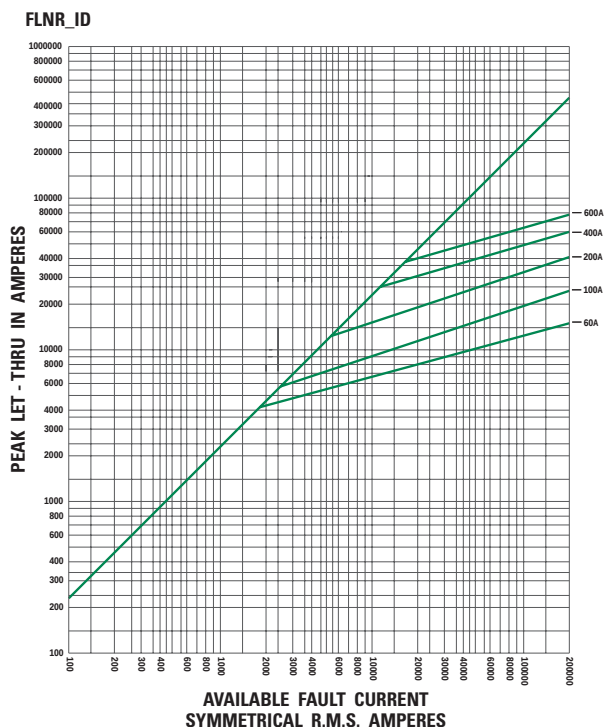
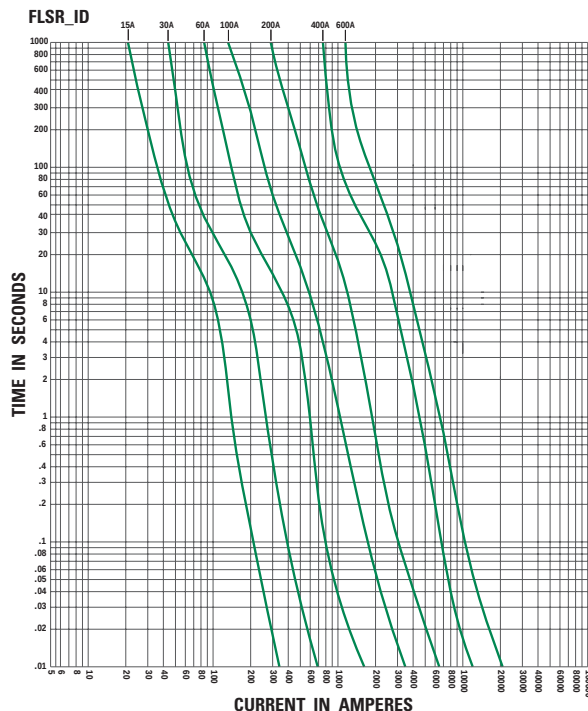
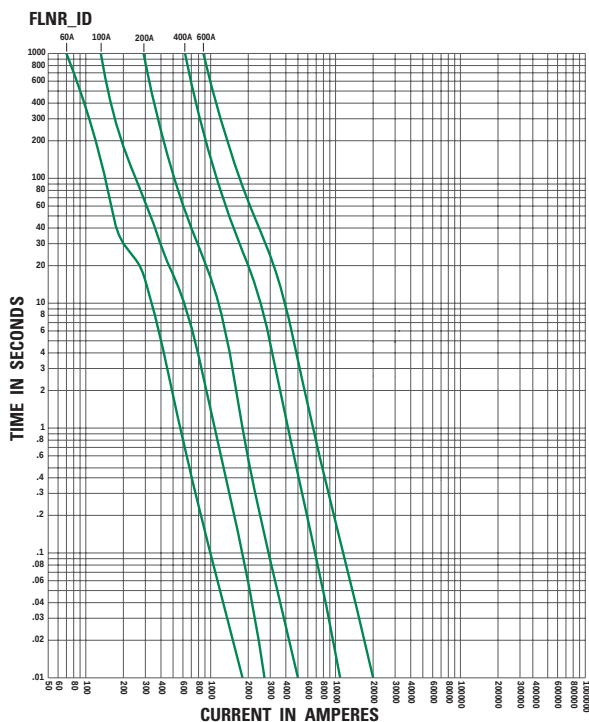
| Short-Circuit Current* | Apparent RMS Symmetrical Current for Various Fuse Ratings |       |        |        |        |        |
|------------------------|-----------------------------------------------------------|-------|--------|--------|--------|--------|
|                        | 30A                                                       | 60A   | 100A   | 200A   | 400A   | 600A   |
| 5,000                  | 1,250                                                     | 2,100 | 3,200  | 5,000  | 5,000  | 5,000  |
| 10,000                 | 1,600                                                     | 2,850 | 4,300  | 7,250  | 10,000 | 10,000 |
| 15,000                 | 1,800                                                     | 3,400 | 5,000  | 8,500  | 13,500 | 15,000 |
| 20,000                 | 2,250                                                     | 3,800 | 5,500  | 9,500  | 15,750 | 19,000 |
| 25,000                 | 2,450                                                     | 4,100 | 5,700  | 10,250 | 17,000 | 21,000 |
| 30,000                 | 2,700                                                     | 4,500 | 6,400  | 10,750 | 18,000 | 23,000 |
| 35,000                 | 2,900                                                     | 4,800 | 6,700  | 11,500 | 19,000 | 24,250 |
| 40,000                 | 3,000                                                     | 5,000 | 7,250  | 12,000 | 19,500 | 27,000 |
| 50,000                 | 3,400                                                     | 5,250 | 7,750  | 13,000 | 21,000 | 29,000 |
| 60,000                 | 3,600                                                     | 5,750 | 8,100  | 14,000 | 22,000 | 30,500 |
| 80,000                 | 3,900                                                     | 6,250 | 9,000  | 15,000 | 24,000 | 33,000 |
| 100,000                | 4,300                                                     | 6,750 | 9,750  | 16,500 | 26,000 | 35,000 |
| 150,000                | 4,500                                                     | 7,600 | 11,100 | 19,000 | 28,000 | 38,000 |
| 200,000                | 4,600                                                     | 8,400 | 12,250 | 21,500 | 30,000 | 40,000 |

\* Prospective RMS Symmetrical Amperes Short-Circuit Current

Note: Data Derived from Peak Let-Thru Curves

## FLNR\_ID/FLSR\_ID Indicator® Class RK5 Fuses

250/600 VAC • Dual-Element, Time Delay • 1/10 – 600 Amperes



## FLNR/FLSR Class RK5 Fuses

250/600 VAC • Dual-Element, Time-Delay • 1/10 – 600 Amperes



Littelfuse FLNR/FLSR series fuses have been the superior UL Class RK5 dual-element time-delay fuses, and are the most widely used class of fuses. FLNR/FLSR series fuses provide excellent protection for all types of circuits especially those containing motors. However, users and specifiers should consider the significant benefits offered by Indicator fuses. Complete information on these fuses may be found earlier in this section.

### Applications

Service entrance switches  
Switchboard main and feeder switches  
Motor control center mains and motor branch circuits  
Individual fused combination motor controllers  
Distribution panelboards  
Industrial control panels  
Protection of fully rated panelboards and loadcenters  
All general purpose circuits

### Safety

- 200,000 A.I.R. — Reliable interruption of all overcurrents up to 200,000 amperes.
- Faster acting short-circuit protection than any non-current-limiting mechanical protective device.

### Reliability

- Accurate and reliable — Automated, precision manufactured and assembled parts ensure accurate, consistent response to overloads and short-circuits.

### Longer Equipment Life

- Reduced damage to equipment caused by heating and magnetic forces of short-circuits.
- Equipment runs cooler with low-resistance dual-element fuses.

### Specifications

|                              |                                    |
|------------------------------|------------------------------------|
| <b>Voltage Ratings:</b>      | AC: 250 Volts (FLNR)               |
|                              | 600 Volts (FLSR)                   |
| <b>Interrupting Ratings:</b> | DC: 125 Volts (FLNR)               |
|                              | 300 Volts (FLSR)                   |
| <b>Ampere Range:</b>         | 1/10 – 600 amperes                 |
| <b>Approvals:</b>            | Standard 248-12, Class RK5         |
|                              | UL Listed (File No: E81895)        |
|                              | CSA Certified (File No: LR29862)   |
|                              | MSHA 300 Volt Listing (FLSR)       |
|                              | QPL: Federal Specification WF-1814 |

### Dimensions

Refer to FLNR\_ID series for FLNR dimensions and FLSR\_ID series for FLSR dimensions.

### Ampere Ratings

|        |        |        |        |        |    |     |     |
|--------|--------|--------|--------|--------|----|-----|-----|
| 1/10   | 6/10   | 1 8/10 | 4      | 8      | 30 | 80  | 225 |
| 1/8    | 9/10   | 2      | 4 1/2  | 9      | 35 | 90  | 250 |
| 15/100 | 1      | 2 1/4  | 5      | 10     | 40 | 100 | 300 |
| 2/10   | 1 1/8  | 2 1/2  | 5 5/10 | 12     | 45 | 110 | 350 |
| 1/4    | 1 1/4  | 2 9/10 | 6      | 15     | 50 | 125 | 400 |
| 3/10** | 1 1/10 | 3      | 6 1/4  | 17 1/2 | 60 | 150 | 450 |
| 4/10   | 1 1/2  | 3 2/10 | 7      | 20     | 70 | 175 | 500 |
| 1/2    | 1 6/10 | 3 1/2  | 7 1/2  | 25     | 75 | 200 | 600 |

\*\*FLNR only,

Example part number (series & amperage): FLSR100

### Recommended Fuse Blocks

LR250 series (for FLNR series fuses)

LR600 series (for FLSR series fuses)

Refer to Blocks & Holders section of this catalog for additional information.

## KLNR/KLSR Class RK1 Fuses

250/600 VAC • Fast Acting • 1 – 600 Amperes



KLNR/KLSR series RK1 fuses were the earliest type of current-limiting fuses developed. Their single-element, silver link design enables them to provide fast-acting overload and short-circuit protection. When used to protect inductive loads such as motors, solenoids, and transformers, KLNR/KLSR series fuses must be greatly oversized to prevent opening the fuses on harmless in-rush currents. In such applications, KLNR/KLSR series fuses may only provide short-circuit protection.

We recommend using POWR-PRO® LLNRK/LLSRK series Class RK1, dual-element, time-delay fuses in all new applications requiring the current-limiting ability of UL Class RK1 fuses. POWR-PRO LLNRK/LLSRK series fuses are also recommended in existing applications where fast-acting RK1 or RK5 fuses have been opening on harmless system surges such as motor starting currents.

### Specifications

|                              |                                                                                            |
|------------------------------|--------------------------------------------------------------------------------------------|
| <b>Voltage Ratings:</b>      | AC: 250 Volts (KLNR); 600 Volts (KLSR)                                                     |
|                              | DC: 125 Volts (1 – 600A KLNR);<br>250 Volts (1 – 30A KLSR);<br>300 Volts (35 – 600A KLSR). |
| <b>Interrupting Ratings:</b> | AC: 200,000 amperes rms symmetrical<br>DC: 20,000 amperes                                  |
| <b>Ampere Range:</b>         | 1 – 600 amperes.                                                                           |
| <b>Approvals:</b>            | AC: Standard 248-12, Class RK1                                                             |
|                              | UL Listed (File No: E81895)                                                                |
|                              | CSA Certified (File No: LR29862)                                                           |
|                              | DC: Littelfuse self-certified                                                              |

### Applications

Resistance heaters  
Lighting circuits  
Non-inductive loads  
Molded case circuit breaker load centers and panelboards have increased interrupting ratings when series rated with Littelfuse KLNR/KLSR Class RK1 fuses. Refer to panelboard manufacturer's literature for UL Listed combination of fuses and panelboards. Series ratings up to 200,000 amperes are available.

### Safety

- 200,000 A.I.R. — Reliable interruption of all overcurrents up to 200,000 amperes.
- Extremely current-limiting — Stops damaging short-circuit current faster than any mechanical protective device.
- Fast-acting — Provides fast acting protection to equipment such as variable speed drives, rectifiers and other equipment containing surge-sensitive components.

### Longer Equipment Life

- Current-limiting design reduces damage to equipment caused by heating and magnetic effects of short-circuit currents.

### Economical

- Extremely current-limiting — often permits use of readily available, less costly equipment.
- Used as input or output fuses for surge sensitive components such as variable speed drives and rectifiers, fast acting KLNR/KLSR fuses may prevent opening of expensive semiconductor fuses protecting individual components.

### Easy To Use

- 200,000 A.I.R. rating minimizes need for short-circuit calculations.

### Dimensions

- Refer to FLNR\_ID for KLNR dimensions and FLSR\_ID for KLSR dimensions.

### Ampere Ratings

|   |    |    |     |     |
|---|----|----|-----|-----|
| 1 | 10 | 40 | 100 | 250 |
| 2 | 12 | 45 | 110 | 300 |
| 3 | 15 | 50 | 125 | 350 |
| 4 | 20 | 60 | 150 | 400 |
| 5 | 25 | 70 | 175 | 450 |
| 6 | 30 | 80 | 200 | 500 |
| 8 | 35 | 90 | 225 | 600 |

Example part number (series & amperage): KLNR 200

### Recommended Fuse Blocks

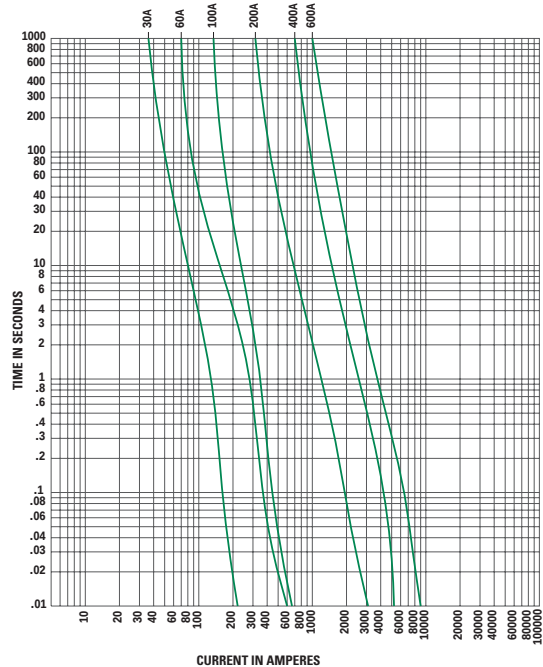
LR250 series (for KLNR series fuses)  
LR600 series (for KLSR series fuses)  
Refer to the Blocks & Holders section of this catalog for additional information.

**KLNR/KLSR Class RK1 Fuses**

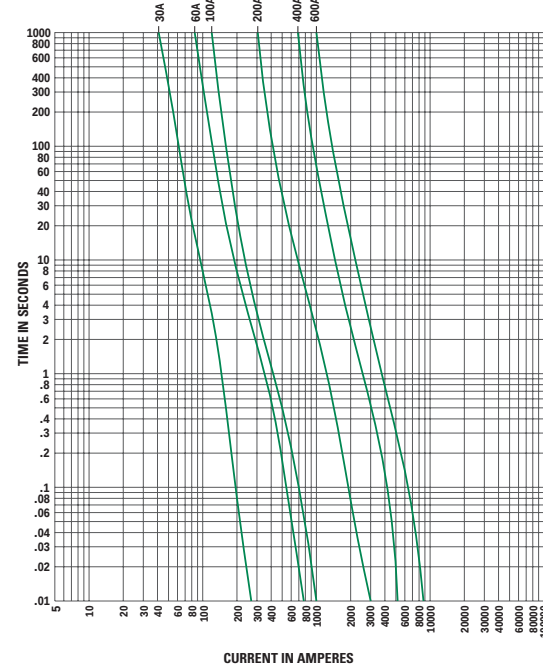
250/600 VAC • Fast Acting • 1 – 600 Amperes

General Purpose Fuses

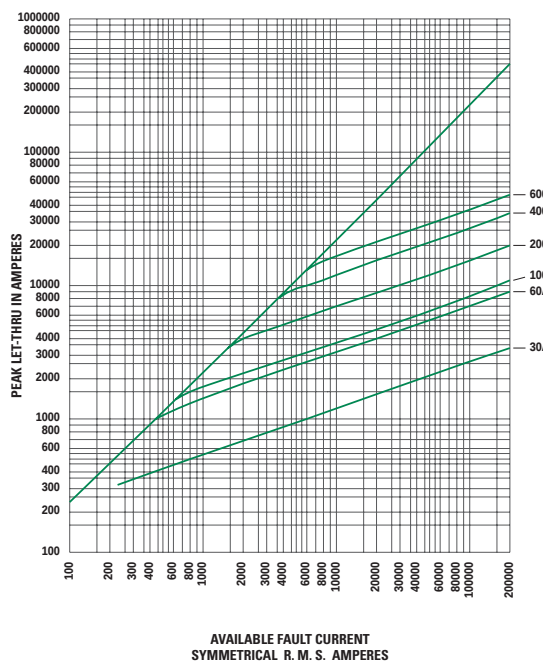
**KLNR**



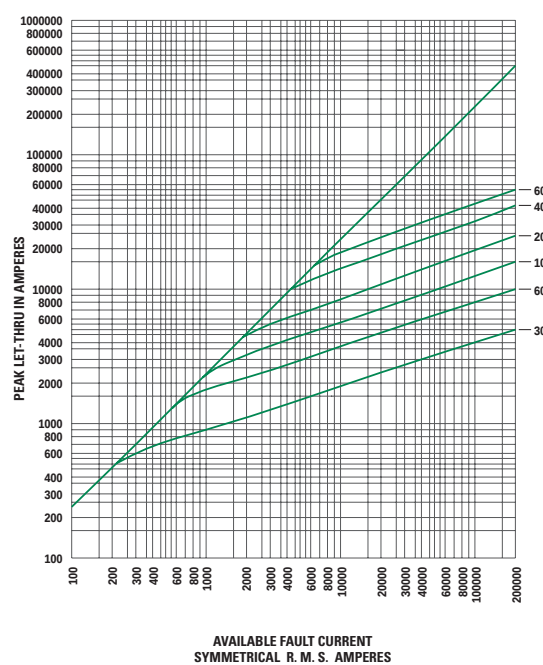
**KLSR**



**KLNR**



**KLSR**



## NLN/NLS Class K5 Fuses

250/600 VAC • "One-Time" • 1 – 600 Amperes



NLN and NLS series fuses provide low cost protection for general purpose feeder and branch circuits when available short-circuit currents are less than 50,000 amperes. They replace all Class H fuses which have only a 10,000 ampere interrupting rating. They are suitable for use in many residential and smaller commercial and industrial applications.

NLKP series fuses are Canadian "Code" fuses specifically designed to meet Canadian Electrical Code Type P fuse requirements for residential use. They have a 10,000 ampere interrupting rating.

However, to obtain the added benefits of time-delay, current-limitation, and higher interrupting rating, consider the use of POWR-PRO® FLNR\_ID and FLNR\_ID Indicator® fuses for circuits up to 600 volts. The user gets all the benefits of time-delay RK5 fuses plus the added benefits of an indicating fuse that shows when it has opened. Complete information on these fuses may be found in the POWR-PRO fuse section of this catalog. For circuits up to 250 volts, see FLNR fuses in this section of the catalog.

### Applications

General purpose residential and commercial circuits with little or no motor load.  
Resistive heating loads.

### Economical

- For use in applications where lowest initial cost is the major consideration.

### Safety

- 50,000 A.I.R., Class K5 — Adequate interrupting capacity for residences and many smaller facilities.

*NOTE: NLKP series fuses have limited interrupting rating and should be used only where available short-circuit current is known to be less than the fuse interrupting rating. Where available fault current is unknown, where it exceeds NLN/NLS interrupting rating, or where it may increase in the future, 200,000 ampere interrupting rating Littelfuse POWR-PRO FLNR\_ID/FLSR\_ID Indicator fuses and FLNR/FLSR series fuses provide superior protection for all motor and general purpose circuits containing inductive loads.*

### Specifications

|                              |                                              |
|------------------------------|----------------------------------------------|
| <b>Voltage Ratings:</b>      | AC: 250 Volts (NLN, NLKP)                    |
|                              | 600 Volts (NLS)                              |
| DC:                          | 250 Volts (NLN)                              |
|                              | 400 Volts (NLS 35 – 60A)                     |
|                              | 500 Volts (NLS 8 – 30A)                      |
|                              | (NLS 225 – 600A)                             |
|                              | 600 Volts (NLS 1 – 7A)                       |
|                              | (NLS 70 – 200A)                              |
| <b>Interrupting Ratings:</b> | AC: 50,000 amperes rms symmetrical (NLN/NLS) |
|                              | 10,000 amperes (NLKP)                        |
|                              | DC: 20,000 amperes (NLN/NLS 1 – 60A)         |
|                              | 50,000 amperes (NLN/NLS 70 – 600A)           |
| <b>Ampere Range:</b>         | 1– 600 amperes (NLN/NLS)                     |
|                              | 15 – 60 amperes (NLKP)                       |
| <b>Approvals:</b>            | NLN/NLS: Standard 248-9, Class K5            |
|                              | UL Listed (File No: E81895)                  |
|                              | CSA Certified (File No: LR29862)**           |
|                              | <b>**Excludes NLN 15-60A</b>                 |
|                              | NLKP: Standard 248-6, Class H                |
|                              | UL Listed (File No: E81895)                  |
|                              | CSA Certified (File No: LR29865)             |
|                              | Meets CSA "Type P" requirements              |

### Ampere Ratings

|   |     |     |     |     |     |
|---|-----|-----|-----|-----|-----|
| 1 | 7   | *25 | *60 | 125 | 300 |
| 2 | 8   | *30 | 70  | 150 | 350 |
| 3 | 10  | *35 | 80  | 175 | 400 |
| 4 | 12  | *40 | 90  | 200 | 450 |
| 5 | *15 | *45 | 100 | 225 | 500 |
| 6 | *20 | *50 | 110 | 250 | 600 |

\* NLKP series available only in those amperages preceded by an asterisk.  
Example part number (series & amperage): NLS 125

### Recommended Fuse Blocks

LH250 series (for NLN and NLKP series fuses)  
LH600 series (for NLS series fuses)  
Refer to the Blocks & Holders section of this catalog for additional information.

## NLN/NLS Class K5 Fuses

250/600 VAC • "One-Time" • 1 – 600 Amperes

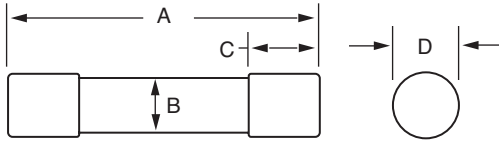


FIG. 1

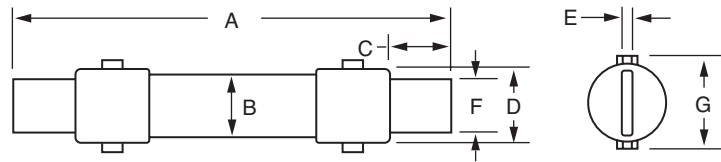
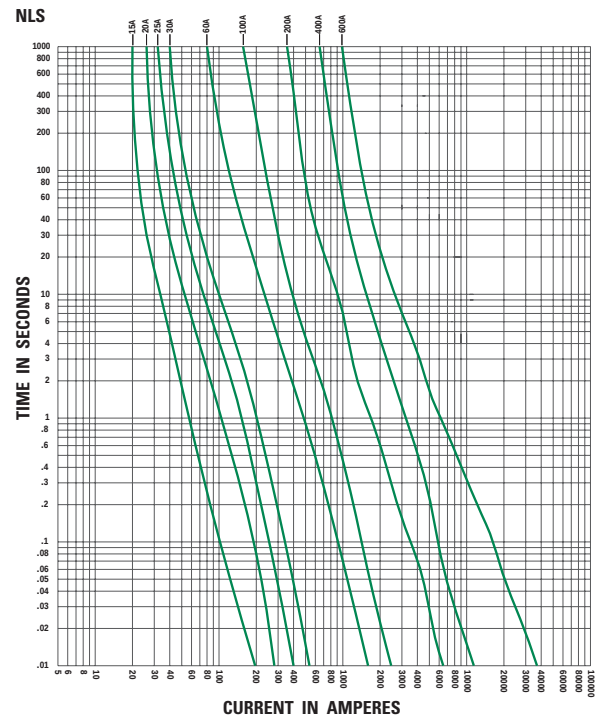
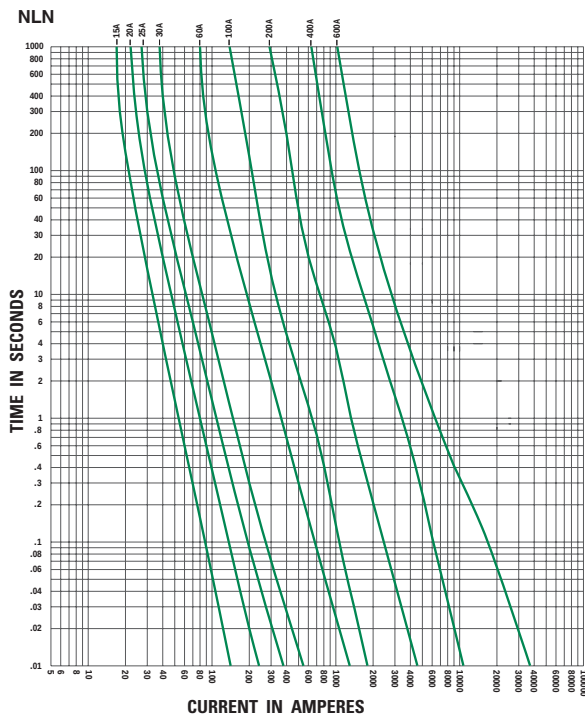


FIG. 2

| Amperes   | Refer to Fig. No. | Series   | Dimensions In Inches (mm in parentheses) |           |            |              |         |           |           |
|-----------|-------------------|----------|------------------------------------------|-----------|------------|--------------|---------|-----------|-----------|
|           |                   |          | A                                        | B         | C          | D            | E       | F         | G         |
| 1 – 30    | 1                 | NLN NLKP | 2 (50.8)                                 | ½ (12.7)  | ½ (12.7)   | 9/16 (14.3)  | —       | —         | —         |
|           |                   | NLS      | 5 (127.0)                                | ¾ (19.1)  | 5/8 (15.9) | 13/16 (20.6) | —       | —         | —         |
| 35 – 60   | 1                 | NLN NLKP | 3 (76.2)                                 | ¾ (19.1)  | 5/8 (15.9) | 13/16 (20.6) | —       | —         | —         |
|           |                   | NLS      | 5½ (139.7)                               | 1 (25.4)  | 5/8 (15.9) | 1½ (38.1)    | —       | —         | —         |
| 70 – 100  | 2                 | NLN      | 5⅞ (149.2)                               | 1 (25.4)  | 1 (25.4)   | 1½ (38.1)    | ⅞ (3.2) | ¾ (19.1)  | 1⅞ (33.3) |
|           |                   | NLS      | 7⅞ (200.0)                               | 1¼ (31.8) | 1 (25.4)   | 1⅞ (39.7)    | ⅞ (3.2) | ¾ (19.1)  | 1⅞ (39.7) |
| 110 – 200 | 2                 | NLN      | 7⅞ (181.0)                               | 1½ (38.1) | 1⅞ (34.9)  | 1⅞ (39.7)    | ¾ (4.8) | 1⅞ (28.6) | 1⅞ (47.6) |
|           |                   | NLS      | 9⅞ (244.5)                               | 1¾ (44.5) | 1⅞ (34.9)  | 2⅞ (46.8)    | ¾ (4.8) | 1⅞ (28.6) | 2⅞ (53.2) |
| 225 – 400 | 2                 | NLN      | 8⅞ (219.1)                               | 2 (50.8)  | 1⅞ (47.6)  | 2⅞ (53.2)    | ¾ (6.4) | 1⅞ (41.3) | 2⅞ (61.1) |
|           |                   | NLS      | 11⅞ (295.3)                              | 2½ (63.5) | 1⅞ (47.6)  | 2⅞ (65.9)    | ¾ (6.4) | 1⅞ (41.3) | 2⅞ (73.0) |
| 450 – 600 | 2                 | NLN      | 10⅞ (263.5)                              | 2½ (63.5) | 2¼ (57.2)  | 2⅞ (65.9)    | ¾ (6.4) | 2 (50.8)  | 2⅞ (73.0) |
|           |                   | NLS      | 13⅞ (339.7)                              | 3 (76.2)  | 2¼ (57.2)  | 3⅞ (78.6)    | ¾ (6.4) | 2 (50.8)  | 3⅞ (87.3) |



## RLN/RLS Class H Fuses

250/600 VAC • Renewable • 1 – 600 Amperes



Littelfuse RLN/RLS series renewable fuses are a quality product that have traditionally been used to provide low cost protection of general purpose feeder and branch circuits where available short-circuit currents do not exceed 10,000 amperes. However, increased levels of available fault current and the possibility that renewable fuses may be improperly renewed is a potential safety hazard. In addition, escalating labor costs

and increasing automation, which makes downtime very expensive, have greatly reduced or eliminated the cost savings attributed to renewable fuses.

We recommend the use of POWR-PRO® FLSR\_ID series Indicator® fuses for circuits between 250 and 600 volts and FLNR\_ID series for circuits 250 volts and below. Complete information on POWR-PRO Indicator fuses may be found in the POWR-PRO fuse section of this catalog. FLNR fuses are in this section of the catalog.

### Cost Considerations

- When comparing the cost of using renewable fuses with the cost of other fuses, the labor required for replacing links and the cost of additional downtime should be included.

### Cautions

- Renewable fuses should only be used where short-circuit currents are known to be less than 10,000 amperes, and where correct replacement of open links is assured.
- After disassembly of fuse, examine carefully. Discard any fuses which show evidence of weakened tube or damaged components.
- Remove all link residue from fuse tube.
- Carefully clean all contact surfaces, and remove metal spatter from all surfaces.
- Install the proper rated fuse link and tighten all connections securely.
- Visually examine fuses for correct alignment of blades.

### Dimensions

- For dimensions, please refer to NLN series for RLN dimensions and NLS series for RLS dimensions.

### Specifications

|                              |                                                                                            |
|------------------------------|--------------------------------------------------------------------------------------------|
| <b>Voltage Ratings:</b>      | AC: 250 Volts (RLN); 600 Volts (RLS)                                                       |
| <b>Interrupting Ratings:</b> | AC: 10,000 amperes rms symmetrical                                                         |
| <b>Ampere Range:</b>         | 1 – 600 amperes                                                                            |
| <b>Approvals:</b>            | Standard 248-6, Class H<br>UL Listed (File No: E81895)<br>CSA Certified (File No: LR29862) |
| <b>FUSE LINKS:</b>           | To order, specify LKN (250V) or LKS (600V) plus ampere rating.                             |

### Ampere Ratings

|   |      |    |    |     |      |      |
|---|------|----|----|-----|------|------|
| 1 | 6    | 20 | 45 | 90  | 175  | 350* |
| 2 | 8**  | 25 | 50 | 100 | 200  | 400* |
| 3 | 10   | 30 | 60 | 110 | 225* | 450* |
| 4 | 12** | 35 | 70 | 125 | 250* | 500* |
| 5 | 15   | 40 | 80 | 150 | 300* | 600* |

\*These ampere ratings require two links per fuse.

\*\*RLS Only.

Example part number (series & amperage): RLN 20

### Recommended Fuse Blocks

LH250 series (for RLN series fuses)

LH600 series (for RLS series fuses)

Refer to the Blocks & Holders section of this catalog for additional information.

## JLS Class J Fuses

600 VAC • Fast Acting • 1 – 600 Amperes



JLS series fuses provide space saving, fast acting overload and short-circuit protection for non-inductive loads. When used for motors or other inductive loads, the ampere rating of JLS series fuses must be increased to prevent nuisance opening on in-rush currents. In such applications, JLS fuses may provide only short-circuit protection. Consider using Littelfuse POWR-PRO® JTD or JTD\_ID series time-delay fuses in such circuits.

### Applications

General purpose circuits with little or no motor load.  
Resistive loads, such as resistance electric heat.  
Loads requiring fast acting overload protection, such as equipment containing solid-state devices.

### Space Saving

- JLS fuse characteristics are similar to KLNK/KLSR fast acting Class RK1 fuses, but dimensionally are much smaller.

### Safety

- 200,000 A.I.R. — Reliable interruption of all overcurrents up to 200,000 amperes.
- Extremely current-limiting — Stops damaging short-circuit current faster than any mechanical protective device.
- Fast acting — Provides fast acting protection to equipment such as variable speed drives, rectifiers and other equipment containing surge sensitive components.

### Longer Equipment Life

- Current-limiting design reduces damage to equipment caused by heating and magnetic effects of short-circuit currents.

### Economical

- Extremely current-limiting design often permits use of readily available, less costly equipment.
- Manufacturers of equipment containing dual voltage devices can simplify manufacturing and reduce inventory by standardizing on 600 volt JLS fuses and Class J fuse blocks for all AC voltage ratings.

### Easy to use

- 200,000 A.I.R. rating minimizes need for short-circuit calculations.

*NOTE: Littelfuse JLS fuses are not time-delay fuses. For applications where short-duration surges and spikes may cause nuisance fuse opening, consider the use of Littelfuse POWR-PRO JTD or JTD\_ID series time-delay fuses.*

### Specifications

|                              |                                        |
|------------------------------|----------------------------------------|
| <b>Voltage Ratings:</b>      | 600 Volts AC                           |
| <b>Interrupting Ratings:</b> | 200,000 amperes rms symmetrical        |
| <b>Ampere Range:</b>         | 1 – 600 amperes                        |
| <b>Approvals:</b>            | Standard 248-8, Class J                |
|                              | UL Listed (File No: E81895)            |
|                              | CSA Certified (File No: LR29862)       |
|                              | QPL: Federal Specification No: WF-1814 |

### Ampere Ratings

|    |    |     |     |     |
|----|----|-----|-----|-----|
| 1  | 25 | 60  | 125 | 300 |
| 3  | 30 | 70  | 150 | 350 |
| 6  | 35 | 80  | 175 | 400 |
| 10 | 40 | 90  | 200 | 450 |
| 15 | 45 | 100 | 225 | 500 |
| 20 | 50 | 110 | 250 | 600 |

Example part number (series & amperage): JLS 110

### Recommended Fuse Blocks

LPSJ series, LJ600 series  
Refer to the Blocks and Holders section of this catalog for additional information.

## JLS Class J Fuses

600 VAC • Fast Acting • 1 – 600 Amperes

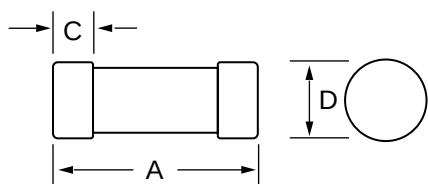


Fig. 1

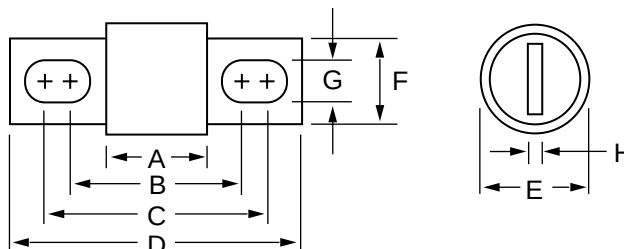
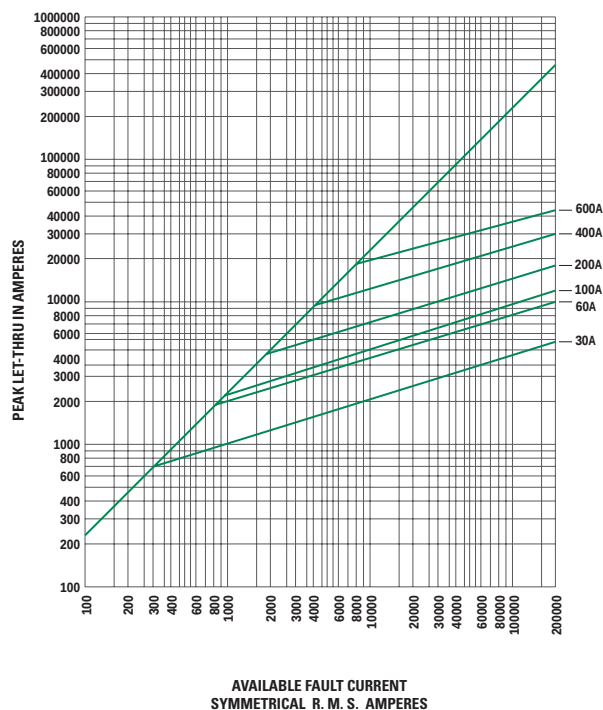
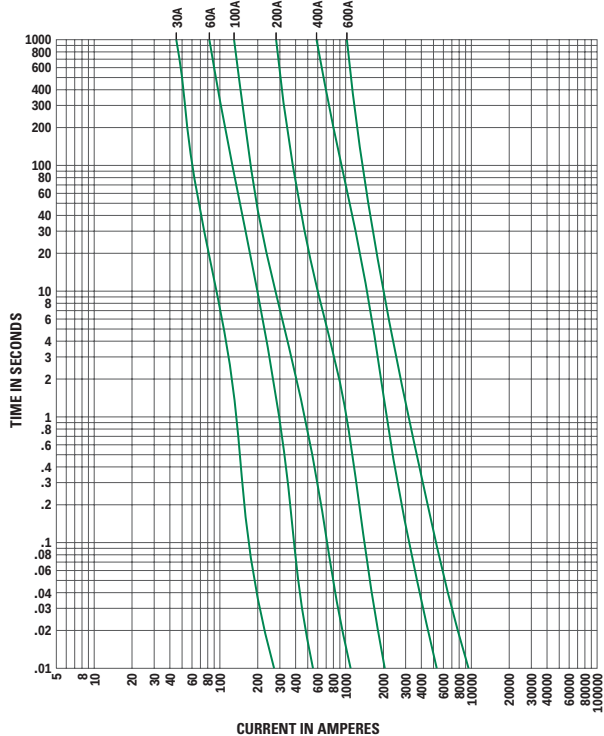


Fig. 2

| Amperes   | Refer to Fig. No. | Dimensions In Inches (mm in parentheses) |                                         |                                         |                                       |           |           |              |            |
|-----------|-------------------|------------------------------------------|-----------------------------------------|-----------------------------------------|---------------------------------------|-----------|-----------|--------------|------------|
|           |                   | A                                        | B                                       | C                                       | D                                     | E         | F         | G            | H          |
| 1 – 30    | 1                 | 2¼ (57.2)                                | —                                       | ½ (12.7)                                | 13/16 (20.6)                          | —         | —         | —            | —          |
| 35 – 60   | 1                 | 2¾ (60.3)                                | —                                       | 5/8 (15.9)                              | 1¼ (27.0)                             | —         | —         | —            | —          |
| 70 – 100  | 2                 | 2⅝ (66.7)                                | 3 <sup>17</sup> / <sub>32</sub> (89.7)  | 3 <sup>23</sup> / <sub>32</sub> (94.5)  | 4 <sup>5</sup> / <sub>8</sub> (117.5) | 1 (25.4)  | ¾ (19.1)  | 9/32 (7.1)   | ⅛ (3.2)    |
| 110 – 200 | 2                 | 3 (76.2)                                 | 4 <sup>9</sup> / <sub>32</sub> (108.7)  | 4 <sup>15</sup> / <sub>32</sub> (113.5) | 5 <sup>3</sup> / <sub>4</sub> (146.1) | 1½ (38.1) | 1⅛ (28.6) | 9/32 (7.1)   | 3/16 (4.8) |
| 225 – 400 | 2                 | 3¾ (85.7)                                | 5⅛ (130.2)                              | 5 <sup>3</sup> / <sub>8</sub> (136.5)   | 7⅞ (181.0)                            | 2 (50.8)  | 1⅝ (41.3) | 13/32 (10.3) | ¼ (6.4)    |
| 450 – 600 | 2                 | 3¾ (95.3)                                | 5 <sup>27</sup> / <sub>32</sub> (148.4) | 6 <sup>5</sup> / <sub>32</sub> (156.4)  | 8 (203.2)                             | 2½ (63.5) | 2 (50.8)  | 17/32 (13.5) | 3/8 (9.5)  |



## JLLN/JLLS POWR-T™ Class T Fuses

300/600 VAC • Fast-Acting • 1 – 1200 Amperes



Space saving POWR-T fuses are the most compact fuses available in ratings above 30 amperes — less than one-third the size of comparable Class R fuses. When rated in accordance with the NEC®, POWR-T fuses provide fast acting overload and short-circuit protection for non-inductive circuits and equipment. Used in inductive circuits, the ampere rating of POWR-T fuses must be increased to prevent opening on in-rush currents. In such instances, POWR-T fuses may provide only short-circuit protection.

### Applications

Littelfuse Class T fuses can be used in applications that require fast-acting protection, such as equipment containing variable speed drives, rectifiers, and other surge-sensitive components. Main switches containing Class T fuses may be used to provide protection to individual electric services and meter stacks. Molded case circuit breaker load centers and Panelboards also will have increased interrupting ratings when “series rated” with Class T fuses.

### Features/Benefits

**Space-Saving** – Switch enclosures, fuse pullouts, and other equipment using Class T fuses are usually more compact. Typical three-pole Class T fuse blocks require less than 50% of the panel space required by similar Class R blocks.

**Longer Equipment Life and Increased Safety** – Class T fuses provide fast, reliable protection against overcurrents up to 200,000 amperes. Extremely current-limiting design minimizes the damaging heating and magnetic effects caused by short-circuit currents.

**Optional Mounting Types** – In addition to the Class T dimensions, Littelfuse offers select ratings with PC board mounting tabs for specialty applications. PC board mount versions are UL Recognized. Contact the factory for more information.

*NOTE: JLLN Class T 300 volt fuses are UL Listed for circuits not exceeding 300 volts to ground. However, since UL does not include testing 300 volt Class T fuses on 277/480 volt three-phase bolted faults, Littelfuse does not recommend using 300 volt Class T fuses where phase-to-phase voltage exceeds 300 volts.*

### Specifications

|                              |                                                |
|------------------------------|------------------------------------------------|
| <b>Voltage Ratings:</b>      | AC: 300 Volts (JLLN); 600 Volts (JLLS)         |
|                              | DC: 125 Volts (JLLN 1 – 30A)                   |
|                              | 160 Volts (JLLN 35 – 60A)                      |
|                              | 125 Volts (JLLN 110 – 1200A)                   |
| <b>Interrupting Ratings:</b> | 300 Volts (JLLS)                               |
|                              | AC: 200,000 amperes rms symmetrical            |
|                              | DC: 20,000 amperes                             |
|                              | (JLLN 110 – 1200A)                             |
| <b>Ampere Range:</b>         | (JLLS 1 – 1200A)                               |
|                              | 1– 1200 amperes                                |
|                              | <b>Approvals:</b> AC: Standard 248-15, Class T |
|                              | UL Listed (File No: E81895):                   |
|                              | JLLN/JLLS (1 – 800A)                           |
|                              | UL Recognized (File No: E71611):               |
|                              | JLLS (900 – 1200A)                             |
|                              | CSA Certified (File No: LR29862):              |
|                              | JLLN/JLLS (1 – 600A)                           |
|                              | DC: UL Listed (File No: E81895):               |
|                              | JLLN (110 – 1200A)                             |
|                              | Littelfuse self-certified: JLLN 1-60A          |
|                              | JLLS (1 – 1200A)                               |

### Ampere Ratings

|    |    |     |     |      |
|----|----|-----|-----|------|
| 1  | 30 | 90  | 250 | 800  |
| 2  | 35 | 100 | 300 | 900* |
| 3  | 40 | 110 | 350 | 1000 |
| 6  | 45 | 125 | 400 | 1100 |
| 10 | 50 | 150 | 450 | 1200 |
| 15 | 60 | 175 | 500 |      |
| 20 | 70 | 200 | 600 |      |
| 25 | 80 | 225 | 700 |      |

\* JLLS only

Example part number (series & amperage): JLLS 100

*Note: Contact the factory for RoHS compliant Class T fuses.*

### Recommended Fuse Blocks

LT300 series (for JLLN series fuses)

LT600 series (for JLLS series fuses)

LSCR002 (for JLLN/JLLS 700-1200A fuses)

Refer to the Blocks and Holders section of this catalog for additional information.

## JLLN/JLLS POWR-T™ Class T Fuses

300/600 VAC • Fast Acting • 1 – 1200 Amperes

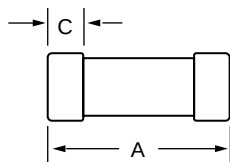


Fig. 1

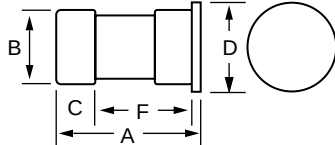


Fig. 2

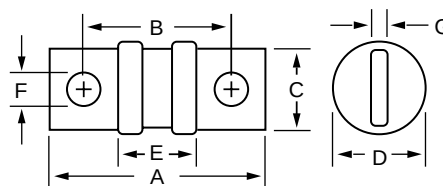


Fig. 3

| Amperes    | Refer to Fig. No. | Series | Dimensions in Inches (mm in parentheses) |                         |                        |                         |                         |                        |                       |
|------------|-------------------|--------|------------------------------------------|-------------------------|------------------------|-------------------------|-------------------------|------------------------|-----------------------|
|            |                   |        | A                                        | B                       | C                      | D                       | E                       | F                      | G                     |
| 1 – 30     | 1                 | JLLN   | $\frac{7}{8}$ (22.2)                     | —                       | $\frac{9}{32}$ (7.1)   | $\frac{13}{32}$ (10.3)  | —                       | —                      | —                     |
|            |                   | JLLS   | $1\frac{1}{2}$ (38.1)                    | —                       | $\frac{9}{32}$ (7.1)   | $\frac{9}{16}$ (14.3)   | —                       | —                      | —                     |
| 35 – 60    | 1                 | JLLN   | $\frac{7}{8}$ (22.2)                     | —                       | $\frac{9}{32}$ (7.1)   | $\frac{9}{16}$ (14.3)   | —                       | —                      | —                     |
|            |                   | JLLS   | $1\frac{1}{16}$ (39.7)                   | $\frac{13}{16}$ (20.6)  | $\frac{13}{32}$ (10.3) | 1 (25.4)                | $\frac{1}{16}$ (1.6)    | $\frac{13}{32}$ (27.8) | —                     |
| 70 – 100   | 3                 | JLLN   | $2\frac{5}{32}$ (54.8)                   | $\frac{19}{16}$ (39.7)  | $\frac{3}{4}$ (19.1)   | $\frac{13}{16}$ (20.6)  | $\frac{27}{32}$ (21.4)  | $\frac{9}{32}$ (7.1)   | $\frac{1}{8}$ (3.2)   |
|            |                   | JLLS   | $2\frac{61}{64}$ (75.0)                  | $2\frac{23}{64}$ (59.9) | $\frac{3}{4}$ (19.1)   | $\frac{13}{16}$ (20.6)  | $1\frac{41}{64}$ (41.7) | $\frac{9}{32}$ (7.1)   | $\frac{1}{8}$ (3.2)   |
| 110 – 200  | 3                 | JLLN   | $2\frac{7}{16}$ (61.9)                   | $1\frac{11}{16}$ (42.9) | $\frac{7}{8}$ (22.2)   | $1\frac{1}{16}$ (27.0)  | $\frac{27}{32}$ (21.4)  | $\frac{11}{32}$ (8.7)  | $\frac{3}{16}$ (4.8)  |
|            |                   | JLLS   | $3\frac{1}{4}$ (82.6)                    | $2\frac{1}{2}$ (63.5)   | $\frac{7}{8}$ (22.2)   | $1\frac{1}{16}$ (27.0)  | $1\frac{21}{32}$ (42.1) | $\frac{11}{32}$ (8.7)  | $\frac{3}{16}$ (4.8)  |
| 225 – 400  | 3                 | JLLN   | $2\frac{3}{4}$ (69.9)                    | $1\frac{27}{32}$ (46.8) | 1 (25.4)               | $1\frac{5}{16}$ (33.3)  | $\frac{59}{64}$ (21.0)  | $\frac{13}{32}$ (10.3) | $\frac{1}{4}$ (6.4)   |
|            |                   | JLLS   | $3\frac{5}{8}$ (92.1)                    | $2\frac{23}{32}$ (69.1) | 1 (25.4)               | $1\frac{19}{32}$ (40.5) | $1\frac{23}{32}$ (43.7) | $\frac{13}{32}$ (10.3) | $\frac{1}{4}$ (6.4)   |
| 450 – 600  | 3                 | JLLN   | $3\frac{1}{16}$ (77.8)                   | $2\frac{1}{32}$ (51.6)  | $1\frac{1}{4}$ (31.8)  | $1\frac{19}{32}$ (40.5) | $\frac{7}{8}$ (22.2)    | $\frac{31}{64}$ (12.3) | $\frac{5}{16}$ (7.9)  |
|            |                   | JLLS   | $3\frac{63}{64}$ (101.2)                 | $2\frac{61}{64}$ (75.0) | $1\frac{1}{4}$ (31.8)  | $2\frac{1}{16}$ (52.4)  | $1\frac{49}{64}$ (44.8) | $\frac{31}{64}$ (12.3) | $\frac{5}{16}$ (7.9)  |
| 700 – 800  | 3                 | JLLN   | $3\frac{3}{8}$ (85.7)                    | $2\frac{7}{32}$ (64.3)  | $1\frac{3}{4}$ (44.5)  | $2\frac{1}{16}$ (52.4)  | $\frac{7}{8}$ (22.2)    | $\frac{35}{64}$ (13.9) | $\frac{3}{8}$ (9.5)   |
|            |                   | JLLS   | $4\frac{21}{64}$ (109.9)                 | $3\frac{11}{64}$ (80.6) | $1\frac{3}{4}$ (44.5)  | $2\frac{1}{2}$ (63.5)   | $1\frac{55}{64}$ (47.2) | $\frac{35}{64}$ (13.9) | $\frac{3}{8}$ (9.5)   |
| 900 – 1200 | 3                 | JLLN   | 4 (101.6)                                | $2\frac{17}{32}$ (64.3) | 2 (50.8)               | $2\frac{1}{2}$ (63.5)   | $1\frac{1}{32}$ (26.2)  | $\frac{39}{64}$ (15.5) | $\frac{7}{16}$ (11.1) |
|            |                   | JLLS   | 5.27 (133.9)                             | 3.80 (96.5)             | 2 (50.8)               | 2.63 (66.8)             | 2.30 (58.4)             | 0.67 (15.5)            | 0.44 (11.2)           |

### Current-Limiting Effects of JLLN (300V) fuses

| Short Circuit Current* | Apparent RMS Symmetrical Current for Various fuse ratings |       |       |       |        |        |        |        |
|------------------------|-----------------------------------------------------------|-------|-------|-------|--------|--------|--------|--------|
|                        | 30A                                                       | 60A   | 100A  | 200A  | 400A   | 600A   | 800A   | 1200A  |
| 5,000                  | 700                                                       | 775   | 1,100 | 1,650 | 3,500  | 4,000  | 5,000  | 5,000  |
| 10,000                 | 900                                                       | 1,000 | 1,400 | 2,100 | 4,400  | 5,100  | 6,750  | 8,250  |
| 15,000                 | 1,000                                                     | 1,100 | 1,600 | 2,400 | 5,000  | 5,900  | 7,750  | 10,000 |
| 20,000                 | 1,100                                                     | 1,250 | 1,800 | 2,700 | 5,500  | 6,500  | 8,750  | 11,000 |
| 25,000                 | 1,230                                                     | 1,300 | 1,950 | 2,900 | 6,000  | 7,000  | 9,500  | 12,000 |
| 30,000                 | 1,300                                                     | 1,475 | 2,050 | 3,100 | 6,400  | 7,500  | 10,000 | 12,500 |
| 35,000                 | 1,330                                                     | 1,575 | 2,150 | 3,300 | 6,750  | 7,750  | 10,500 | 13,500 |
| 40,000                 | 1,430                                                     | 1,600 | 2,300 | 3,500 | 7,000  | 8,000  | 11,000 | 14,000 |
| 50,000                 | 1,500                                                     | 1,750 | 2,400 | 3,700 | 7,500  | 8,750  | 12,000 | 15,000 |
| 60,000                 | 1,700                                                     | 1,900 | 2,700 | 4,000 | 8,000  | 9,500  | 12,500 | 16,000 |
| 80,000                 | 1,850                                                     | 2,100 | 2,800 | 4,400 | 9,000  | 10,500 | 14,000 | 17,500 |
| 100,000                | 2,000                                                     | 2,250 | 3,150 | 4,800 | 9,750  | 11,500 | 15,000 | 18,500 |
| 150,000                | 2,300                                                     | 2,600 | 3,600 | 5,500 | 11,000 | 13,000 | 17,500 | 22,000 |
| 200,000                | 2,600                                                     | 2,800 | 3,900 | 6,000 | 12,000 | 14,500 | 19,500 | 24,000 |

\* Prospective RMS Symmetrical Amperes Short-Circuit Current  
Note: Data Derived from Peak Let-Thru Curves

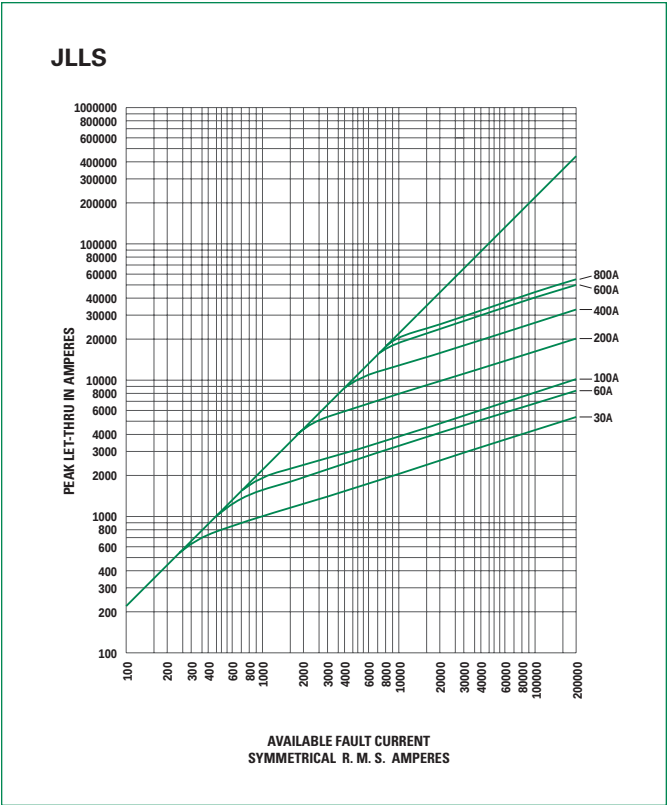
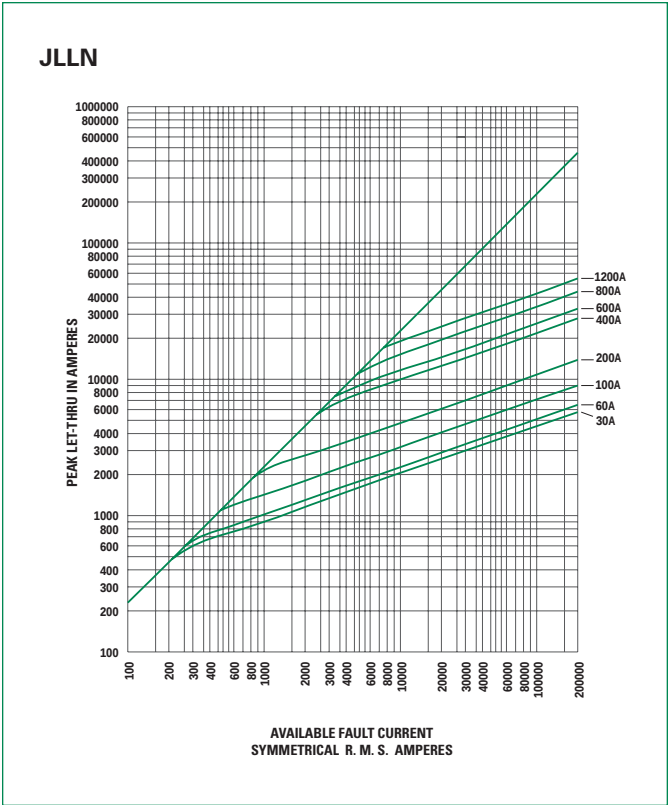
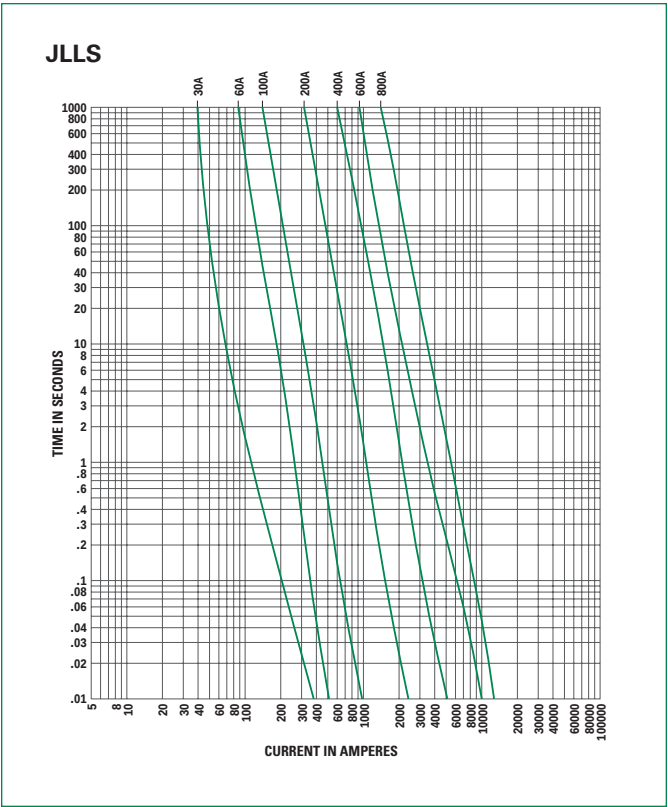
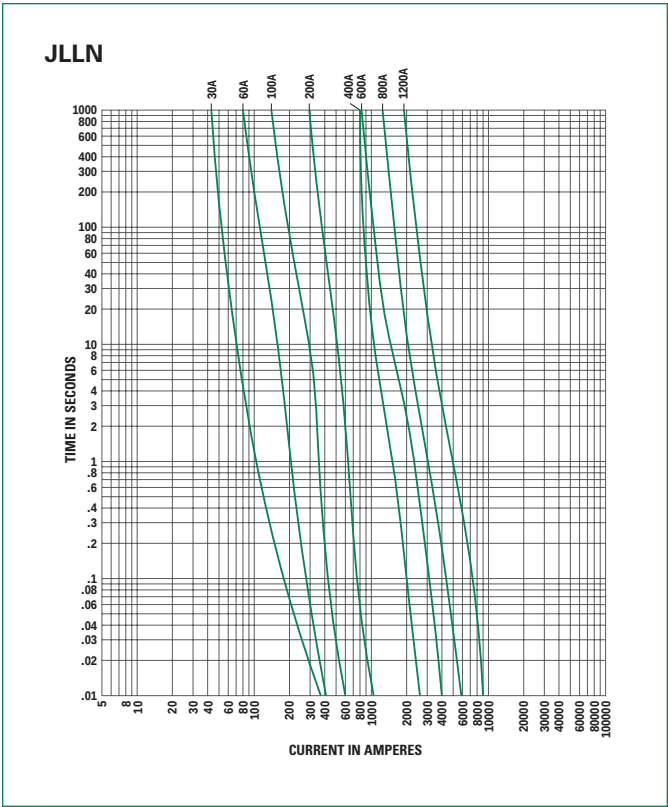
### Current-Limiting Effects of JLLS (600V) fuses

| Short Circuit Current* | Apparent RMS Symmetrical Current for Various fuse ratings |       |       |       |        |        |        |        |
|------------------------|-----------------------------------------------------------|-------|-------|-------|--------|--------|--------|--------|
|                        | 30A                                                       | 60A   | 100A  | 200A  | 400A   | 600A   | 800A   | 1200A  |
| 5,000                  | 750                                                       | 1,225 | 1,400 | 2,850 | 4,600  | 5,000  | 5,000  | 5,000  |
| 10,000                 | 945                                                       | 1,525 | 1,700 | 3,600 | 6,000  | 8,500  | 9,400  | 10,000 |
| 15,000                 | 1,050                                                     | 1,700 | 2,000 | 4,050 | 6,600  | 9,750  | 10,500 | 13,000 |
| 20,000                 | 1,150                                                     | 1,900 | 2,200 | 4,450 | 7,250  | 10,500 | 11,000 | 14,750 |
| 25,000                 | 1,300                                                     | 2,050 | 2,400 | 4,800 | 8,000  | 11,500 | 12,500 | 15,500 |
| 30,000                 | 1,375                                                     | 2,150 | 2,450 | 5,000 | 8,250  | 12,000 | 13,750 | 16,500 |
| 35,000                 | 1,400                                                     | 2,250 | 2,600 | 5,100 | 8,500  | 13,000 | 14,000 | 17,000 |
| 40,000                 | 1,425                                                     | 2,400 | 2,800 | 5,200 | 8,700  | 14,000 | 14,750 | 18,000 |
| 50,000                 | 1,600                                                     | 2,450 | 2,900 | 6,000 | 9,500  | 14,500 | 16,000 | 20,000 |
| 60,000                 | 1,650                                                     | 2,625 | 3,100 | 6,250 | 10,000 | 15,500 | 17,300 | 21,000 |
| 80,000                 | 1,825                                                     | 2,800 | 3,400 | 7,000 | 11,000 | 17,000 | 18,750 | 23,000 |
| 100,000                | 2,000                                                     | 3,100 | 3,700 | 7,250 | 12,000 | 18,000 | 20,000 | 25,000 |
| 150,000                | 2,250                                                     | 3,400 | 4,300 | 8,500 | 13,000 | 21,000 | 23,000 | 28,500 |
| 200,000                | 2,450                                                     | 3,800 | 4,600 | 9,000 | 15,000 | 23,000 | 25,000 | 31,000 |

\* Prospective RMS Symmetrical Amperes Short-Circuit Current  
Note: Data Derived from Peak Let-Thru Curves

**JLLN/JLLS POWR-T™ Class T Fuses**

300/600 VAC • Fast Acting • 1 – 1200 Amperes



## SLC Class G Fuses

480 VAC, 600 VAC • Medium Time-Delay • 1/2 – 60 Amperes



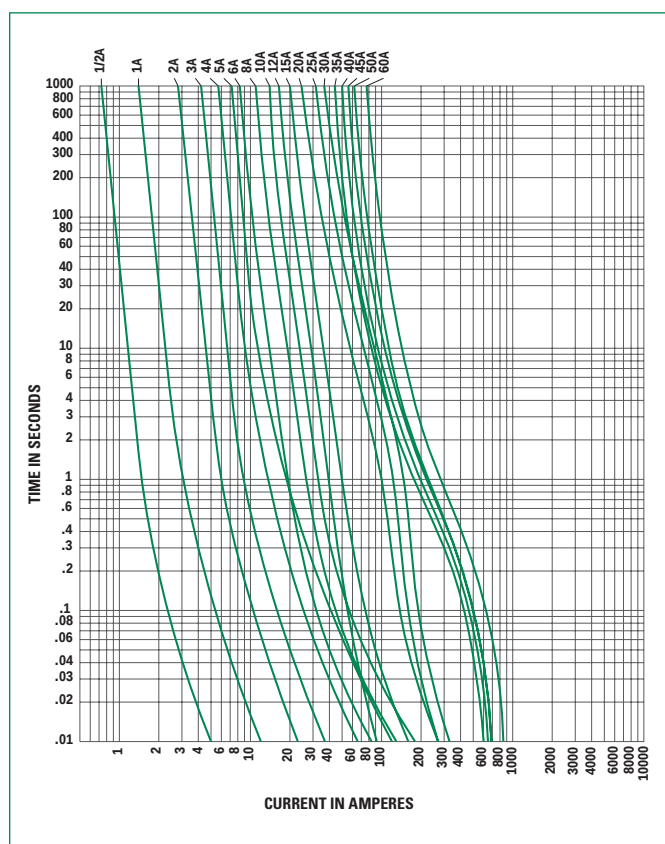
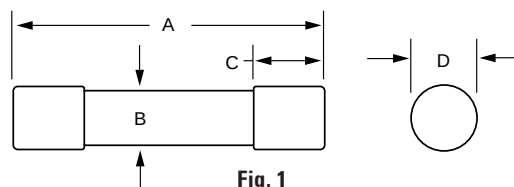
The compact design of Littelfuse SLC series Class G fuses offers a cost effective, space saving alternative to other fuse classes. The unique design of the SLC series provides superior time-delay characteristics over competitive products, which can increase system reliability and minimize downtime. Class G fuses meet NEC requirements for branch circuit protection and vary in length to prevent over-fusing when used with the appropriate Class G fuse block.

### Features/Benefits

- Current-limiting – Reduces damage to equipment caused by heating and magnetic effects of short-circuit currents.
- 100,000 A.I.R. – Reliable interruption of all overcurrents up to 100,000 amperes.
- Time-Delay – Allows fuses to be sized closer to actual equipment requirements and may reduce downtime caused by power surges.

*Note: For applications where greater time-delay is required, or where ratings exceed 60 amperes, consider selecting Littelfuse time-delay Class RK1, RK5, J or CC fuses.*

| Amperes  | Refer to Fig. No. | Dimensions in Inches (mm in parentheses) |           |            |              |
|----------|-------------------|------------------------------------------|-----------|------------|--------------|
|          |                   | A                                        | B         | C          | D            |
| 1/2 – 15 | 1                 | 1 5/16 (33.3)                            | 3/8 (9.5) | 9/32 (7.1) | 13/32 (10.3) |
| 20       | 1                 | 1 13/32 (35.7)                           | 3/8 (9.5) | 9/32 (7.1) | 13/32 (10.3) |
| 25, 30   | 1                 | 1 5/8 (41.3)                             | 3/8 (9.5) | 9/32 (7.1) | 13/32 (10.3) |
| 35 – 60  | 1                 | 2 1/4 (57.2)                             | 3/8 (9.5) | 1/2 (12.7) | 13/32 (10.3) |



### Specifications

**Voltage Ratings:** 600 Volts AC (1/2 – 20A)  
480 Volts AC (25 – 60A)

**Interrupting Ratings:** 100,000 amperes rms symmetrical

**Ampere Range:** 1/2 – 60 amperes

**Approvals:** Standard 248-5, Class G  
UL Listed (File No: E81895)  
CSA Certified (File No: LR29862)  
QPL: Federal Specification No: WF-1814

### Ampere Ratings

|     |   |    |    |    |    |
|-----|---|----|----|----|----|
| 1/2 | 3 | 6  | 15 | 30 | 45 |
| 1   | 4 | 8  | 20 | 35 | 50 |
| 2   | 5 | 10 | 25 | 40 | 60 |

Example part number (series & amperage): SLC 10

### Recommended Fuse Blocks

LG300 series; L300G30 (for 25 and 30 amp fuses)  
Refer to the Blocks & Holders section of this catalog for additional information.

## Class CC and Class CD Fuses

600 VAC • 1/10 – 60 Amperes



Compared to other UL Listed fuses, Class CC has the most current-limiting fuse design available, rating for rating. Because they are physically compact, they provide this superior protection in a fraction of the space required by other fuse classes. For example, when 600V three-pole, 30 ampere Class R fuse blocks are replaced by Littelfuse Class CC fuse blocks, panel mounting space is reduced approximately 70%. This is especially important when a panel contains many fuses to protect multiple circuit components.

### Specifications

|                              |                                                  |
|------------------------------|--------------------------------------------------|
| <b>Voltage Ratings:</b>      | AC: 600 Volts                                    |
|                              | DC: 250 – 500 Volts (CCMR) †                     |
| <b>Interrupting Ratings:</b> | 300 Volts (KLDR)                                 |
|                              | 300 Volts (KLKR)                                 |
|                              | AC: 200,000 amperes<br>rms symmetrical           |
|                              | DC: 20,000 amperes                               |
| <b>Ampere Range:</b>         | CCMR: 2/10 – 60 amperes                          |
|                              | KLDR: 1/10 – 30 amperes                          |
|                              | KLKR: 1/10 – 30 amperes                          |
| <b>Approvals:</b>            | AC: Standard 248-4, Class CC                     |
|                              | UL Listed 1/10-30 Amps (File No: E81895)         |
|                              | Standard 248, Class CD                           |
|                              | UL Listed 35-60 Amps (File No: E71611)           |
|                              | CSA Certified 1/10-30 Amps<br>(File No: LR29862) |
|                              | DC: Littelfuse Self-certified                    |

\*\* Consult the Motor Protection Tables in the Fuseology section for specific motor sizing information

### Applications

Three types of Class CC fuses, specifically designed to protect different types of components

- 1) Motor protection — *CCMR series*; dual-element, time-delay fuses specifically designed to protect motor circuits up to 40 HP\*\*.
- 2) Small transformer protection (control power transformers) — *KLDR series*, time-delay fuses designed to withstand the high magnetizing in-rush of transformers.
- 3) General purpose protection of equipment requiring fast overload protection — *KLKR series*, fast-acting fuses used for protection of equipment containing solid-state devices or other electronic components requiring fast response on overloads.

### Safety

- 200,000 A.I.R. — Reliable interruption of all overcurrents up to 200,000 amperes.
- Extremely current-limiting — Reduces damage caused by heating and magnetic effects of short-circuit currents. Stops damaging short-circuit currents faster than any mechanical protective device.

### Space Saving

- Class CC and CD fuses are the smallest 600V, 200,000 A.I.R. fuses approved for branch circuit protection.

### Economical

- Current-limiting design often permits use of readily available, less costly equipment.

### Recommended Fuse Blocks

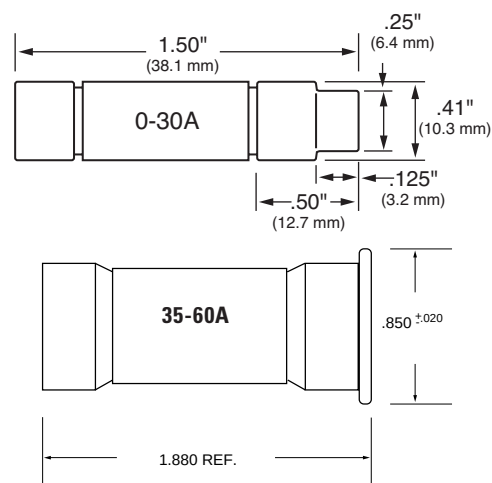
LPSC series (for 1/10–30A)

L60030C series (for 1/10–30A)

L60060C series (for CCMR 35–60A)

Refer to the Blocks and Holders section of this catalog for additional information.

†Refer to the POWR-PRO® section for additional information.



## Class CC and Class CD Fuses

600 VAC • 1/10 – 60 Amperes

### CCMR Series



For space saving protection of motor circuits up to 40 HP\*\*, we recommend Littelfuse POWR-PRO® CCMR series fuses. These fuses are the only true dual-element time-delay CC fuses specifically engineered for motor branch circuit protection. They provide Type 2 “No Damage” protection to both NEMA-rated and the more sensitive IEC (International Electrotechnical Commission) type motor circuit components.

CCMR series fuses are now available in larger sizes — from 35 to 60 amperes! **No other 600V fuse is available with this current carrying capacity in a package this small.**

*\*\*Consult the Motor Protection Tables in the Fuseology section for specific motor sizing information*

For more information on CCMR series Class CC fuses, see the CCMR series pages in the POWR-PRO section of this catalog.

1/10 – 30A: UL Listed Class CC  
35 – 60A: UL Listed Class CD

### Ampere Ratings

|      |    |    |    |     |    |
|------|----|----|----|-----|----|
| 2/10 | 1¼ | 2½ | 5  | 9   | 30 |
| ¼    | 1½ | 2¾ | 5½ | 10  | 35 |
| 3/10 | 1½ | 3  | 6  | 12  | 40 |
| ½    | 1¾ | 3½ | 6¾ | 15  | 45 |
| 5/10 | 1¾ | 3½ | 7  | 17½ | 50 |
| 8/10 | 2  | 4  | 7½ | 20  | 60 |
| 1    | 2¼ | 4½ | 8  | 25  |    |

Example part number (series & amperage): CCMR 30

### KLDR Series



KLDR fuses are time-delay fuses specifically designed for the protection of control transformers, solenoids and similar inductive components with high magnetizing currents during the first half-cycle. They closely match most control power transformer characteristics, which permits the fuses to be sized in accordance with the latest revisions of UL 508 (Industrial Control) and UL 845 (Motor Control Centers). When the time delay of KLDR fuses is adequate to carry motor starting current, they provide excellent protection of motor branch circuits containing IEC or NEMA rated motor controllers or contactors.

### Ampere Ratings

|        |      |    |    |     |
|--------|------|----|----|-----|
| 1/10   | 6/10 | 1¾ | 4½ | 10  |
| 1/8    | ¾    | 2  | 5  | 12  |
| 15/100 | 8/10 | 2¼ | 5½ | 15  |
| 1/16   | 1    | 2½ | 6  | 17½ |
| 2/10   | 1½   | 2¾ | 6¾ | 20  |
| ¼      | 1¾   | 3  | 7  | 25  |
| 3/10   | 1¾   | 3½ | 7½ | 30  |
| 4/10   | 1½   | 3½ | 8  |     |
| ½      | 1¾   | 4  | 9  |     |

Example part number (series & amperage): KLDR 5 5/10

### KLKR Series



KLKR series Class CC fuses are fast acting fuses intended for general purpose branch circuit protection. Their compact size, fast acting overload response, and highly current-limiting design make them ideal for use in OEM equipment and control panels. Solid state devices such as SCRs and other electronic equipment generally require fast acting protection.

### Ampere Ratings

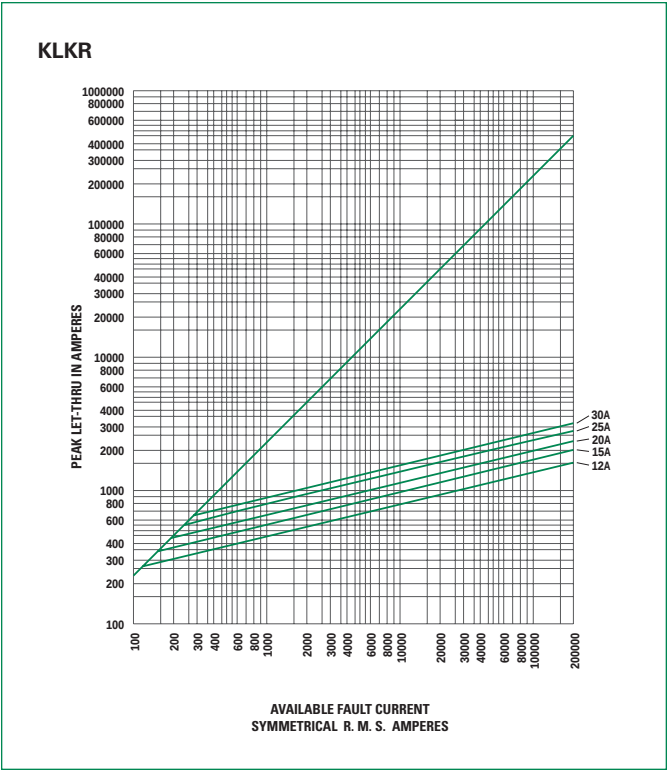
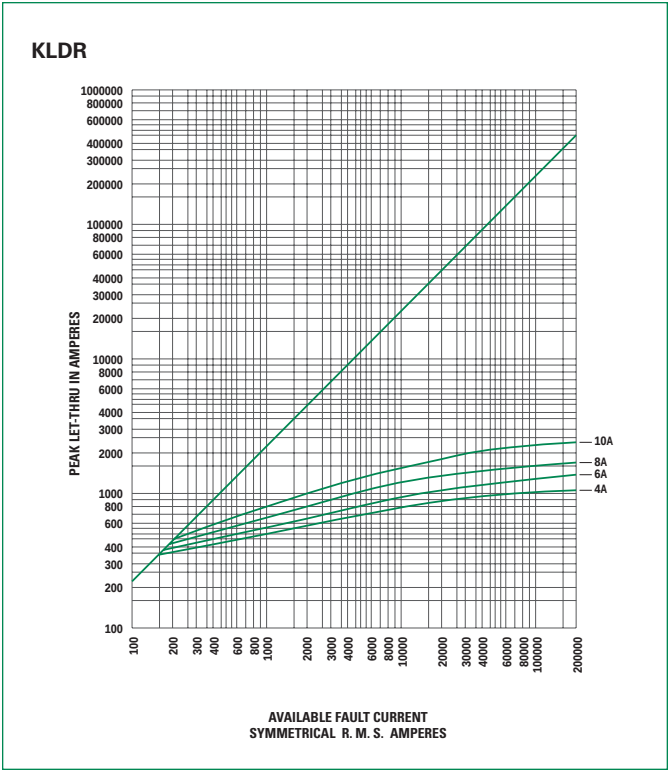
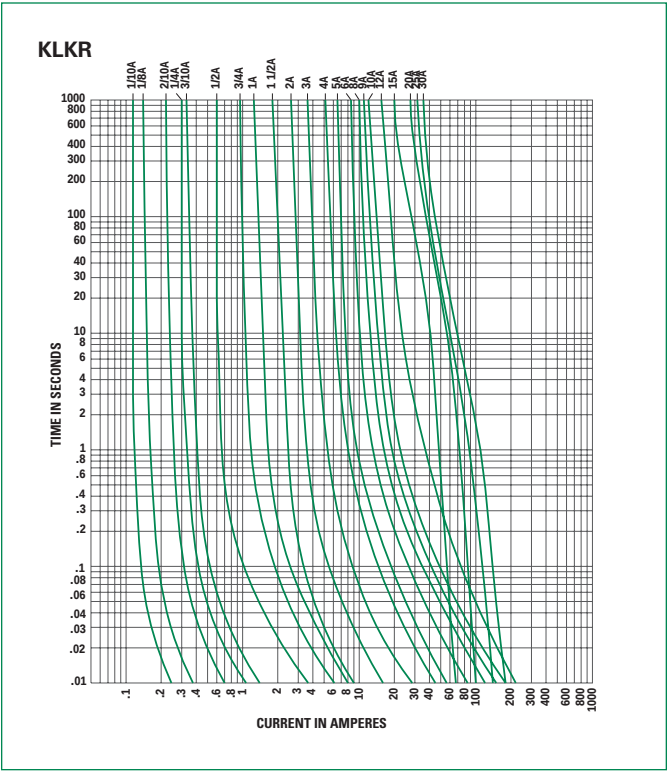
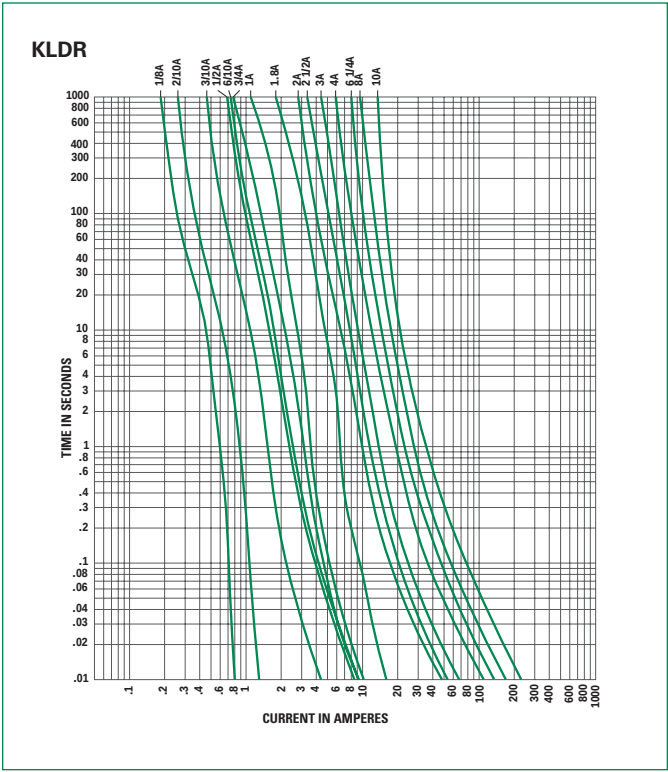
|      |    |    |    |    |
|------|----|----|----|----|
| 1/10 | ½  | 2½ | 6  | 12 |
| 1/8  | ¾  | 3  | 7  | 15 |
| 2/10 | 1  | 3½ | 8  | 20 |
| ¼    | 1½ | 4  | 9  | 25 |
| 3/10 | 2  | 5  | 10 | 30 |

Example part number (series & amperage): KLKR 25

**Class CC and Class CD Fuses**

**600 VAC • 1/10 – 60 Amperes**

For performance data on Littelfuse CCMR series Class CC fuses, see the CCMR pages in the POWR-PRO® section of this catalog.



## Plug Fuses

125 VAC • Time-Delay • 1/4 – 30 Amperes



Littelfuse Plug fuses provide overcurrent protection to general purpose circuits and small motor loads. Edison-base Plug fuses (T00 and TLO series) feature metal threads similar to incandescent lamp bases. Type S Plug fuses (S00 and SLO series) utilize a nonmetallic threaded base and must be used with Type S adapters (SAO series). The National Electrical Code permits Edison-base Plug fuses to be used for replacement purposes only. Type S fuses and adapters prevent shunting open fuses and over-fusing.

| SAO Adapter Rating | Accepts Fuse Ratings:   | Other S00 Fuse Ratings Which Fit |
|--------------------|-------------------------|----------------------------------|
| SAO 1              | 3/10 – 1                | —                                |
| SAO 1¼             | 1½, 1¼                  | 3/10 – 1                         |
| SAO 1⅝             | 1¾, 1⅝                  | 3/10 – 1¼                        |
| SAO 2              | 1⅞, 2                   | —                                |
| SAO 2½             | 2¼, 2½                  | 1⅞, 2                            |
| SAO 3⅝             | 2⅞, 3⅝                  | 1⅞ – 2½                          |
| SAO 4              | 3½, 4                   | —                                |
| SAO 5              | 4½, 5                   | 3½, 4                            |
| SAO 6¼             | 3½, 6¼                  | 3½ – 5                           |
| SAO 8              | 7, 8                    | —                                |
| SAO 15             | 7, 8, 9, 10, 12, 14, 15 | 7, 8, 9, 10                      |
| SAO 20             | 20 only                 | —                                |
| SAO 30             | 20, 25, 30              | —                                |

## Specifications

**Voltage Rating:** 125 VAC  
**Interrupting Rating:** 10,000 amperes rms symmetrical  
**Approvals:** UL Listed Plug Fuses, Standard UL 248-11

*Note: See NEC Article 240-V for additional information on Plug fuse applications.*

## Edison-base Plug fuses

**T00 Fuses** are dual-element time-delay Edison-base fuses designed for motor and motor branch circuit protection; also suitable for all general purpose circuits. Use for replacement purposes only.

### Ampere Ratings

|      |    |    |    |    |    |
|------|----|----|----|----|----|
| 3/10 | 1½ | 2¼ | 4  | 7  | 15 |
| 4/10 | 1¼ | 2½ | 4½ | 8  | 20 |
| ½    | 1⅝ | 2⅞ | 5  | 9  | 25 |
| ⅝    | 1⅞ | 3  | 5⅝ | 10 | 30 |
| ⅞    | 1⅞ | 3⅝ | 6  | 12 |    |
| 1    | 2  | 3½ | 6¼ | 14 |    |

**TLO Fuses** are medium time-delay Edison-base fuses designed for general purpose branch circuit protection. See T00 and S00 fuses for motor protection. Use for replacement purposes only.

### Ampere Ratings

|    |    |    |    |
|----|----|----|----|
| 15 | 20 | 25 | 30 |
|----|----|----|----|

## Type S Plug fuses

**S00 Fuses** are dual-element time-delay Type S fuses designed for motor and motor branch circuit protection; also suitable for all general purpose circuits.

### Ampere Ratings

|      |    |    |    |    |    |
|------|----|----|----|----|----|
| ¼    | 1  | 2  | 3½ | 6¼ | 14 |
| 3/10 | 1½ | 2¼ | 4  | 7  | 15 |
| 4/10 | 1¼ | 2½ | 4½ | 8  | 20 |
| ½    | 1⅝ | 2⅞ | 5  | 9  | 25 |
| ⅝    | 1⅞ | 3  | 5⅝ | 10 | 30 |
| ⅞    | 1⅞ | 3⅝ | 6  | 12 |    |

**SLO Fuses** are medium time-delay Type S fuses for general purpose branch circuit protection.

### Ampere Ratings

|    |    |    |    |
|----|----|----|----|
| 15 | 20 | 25 | 30 |
|----|----|----|----|

## Midget & Electronic Fuses



*Midget Fuses*

**50-54**

*Electronic Fuses*

**55-59**

*Automotive Fuses*

**60-62**

## Midget Fuses

### Supplementary Overcurrent Protection

#### KLK Fuses

Fast-Acting • 600 VAC



Fast-acting, high-interrupting capacity, current-limiting type fuse. Especially suited for control circuits, street lighting, H.I.D. lighting, computers, and other applications without high in-rush currents.

**Voltage Rating:** 600 Volts AC  
500 Volts DC

**Interrupting Rating:** UL Listed 100,000 amperes rms symmetrical  
(Capable of 200,000 amperes)

**Dimensions:**  $\frac{13}{32}$ " x  $1\frac{1}{2}$ "  
Example part number (series & amperage): **KLK 1 $\frac{1}{2}$**

#### Ampere Ratings:

|                |                 |    |    |
|----------------|-----------------|----|----|
| $\frac{1}{10}$ | 1               | 5  | 15 |
| $\frac{1}{8}$  | 1 $\frac{1}{2}$ | 6  | 20 |
| $\frac{2}{10}$ | 2               | 7  | 25 |
| $\frac{1}{4}$  | 2 $\frac{1}{2}$ | 8  | 30 |
| $\frac{3}{10}$ | 3               | 9  |    |
| $\frac{1}{2}$  | 3 $\frac{1}{2}$ | 10 |    |
| $\frac{3}{4}$  | 4               | 12 |    |

**Approvals:** Standard 248-14  
UL Listed 3/10-30A (File No: E10480)  
CSA Certified 3/10-30A (File No: LR29862)  
Versions available to meet  
MIL-F-5160/60, QPL F60C:  
Contact Factory.

#### KLKD Fuses

Fast-Acting • 600 VAC/DC



Fast acting, high interrupting capacity, current-limiting type fuse. Especially suited for DC control circuits, street lighting, H.I.D. lighting, computers, and other applications.

**Voltage Rating:** 600 Volts AC/DC

**Interrupting Rating:** AC: 100,000 amperes rms symmetrical;  
DC: 10,000 amperes

**Dimensions:**  $\frac{13}{32}$ " x  $1\frac{1}{2}$ "  
Example part number (series & amperage): **KLKD 30**

#### Ampere Ratings:

|                |                 |    |    |
|----------------|-----------------|----|----|
| $\frac{1}{10}$ | 1               | 5  | 15 |
| $\frac{1}{8}$  | 1 $\frac{1}{2}$ | 6  | 20 |
| $\frac{2}{10}$ | 2               | 7  | 25 |
| $\frac{1}{4}$  | 2 $\frac{1}{2}$ | 8  | 30 |
| $\frac{3}{10}$ | 3               | 9  |    |
| $\frac{1}{2}$  | 3 $\frac{1}{2}$ | 10 |    |
| $\frac{3}{4}$  | 4               | 12 |    |

**Approvals:** Standard 248-14  
UL Listed 3/10-30A (File No: E10480)  
CSA Certified 3/10-30A (File No: LR29862)

#### FLM Fuses

Time-Delay • 250 VAC



Use FLM 250 volt time-delay fuses to protect control circuit transformers, solenoids, and other circuits with high in-rush currents. Excellent for supplemental protection of small motors. For motor branch circuit protection, Refer to Class CC fuses.

**Voltage Rating:** 125 Volts AC  
125 Volts DC self-certified @ 10KA

**Interrupting Rating:** AC: 10,000 amperes rms symmetrical.

**Dimensions:**  $\frac{13}{32}$ " x  $1\frac{1}{2}$ "  
Example part number (series & amperage): **FLM 15**

#### Ampere Ratings:

|                  |                  |                  |    |
|------------------|------------------|------------------|----|
| $\frac{1}{10}$   | 1 $\frac{1}{8}$  | 3                | 8  |
| $\frac{15}{100}$ | $\frac{1}{4}$    | 3 $\frac{1}{2}$  | 9  |
| $\frac{2}{10}$   | 1 $\frac{1}{10}$ | 3 $\frac{1}{2}$  | 10 |
| $\frac{1}{4}$    | 1 $\frac{1}{2}$  | 4                | 12 |
| $\frac{3}{10}$   | 1 $\frac{6}{10}$ | 4 $\frac{1}{2}$  | 15 |
| $\frac{4}{10}$   | 1 $\frac{9}{10}$ | 5                | 20 |
| $\frac{1}{2}$    | 2                | 5 $\frac{6}{10}$ | 25 |
| $\frac{6}{10}$   | 2 $\frac{1}{4}$  | 6                | 30 |
| $\frac{8}{10}$   | 2 $\frac{1}{2}$  | 6 $\frac{1}{4}$  |    |
| 1                | 2 $\frac{9}{10}$ | 7                |    |

**Approvals:** Standard 248-14  
UL Listed (File No: E10480)  
CSA Certified (File No: LR29862)

### Recommended Fuse Blocks

L60030M and LPSM series. Refer to the Blocks & Holders section of this catalog for additional information.

## Midget Fuses

### Supplementary Overcurrent Protection

#### FLQ Fuses

Time-Delay • 500 VAC



These 500 volt time-delay fuses provide excellent supplemental protection of control power transformers, solenoids, and circuits with high inrush currents. UL and CSA 500 volt ratings permit use on 480 volt circuits. FLQ fuses also provide supplemental protection to small motors. For motor branch circuit protection, refer to Class CC fuses.

**Voltage Rating:** 500 Volts AC  
300 Volts DC self-certified @ 10KA

**Interrupting Rating:** 10,000 amperes rms  
symmetrical

**Dimensions:**  $\frac{13}{32}$ " x  $1\frac{1}{2}$ "  
Example part number (series & amperage): **FLQ ½**

#### Ampere Ratings:

|                  |                 |                 |    |
|------------------|-----------------|-----------------|----|
| $\frac{1}{10}$   | $\frac{8}{10}$  | $3\frac{3}{10}$ | 9  |
| $\frac{1}{8}$    | 1               | $3\frac{1}{2}$  | 10 |
| $\frac{15}{100}$ | $1\frac{1}{8}$  | 4               | 12 |
| $\frac{3}{16}$   | $1\frac{1}{4}$  | $4\frac{1}{2}$  | 14 |
| $\frac{2}{10}$   | $1\frac{1}{2}$  | 5               | 15 |
| $\frac{1}{4}$    | $1\frac{6}{10}$ | $5\frac{6}{10}$ | 20 |
| $\frac{3}{10}$   | 2               | 6               | 25 |
| $\frac{4}{10}$   | $2\frac{1}{4}$  | $6\frac{1}{4}$  | 30 |
| $\frac{1}{2}$    | $2\frac{1}{2}$  | 7               |    |
| $\frac{6}{10}$   | 3               | 8               |    |

**Approvals:** Standard 248-14  
UL Listed (File No: E10480)  
CSA Certified (File No: LR29862)

#### BLN Fuses

Fast-Acting • 250 VAC



Fiber tube, 250 volt BLN fuses provide low-cost protection for military applications and control circuits.

**Voltage Rating:** 250 Volts AC  
**Interrupting Rating:** 10,000 amperes rms  
symmetrical

**Dimensions:**  $\frac{13}{32}$ " x  $1\frac{1}{2}$ "  
Example part number (series & amperage): **BLN 30**

#### Ampere Ratings:

|   |   |    |    |    |
|---|---|----|----|----|
| 1 | 4 | 8  | 15 | 30 |
| 2 | 5 | 10 | 20 |    |
| 3 | 6 | 12 | 25 |    |

**Approvals:** Standard 248-14  
UL Listed (File No: E10480)  
CSA Certified (File No: LR29862)  
Versions available to meet MIL-F-15160/9,  
QPL F09A: Contact Factory

#### BLF Fuses

Fast-Acting • 125/250 VAC



Laminated tube BLF fuses are the lowest price midget fuse. They are suitable for control circuit and instrument protection in dry locations.

**Voltage Ratings:** 250 Volts AC: ½ – 15 amperes;  
125 Volts AC: 20 – 30 amperes  
**Interrupting Rating:** 10,000 amperes rms  
symmetrical

**Dimensions:**  $\frac{13}{32}$ " x  $1\frac{1}{2}$ "  
Example part number (series & amperage): **BLF 5**

#### Ampere Ratings:

|                |                |    |    |
|----------------|----------------|----|----|
| $\frac{1}{2}$  | 3              | 7  | 15 |
| 1              | 4              | 8  | 20 |
| $1\frac{1}{2}$ | 5              | 9  | 25 |
| 2              | 6              | 10 | 30 |
| $2\frac{1}{2}$ | $6\frac{1}{4}$ | 12 |    |

**Approvals:** Standard 248-14  
UL Listed (File No: E10480)  
CSA Certified (File No: LR29862)

### Recommended Fuse Blocks

L60030M and LPSM series. Refer to the Blocks & Holders section of this catalog for additional information.

## Midget Fuses

### Supplementary Overcurrent Protection

#### BLS Fuses

Fast-Acting • 250/600 VAC



BLS fuses are  $1\frac{3}{8}$ " long in contrast to other midget fuses which are  $1\frac{1}{2}$ ". They provide space saving, low cost protection to street lighting, metering, control and electronic circuits.

**Voltage Rating:** 600 Volts AC:  $\frac{2}{10}$  – 5 amperes;  
250 Volts AC: 6 – 10 amperes

**Interrupting Rating:** 10,000 amperes rms  
symmetrical

**Dimensions:**  $\frac{13}{32}$ " x  $1\frac{3}{8}$ "

Example part number (series & amperage): **BLS 10**

#### Ampere Ratings:

|                |                 |   |    |
|----------------|-----------------|---|----|
| $\frac{2}{10}$ | 1               | 3 | 8  |
| $\frac{4}{10}$ | $1\frac{1}{2}$  | 4 | 10 |
| $\frac{1}{2}$  | $1\frac{5}{10}$ | 5 |    |
| $\frac{3}{4}$  | $1\frac{8}{10}$ | 6 |    |
| $\frac{8}{10}$ | 2               | 7 |    |

**Approvals:** Standard 248-14  
UL Listed  $\frac{2}{10}$ -10 Amps (File No: E10480)  
CSA Certified  $\frac{1}{2}$  – 5 Amps  
(File No: LR29862)

#### FLA Fuses

Time-Delay • 125 VAC



FLA fuses are 125 volt, pin-indicating time-delay fuses for protection of control circuit transformers, solenoids, and other circuits with high in-rush currents. Metal indicating pin pops-out when fuse opens, giving visual indication of blown fuse. Use FLA fuses in conjunction with special fuseblocks to operate mechanical signal switches or energize alarm circuits. Fuses rated 12 amperes and above have dual-tube construction.

**Voltage Rating:** 125 Volts AC

**Interrupting Rating:** 10,000 amperes rms  
symmetrical

**Dimensions:**  $\frac{13}{32}$ " x  $1\frac{1}{2}$ "

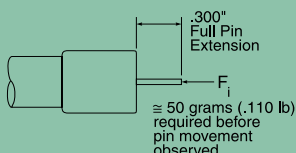
Example part number (series & amperage): **FLA 15**

\* *Note: Dual tube construction*

#### Ampere Ratings:

|                  |                 |                 |     |
|------------------|-----------------|-----------------|-----|
| $\frac{1}{10}$   | $1\frac{1}{8}$  | 3               | 8   |
| $\frac{15}{100}$ | $1\frac{1}{4}$  | $3\frac{2}{10}$ | 10  |
| $\frac{2}{10}$   | $1\frac{4}{10}$ | $3\frac{1}{2}$  | 12* |
| $\frac{1}{4}$    | $1\frac{1}{2}$  | 4               | 15* |
| $\frac{3}{10}$   | $1\frac{6}{10}$ | $4\frac{1}{2}$  | 20* |
| $\frac{4}{10}$   | $1\frac{8}{10}$ | 5               | 25* |
| $\frac{1}{2}$    | 2               | $5\frac{6}{10}$ | 30* |
| $\frac{6}{10}$   | $2\frac{1}{4}$  | 6               |     |
| $\frac{8}{10}$   | $2\frac{1}{2}$  | $6\frac{1}{4}$  |     |
| 1                | $2\frac{8}{10}$ | 7               |     |

**Approvals:** Standard 248-14  
UL Listed (File No: E10480)  
CSA Certification Pending



### Recommended Fuse Blocks

L60030M and LPSM series. Refer to the Blocks & Holders section of this catalog for additional information.

## Midget Fuses

### Supplementary Overcurrent Protection

#### KLQ Series Fuses



The Littelfuse KLQ series is designed to protect gaseous vapor fixtures, HID ballasts, and other electronic and lighting circuits. The KLQ is the same physical size as the Littelfuse BLS, but has more time-delay to handle transient and in-rush currents.

**Voltage Rating:** 600 VAC  
**Interrupting Rating:** 10,000 amperes  
**Approvals:** Standard 248-14 UL Listed (File No: E10480)  
**Dimensions:**  $\frac{13}{32}$ " x  $1\frac{3}{8}$ "

#### Ampere Ratings:

|                 |   |   |
|-----------------|---|---|
| 1               | 2 | 5 |
| $1\frac{6}{10}$ | 3 | 6 |

#### Recommended Fuse Blocks:

L60030M Series. Refer to the Blocks & Holders section of this catalog for additional information.

#### Ordering Information:

Example catalog number: KLQ005  
 Example system number: OKLQ005.T

#### FLU Series Fuses



The Littelfuse FLU series is designed specifically for the protection of multimeters. The 1000 VAC/VDC rating also makes the FLU ideal for a variety of other applications.

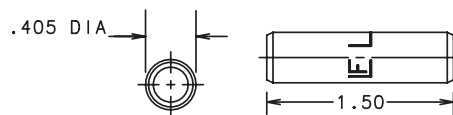
**Voltage Rating:** 1000 VAC/VDC  
**Interrupting Rating:**  $\frac{44}{100}$ A: 10kA  
 11A: 20kA  
**Ampere Range:** FLU  $\frac{44}{100}$  = 1A and FLU 11 = 15A  
**Approvals:** UL Recognized under the components program. (File No: E10480)  
 CSA Certified (File No: LR29862)  
**Dimensions:**  $\frac{44}{100}$ A:  $\frac{13}{32}$ " x  $1\frac{3}{8}$ "  
 11A:  $\frac{13}{32}$ " x  $1\frac{1}{2}$ "

#### Ordering Information

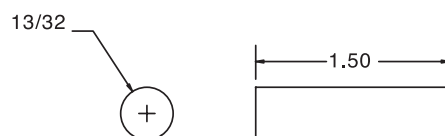
Example catalog number: FLU011  
 Example system number: 0FLU011.T

#### LNNB "Dummy" Fuse

Also known as a "neutral", the LNNB is actually not a fuse. It is the same physical size as a standard Midget fuse. The LNNB001 is a hollow body design for use with standard fuse clips. The LNNB002 is a solid body design for use with LEB/LEX series inline style fuse holders.



LNNB001



LNNB002

## Specifications

**Dimensions:**  $\frac{13}{32}$ " x  $1\frac{1}{2}$ "

## Ordering Information

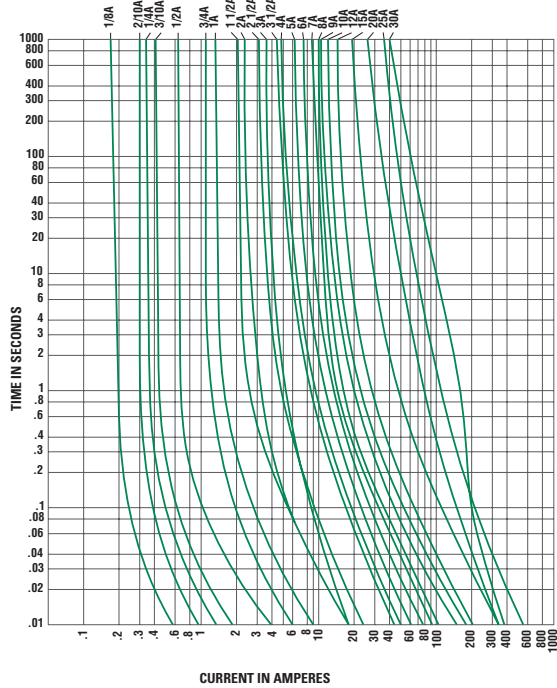
Example catalog number: LNNB001  
 Example system number: LNNB0001Z

Example catalog number: LNNB002  
 Example system number: LNNB0002Z

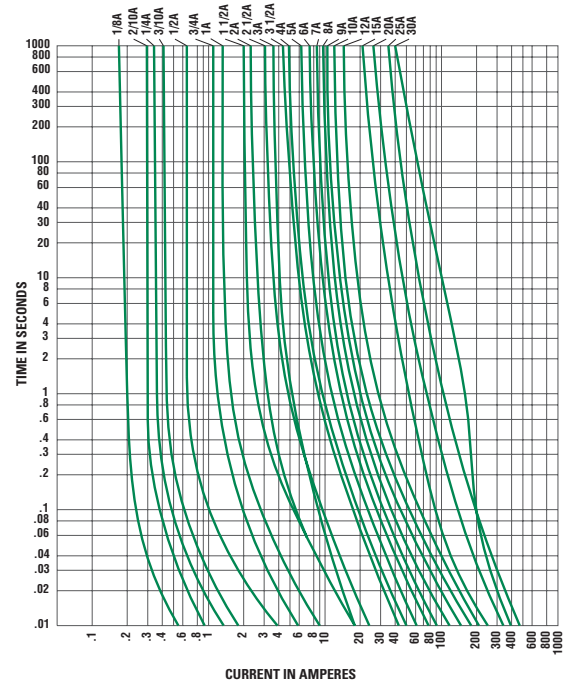
## Midget Fuses

### Supplementary Overcurrent Protection

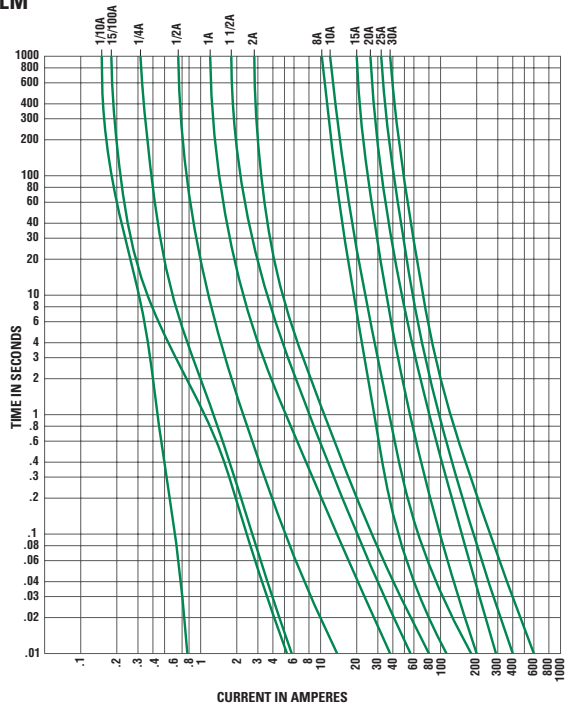
KLK



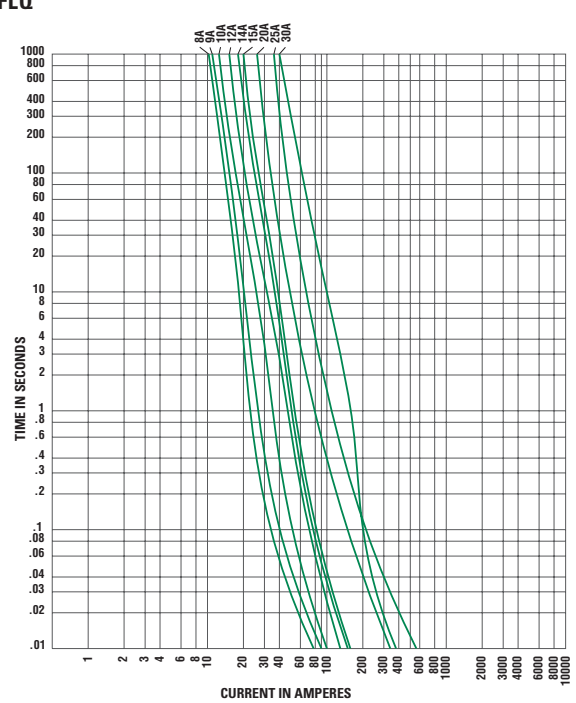
KLKD



FLM



FLQ



## Electronic Fuses

### 3AG/3AB Type

#### 312/318 Series 3AG Fast Acting Fuse



Designed for fast acting protection of electronic equipment and appliances. The "standard" fast acting, glass tube fuse.

**Voltage Rating:** 250V:  $\frac{1}{100}$  – 10A.  
32V: 12 – 35A.

**Dimensions:**  $\frac{1}{4}$ " x  $1\frac{1}{4}$ " (6.4 x 31.8mm)

Order 312 series without leads.

Example part number (series & amperage): **312.375**

*Note: For fuses with axial leads, request 318 series.*

To order a 3AG "Dummy" fuse request part number 310033.

#### Ampere Ratings:

|                  |                |                 |                |    |
|------------------|----------------|-----------------|----------------|----|
| $\frac{1}{100}$  | $\frac{2}{10}$ | 1               | $2\frac{1}{2}$ | 12 |
| $\frac{1}{32}$   | $\frac{1}{4}$  | $1\frac{1}{4}$  | 3              | 15 |
| $\frac{1}{16}$   | $\frac{3}{10}$ | $1\frac{1}{2}$  | 4              | 20 |
| $\frac{1}{10}$   | $\frac{3}{8}$  | $1\frac{5}{10}$ | 5              | 25 |
| $\frac{1}{8}$    | $\frac{1}{2}$  | $1\frac{3}{4}$  | 6              | 30 |
| $\frac{15}{100}$ | $\frac{6}{10}$ | $1\frac{8}{10}$ | 7              | 35 |
| 0.175            | $\frac{8}{10}$ | 2               | 8              |    |
| $\frac{3}{16}$   | $\frac{3}{4}$  | $2\frac{1}{4}$  | 10             |    |

**Approvals:** Standard 248-14, UL Listed  $\frac{1}{100}$ -10 Amps and UL Listed 12 – 30 Amps per Standard UL 275. CSA Certified through 30 Amps.

#### 314/324 Series 3AB Fast Acting Fuse



Similar to 312 series, but ceramic tube permits additional ampere ratings: 250 volt ratings through 30 amps.

**Voltage Rating:** 250V:  $\frac{1}{8}$  – 30A

**Dimensions:**  $\frac{1}{4}$ " x  $1\frac{1}{4}$ " (6.4 x 31.8mm)

Order 314 series without leads.

Example part number (series & amperage): **324.375**

*Note: For fuses with axial leads, request 324 series.*

#### Ampere Ratings:

|               |               |   |    |    |
|---------------|---------------|---|----|----|
| $\frac{1}{8}$ | $\frac{3}{4}$ | 4 | 8  | 20 |
| $\frac{1}{4}$ | 1             | 5 | 10 | 25 |
| $\frac{3}{8}$ | 2             | 6 | 12 | 30 |
| $\frac{1}{2}$ | 3             | 7 | 15 |    |

**Approvals:** Standard 248-14, UL Listed and CSA Certified  $\frac{1}{8}$  – 15 Amps. UL Recognized under the Components Program and CSA Recognized under the Component Acceptance Program 20 – 30 Amps. Approved by MITI from 10 – 30 Amps.

#### 313/315 Series 3AG SLO-BLO® Fuse



313 and 315 series fuses have time-delay in the overload range, which provides superior protection for inductive loads such as motors, transformers, and solenoids.

**Voltage Rating:** 250V:  $\frac{1}{100}$  – 8A. 32V: 10 – 30A.

**Dimensions:**  $\frac{1}{4}$ " x  $1\frac{1}{4}$ " (6.4 x 31.8mm)

Order 313 series without leads.

Example part number (series & amperage): **313.500**

*Note: For fuses with axial leads, request 315 series.*

To order a 3AG "Dummy" fuse request part number 310033.

#### Ampere Ratings:

|                 |                  |                |                 |                 |                 |    |
|-----------------|------------------|----------------|-----------------|-----------------|-----------------|----|
| $\frac{1}{100}$ | $\frac{15}{100}$ | $\frac{3}{8}$  | $\frac{8}{10}$  | $1\frac{9}{10}$ | $3\frac{7}{10}$ | 10 |
| $\frac{1}{32}$  | 0.175            | $\frac{4}{10}$ | 1               | 2               | 4               | 12 |
| $\frac{4}{100}$ | $\frac{3}{16}$   | $\frac{1}{2}$  | $1\frac{2}{10}$ | $2\frac{1}{4}$  | 5               | 15 |
| $\frac{1}{16}$  | $\frac{3}{10}$   | $\frac{5}{10}$ | $1\frac{1}{4}$  | $2\frac{1}{2}$  | $6\frac{1}{4}$  | 20 |
| $\frac{1}{10}$  | $\frac{1}{4}$    | $\frac{7}{10}$ | $1\frac{1}{2}$  | $2\frac{9}{10}$ | 7               | 25 |
| $\frac{1}{8}$   | $\frac{3}{10}$   | $\frac{3}{4}$  | $1\frac{6}{10}$ | 3               | 8               | 30 |

**Approvals:** Standard 248-14, UL Listed and CSA Certified  $\frac{1}{100}$ -8 Amps. UL Recognized under the Components Program and CSA Recognized under the Component Acceptance Program 10 – 30 Amps. MITI approved 1 – 5 Amps.

#### 326/325 Series 3AB SLO-BLO® Fuse



The 326 series fuse has time-delay similar to the 313 series, but the ceramic body permits higher voltage ratings for the 8 – 30 ampere sizes and faster opening of short-circuits.

**Voltage Rating:** 250V:  $\frac{1}{100}$  – 20A.  
125V: 25 – 30A.

**Dimensions:**  $\frac{1}{4}$ " x  $1\frac{1}{4}$ " (6.4 x 31.8mm)

Order 326 series without leads.

Example part number (series & amperage): **326012**

*Note: For fuses with axial leads, request 325 series.*

#### Ampere Ratings:

|                  |                |                 |                 |                |    |
|------------------|----------------|-----------------|-----------------|----------------|----|
| $\frac{1}{100}$  | $\frac{3}{16}$ | $\frac{6}{10}$  | $1\frac{1}{2}$  | 4              | 15 |
| $\frac{1}{32}$   | $\frac{2}{10}$ | $\frac{7}{10}$  | $1\frac{6}{10}$ | 5              | 20 |
| $\frac{1}{16}$   | $\frac{1}{4}$  | $\frac{3}{4}$   | 2               | $6\frac{1}{4}$ | 25 |
| $\frac{1}{10}$   | $\frac{3}{10}$ | $\frac{8}{10}$  | $2\frac{1}{2}$  | 7              | 30 |
| $\frac{1}{8}$    | $\frac{3}{8}$  | 1               | $2\frac{8}{10}$ | 8              |    |
| $\frac{15}{100}$ | $\frac{4}{10}$ | $1\frac{2}{10}$ | 3               | 10             |    |
| 0.175            | $\frac{1}{2}$  | $1\frac{1}{4}$  | $3\frac{3}{10}$ | 12             |    |

**Approvals:** Standard 248-14, UL Listed  $\frac{1}{4}$  – 10 Amps. UL Recognized under the Components Program 12-30 Amps. CSA Certified  $\frac{1}{4}$  – 30 Amps.

## Electronic Fuses

### Indicating Types

#### 229/230 Series 2AG SLO-BLO® Indicating Fuse



2AG indicating fuses instantly identify themselves upon opening by showing a discoloration of their glass bodies. Guesswork and time consuming circuit testing is eliminated. This unique design offers the same quality performance characteristics as the standard 2AG fuse design.

**Voltage Rating:** 250V: ¼ – 3½A; 125V: 4 – 7A

**Dimensions:** .177" x .57" (4.5 x 14.5mm)

For fuses with axial leads, request 230\_\_\_S series.

Order 229\_\_\_S series without leads.

Example part number (series & amperage): **22902.5S**

#### Ampere Ratings:

|      |      |    |   |
|------|------|----|---|
| ¼    | ¾    | 2  | 4 |
| .350 | 8/10 | 2¼ | 5 |
| 3/8  | 1    | 2½ | 6 |
| ½    | 1¼   | 3  | 7 |
| 6/10 | 1½   | 3½ |   |

**Approvals:** Standard 248-14, UL Listed and CSA Certified ¼ – 3½ Amps. UL Recognized under the Components Program and CSA Recognized under the Component Acceptance Program 4 – 7 Amps.

#### 313 Series 3AG SLO-BLO® Indicating Fuse



3AG indicating fuses instantly identify themselves upon opening by showing a discoloration of their glass bodies. Guesswork and time consuming circuit testing is eliminated. This unique design offers the same quality performance characteristics as the standard 3AG fuse design.

**Voltage Rating:** 250V: ½ – 8A; 32V: 10A.

**Dimensions:** ¼" x 1¼": (6.4 x 31.8mm)

Example part number (series plus amperage, followed by "ID"): **313007ID**

#### Ampere Ratings:

|   |    |   |    |   |    |
|---|----|---|----|---|----|
| ½ | 1½ | 3 | 5  | 7 | 10 |
| 1 | 2  | 4 | 6¼ | 8 |    |

**Approvals:** Standard 248-14, UL Listed and CSA Certified ½ – 8 Amps. The 10 Amp is UL Recognized under the Components Program and CSA Recognized under the Component Acceptance Program.

#### 215 Series (Type T) 5 x 20mm SLO-BLO® Fuse



Time-delay protection of electronic equipment and appliances when fuses to International Standards are required. Replacement fuses for foreign equipment.

**Voltage Rating:** 250V AC

**Design Standards:** Meets IEC 60127-2, Sheet 5 Specification for Time Lag fuses.

**Dimensions:** 5mm x 20mm (.2 x .79 in.)

Example part number (series & amperage): **215.315**

*Note: For fuses with axial leads add "XE" extension to the part number. Example 215.630XE*

#### Ampere Ratings:

|      |      |      |     |      |     |
|------|------|------|-----|------|-----|
| .200 | .400 | .800 | 1.6 | 3.15 | 6.3 |
| .250 | .500 | 1    | 2   | 4    | 8*  |
| .315 | .630 | 1.25 | 2.5 | 5    | 10* |

\*Available but not included in International Standards. Interrupting Capacity: 1500A

**Approvals:** UL Recognized under the Components Program and CSA Recognized under the Component Acceptance Program. SEMKO, VDE, and BSI approved 1 – 6.3 Amps. MITI approved 1 – 10 Amps.

## Electronic Fuses

### 5 x 20mm IEC Type

#### 216 Series (Type F) 5 x 20mm Fast-Acting Fuse



Fast acting protection of electronic equipment and appliances when fuses to International Standards are required. Replacement fuse for foreign equipment.

**Voltage Rating:** 250V AC  
**Design Standards:** Meets IEC 60127-2, Sheet 1 Specification for Fast-Acting Fuses.  
**Dimensions:** 5mm x 20mm (.2 x .79 in.)  
 Example part number (series & amperage): **216.200**

*Note: For fuses with axial leads add "XE" extension to the part number. Example 216.630XE*

#### Ampere Ratings:

|      |      |      |      |      |     |
|------|------|------|------|------|-----|
| .050 | .125 | .315 | .800 | 2    | 5   |
| .063 | .160 | .400 | 1    | 2.5  | 6.3 |
| .080 | .200 | .500 | 1.25 | 3.15 | 8*  |
| .100 | .250 | .630 | 1.6  | 4    | 10* |

\*Available but not included in International Standards. Interrupting Capacity: 1500A

**Approvals:** UL Recognized under the Components Program and CSA Recognized under the Component Acceptance Program. SEMKO and VDE approved through 6.3 Amps. BSI approved 1 – 6.3 Amps.

#### 217 Series (Type F) 5 x 20mm Fast-Acting Fuse



Fast-acting protection of electronic equipment and appliances when fuses to International Standards are required. Replacement fuse for foreign equipment.

**Voltage Rating:** 250V AC  
**Dimensions:** 5mm x 20mm (.2 x .79 in.)  
 Example part number (series & amperage): **217.050**  
**Design Standards:** Meets IEC 60127-2, Sheet 2 Specification for Fast Acting Fuses.

*Note: For fuses with axial leads add "XE" extension to the part number. Example 217.630XE*

#### Ampere Ratings:

|      |      |      |      |      |      |     |
|------|------|------|------|------|------|-----|
| .032 | .080 | .200 | .500 | 1.25 | 3.15 | 8*  |
| .040 | .100 | .250 | .630 | 1.6  | 4    | 10* |
| .050 | .125 | .315 | .800 | 2    | 5    | 15* |
| .063 | .160 | .400 | 1    | 2.5  | 6.3  |     |

\*Available but not included in International Standards. Interrupting Capacity: 35A or 10x rated current, whichever is greater.

**Approvals:** UL Recognized under the Components Program and CSA Recognized under the Component Acceptance Program. SEMKO and VDE approved through 6.3 Amps. BSI approved 0.4 – 6.3 Amps.

#### 218 Series (Type T) 5 x 20mm SLO-BLO® Fuse



Time-delay protection of electronic equipment and appliances when fuses to International Standards are required. Replacement fuses for foreign equipment.

**Voltage Rating:** 250V AC  
**Dimensions:** 5mm x 20mm (.2 x .79 in.)  
 Example part number (series & amperage): **218.630**  
**Design Standards:** Meets IEC 60127-2, Sheet 3 Specification for Time Lag Fuses.

*Note: For fuses with axial leads add "XE" extension to the part number. Example 218.630XE*

#### Ampere Ratings:

|      |      |      |      |      |      |     |
|------|------|------|------|------|------|-----|
| .032 | .080 | .200 | .500 | 1.25 | 3.15 | 8*  |
| .040 | .100 | .250 | .630 | 1.6  | 4    | 10* |
| .050 | .125 | .315 | .800 | 2    | 5    | 15* |
| .063 | .160 | .400 | 1    | 2.5  | 6.3  |     |

\*Available but not included in International Standards. Interrupting Capacity: 35A or 10x rated current, whichever is greater.

**Approvals:** UL Recognized under the Components Program and CSA Recognized under the Component Acceptance Program. SEMKO and VDE approved through 6.3 Amps. BSI approved 0.8 – 6.3 Amps.

## Electronic Fuses

### 5 x 20mm and 2AG Type

#### 235 Series

5 x 20mm Fast-Acting fuse



5 x 20mm fuses designed to UL and CSA standards. Fast Acting protection of electronic equipment appliances.

**Voltage Rating:** 250V:  $\frac{1}{10}$  – 3A; 125V: 4 – 6A.

**Dimensions:** 5mm x 20mm (.2 x .79 in.)

Example part number (series & amperage): **235.600**

*Note: For fuses with axial leads add "XE" extension to the part number. Example 235.600XE*

#### Ampere Ratings:

|                |                |                |                 |   |
|----------------|----------------|----------------|-----------------|---|
| $\frac{1}{10}$ | $\frac{3}{10}$ | $\frac{7}{10}$ | $1\frac{1}{10}$ | 4 |
| $\frac{1}{8}$  | $\frac{4}{10}$ | $\frac{8}{10}$ | 2               | 5 |
| $\frac{2}{10}$ | $\frac{1}{2}$  | 1              | $2\frac{1}{2}$  | 6 |
| $\frac{1}{4}$  | $\frac{6}{10}$ | $1\frac{1}{4}$ | 3               |   |

**Approvals:** Standard 248-14, UL Listed and CSA Certified. MITI approved 1 – 5 Amps.

#### 239 Series

5 x 20mm SLO-BLO® fuse



5 x 20mm fuses designed to UL and CSA standards. For protection of electronic equipment and appliances.

**Voltage Rating:** 250V:  $\frac{2}{10}$  – 3A. 125V: 4A.

**Dimensions:** 5mm x 20mm (.2 x .79 in.)

Example part number (series & amperage): **239.400**

*Note: For fuses with axial leads add "XE" extension to the part number. Example 239.600XE*

#### Ampere Ratings:

|                |                |                |                 |                |   |
|----------------|----------------|----------------|-----------------|----------------|---|
| $\frac{2}{10}$ | $\frac{4}{10}$ | $\frac{7}{10}$ | 1               | 2              | 4 |
| $\frac{1}{4}$  | $\frac{1}{2}$  | $\frac{3}{4}$  | $1\frac{1}{4}$  | $2\frac{1}{2}$ | 5 |
| $\frac{3}{10}$ | $\frac{6}{10}$ | $\frac{8}{10}$ | $1\frac{6}{10}$ | 3              |   |

**Approvals:** Standard 248–14, UL Listed and CSA Certified. MITI approved 1 – 5 Amps.

#### 225/224 Series

2AG Fast-Acting fuse



Fast acting performance of the 312, 3AG fuses in less than one-third the space. For protection of electronic equipment and appliances.

**Voltage Rating:** 250V:  $\frac{1}{10}$  –  $3\frac{1}{2}$ A. 125V: 4 – 10A

**Dimensions:** 2AG Fuse .177" x .57" (4.5 x 14.5mm)

Example part number (series & amperage): **224.500**

*Note: For fuses with axial leads, request series number 224. Order 225 series without leads.*

#### Ampere Ratings:

|                |               |                |                |   |    |
|----------------|---------------|----------------|----------------|---|----|
| $\frac{1}{10}$ | $\frac{3}{8}$ | 1              | $2\frac{1}{2}$ | 4 | 7  |
| $\frac{1}{8}$  | $\frac{1}{2}$ | $1\frac{1}{2}$ | 3              | 5 | 8  |
| $\frac{1}{4}$  | $\frac{3}{4}$ | 2              | $3\frac{1}{2}$ | 6 | 10 |

**Approvals:** Standard 248–14, UL Listed and CSA Certified. 224 series approved by MITI 1 – 5 Amps.

#### 229/230 Series

2AG SLO-BLO® fuse



229 series 2AG fuses have time-delay of 313 series 3AG fuses in less than one-third the space. They provide superior protection for inductive loads such as motors, transformers, and solenoids. Use whenever time-delay fuses are indicated.

**Voltage Rating:** 250V:  $\frac{1}{4}$  –  $3\frac{1}{2}$ A; 125V: 4 – 7A.

**Dimensions:** 2AG Fuse .177" x .57" (4.5 x 14.5mm)

Example part number (series & amperage): **229.375**

*Note: For fuses with axial leads, request series number 230. Order 229 series without leads.*

#### Ampere Ratings:

|               |                |                |                |   |   |
|---------------|----------------|----------------|----------------|---|---|
| $\frac{1}{4}$ | $\frac{5}{10}$ | $1\frac{1}{2}$ | $2\frac{1}{2}$ | 4 | 6 |
| $\frac{3}{8}$ | $\frac{3}{4}$  | 2              | 3              | 5 | 7 |
| $\frac{1}{2}$ | 1              | $2\frac{1}{4}$ | $3\frac{1}{2}$ |   |   |

**Approvals:** Standard 248-14, UL Listed and CSA Certified  $\frac{1}{4}$  –  $3\frac{1}{2}$  Amps. UL Recognized under the Components Program and CSA Recognized under the Component Acceptance Program 4 – 7 Amps.

## Electronic Fuses

### Subminiature Type

#### 272/278 Series Fast-Acting Microfuse

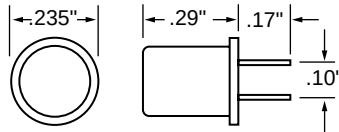


Fast acting Microfuses for protection of printed circuit boards and similar equipment.

**Voltage Rating:** 125V AC

Example part number (series & amperage): **27201.5**

*Note: 278 series has 1" leads*



#### Ampere Ratings:

|                 |                |                |                |                |   |
|-----------------|----------------|----------------|----------------|----------------|---|
| $\frac{1}{500}$ | $\frac{1}{32}$ | $\frac{1}{8}$  | $\frac{4}{10}$ | $\frac{3}{4}$  | 2 |
| $\frac{1}{200}$ | $\frac{1}{20}$ | $\frac{2}{10}$ | $\frac{1}{2}$  | $\frac{8}{10}$ | 3 |
| $\frac{1}{100}$ | $\frac{1}{16}$ | $\frac{1}{4}$  | $\frac{6}{10}$ | 1              | 4 |
| $\frac{1}{64}$  | $\frac{1}{10}$ | $\frac{3}{10}$ | $\frac{7}{10}$ | $1\frac{1}{2}$ | 5 |

**Approvals:** UL Recognized under the Components Program and CSA Recognized under the Component Acceptance Program.

For data on 262 and 268 series High Reliability (Hi-Rel) microfuses, request Electronic Catalog.

#### 273/279 Series Fast-Acting Microfuse

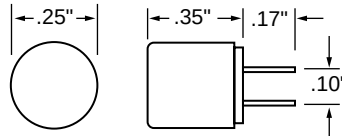


Similar to 272 and 278 series, except has transparent cap for visual indication of fuse status.

**Voltage Rating:** 125V AC

Example part number (series & amperage): **273002**

*Note: 279 series has 1" leads*

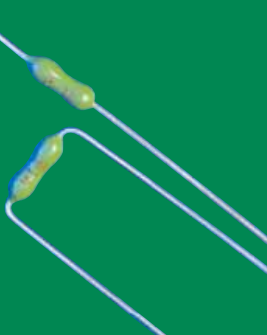


#### Ampere Ratings:

|                 |                |                |                |                |   |
|-----------------|----------------|----------------|----------------|----------------|---|
| $\frac{1}{500}$ | $\frac{1}{32}$ | $\frac{1}{8}$  | $\frac{4}{10}$ | $\frac{3}{4}$  | 2 |
| $\frac{1}{200}$ | $\frac{1}{20}$ | $\frac{2}{10}$ | $\frac{1}{2}$  | $\frac{8}{10}$ | 3 |
| $\frac{1}{100}$ | $\frac{1}{16}$ | $\frac{1}{4}$  | $\frac{6}{10}$ | 1              | 4 |
| $\frac{1}{64}$  | $\frac{1}{10}$ | $\frac{3}{10}$ | $\frac{7}{10}$ | $1\frac{1}{2}$ | 5 |

**Approvals:** UL Recognized under the Components Program and CSA Recognized under the Component Acceptance Program.

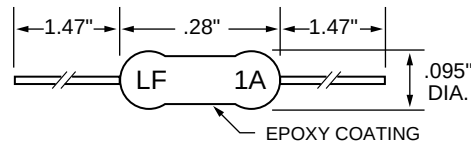
#### 251/252 Series Fast-Acting Pico® II Fuse



Subminiature fuse for soldered mounting on printed circuit boards. Available on tape and reel for automatic insertion.

**Voltage Rating:** 125V:  $\frac{1}{16}$  – 10A; 32V: 12 – 15A.

Example part number (series & amperage): **251.125**



#### Ampere Ratings:

|                |               |                |                |   |    |
|----------------|---------------|----------------|----------------|---|----|
| $\frac{1}{16}$ | $\frac{3}{8}$ | 1              | $2\frac{1}{2}$ | 4 | 10 |
| $\frac{1}{8}$  | $\frac{1}{2}$ | $1\frac{1}{2}$ | 3              | 5 | 12 |
| $\frac{1}{4}$  | $\frac{3}{4}$ | 2              | $3\frac{1}{2}$ | 7 | 15 |

**Approvals:** UL Recognized under the Components Program and CSA Recognized under the Component Acceptance Program.

Order 252 series for radial leads. To order PICO II fuses with ampere ratings color-coded, order 255 series for axial leads and 256 for radial leads.

For data on 265 and 266 series High Reliability (Hi-Rel) Pico fuses, request Electronic Catalog. For information on PICO II 250V fast-acting fuses, contact factory.

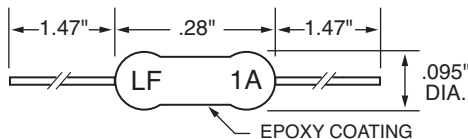
#### 473 Series SLO-BLO® Pico® II Fuse



Subminiature time-delay fuse for soldered mounting on printed circuit boards. Available on tape and reel for automatic insertion. Request bulletin PB-1027 for further information.

**Voltage Rating:** 125V AC

Example part number (series & amperage): **473005**



#### Ampere Ratings:

|               |               |                |                |                |   |   |
|---------------|---------------|----------------|----------------|----------------|---|---|
| $\frac{3}{8}$ | $\frac{3}{4}$ | $1\frac{1}{2}$ | $2\frac{1}{4}$ | 3              | 4 | 7 |
| $\frac{1}{2}$ | 1             | 2              | $2\frac{1}{2}$ | $3\frac{1}{2}$ | 5 |   |

**Approvals:** UL Recognized under the Components Program and CSA Recognized under the Component Acceptance Program. MITI approved 1 – 5 Amp.

## Automotive Fuses

### SFE and Blade Type

#### SFE Series Fast-Acting Fuse



Low voltage fuse for automotive and electronic applications.

**Voltage Rating:** 32V AC/DC

**Approvals:** UL Listed under UL Standard #275.

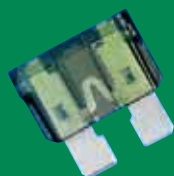
Society of Automotive Engineers (SAE) J554.

Example part number (series & amperage): **SFE006**

#### Ampere Ratings/Dimensions:

| Ampere Rating | Length  | Diameter |
|---------------|---------|----------|
| 4             | 5/8"    | 1/4"     |
| 6             | 3/4"    | 1/4"     |
| 7½            | 7/8"    | 1/4"     |
| 9             | 7/8"    | 1/4"     |
| 14            | 1 1/16" | 1/4"     |
| 20            | 1 1/4"  | 1/4"     |
| 30            | 1 7/16" | 1/4"     |

#### ATO® /257 Series Fast-Acting Fuse



The 257 series ATO fuse is a low voltage blade type fuse for automotive and electronic applications. Designed, originated and patented by Littelfuse, it has become the standard for OEM circuit protection on foreign and domestic autos and trucks. They are color-coded and readily identifiable and may be specified for a variety of low voltage applications.

**Voltage Rating:** 32V AC/DC

Example part number (series & amperage): **ATO015**

**Approvals:** UL Listed. CSA Certified 3 – 30 A.

| Catalog No. | Amp. Rating | Volt. Rating | Color Code |
|-------------|-------------|--------------|------------|
| ATO 001     | 1           | 32           | Black      |
| ATO 002     | 2           | 32           | Grey       |
| ATO 003     | 3           | 32           | Violet     |
| ATO 004     | 4           | 32           | Pink       |
| ATO 005     | 5           | 32           | Tan        |
| ATO 07.5    | 7½          | 32           | Brown      |
| ATO 010     | 10          | 32           | Red        |
| ATO 015     | 15          | 32           | Blue       |
| ATO 020     | 20          | 32           | Yellow     |
| ATO 025     | 25          | 32           | Natural    |
| ATO 030     | 30          | 32           | Green      |
| ATO 040     | 40          | 32           | Orange     |

#### MIN/297 Series MINI® Fast-Acting Fuse



The MINI fuse is smaller than its predecessor, the ATO fuse, which permits using more fuses in the same amount of space. More fuses in the same space satisfies the requirement that more circuits be individually fused in newer automobiles. Patented by Littelfuse.

**Voltage Rating:** 32V AC/DC

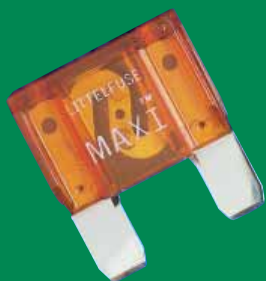
Example part number (series & amperage): **MIN025**

**Approvals:** UL Listed.

*Note: For low-profile MINI® fuse, request 897 series*

| Catalog No. | Amp. Rating | Volt. Rating | Color Code |
|-------------|-------------|--------------|------------|
| MIN 002     | 2           | 32           | Grey       |
| MIN 003     | 3           | 32           | Violet     |
| MIN 004     | 4           | 32           | Pink       |
| MIN 005     | 5           | 32           | Tan        |
| MIN 07.5    | 7½          | 32           | Brown      |
| MIN 010     | 10          | 32           | Red        |
| MIN 015     | 15          | 32           | Blue       |
| MIN 020     | 20          | 32           | Yellow     |
| MIN 025     | 25          | 32           | Natural    |
| MIN 030     | 30          | 32           | Green      |

#### MAX/299 Series MAXI™ SLO-BLO® Fuse



The patented MAXI Fuse is available in a higher range of amperage ratings (20 – 80 amperes) than the ATO or MINI fuses, and is physically larger in size. It is color-coded for easy identification. A typical MAXI Fuse application, in today's more sophisticated automobile circuits, is protection of the wiring harness by replacing the fusible wire or fusible link which is often a plain piece of small wire.

**Voltage Rating:** 32V AC/DC

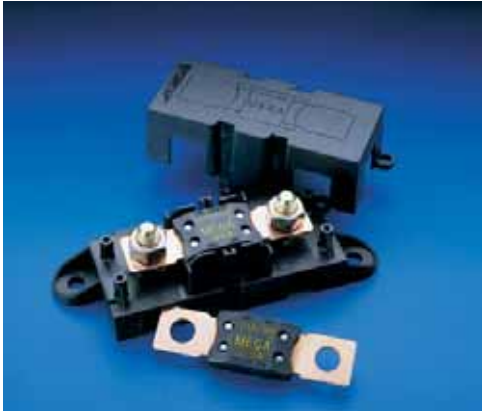
Example part number (series & amperage): **MAX070**

**Approvals:** UL Listed.

| Catalog No. | Amp. Rating | Volt. Rating | Color Code |
|-------------|-------------|--------------|------------|
| MAX 020     | 20          | 32           | Yellow     |
| MAX 030     | 30          | 32           | Green      |
| MAX 040     | 40          | 32           | Orange     |
| MAX 050     | 50          | 32           | Red        |
| MAX 060     | 60          | 32           | Blue       |
| MAX 070     | 70          | 32           | Tan        |
| MAX 080     | 80          | 32           | Natural    |

## Automotive Fuses

### Bolt-On Type



#### MEGA® SLO-BLO® Bolt-On Fuse

The MEGA Fuse is designed for the protection of high current applications. Designed and patented by Littelfuse, it is ideal for battery and alternator protection and other heavy gauge cable applications.

#### Specifications

**Voltage Rating:** 32V AC/DC  
**Interrupting Rating:** 2000 A @ 32VDC

| Catalog No. | Amp. Rating | Volt. Rating | Color Code |
|-------------|-------------|--------------|------------|
| MEG100      | 100         | 32           | Yellow     |
| MEG125      | 125         | 32           | Green      |
| MEG150      | 150         | 32           | Orange     |
| MEG175      | 175         | 32           | White      |
| MEG200      | 200         | 32           | Blue       |
| MEG225      | 225         | 32           | Tan        |
| MEG250      | 250         | 32           | Pink       |

Example part number (series & amperage): **MEG200**

#### Recommended Fuse Holder

298900



#### MIDI® SLO-BLO® Bolt-On Fuse

The patented design of the Littelfuse MIDI fuse offers a bolt-on space saving fuse with SLO-BLO characteristics for high current wiring protection.

#### Specifications

**Voltage Rating:** 32V AC/DC  
**Interrupting Rating:** 1000 A @ 32VDC

| Catalog No. | Amp. Rating | Volt. Rating | Color Code |
|-------------|-------------|--------------|------------|
| 498030      | 30          | 32           | Pink       |
| 498040      | 40          | 32           | Green      |
| 498050      | 50          | 32           | Red        |
| 498060      | 60          | 32           | Yellow     |
| 498070      | 70          | 32           | Brown      |
| 498080      | 80          | 32           | White      |
| 498100      | 100         | 32           | Blue       |
| 498125      | 125         | 32           | Orange     |
| 498150      | 150         | 32           | Grey       |
| 498200      | 200         | 32           | Violet     |

Example part number (series & amperage): **498080**

#### Recommended Fuse Holder

498900

## Automotive Fuses

### Miscellaneous



### JCASE® SLO-BLO® Fuse

The patented JCASE is a cartridge style fuse with female terminals. It was designed to provide increased time-delay to handle in-rush currents and low voltage drop to protect high current automotive circuits.

### Specifications

**Voltage Rating:** 32V AC/DC  
**Interrupting Rating:** 1000 A @ 32VDC

| Catalog No. | Amp. Rating | Volt. Rating | Color Code |
|-------------|-------------|--------------|------------|
| JCAS20      | 20          | 32           | Blue       |
| JCAS30      | 30          | 32           | Pink       |
| JCAS40      | 40          | 32           | Green      |
| JCAS50      | 50          | 32           | Red        |
| JCAS60      | 60          | 32           | Yellow     |

Example part number (series & amperage): **JCAS60**



### Specifications

**Voltage Rating:** 32V AC/DC  
**Interrupting Rating:** 2000 A @ 32VDC

| Catalog No. | Amp. Rating | Volt. Rating | Wire Gauge |
|-------------|-------------|--------------|------------|
| 496060      | 60          | 32           | 10AWG      |
| 496080      | 80          | 32           | 8AWG       |
| 496100      | 100         | 32           | 8AWG       |
| 496125      | 125         | 32           | 6AWG       |
| 496150      | 150         | 32           | 4AWG       |
| 496175      | 175         | 32           | 4AWG       |
| 496200      | 200         | 32           | 4AWG       |

Example part number (series & amperage): **496060**

**Standard item:** 1 foot cable on one side; 3 foot cable on the other side.

### CablePro® Cable Protector Fuse

The CablePro Fuse is a high performance alternative for providing a reliable, safe, and cost effective fusible link. It provides similar circuit protection as the MEGA® fuse in a slim package that fits into tight locations. The standard CablePro features 1 one foot wire lead and 1 three foot wire lead. Contact the factory for custom wire lead lengths.

## Medium Voltage Fuses



|                                            |              |
|--------------------------------------------|--------------|
| <i>Medium Voltage Fuses</i>                | <b>64</b>    |
| <i>R Rated Medium Voltage Fuses</i>        | <b>65-68</b> |
| <i>E Rated Medium Voltage Fuses</i>        | <b>69-73</b> |
| <i>E Rated Potential Transformer Fuses</i> | <b>74</b>    |
| <i>Live Parts</i>                          | <b>75</b>    |

## Medium Voltage Fuses

2,400 - 38,000 VAC • Current-Limiting



Littelfuse now offers a complete selection of “E” and “R” rated medium voltage fuses for the protection of transformers, potential transformers, feeders, and motor circuits. Single, double, and triple barrel designs are available to cover a wide range of current, voltage, and interrupting ratings. Conventional ferrule type, clip lock, and bolt-in mounting configurations are now available for virtually any application. Hermetically sealed fuses for use in hazardous environments are also offered.

Contact the factory or your local Littelfuse representative for additional fuse ratings or custom mounting configurations.

24 Hour Emergency Service is available. Call 847 824 1188.

### Applications

- Power Transformer Protection
- Potential Transformer Protection
- Motor Controller Back-up Protection
- Fused Switches
- Feeder Circuits



Current-limiting “E” and “R” rated fuses are equipped with a mechanical indicator or striker pin that protrudes through the fuse cap upon operation of the fuse. This provides visual identification of a blown fuse and can be used as a trigger for external devices.

*Note: Extension distance 1/2" min; extension force 2lb. min*

### General Information

The terms “Medium Voltage” and “High Voltage” have been used interchangeably by many people to describe fuses operating above 600 volts. Technically speaking, “medium voltage” fuses are those intended for the voltage range from 2,400 to 38,000 VAC. “High voltage” fuses are for circuits carrying voltages greater than 38,000 VAC.

“E” rated fuses are considered to be general purpose fuses and can be used to protect against low and high values of fault current. “R” rated fuses are designed for back-up protection. They must be used in series with other devices such as motor overload relays in order to achieve both overload and short-circuit protection.

Medium voltage fuses are not intended to provide overload protection in the same sense as fuses rated 600 volts or less. Medium voltage fuse current ratings do not have the same meanings as the ampere ratings of low voltage fuses.

All medium voltage fuses are limited in their ability to interrupt low value overcurrents, especially those between 100% and 200% of the fuse’s continuous current rating. They are designed to carry their rated current without exceeding the temperature rise permitted by NEMA and ANSI standards.

Additional application data can be found in the Fuse Application section of this catalog.



**Bolt-in Mount Fuses**

## R Rated Medium Voltage Fuses

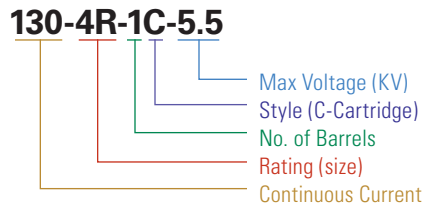
### Current-Limiting

#### Features

"R" rated fuses provide required short-circuit protection for medium voltage motors, motor controllers and associated circuitry. These components have limited ability to absorb the energy of large short-circuit currents. Medium voltage motor controllers contain overload relays which provide both overload protection and locked rotor protection to the motor. The controllers are also intended to interrupt low value short-circuits within the capability of the motor controller. This protects the medium voltage fuse from sustained overcurrents which are less than their minimum interrupting rating.

NEMA Standards for "R" rated medium voltage power fuses require they operate within 15-35 seconds when subjected to an rms current 100 times the "R" rating. For example, a fuse with a 2R rating will open within 15 to 35 seconds on an applied current of  $2 \times 100 = 200$  amperes.

#### Part Number System



#### Characteristics

**Voltage Rating:** 2,400 volts – 8,250 volts  
**Current Range:** 2R – 36R

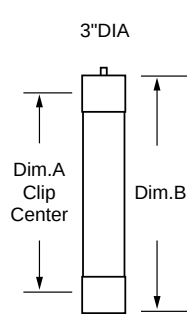
#### Options

- Hermitically sealed for use in hazardous locations (add "S" suffix to part number)
- Bolt-in mounting configurations

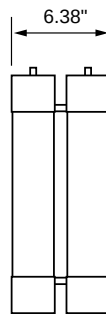


#### Hookeye Feature\*

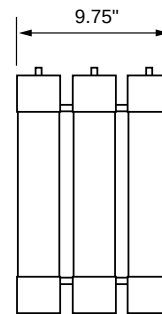
\*For hookeye attachment; add "W" suffix to part number



**D**  
Figure 1



**DD**  
Figure 2



**DDD**  
Figure 3

| <b>R</b><br>Rated | Catalog Number  | Old Catalog Number | Size | Maximum Continuous Current @ 40 deg C. | Dim. A (inches) | Dim. B (inches) | Min. Interrupting Rating RMS Amps | Max Interrupting Rating RMS Asym | Figure Number |
|-------------------|-----------------|--------------------|------|----------------------------------------|-----------------|-----------------|-----------------------------------|----------------------------------|---------------|
| <b>2.75 KV</b>    | 70-2R-1C-2.75   | LCK 2R             | 2R   | 70                                     | 7"              | 10.875"         | 170                               | 80,000                           | 1             |
|                   | 100-3R-1C-2.75  | LCK 3R             | 3R   | 100                                    | 7"              | 10.875"         | 250                               | 80,000                           | 1             |
|                   | 130-4R-1C-2.75  | LCK 4R             | 4R   | 130                                    | 7"              | 10.875"         | 340                               | 80,000                           | 1             |
|                   | 150-5R-1C-2.75  | LCK 5R             | 5R   | 150                                    | 7"              | 10.875"         | 390                               | 80,000                           | 1             |
|                   | 170-6R-1C-2.75  | LCK 6R             | 6R   | 170                                    | 7"              | 10.875"         | 500                               | 80,000                           | 1             |
|                   | 200-9R-1C-2.75  | LCK 9R             | 9R   | 200                                    | 7"              | 10.875"         | 760                               | 80,000                           | 1             |
|                   | 230-12R-1C-2.75 | LCK 12R            | 12R  | 230                                    | 7"              | 10.875"         | 1000                              | 80,000                           | 1             |
|                   | 390-18R-2C-2.75 | LCK 18R            | 18R  | 390                                    | 7"              | 10.875"         | 1500                              | 80,000                           | 2             |
|                   | 450-24R-2C-2.75 | LCK 24R            | 24R  | 450                                    | 7"              | 10.875"         | 1950                              | 80,000                           | 2             |

Add "w" suffix to part number for hookeye attachment.

## R Rated Medium Voltage Fuses

### Current-Limiting

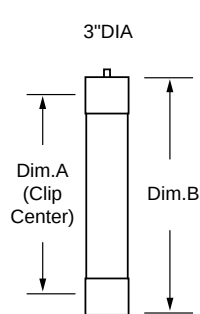


Figure 4

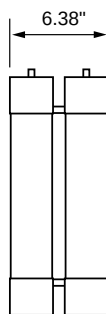


Figure 5

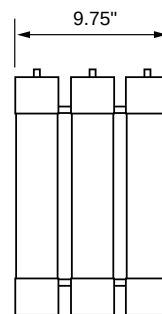


Figure 6

| <b>R</b><br>Rated          | Catalog<br>Number | Old<br>Catalog<br>Number | Size | Maximum<br>Continuous Current<br>@ 40 Degrees C° | Dim. A<br>(inches) | Dim. B<br>(inches) | Min. Interrupting<br>Rating RMS Amps | Max Interrupting<br>Rating RMS (Asym) | Figure<br>Number |
|----------------------------|-------------------|--------------------------|------|--------------------------------------------------|--------------------|--------------------|--------------------------------------|---------------------------------------|------------------|
|                            |                   |                          |      |                                                  |                    |                    |                                      |                                       |                  |
| 5.5 KV                     | 70-2R-1C-5.5      | LCL 2R                   | 2R   | 70                                               | 12"                | 15.875"            | 170                                  | 80,000                                | 4                |
|                            | 100-3R-1C-5.5     | LCL 3R                   | 3R   | 100                                              | 12"                | 15.875"            | 250                                  | 80,000                                | 4                |
|                            | 130-4R-1C-5.5     | LCL 4R                   | 4R   | 130                                              | 12"                | 15.875"            | 340                                  | 80,000                                | 4                |
|                            | 150-5R-1C-5.5     | LCL 5R                   | 5R   | 150                                              | 12"                | 15.875"            | 390                                  | 80,000                                | 4                |
|                            | 170-6R-1C-5.5     | LCL 6R                   | 6R   | 170                                              | 12"                | 15.875"            | 500                                  | 80,000                                | 4                |
|                            | 200-9R-1C-5.5     | LCL 9R                   | 9R   | 200                                              | 12"                | 15.875"            | 760                                  | 80,000                                | 4                |
|                            | 230-12R-1C-5.5    | LCL 12R                  | 12R  | 230                                              | 12"                | 15.875"            | 1000                                 | 80,000                                | 4                |
|                            | 390-18R-2C-5.5    | LCL 18R                  | 18R  | 390                                              | 12"                | 15.875"            | 1500                                 | 80,000                                | 5                |
|                            | 450-24R-2C-5.5    | LCL 24R                  | 24R  | 450                                              | 12"                | 15.875"            | 1950                                 | 80,000                                | 5                |
|                            | 480-26R-2C-5.5    | —                        | 26R  | 480                                              | 12"                | 15.875"            | 2100                                 | 80,000                                | 5                |
|                            | 550-30R-2C-5.5    | —                        | 30R  | 550                                              | 12"                | 15.875"            | 2400                                 | 80,000                                | 5                |
|                            | 600-32R-2C-5.5    | —                        | 32R  | 600                                              | 12"                | 15.875"            | 2600                                 | 80,000                                | 5                |
|                            | 650-36R-2C-5.5    | —                        | 36R  | 650                                              | 12"                | 15.875"            | 2900                                 | 80,000                                | 5                |
|                            | 550-30R-3C-5.5    | —                        | 30R  | 550                                              | 12"                | 15.875"            | 2400                                 | 80,000                                | 6                |
|                            | 600-32R-3C-5.5    | —                        | 32R  | 600                                              | 12"                | 15.875"            | 2600                                 | 80,000                                | 6                |
|                            | 650-36R-3C-5.5    | LCL 36R                  | 36R  | 650                                              | 12"                | 15.875"            | 2900                                 | 80,000                                | 6                |
| 5.5 KV<br>14" Clip Centers | 70-2R-1C-5.5X     | —                        | 2R   | 70                                               | 14"                | 17.875"            | 170                                  | 80,000                                | 4                |
|                            | 100-3R-1C-5.5X    | —                        | 3R   | 100                                              | 14"                | 17.875"            | 250                                  | 80,000                                | 4                |
|                            | 130-4R-1C-5.5X    | —                        | 4R   | 130                                              | 14"                | 17.875"            | 340                                  | 80,000                                | 4                |
|                            | 150-5R-1C-5.5X    | —                        | 5R   | 150                                              | 14"                | 17.875"            | 390                                  | 80,000                                | 4                |
|                            | 170-6R-1C-5.5X    | —                        | 6R   | 170                                              | 14"                | 17.875"            | 500                                  | 80,000                                | 4                |
|                            | 200-9R-1C-5.5X    | —                        | 9R   | 200                                              | 14"                | 17.875"            | 760                                  | 80,000                                | 4                |
|                            | 230-12R-1C-5.5X   | —                        | 12R  | 230                                              | 14"                | 17.875"            | 1000                                 | 80,000                                | 4                |
|                            | 390-18R-2C-5.5X   | —                        | 18R  | 390                                              | 14"                | 17.875"            | 1500                                 | 80,000                                | 5                |
|                            | 450-24R-2C-5.5X   | —                        | 24R  | 450                                              | 14"                | 17.875"            | 1950                                 | 80,000                                | 5                |
|                            | 550-30R-2C-5.5X   | —                        | 30R  | 550                                              | 14"                | 17.875"            | 2400                                 | 80,000                                | 5                |
| <b>R</b><br>Rated          | Catalog<br>Number | Old<br>Catalog<br>Number | Size | Maximum<br>Continuous Current<br>@ 40 Degrees C° | Dim. A<br>(inches) | Dim. B<br>(inches) | Min. Interrupting<br>Rating RMS Amps | Max Interrupting<br>Rating RMS (Asym) | Figure<br>Number |
|                            | 70-2R-1C-8.25     | —                        | 2R   | 70                                               | 12"                | 15.875"            | 190                                  | 80,000                                | 4                |
|                            | 100-3R-1C-8.25    | —                        | 3R   | 100                                              | 12"                | 15.875"            | 225                                  | 80,000                                | 4                |
|                            | 130-4R-1C-8.25    | —                        | 4R   | 130                                              | 12"                | 15.875"            | 330                                  | 80,000                                | 4                |
|                            | 150-5R-1C-8.25    | —                        | 5R   | 150                                              | 12"                | 15.875"            | 440                                  | 80,000                                | 4                |
|                            | 170-6R-1C-8.25    | —                        | 6R   | 170                                              | 12"                | 15.875"            | 500                                  | 80,000                                | 4                |
|                            | 200-9R-1C-8.25    | —                        | 9R   | 200                                              | 12"                | 15.875"            | 740                                  | 80,000                                | 4                |
|                            | 230-12R-1C-8.25   | —                        | 12R  | 230                                              | 12"                | 15.875"            | 955                                  | 80,000                                | 4                |
|                            | 390-18R-2C-8.25   | —                        | 18R  | 390                                              | 12"                | 15.875"            | 1440                                 | 80,000                                | 5                |
|                            | 450-24R-2C-8.25   | —                        | 24R  | 450                                              | 12"                | 15.875"            | 1910                                 | 80,000                                | 5                |

Add "w" suffix to part number for hookeye attachment.

## R Rated Medium Voltage Fuses

### Current-Limiting



Littelfuse POWR-GARD™ medium voltage fuses are available in several bolt-in mounting configurations. Contact factory for custom configurations.

**"B"** Bolt mount  
**"BI"** Bolt-In mount  
**"IB"** Inverted-Bolt mount

Refer to illustrations for mounting dimensions.

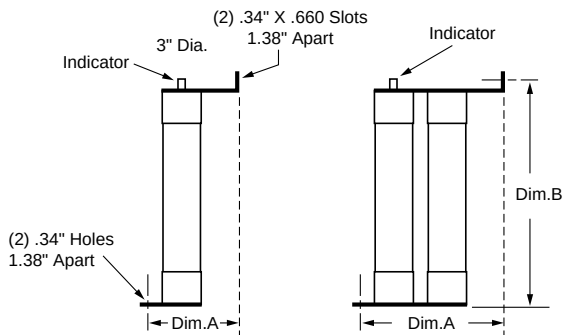


Figure 7

Figure 8

Bolt Mount "B"

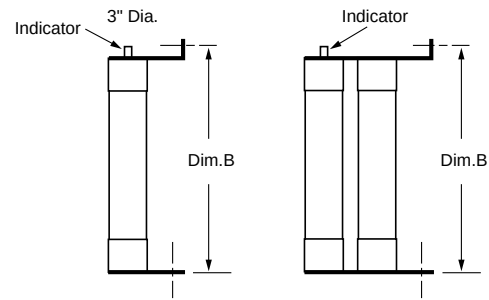


Figure 9

Figure 10

Inverted-Bolt "IB"

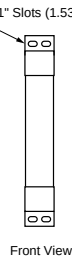
| <b>R</b><br>Rated                    | Catalog Number   | Old Catalog Number | Size | Maximum Continuous Current @ Degrees C° | Dim. A (inches) | Dim. B (inches) | Min. Interrupting Rating RMS Amps | Max Interrupting Rating RMS (Asym) | Figure Number |
|--------------------------------------|------------------|--------------------|------|-----------------------------------------|-----------------|-----------------|-----------------------------------|------------------------------------|---------------|
| <b>2.75 KV</b><br>Bolt Mount "B"     | 70-2R-1B-2.75    | —                  | 2R   | 70                                      | 4.6"            | 13"             | 170                               | 80,000                             | 7             |
|                                      | 00-3R-1B-2.75    | —                  | 3R   | 100                                     | 4.6"            | 13"             | 250                               | 80,000                             | 7             |
|                                      | 30-4R-1B-2.75    | —                  | 4R   | 130                                     | 4.6"            | 13"             | 240                               | 80,000                             | 7             |
|                                      | 150-5R-1B-2.75   | —                  | 5R   | 150                                     | 4.6"            | 13"             | 390                               | 80,000                             | 7             |
|                                      | 170-6R-1B-2.75   | —                  | 6R   | 170                                     | 4.6"            | 13"             | 500                               | 80,000                             | 7             |
|                                      | 200-9R-1B-2.75   | —                  | 9R   | 200                                     | 4.6"            | 13"             | 760                               | 80,000                             | 7             |
|                                      | 230-12R-1B-2.75  | —                  | 12R  | 230                                     | 4.6"            | 13"             | 1000                              | 80,000                             | 7             |
|                                      | 390-18R-2B-2.75  | —                  | 18R  | 390                                     | 7.4"            | 13"             | 1500                              | 80,000                             | 8             |
|                                      | 450-24R-2B-2.75  | —                  | 24R  | 450                                     | 7.4"            | 13"             | 1950                              | 80,000                             | 8             |
| <b>2.75 KV</b><br>Inverted Bolt "IB" | 70-2R-1IB-2.75   | —                  | 2R   | 70                                      | —               | 13"             | 170                               | 80,000                             | 9             |
|                                      | 100-3R-1IB-2.75  | —                  | 3R   | 100                                     | —               | 13"             | 250                               | 80,000                             | 9             |
|                                      | 130-4R-1IB-2.75  | —                  | 4R   | 130                                     | —               | 13"             | 340                               | 80,000                             | 9             |
|                                      | 150-5R-1IB-2.75  | —                  | 5R   | 150                                     | —               | 13"             | 390                               | 80,000                             | 9             |
|                                      | 170-6R-1IB-2.75  | —                  | 6R   | 170                                     | —               | 13"             | 500                               | 80,000                             | 9             |
|                                      | 200-9R-1IB-2.75  | —                  | 9R   | 200                                     | —               | 13"             | 760                               | 80,000                             | 9             |
|                                      | 230-12R-1IB-2.75 | —                  | 12R  | 230                                     | —               | 13"             | 1000                              | 80,000                             | 9             |
|                                      | 390-18R-2IB-2.75 | —                  | 18R  | 390                                     | —               | 13"             | 1500                              | 80,000                             | 10            |
|                                      | 450-24R-2IB-2.75 | —                  | 24R  | 450                                     | —               | 13"             | 1950                              | 80,000                             | 10            |

## R Rated Medium Voltage Fuses

### Current-Limiting

#### Bolt-In Mount "BI"

.44" X .91" Slots (1.53" c.t.c.)



Front View

3"Dia. Indicator

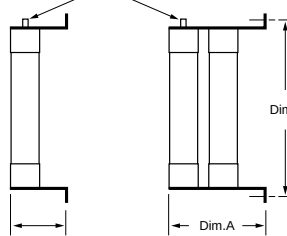


Figure 11

Indicator

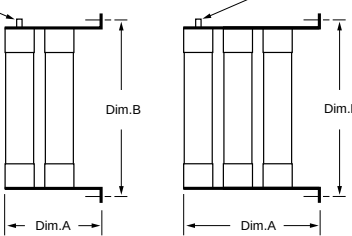


Figure 12

Indicator

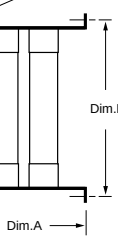


Figure 13

| <b>R Rated</b>                              | <b>Catalog Number</b> | <b>Old Catalog Number</b> | <b>Size</b> | <b>Maximum Continuous Current @ 40° C.</b> | <b>Dim. A (inches)</b> | <b>Dim. B (inches)</b> | <b>Min. Interrupting Rating RMS Amps</b> | <b>Max Interrupting Rating RMS (Asym)</b> | <b>Figure Number</b> |
|---------------------------------------------|-----------------------|---------------------------|-------------|--------------------------------------------|------------------------|------------------------|------------------------------------------|-------------------------------------------|----------------------|
| <b>5.5 KV</b><br><b>Bolt In Mount "BI"</b>  | 70-2R-1BI-5.5         | —                         | 2R          | 70                                         | 3.6"                   | 18"                    | 170                                      | 80,000                                    | 11                   |
|                                             | 100-3R-1BI-5.5        | —                         | 3R          | 100                                        | 3.6"                   | 18"                    | 250                                      | 80,000                                    | 11                   |
|                                             | 130-4R-1BI-5.5        | —                         | 4R          | 130                                        | 3.6"                   | 18"                    | 340                                      | 80,000                                    | 11                   |
|                                             | 150-5R-1BI-5.5        | —                         | 5R          | 150                                        | 3.6"                   | 18"                    | 390                                      | 80,000                                    | 11                   |
|                                             | 170-6R-1BI-5.5        | —                         | 6R          | 170                                        | 3.6"                   | 18"                    | 500                                      | 80,000                                    | 11                   |
|                                             | 200-9R-1BI-5.5        | —                         | 9R          | 200                                        | 3.6"                   | 18"                    | 760                                      | 80,000                                    | 11                   |
|                                             | 230-12R-1BI-5.5       | —                         | 12R         | 230                                        | 3.6"                   | 18"                    | 1000                                     | 80,000                                    | 11                   |
|                                             | 390-18R-2BI-5.5       | —                         | 18R         | 390                                        | 7.6"                   | 18"                    | 1500                                     | 80,000                                    | 12                   |
|                                             | 450-24R-2BI-5.5       | —                         | 24R         | 450                                        | 7.6"                   | 18"                    | 1950                                     | 80,000                                    | 12                   |
|                                             | 480-26R-2BI-5.5       | —                         | 26R         | 480                                        | 7.6"                   | 18"                    | 2200                                     | 80,000                                    | 12                   |
|                                             | 550-30R-2BI-5.5       | —                         | 30R         | 550                                        | 7.6"                   | 18"                    | 2400                                     | 80,000                                    | 12                   |
|                                             | 600-32R-2BI-5.5       | —                         | 32R         | 600                                        | 7.6"                   | 18"                    | 2650                                     | 80,000                                    | 12                   |
|                                             | 650-36R-2BI-5.5       | —                         | 36R         | 650                                        | 7.6"                   | 18"                    | 2900                                     | 80,000                                    | 12                   |
|                                             | 550-30R-3BI-5.5       | —                         | 30R         | 550                                        | —                      | 18"                    | —                                        | 80,000                                    | 13                   |
|                                             | 600-32R-3BI-5.5       | —                         | 32R         | 600                                        | —                      | 18"                    | —                                        | 80,000                                    | 13                   |
|                                             | 650-36R-3BI-5.5       | —                         | 36R         | 650                                        | —                      | 18"                    | —                                        | 80,000                                    | 13                   |
|                                             | 700-38R-3BI-5.5       | —                         | 38R         | 700                                        | —                      | 18"                    | —                                        | 80,000                                    | 13                   |
| <b>5.5 KV</b><br><b>Bolt Mount "B"</b>      | 70-2R-1B-5.5          | —                         | 2R          | 70                                         | 4.6"                   | 18"                    | 170                                      | 80,000                                    | 7                    |
|                                             | 100-3R-1B-5.5         | —                         | 3R          | 100                                        | 4.6"                   | 18"                    | 250                                      | 80,000                                    | 7                    |
|                                             | 130-4R-1B-5.5         | —                         | 4R          | 130                                        | 4.6"                   | 18"                    | 340                                      | 80,000                                    | 7                    |
|                                             | 150-5R-1B-5.5         | —                         | 5R          | 150                                        | 4.6"                   | 18"                    | 390                                      | 80,000                                    | 7                    |
|                                             | 170-6R-1B-5.5         | —                         | 6R          | 170                                        | 4.6"                   | 18"                    | 500                                      | 80,000                                    | 7                    |
|                                             | 200-9R-1B-5.5         | —                         | 9R          | 200                                        | 4.6"                   | 18"                    | 760                                      | 80,000                                    | 7                    |
|                                             | 230-12R-1B-5.5        | —                         | 12R         | 230                                        | 4.6"                   | 18"                    | 1000                                     | 80,000                                    | 7                    |
|                                             | 390-18R-2B-5.5        | —                         | 18R         | 390                                        | 7.4"                   | 18"                    | 1500                                     | 80,000                                    | 8                    |
|                                             | 450-24R-2B-5.5        | —                         | 24R         | 450                                        | 7.4"                   | 18"                    | 1950                                     | 80,000                                    | 8                    |
|                                             | 550-30R-2B-5.5        | —                         | 30R         | 550                                        | 8.4"                   | 18"                    | 2400                                     | 80,000                                    | 8                    |
|                                             | 600-32R-2B-5.5        | —                         | 32R         | 600                                        | 8.4"                   | 18"                    | 2650                                     | 80,000                                    | 8                    |
|                                             | 650-36R-2B-5.5        | —                         | 36R         | 650                                        | 8.4"                   | 18"                    | 2900                                     | 80,000                                    | 8                    |
| <b>5.5 KV</b><br><b>Inverted Bolt "IB"</b>  | 70-2R-1IB-5.5         | —                         | 2R          | 70                                         | —                      | 18"                    | 170                                      | 80,000                                    | 9                    |
|                                             | 100-3R-1IB-5.5        | —                         | 3R          | 100                                        | —                      | 18"                    | 250                                      | 80,000                                    | 9                    |
|                                             | 130-4R-1IB-5.5        | —                         | 4R          | 130                                        | —                      | 18"                    | 340                                      | 80,000                                    | 9                    |
|                                             | 150-5R-1IB-5.5        | —                         | 5R          | 150                                        | —                      | 18"                    | 390                                      | 80,000                                    | 9                    |
|                                             | 170-6R-1IB-5.5        | —                         | 6R          | 170                                        | —                      | 18"                    | 500                                      | 80,000                                    | 9                    |
|                                             | 200-9R-1IB-5.5        | —                         | 9R          | 200                                        | —                      | 18"                    | 760                                      | 80,000                                    | 9                    |
|                                             | 230-12R-1IB-5.5       | —                         | 12R         | 230                                        | —                      | 18"                    | 1000                                     | 80,000                                    | 9                    |
|                                             | 390-18R-2IB-5.5       | —                         | 18R         | 390                                        | —                      | 18"                    | 1500                                     | 80,000                                    | 10                   |
|                                             | 450-24R-2IB-5.5       | —                         | 24R         | 450                                        | —                      | 18"                    | 1950                                     | 80,000                                    | 10                   |
|                                             | 550-30R-2IB-5.5       | —                         | 30R         | 550                                        | —                      | 18"                    | 2400                                     | 80,000                                    | 10                   |
| <b>8.25 KV</b><br><b>Bolt-In Mount "BI"</b> | 70-2R-1BI-8.25        | —                         | 2R          | 70                                         | 3.6"                   | 18"                    | 190                                      | 80,000                                    | 11                   |
|                                             | 100-3R-1BI-8.25       | —                         | 3R          | 100                                        | 3.6"                   | 18"                    | 225                                      | 80,000                                    | 11                   |
|                                             | 130-4R-1BI-8.25       | —                         | 4R          | 130                                        | 3.6"                   | 18"                    | 330                                      | 80,000                                    | 11                   |
|                                             | 150-5R-1BI-8.25       | —                         | 5R          | 150                                        | 3.6"                   | 18"                    | 400                                      | 80,000                                    | 11                   |
|                                             | 170-6R-1BI-8.25       | —                         | 6R          | 170                                        | 3.6"                   | 18"                    | 500                                      | 80,000                                    | 11                   |
|                                             | 200-9R-1BI-8.25       | —                         | 9R          | 200                                        | 3.6"                   | 18"                    | 740                                      | 80,000                                    | 11                   |
|                                             | 230-12R-1BI-8.25      | —                         | 12R         | 230                                        | 3.6"                   | 18"                    | 955                                      | 80,000                                    | 11                   |
|                                             | 390-18R-2BI-8.25      | —                         | 18R         | 390                                        | 7.6"                   | 18"                    | 1440                                     | 80,000                                    | 12                   |
|                                             | 450-24R-2BI-8.25      | —                         | 24R         | 450                                        | 7.6"                   | 18"                    | 1910                                     | 80,000                                    | 12                   |

## E Rated Medium Voltage Fuses

### Current-Limiting

"E" Rated fuses have time current characteristics designed to provide current-limiting protection for power transformers, potential transformers, power centers, feeder centers, and unit sub stations. When properly applied, they can protect against high and low fault currents.

NEMA Standards for "E" rated medium voltage fuses require that fuses rated 100E or less open within 300 seconds (5 minutes) when subjected to an RMS value of 200-240% of the fuse continuous current rating; and fuses with an "E" rating larger than 100E must open within 600 seconds (10 minutes) when subjected to an RMS current of 220-240% of the fuse's continuous current rating. These values establish one point on the time-current curve.

#### Application Note:

Since these fuses are used for the protection of general purpose circuits which may contain transformers, motors, and other equipment producing in-rush and/or overload currents, fuses should generally be rated at 140% of the normal full load current, and circuits should be analyzed to ensure that system load currents will not exceed the current rating of the fuse.

### Characteristics

Voltage Rating: 2,400 volts – 38,000 volts

Current Range: 10E – 600E

### Options

- Hermetically sealed for use in hazardous locations (add "S" suffix to part number)
- Clip-lock (CL) and bolt-in styles available.

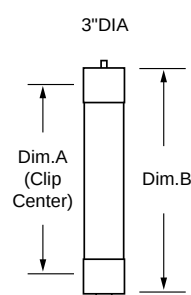


Figure 14

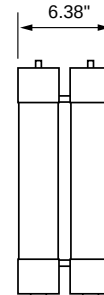


Figure 15

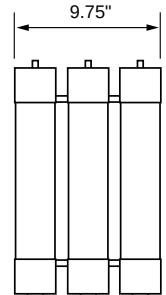


Figure 16

| E<br>Rated | Catalog Number | Old Catalog Number | Size | Dim. A (inches) | Dim. B (inches) | Max Interrupting Rating RMS (Asym) | Figure Number |
|------------|----------------|--------------------|------|-----------------|-----------------|------------------------------------|---------------|
|            | 2.75 Max. KV   |                    |      |                 |                 |                                    |               |
|            | 10E-1C-2.75    | LCX 10E            | 10E  | 7"              | 10.875"         | 80,000                             | 14            |
|            | 15E-1C-2.75    | —                  | 15E  | 7"              | 10.875"         | 80,000                             | 14            |
|            | 20E-1C-2.75    | —                  | 20E  | 7"              | 10.875"         | 80,000                             | 14            |
|            | 25E-1C-2.75    | —                  | 25E  | 7"              | 10.875"         | 80,000                             | 14            |
|            | 30E-1C-2.75    | LCX 30E            | 30E  | 7"              | 10.875"         | 80,000                             | 14            |
|            | 40E-1C-2.75    | LCX 40E            | 40E  | 7"              | 10.875"         | 80,000                             | 14            |
|            | 50E-1C-2.75    | LCX 50E            | 50E  | 7"              | 10.875"         | 80,000                             | 14            |
|            | 65E-1C-2.75    | LCX 65E            | 65E  | 7"              | 10.875"         | 80,000                             | 14            |
|            | 80E-1C-2.75    | LCX 80E            | 80E  | 7"              | 10.875"         | 80,000                             | 14            |
|            | 100E-1C-2.75   | LCX 100E           | 100E | 7"              | 10.875"         | 80,000                             | 14            |
|            | 125E-1C-2.75   | —                  | 125E | 7"              | 10.875"         | 80,000                             | 14            |
|            | 150E-1C-2.75   | —                  | 150E | 7"              | 10.875"         | 80,000                             | 14            |
|            | 200E-1C-2.75   | —                  | 200E | 7"              | 10.875"         | 80,000                             | 14            |
|            | 125E-2C-2.75   | LCX 125E           | 125E | 7"              | 10.875"         | 80,000                             | 15            |
|            | 150E-2C-2.75   | LCX 150E           | 150E | 7"              | 10.875"         | 80,000                             | 15            |
|            | 175E-2C-2.75   | LCX 175E           | 175E | 7"              | 10.875"         | 80,000                             | 15            |
|            | 200E-2C-2.75   | LCX 200E           | 200E | 7"              | 10.875"         | 80,000                             | 15            |
|            | 225E-2C-2.75   | —                  | 225E | 7"              | 10.875"         | 80,000                             | 15            |
|            | 250E-2C-2.75   | LCX 250E           | 250E | 7"              | 10.875"         | 80,000                             | 15            |
|            | 300E-2C-2.75   | LCX 300E           | 300E | 7"              | 10.875"         | 80,000                             | 15            |
|            | 350E-2C-2.75   | —                  | 350E | 7"              | 10.875"         | 80,000                             | 15            |
|            | 400E-2C-2.75   | LCX 400E           | 400E | 7"              | 10.875"         | 80,000                             | 15            |
|            | 450E-2C-2.75   | —                  | 450E | 7"              | 10.875"         | 80,000                             | 15            |

## E Rated Medium Voltage Fuses

### Current-Limiting

| <b>E<br/>Rated</b> | <b>Catalog Number</b> | <b>Old Catalog Number</b> | <b>Size</b> | <b>Dim. A (inches)</b> | <b>Dim. B (inches)</b> | <b>Max Interrupting<br/>Rating RMS (Asym)</b> | <b>Diagram</b> |
|--------------------|-----------------------|---------------------------|-------------|------------------------|------------------------|-----------------------------------------------|----------------|
|                    |                       |                           |             |                        |                        |                                               |                |
| <b>5.5 Max. KV</b> | 10E-1C-5.5            | —                         | 10E         | 12"                    | 15.875"                | 80,000                                        | 14             |
|                    | 15E-1C-5.5            | —                         | 15E         | 12"                    | 15.875"                | 80,000                                        | 14             |
|                    | 20E-1C-5.5            | —                         | 20E         | 12"                    | 15.875"                | 80,000                                        | 14             |
|                    | 25E-1C-5.5            | —                         | 25E         | 12"                    | 15.875"                | 80,000                                        | 14             |
|                    | 30E-1C-5.5            | LCY 30E                   | 30E         | 12"                    | 15.875"                | 80,000                                        | 14             |
|                    | 40E-1C-5.5            | LCY 40E                   | 40E         | 12"                    | 15.875"                | 80,000                                        | 14             |
|                    | 50E-1C-5.5            | LCY 50E                   | 50E         | 12"                    | 15.875"                | 80,000                                        | 14             |
|                    | 65E-1C-5.5            | LCY 60E                   | 65E         | 12"                    | 15.875"                | 80,000                                        | 14             |
|                    | 80E-1C-5.5            | LCY 80E                   | 80E         | 12"                    | 15.875"                | 80,000                                        | 14             |
|                    | 100E-1C-5.5           | LCY 100E                  | 100E        | 12"                    | 15.875"                | 80,000                                        | 14             |
|                    | 125E-1C-5.5           | LCY 125E                  | 125E        | 12"                    | 15.875"                | 80,000                                        | 14             |
|                    | 150E-1C-5.5           | LCY 150E                  | 150E        | 12"                    | 15.875"                | 80,000                                        | 14             |
|                    | 175E-1C-5.5           | LCY 175E                  | 175E        | 12"                    | 15.875"                | 80,000                                        | 14             |
|                    | 200E-1C-5.5           | LCY 200E                  | 200E        | 12"                    | 15.875"                | 80,000                                        | 14             |
|                    | 125E-2C-5.5           | —                         | 125E        | 12"                    | 15.875"                | 80,000                                        | 15             |
|                    | 150E-2C-5.5           | —                         | 150E        | 12"                    | 15.875"                | 80,000                                        | 15             |
|                    | 175E-2C-5.5           | —                         | 175E        | 12"                    | 15.875"                | 80,000                                        | 15             |
|                    | 200E-2C-5.5           | —                         | 200E        | 12"                    | 15.875"                | 80,000                                        | 15             |
|                    | 250E-2C-5.5           | LCY 250E                  | 250E        | 12"                    | 15.875"                | 80,000                                        | 15             |
|                    | 300E-2C-5.5           | LCY 300E                  | 300E        | 12"                    | 15.875"                | 80,000                                        | 15             |
|                    | 350E-2C-5.5           | LCY 350E                  | 350E        | 12"                    | 15.875"                | 80,000                                        | 15             |
|                    | 400E-2C-5.5           | LCY 400E                  | 400E        | 12"                    | 15.875"                | 80,000                                        | 15             |
|                    | 450E-2C-5.5           | LCY 450E                  | 450E        | 12"                    | 15.875"                | 80,000                                        | 15             |
|                    | 500E-3C-5.5           | —                         | 500E        | 12"                    | 15.875"                | 80,000                                        | 16             |
|                    | 550E-3C-5.5           | —                         | 550E        | 12"                    | 15.875"                | 80,000                                        | 16             |
|                    | 600E-3C-5.5           | —                         | 600E        | 12"                    | 15.875"                | 80,000                                        | 16             |

|                    |            |          |      |     |                    |        |    |
|--------------------|------------|----------|------|-----|--------------------|--------|----|
| <b>5.5 Max. KV</b> | 5NLE-10E   | —        | 10E  | 14" | 17 $\frac{7}{8}$ " | 80,000 | 14 |
|                    | 5NLE-15E   | —        | 15E  | 14" | 17 $\frac{7}{8}$ " | 80,000 | 14 |
|                    | 5NLE-20E   | —        | 20E  | 14" | 17 $\frac{7}{8}$ " | 80,000 | 14 |
|                    | 5NLE-25E   | —        | 25E  | 14" | 17 $\frac{7}{8}$ " | 80,000 | 14 |
|                    | 5NLE-30E   | LCU 30E  | 30E  | 14" | 17 $\frac{7}{8}$ " | 80,000 | 14 |
|                    | 5NLE-40E   | LCU 40E  | 40E  | 14" | 17 $\frac{7}{8}$ " | 80,000 | 14 |
|                    | 5NLE-50E   | LCU 50E  | 50E  | 14" | 17 $\frac{7}{8}$ " | 80,000 | 14 |
|                    | 5NLE-65E   | LCU 65E  | 65E  | 14" | 17 $\frac{7}{8}$ " | 80,000 | 14 |
|                    | 5NLE-80E   | LCU 80E  | 80E  | 14" | 17 $\frac{7}{8}$ " | 80,000 | 14 |
|                    | 5NLE-100E  | LCU 100E | 100E | 14" | 17 $\frac{7}{8}$ " | 80,000 | 14 |
|                    | 5NLE-125E  | LCU 125E | 125E | 14" | 17 $\frac{7}{8}$ " | 80,000 | 14 |
|                    | 5NLE-150E  | LCU 150E | 150E | 14" | 17 $\frac{7}{8}$ " | 80,000 | 14 |
|                    | 5NLE-175E  | LCU 175E | 175E | 14" | 17 $\frac{7}{8}$ " | 80,000 | 14 |
|                    | 5NLE-200E  | LCU 200E | 200E | 14" | 17 $\frac{7}{8}$ " | 80,000 | 14 |
|                    | 5NLE2-225E | —        | 225E | 14" | 17 $\frac{7}{8}$ " | 80,000 | 15 |
|                    | 5NLE2-250E | LCU 250E | 250E | 14" | 17 $\frac{7}{8}$ " | 80,000 | 15 |
|                    | 5NLE2-300E | LCU 300E | 300E | 14" | 17 $\frac{7}{8}$ " | 80,000 | 15 |
|                    | 5NLE2-350E | LCU 350E | 350E | 14" | 17 $\frac{7}{8}$ " | 80,000 | 15 |
|                    | 5NLE2-400E | LCU 400E | 400E | 14" | 17 $\frac{7}{8}$ " | 80,000 | 15 |
|                    | 5NLE2-450E | LCU 450E | 450E | 14" | 17 $\frac{7}{8}$ " | 80,000 | 15 |

## E Rated Medium Voltage Fuses

### Current-Limiting

| <b>E Rated</b>      | Catalog Number | Old Catalog Number | Size | Dim. A (inches) | Dim. B (inches)    | Max Interrupting Rating RMS (Asym) | Diagram |
|---------------------|----------------|--------------------|------|-----------------|--------------------|------------------------------------|---------|
| <b>8.25 Max. KV</b> | 10E-1C-8.25    | —                  | 10E  | 12"             | 15 $\frac{7}{8}$ " | 80,000                             | 14      |
|                     | 15E-1C-8.25    | —                  | 15E  | 12"             | 15 $\frac{7}{8}$ " | 80,000                             | 14      |
|                     | 20E-1C-8.25    | —                  | 20E  | 12"             | 15 $\frac{7}{8}$ " | 80,000                             | 14      |
|                     | 25E-1C-8.25    | —                  | 25E  | 12"             | 15 $\frac{7}{8}$ " | 80,000                             | 14      |
|                     | 30E-1C-8.25    | LDZ 30E            | 30E  | 12"             | 15 $\frac{7}{8}$ " | 80,000                             | 14      |
|                     | 40E-1C-8.25    | LDZ 40E            | 40E  | 12"             | 15 $\frac{7}{8}$ " | 80,000                             | 14      |
|                     | 50E-1C-8.25    | LDZ 50E            | 50E  | 12"             | 15 $\frac{7}{8}$ " | 80,000                             | 14      |
|                     | 65E-1C-8.25    | LDZ 65E            | 65E  | 12"             | 15 $\frac{7}{8}$ " | 80,000                             | 14      |
|                     | 80E-1C-8.25    | LDZ 80E            | 80E  | 12"             | 15 $\frac{7}{8}$ " | 80,000                             | 14      |
|                     | 100E-1C-8.25   | LDZ 100E           | 100E | 12"             | 15 $\frac{7}{8}$ " | 80,000                             | 14      |
|                     | 125E-1C-8.25   | LDZ 125E           | 125E | 12"             | 15 $\frac{7}{8}$ " | 80,000                             | 14      |
|                     | 150E-1C-8.25   | LDZ 150E           | 150E | 12"             | 15 $\frac{7}{8}$ " | 80,000                             | 14      |
|                     | 125E-2C-8.25   | LDZ 125E           | 125E | 12"             | 15 $\frac{7}{8}$ " | 80,000                             | 15      |
|                     | 150E-2C-8.25   | LDZ 150E           | 150E | 12"             | 15 $\frac{7}{8}$ " | 80,000                             | 15      |
|                     | 200E-2C-8.25   | LDZ 200E           | 200E | 12"             | 15 $\frac{7}{8}$ " | 80,000                             | 15      |
|                     | 250E-2C-8.25   | LDZ 250E           | 250E | 12"             | 15 $\frac{7}{8}$ " | 80,000                             | 15      |
|                     | 300E-2C-8.25   | LDZ 300E           | 300E | 12"             | 15 $\frac{7}{8}$ " | 80,000                             | 15      |
|                     | 350E-3C-8.25   | LDZ 350Z           | 350E | 12"             | 15 $\frac{7}{8}$ " | 80,000                             | 16      |
|                     | 400E-3C-8.25   | —                  | 400E | 12"             | 15 $\frac{7}{8}$ " | 80,000                             | 16      |

|                     |            |          |      |     |                    |        |    |
|---------------------|------------|----------|------|-----|--------------------|--------|----|
| <b>8.25 Max. KV</b> | 8NLE-10E   | —        | 10E  | 14" | 17 $\frac{7}{8}$ " | 80,000 | 14 |
|                     | 8NLE-15E   | —        | 15E  | 14" | 17 $\frac{7}{8}$ " | 80,000 | 14 |
|                     | 8NLE-20E   | —        | 20E  | 14" | 17 $\frac{7}{8}$ " | 80,000 | 14 |
|                     | 8NLE-25E   | —        | 25E  | 14" | 17 $\frac{7}{8}$ " | 80,000 | 14 |
|                     | 8NLE-30E   | LCZ 30E  | 30E  | 14" | 17 $\frac{7}{8}$ " | 80,000 | 14 |
|                     | 8NLE-40E   | LCZ 40E  | 40E  | 14" | 17 $\frac{7}{8}$ " | 80,000 | 14 |
|                     | 8NLE-50E   | LCZ 50E  | 50E  | 14" | 17 $\frac{7}{8}$ " | 80,000 | 14 |
|                     | 8NLE-65E   | LCZ 65E  | 65E  | 14" | 17 $\frac{7}{8}$ " | 80,000 | 14 |
|                     | 8NLE-80E   | LCZ 80E  | 80E  | 14" | 17 $\frac{7}{8}$ " | 80,000 | 14 |
|                     | 8NLE-100E  | LCZ 100E | 100E | 14" | 17 $\frac{7}{8}$ " | 80,000 | 14 |
|                     | 8NLE2-100E | LCZ 100E | 100E | 14" | 17 $\frac{7}{8}$ " | 80,000 | 14 |
|                     | 8NLE2-125E | LCZ 125E | 125E | 14" | 17 $\frac{7}{8}$ " | 80,000 | 15 |
|                     | 8NLE2-150E | LCZ 150E | 150E | 14" | 17 $\frac{7}{8}$ " | 80,000 | 15 |
|                     | 8NLE2-200E | LCZ 200E | 200E | 14" | 17 $\frac{7}{8}$ " | 80,000 | 15 |
|                     | 8NLE2-250E | —        | 250E | 14" | 17 $\frac{7}{8}$ " | 80,000 | 15 |

| <b>E Rated</b>      | Catalog Number | Old Catalog Number | Size | Dim. A (inches) | Dim. B (inches) | Max Interrupting Rating RMS (Asym) | Figure Number |
|---------------------|----------------|--------------------|------|-----------------|-----------------|------------------------------------|---------------|
| <b>15.5 Max. KV</b> | 10E-1C-15.5    | LDN 10E            | 10E  | 15"             | 18.875"         | 80,000                             | 14            |
|                     | 15E-1C-15.5    | LDN 15E            | 15E  | 15"             | 18.875"         | 80,000                             | 14            |
|                     | 20E-1C-15.5    | LDN 20E            | 20E  | 15"             | 18.875"         | 80,000                             | 14            |
|                     | 25E-1C-15.5    | LDN 25E            | 25E  | 15"             | 18.875"         | 80,000                             | 14            |
|                     | 30E-1C-15.5    | LDN 30E            | 30E  | 15"             | 18.875"         | 80,000                             | 14            |
|                     | 40E-1C-15.5    | LDN 40E            | 40E  | 15"             | 18.875"         | 80,000                             | 14            |
|                     | 50E-1C-15.5    | LDN 50E            | 50E  | 15"             | 18.875"         | 80,000                             | 14            |
|                     | 65E-1C-15.5    | LDN 65E            | 65E  | 15"             | 18.875"         | 80,000                             | 14            |
|                     | 80E-1C-15.5    | LDN 80E            | 80E  | 15"             | 18.875"         | 80,000                             | 14            |
|                     | 100E-1C-15.5   | LDN 100E           | 100E | 15"             | 18.875"         | 80,000                             | 14            |
|                     | 65E-2C-15.5    | —                  | 65E  | 15"             | 18.875"         | 80,000                             | 15            |
|                     | 80E-2C-15.5    | —                  | 80E  | 15"             | 18.875"         | 80,000                             | 15            |
|                     | 100E-2C-15.5   | —                  | 100E | 15"             | 18.875"         | 80,000                             | 15            |
|                     | 125E-2C-15.5   | —                  | 125E | 15"             | 18.875"         | 80,000                             | 15            |
|                     | 150E-2C-15.5   | LDN 150E           | 150E | 15"             | 18.875"         | 80,000                             | 15            |
|                     | 175E-2C-15.5   | LDN 175E           | 175E | 15"             | 18.875"         | 80,000                             | 15            |
|                     | 200E-2C-15.5   | —                  | 200E | 15"             | 18.875"         | 80,000                             | 15            |
|                     | 200E-3C-15.5   | —                  | 200E | 15"             | 18.875"         | 80,000                             | 16            |
|                     | 250E-3C-15.5   | —                  | 250E | 15"             | 18.875"         | 80,000                             | 16            |
|                     | 300E-3C-15.5   | —                  | 300E | 15"             | 18.875"         | 80,000                             | 16            |

## E Rated Medium Voltage Fuses

### Current-Limiting

|  Rated | Catalog Number | Old Catalog Number | Size | Dim. A (inches) | Dim. B (inches)    | Max Interrupting Rating RMS (Asym) | Figure Number |
|-----------------------------------------------------------------------------------------|----------------|--------------------|------|-----------------|--------------------|------------------------------------|---------------|
| 15.5 Max. KV                                                                            | 15GSE-65E      | —                  | 65E  | 18"             | 21 $\frac{7}{8}$ " | 60,000                             | 14            |
|                                                                                         | 15GSE-80E      | —                  | 80E  | 18"             | 21 $\frac{7}{8}$ " | 60,000                             | 14            |
|                                                                                         | 15GSE-100E     | —                  | 100E | 18"             | 21 $\frac{7}{8}$ " | 60,000                             | 14            |
|                                                                                         | 15GSE2-125E    | —                  | 125E | 18"             | 21 $\frac{7}{8}$ " | 60,000                             | 15            |
|                                                                                         | 15GSE2-150E    | —                  | 150E | 18"             | 21 $\frac{7}{8}$ " | 60,000                             | 15            |
|                                                                                         | 15GSE2-175E    | —                  | 175E | 18"             | 21 $\frac{7}{8}$ " | 60,000                             | 15            |
|                                                                                         | 15GSE2-200E    | —                  | 200E | 18"             | 21 $\frac{7}{8}$ " | 60,000                             | 15            |

|              |             |           |      |     |                    |        |    |
|--------------|-------------|-----------|------|-----|--------------------|--------|----|
| 15.5 Max. KV | 15NLE-10E   | —         | 10E  | 20" | 23 $\frac{3}{8}$ " | 60,000 | 14 |
|              | 15NLE-15E   | —         | 15E  | 20" | 23 $\frac{3}{8}$ " | 60,000 | 14 |
|              | 15NLE-20E   | —         | 20E  | 20" | 23 $\frac{3}{8}$ " | 60,000 | 14 |
|              | 15NLE-25E   | —         | 25E  | 20" | 23 $\frac{3}{8}$ " | 60,000 | 14 |
|              | 15NLE-30E   | LCN 30E   | 30E  | 20" | 23 $\frac{3}{8}$ " | 60,000 | 14 |
|              | 15NLE-40E   | LCN 40E   | 40E  | 20" | 23 $\frac{3}{8}$ " | 60,000 | 14 |
|              | 15NLE-50E   | LCN 50E   | 50E  | 20" | 23 $\frac{3}{8}$ " | 60,000 | 14 |
|              | 15NLE-65E   | LCN 65E   | 65E  | 20" | 23 $\frac{3}{8}$ " | 60,000 | 14 |
|              | 15NLE-80E   | LCN 80ES  | 80E  | 20" | 23 $\frac{3}{8}$ " | 60,000 | 14 |
|              | 15NLE-100E  | LCN 100ES | 100E | 20" | 23 $\frac{3}{8}$ " | 60,000 | 14 |
|              | 15NLE2-80E  | LCN 80E   | 80E  | 20" | 23 $\frac{3}{8}$ " | 60,000 | 15 |
|              | 15NLE2-100E | LCN 100E  | 100E | 20" | 23 $\frac{3}{8}$ " | 60,000 | 15 |
|              | 15NLE2-125E | LCN 125X  | 125E | 20" | 23 $\frac{3}{8}$ " | 60,000 | 15 |
|              | 15NLE2-150E | LCN 150E  | 150E | 20" | 23 $\frac{3}{8}$ " | 60,000 | 15 |
|              | 15NLE2-175E | —         | 175E | 20" | 23 $\frac{3}{8}$ " | 60,000 | 15 |
|              | 15NLE2-200E | LCN 200ED | 200E | 20" | 23 $\frac{3}{8}$ " | 60,000 | 15 |
|              | 15NLE3-150E | —         | 150E | 20" | 23 $\frac{3}{8}$ " | 60,000 | 16 |
|              | 15NLE3-175E | —         | 175E | 20" | 23 $\frac{3}{8}$ " | 60,000 | 16 |
|              | 15NLE3-250E | —         | 250E | 20" | 23 $\frac{3}{8}$ " | 60,000 | 16 |
|              | 15NLE3-300E | —         | 300E | 20" | 23 $\frac{3}{8}$ " | 60,000 | 16 |

|  Rated | Catalog Number | Old Catalog Number | Size | Dim. A (inches) | Dim. B (inches)    | Max Interrupting Rating RMS (Asym) | Figure Number |
|-------------------------------------------------------------------------------------------|----------------|--------------------|------|-----------------|--------------------|------------------------------------|---------------|
| 25.8 Max. KV                                                                              | 15E-1C-25.8    | —                  | 15E  | 21"             | 24 $\frac{5}{8}$ " | 40,000                             | 14            |
|                                                                                           | 20E-1C-25.8    | —                  | 20E  | 21"             | 24 $\frac{5}{8}$ " | 40,000                             | 14            |
|                                                                                           | 25E-1C-25.8    | —                  | 25E  | 21"             | 24 $\frac{5}{8}$ " | 40,000                             | 14            |
|                                                                                           | 30E-1C-25.8    | —                  | 30E  | 21"             | 24 $\frac{5}{8}$ " | 40,000                             | 14            |
|                                                                                           | 40E-1C-25.8    | —                  | 40E  | 21"             | 24 $\frac{5}{8}$ " | 40,000                             | 14            |
|                                                                                           | 50E-1C-25.8    | —                  | 50E  | 21"             | 24 $\frac{5}{8}$ " | 40,000                             | 14            |
|                                                                                           | 65E-2C-25.8    | —                  | 65E  | 21"             | 24 $\frac{5}{8}$ " | 40,000                             | 14            |
|                                                                                           | 80E-2C-25.8    | —                  | 80E  | 21"             | 24 $\frac{5}{8}$ " | 40,000                             | 15            |
|                                                                                           | 100E-2C-25.8   | —                  | 100E | 21"             | 24 $\frac{5}{8}$ " | 40,000                             | 15            |

|  Rated | Catalog Number | Old Catalog Number | Size | Dim. A (inches) | Dim. B (inches)    | Max Interrupting Rating RMS (Asym) | Figure Number |
|-------------------------------------------------------------------------------------------|----------------|--------------------|------|-----------------|--------------------|------------------------------------|---------------|
| 38 Max. KV                                                                                | 3E-1C-38.0     | —                  | 3E   | 27"             | 30 $\frac{5}{8}$ " | 20,000                             | 14            |
|                                                                                           | 7E-1C-38.0     | —                  | 7E   | 27"             | 30 $\frac{5}{8}$ " | 20,000                             | 14            |
|                                                                                           | 10E-1C-38.0    | —                  | 10E  | 27"             | 30 $\frac{5}{8}$ " | 20,000                             | 14            |
|                                                                                           | 15E-1C-38.0    | —                  | 15E  | 27"             | 30 $\frac{5}{8}$ " | 20,000                             | 14            |
|                                                                                           | 20E-1C-38.0    | —                  | 20E  | 27"             | 30 $\frac{5}{8}$ " | 20,000                             | 14            |
|                                                                                           | 25E-1C-38.0    | —                  | 25E  | 27"             | 30 $\frac{5}{8}$ " | 20,000                             | 14            |
|                                                                                           | 30E-1C-38.0    | —                  | 30E  | 27"             | 30 $\frac{5}{8}$ " | 20,000                             | 14            |
|                                                                                           | 40E-1C-38.0    | —                  | 40E  | 27"             | 30 $\frac{5}{8}$ " | 20,000                             | 14            |
|                                                                                           | 50E-2C-38.0    | —                  | 50E  | 27"             | 30 $\frac{5}{8}$ " | 20,000                             | 15            |
|                                                                                           | 65E-2C-38.0    | —                  | 65E  | 27"             | 30 $\frac{5}{8}$ " | 20,000                             | 15            |
|                                                                                           | 80E-2C-38.0    | —                  | 80E  | 27"             | 30 $\frac{5}{8}$ " | 20,000                             | 15            |

## E Rated Medium Voltage Fuses

### Current-Limiting

#### Clip Lock Design

The clip lock type designs ensures a positive contact between the fuse and the connection cam. The fuse's clip lock tab slides in between the clip casting and the cam to prevent the fuse from slipping or blowing out of the holder. This positive contact improves heat dissipation and allows fuses to run cooler.

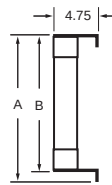


Figure 17

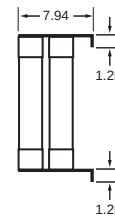


Figure 18

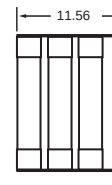
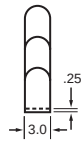


Figure 19



| <b>E</b><br>Rated        | Catalog Number | Old Catalog Number | Size | Dim. A (inches) | Dim. B (inches) | Max Interrupting Rating RMS (Asym) | Figure Number |
|--------------------------|----------------|--------------------|------|-----------------|-----------------|------------------------------------|---------------|
| 5.5 Max. KV<br>Clip Lock | 10E-1CL-5.5    | —                  | 10E  | 16.38"          | 15.13"          | 80,000                             | 17            |
|                          | 15E-1CL-5.5    | —                  | 15E  | 16.38"          | 15.13"          | 80,000                             | 17            |
|                          | 20E-1CL-5.5    | —                  | 20E  | 16.38"          | 15.13"          | 80,000                             | 17            |
|                          | 25E-1CL-5.5    | —                  | 25E  | 16.38"          | 15.13"          | 80,000                             | 17            |
|                          | 30E-1CL-5.5    | —                  | 30E  | 16.38"          | 15.13"          | 80,000                             | 17            |
|                          | 40E-1CL-5.5    | —                  | 40E  | 16.38"          | 15.13"          | 80,000                             | 17            |
|                          | 50E-1CL-5.5    | —                  | 50E  | 16.38"          | 15.13"          | 80,000                             | 17            |
|                          | 65E-1CL-5.5    | —                  | 65E  | 16.38"          | 15.13"          | 80,000                             | 17            |
|                          | 80E-1CL-5.5    | —                  | 80E  | 16.38"          | 15.13"          | 80,000                             | 17            |
|                          | 100E-1CL-5.5   | —                  | 100E | 16.38"          | 15.13"          | 80,000                             | 17            |
|                          | 125E-1CL-5.5   | —                  | 125E | 16.38"          | 15.13"          | 80,000                             | 17            |
|                          | 150E-1CL-5.5   | —                  | 150E | 16.38"          | 15.13"          | 80,000                             | 17            |
|                          | 225E-2CL-5.5   | —                  | 225E | 17.38"          | 16.13"          | 80,000                             | 18            |
|                          | 250E-2CL-5.5   | —                  | 250E | 17.38"          | 16.13"          | 80,000                             | 18            |
|                          | 300E-2CL-5.5   | —                  | 300E | 17.38"          | 16.13"          | 80,000                             | 18            |
|                          | 350E-2CL-5.5   | —                  | 350E | 17.38"          | 16.13"          | 80,000                             | 18            |
|                          | 400E-2CL-5.5   | —                  | 400E | 17.38"          | 16.13"          | 80,000                             | 18            |
|                          | 450E-2CL-5.5   | —                  | 450E | 17.38"          | 16.13"          | 80,000                             | 18            |
|                          | 500E-3CL-5.5   | —                  | 500E | 17.38"          | 16.13"          | 80,000                             | 19            |
|                          | 550E-3CL-5.5   | —                  | 550E | 17.38"          | 16.13"          | 80,000                             | 19            |
|                          | 600E-3CL-5.5   | —                  | 600E | 17.38"          | 16.13"          | 80,000                             | 19            |

| <b>E</b><br>Rated         | Catalog Number | Old Catalog Number | Size | Dim. A (inches) | Dim. B (inches) | Max Interrupting Rating RMS (Asym) | Figure Number |
|---------------------------|----------------|--------------------|------|-----------------|-----------------|------------------------------------|---------------|
| 8.25 Max. KV<br>Clip Lock | 10E-1CL-8.25   | —                  | 10E  | 17.38"          | 16.13"          | 80,000                             | 17            |
|                           | 15E-1CL-8.25   | —                  | 15E  | 17.38"          | 16.13"          | 80,000                             | 17            |
|                           | 20E-1CL-8.25   | —                  | 20E  | 17.38"          | 16.13"          | 80,000                             | 17            |
|                           | 25E-1CL-8.25   | —                  | 25E  | 17.38"          | 16.13"          | 80,000                             | 17            |
|                           | 30E-1CL-8.25   | —                  | 30E  | 17.38"          | 16.13"          | 80,000                             | 17            |
|                           | 40E-1CL-8.25   | —                  | 40E  | 17.38"          | 16.13"          | 80,000                             | 17            |
|                           | 50E-1CL-8.25   | —                  | 50E  | 17.38"          | 16.13"          | 80,000                             | 17            |
|                           | 65E-1CL-8.25   | —                  | 65E  | 17.38"          | 16.13"          | 80,000                             | 17            |
|                           | 80E-1CL-8.25   | —                  | 80E  | 17.38"          | 16.13"          | 80,000                             | 17            |
|                           | 100E-1CL-8.25  | —                  | 100E | 17.38"          | 16.13"          | 80,000                             | 17            |
|                           | 125E-2CL-8.25  | —                  | 125E | 17.38"          | 16.13"          | 80,000                             | 18            |
|                           | 150E-2CL-8.25  | —                  | 150E | 17.38"          | 16.13"          | 80,000                             | 18            |
|                           | 175E-2CL-8.25  | —                  | 175E | 17.38"          | 16.13"          | 80,000                             | 18            |
|                           | 200E-2CL-8.25  | —                  | 200E | 17.38"          | 16.13"          | 80,000                             | 18            |
|                           | 225E-2CL-8.25  | —                  | 225E | 17.38"          | 16.13"          | 80,000                             | 18            |
|                           | 250E-2CL-8.25  | —                  | 250E | 17.38"          | 16.13"          | 80,000                             | 18            |
|                           | 300E-2CL-8.25  | —                  | 300E | 17.38"          | 16.13"          | 80,000                             | 18            |
|                           | 350E-3CL-8.25  | —                  | 350E | 17.38"          | 16.13"          | 80,000                             | 19            |

| <b>E</b><br>Rated         | Catalog Number | Old Catalog Number | Size | Dim. A (inches) | Dim. B (inches) | Max Interrupting Rating RMS (Asym) | Figure Number |
|---------------------------|----------------|--------------------|------|-----------------|-----------------|------------------------------------|---------------|
| 15.5 Max. KV<br>Clip Lock | 10E-1CL-15.5   | —                  | 10E  | 19.8"           | 18.1"           | 60,000                             | 17            |
|                           | 15E-1CL-15.5   | —                  | 15E  | 19.8"           | 18.1"           | 60,000                             | 17            |
|                           | 20E-1CL-15.5   | —                  | 20E  | 19.8"           | 18.1"           | 60,000                             | 17            |
|                           | 25E-1CL-15.5   | —                  | 25E  | 19.8"           | 18.1"           | 60,000                             | 17            |
|                           | 30E-1CL-15.5   | —                  | 30E  | 19.8"           | 18.1"           | 60,000                             | 17            |
|                           | 40E-1CL-15.5   | —                  | 40E  | 19.8"           | 18.1"           | 60,000                             | 17            |
|                           | 50E-1CL-15.5   | —                  | 50E  | 19.8"           | 18.1"           | 60,000                             | 17            |
|                           | 65E-1CL-15.5   | —                  | 65E  | 22.81"          | 21.13"          | 60,000                             | 17            |
|                           | 80E-1CL-15.5   | —                  | 80E  | 22.81"          | 21.13"          | 60,000                             | 17            |
|                           | 100E-1CL-15.5  | —                  | 100E | 22.81"          | 21.13"          | 60,000                             | 17            |
|                           | 125E-2CL-15.5  | —                  | 125E | 22.81"          | 19.1"           | 60,000                             | 18            |
|                           | 150E-3CL-15.5  | —                  | 150E | 22.81"          | 19.1"           | 60,000                             | 19            |
|                           | 175E-3CL-15.5  | —                  | 175E | 22.81"          | 19.1"           | 60,000                             | 19            |
|                           | 200E-3CL-15.5  | —                  | 200E | 22.81"          | 19.1"           | 60,000                             | 19            |
|                           | 225E-3CL-15.5  | —                  | 225E | 22.81"          | 19.1"           | 60,000                             | 19            |
|                           | 250E-3CL-15.5  | —                  | 250E | 22.81"          | 19.1"           | 60,000                             | 19            |
|                           | 300E-3CL-15.5  | —                  | 300E | 22.81"          | 19.1"           | 60,000                             | 19            |

## E Rated Potential Transformer Fuses

### Current-Limiting

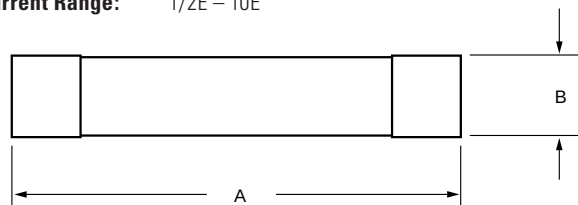
Potential Transformer (PT) fuses are current-limiting fuses with high interrupting ratings designed for the protection of potential transformers.

#### Application Note:

When applying fuses for the protection of transformers, the magnetizing current in-rush must be considered. The characteristics of the in-rush, which can be matched with a fuse time-current curve, should be available from the transformer manufacturer.

### Characteristics

**Voltage Rating:** 600VAC – 25,500 VAC  
**Current Range:** 1/2E – 10E



|  Rated | Catalog Number | Old Catalog Number | Size | Length Dim. A (inches) | Diameter Dim. B (inches) | Max Interrupting Rating RMS (Sym) |
|-----------------------------------------------------------------------------------------|----------------|--------------------|------|------------------------|--------------------------|-----------------------------------|
| 600 Volt                                                                                | 3E-4PT-6       | —                  | 3E   | 4.6"                   | 0.8125"                  | 37,500                            |
|                                                                                         | 5E-4PT-6       | —                  | 5E   | 4.6"                   | 0.8125"                  | 37,500                            |
|                                                                                         | 7E-4PT-6       | —                  | 7E   | 4.6"                   | 0.8125"                  | 37,500                            |
|                                                                                         | 10E-4PT-6      | —                  | 10E  | 4.6"                   | 0.8125"                  | 37,500                            |
| 2.75 Max. kV                                                                            | 500E-4PT-2.4   | —                  | 1/2E | 4.6"                   | 0.8125"                  | 37,000                            |
|                                                                                         | 1E-4PT-2.4     | LCD 1E-4           | 1E   | 4.6"                   | 0.8125"                  | 37,000                            |
|                                                                                         | 2E-4PT-2.4     | LCD 2E-4           | 2E   | 4.6"                   | 0.8125"                  | 37,000                            |
| 2.75 Max. KV                                                                            | 1E-6PT-2.75    | —                  | 1E   | 7.4"                   | 1.5625"                  | 37,500                            |
|                                                                                         | 2E-6PT-2.75    | —                  | 2E   | 7.4"                   | 1.5625"                  | 37,500                            |
|                                                                                         | 3E-6PT-2.75    | —                  | 3E   | 7.4"                   | 1.5625"                  | 37,500                            |
|                                                                                         | 1E-8PT-2.75    | —                  | 1E   | 9.5"                   | 1.5625"                  | 37,000                            |
|                                                                                         | 2E-8PT-2.75    | —                  | 2E   | 9.5"                   | 1.5625"                  | 37,000                            |
|                                                                                         | 3E-8PT-2.75    | —                  | 3E   | 9.5"                   | 1.5625"                  | 37,000                            |
| 4.8 Max. kV                                                                             | 1E-5PT-4.8     | LCE 1E-4           | 1E   | 5.6"                   | 0.8125"                  | 50,000                            |
|                                                                                         | 2E-5PT-4.8     | LCE 2E-4           | 2E   | 5.6"                   | 0.8125"                  | 50,000                            |
| 5.5 Max. kV                                                                             | 1/2E-6PT-5.5   | —                  | 1/2E | 7.4"                   | 1.5625"                  | 50,000                            |
|                                                                                         | 1E-6PT-5.5     | —                  | 1E   | 7.4"                   | 1.5625"                  | 50,000                            |
|                                                                                         | 2E-6PT-5.5     | —                  | 2E   | 7.4"                   | 1.5625"                  | 50,000                            |
|                                                                                         | 3E-6PT-5.5     | —                  | 3E   | 7.4"                   | 1.5625"                  | 50,000                            |
|                                                                                         | 5E-6PT-5.5     | —                  | 5E   | 7.4"                   | 1.5625"                  | 50,000                            |
|                                                                                         | 1/2E-8PT-5.5   | LCQ .5E            | 1/2E | 9.5"                   | 1.5625"                  | 50,000                            |
|                                                                                         | 1E-8PT-5.5     | LCQ 1E             | 1E   | 9.5"                   | 1.5625"                  | 50,000                            |
|                                                                                         | 2E-8PT-5.5     | LCQ 2E             | 2E   | 9.5"                   | 1.5625"                  | 50,000                            |
|                                                                                         | 3E-8PT-5.5     | LCQ 3E             | 3E   | 9.5"                   | 1.5625"                  | 50,000                            |
|                                                                                         | 5E-8PT-5.5     | LCQ 5E             | 5E   | 9.5"                   | 1.5625"                  | 50,000                            |
| 8.25 Max. kV                                                                            | 1/2E-8PT-8.25  | —                  | 1/2E | 9.5"                   | 1.5625"                  | 50,000                            |
|                                                                                         | 1E-8PT-8.25    | —                  | 1E   | 9.5"                   | 1.5625"                  | 50,000                            |
|                                                                                         | 2E-8PT-8.25    | —                  | 2E   | 9.5"                   | 1.5625"                  | 50,000                            |
|                                                                                         | 3E-8PT-8.25    | —                  | 3    | 9.5"                   | 1.5625"                  | 50,000                            |
| 15.5 Max. kV                                                                            | 1/2E-11PT-15.5 | LCT .5E            | 1/2E | 12.8"                  | 1.5625"                  | 35,000                            |
|                                                                                         | 1E-11PT-15.5   | LCT 1E             | 1E   | 12.8"                  | 1.5625"                  | 35,000                            |
|                                                                                         | 2E-11PT-15.5   | LCT 2E             | 2E   | 12.8"                  | 1.5625"                  | 35,000                            |
|                                                                                         | 3E-11PT-15.5   | LCT 3E             | 3E   | 12.8"                  | 1.5625"                  | 35,000                            |
|                                                                                         | 3E-16PT-15.5   | —                  | 3E   | 17.5"                  | 1.5625"                  | 35,000                            |
|                                                                                         | 5E-16PT-15.5   | —                  | 5E   | 17.5"                  | 1.5625"                  | 35,000                            |
| 25.8 Max. kV                                                                            | 1/2E-16PT-25.5 | LCJ 1E-4           | 1/2E | 17.5"                  | 1.5625"                  | 43,500                            |
|                                                                                         | 1E-16PT-25.5   | LCJ 2E-4           | 1E   | 17.5"                  | 1.5625"                  | 43,500                            |

## Live Parts

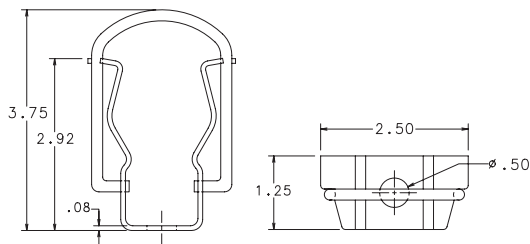


Live parts are available for mounting "E", "R", and "PT" single, double, and triple barrel fuses. Mounting clips are available for ferrule type and clip lock style fuses. All clips are sold in pairs. Contact factory for additional live parts.

### Part Number: 700-156\*

System Number: 0700156.Z

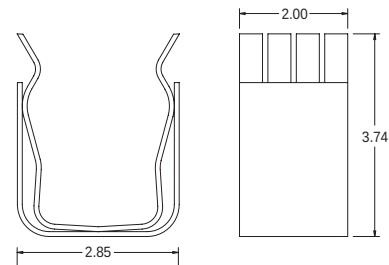
For use with 1-9/16" to 1-5/8" (1.625") diameter PT fuses.



### Part Number: 700-300\*

System Number: 0700300.Z

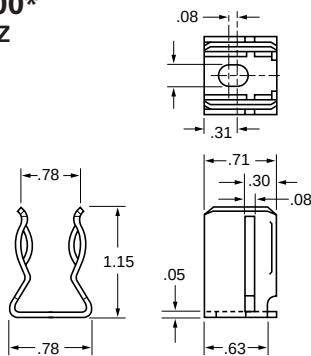
For use with 3" diameter fuses.



### Part Number: 700-500\*

System Number: 0700500.Z

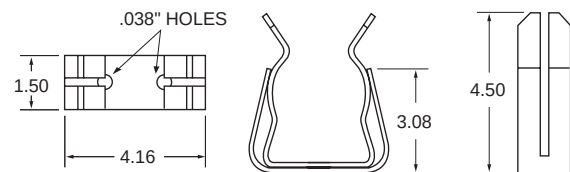
For use with all 13/16" (.8125") diameter PT fuses.



### Part Number: 700-530\*

System Number: 0700530.Z

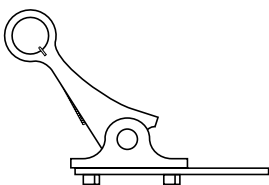
For use with all 3" diameter fuses.



### Part Number: 700-520-CL\*

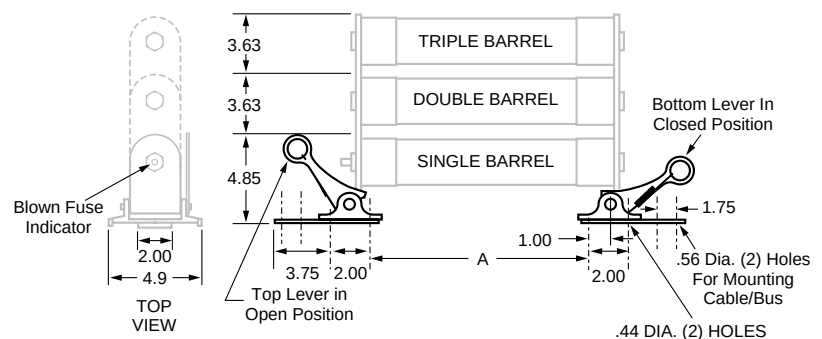
System Number: 0700520.ZXCL

Clip Lock Design (For CL-14)



\* One Pair. Dimensions for reference only.

### Mounting Details for Clip Lock

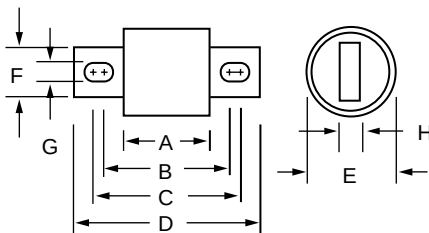


**Telecom Products**

|                                                             |           |
|-------------------------------------------------------------|-----------|
| <i>L17T Series Telecommunications Power Fuse</i>            | <b>77</b> |
| <i>TLN Series Telecommunications Power Fuse</i>             | <b>78</b> |
| <i>TLS Series Telecommunications Power Fuse</i>             | <b>79</b> |
| <i>Alarm Indicating Fuses</i>                               | <b>80</b> |
| <i>LTFD 101 Series Telecommunications Disconnect Switch</i> | <b>81</b> |
| <i>LTFD Series Telecommunications Disconnect Switch</i>     | <b>82</b> |

## L17T Series Telecommunications Power Fuse

170 VDC • Current-Limiting • 70 – 1200 Amperes



Contact Littelfuse for characteristic curves.

Specifically designed for short-circuit protection of telecommunications circuits, the Littelfuse L17T series fuses provide reliable protection of sensitive DC power distribution systems. Constructed with silver plated elements for low  $I^2t$  and peak let-through, these advanced fuses virtually eliminate equipment damage due to surges and spikes. The L17T series fuse unique element geometry also provides cooler running temperatures, helping to minimize heat within enclosures.

### Ordering Information & Cross Reference

| Catalog Number | Ampere Rating | Competitor A Part Number | Competitor B Part Number |
|----------------|---------------|--------------------------|--------------------------|
| L17T 70        | 70            | TPL-BA                   | TGL-BA                   |
| L17T 90        | 90            | TPL-BC                   | TGL-BC                   |
| L17T 100       | 100           | TPL-BD                   | TGL-BD                   |
| L17T 125       | 125           | TPL-BE                   | TGL-BE                   |
| L17T 150       | 150           | TPL-BF                   | TGL-BF                   |
| L17T 175       | 175           | TPL-BG                   | TGL-BG                   |
| L17T 200       | 200           | TPL-BH                   | TGL-BH                   |
| L17T 225       | 225           | TPL-BK                   | TGL-BK                   |
| L17T 250       | 250           | TPL-BL                   | TGL-BL                   |
| L17T 300       | 300           | TPL-CN                   | TGL-CN                   |
| L17T 350       | 350           | TPL-CO                   | TGL-CO                   |
| L17T 400       | 400           | TPL-CR                   | TGL-CR                   |
| L17T 450       | 450           | TPL-CU                   | TGL-CU                   |
| L17T 500       | 500           | TPL-CV                   | TGL-CV                   |
| L17T 600       | 600           | TPL-CZ                   | TGL-CZ                   |
| L17T 800       | 800           | TPL-CZH                  | TGL-CZH                  |
| L17T 900       | 900           | —                        | —                        |
| L17T 1000      | 1000          | —                        | —                        |
| L17T 1100      | 1100          | —                        | —                        |
| L17T 1200      | 1200          | —                        | —                        |

| Ampere Rating | Dimensions in Inches (mm in parentheses) |                   |                  |                   |                 |                 |                 |               |
|---------------|------------------------------------------|-------------------|------------------|-------------------|-----------------|-----------------|-----------------|---------------|
|               | A                                        | B                 | C                | D                 | E               | F               | G               | H             |
| 70 – 250      | 1 5/32<br>(29.4)                         | 1 7/8<br>(47.6)   | 2 3/16<br>(55.6) | 2 21/32<br>(67.5) | 1<br>(25.4)     | 7/8<br>(22.2)   | 5/16<br>(7.9)   | 3/16<br>(4.8) |
| 300 – 800     | 1 1/4<br>(31.8)                          | 1 15/16<br>(49.2) | 2 9/16<br>(65.1) | 3 1/2<br>(88.9)   | 1 1/2<br>(38.1) | 1<br>(25.4)     | 13/32<br>(10.3) | 1/4<br>(6.35) |
| 1000–1200     | 1 11/32<br>(34.0)                        | —                 | —                | 4 1/16<br>(103.1) | —               | 1 1/2<br>(38.1) | —               | 1/4<br>(6.35) |

### Specifications

**Voltage Rating:** 170 VDC  
**Interrupting Rating:** 100,000 amperes  
**Ampere Range:** 70 – 1200 amperes  
**Approvals:** UL Recognized under the Components Program (File No: E71611)  
 CSA Recognized under the Component Acceptance Program (File No: LR29862)

### Recommended Fuse Blocks

LTFD 6001 and LTFD 1200 series  
 Refer to the LTFD series in this catalog section for additional information.

### Ampere Ratings

|    |     |     |     |     |     |      |
|----|-----|-----|-----|-----|-----|------|
| 70 | 100 | 175 | 250 | 400 | 600 | 1000 |
| 80 | 125 | 200 | 300 | 450 | 800 | 1100 |
| 90 | 150 | 225 | 350 | 500 | 900 | 1200 |

Example part number (series & amperage): L17T 200

### Features

- Low  $I^2t$
- Extremely current-limiting
- Low operating temperature
- 170 VDC rating

## TLN Series Telecommunications Power Fuse

170 VDC • Current-Limiting • 1 – 600 Amperes



### Specifications

|                             |                                                                 |
|-----------------------------|-----------------------------------------------------------------|
| <b>Voltage Rating:</b>      | 170 VDC                                                         |
| <b>Interrupting Rating:</b> | 100,000 amperes                                                 |
| <b>Ampere Range:</b>        | 1 – 600 amperes                                                 |
| <b>Approvals:</b>           | UL Recognized under the components program<br>(File No: E71611) |

### Ampere Ratings

|    |    |    |     |     |     |     |
|----|----|----|-----|-----|-----|-----|
| 1  | 15 | 40 | 80  | 150 | 300 | 600 |
| 3  | 20 | 45 | 90  | 175 | 350 |     |
| 5  | 25 | 50 | 100 | 200 | 400 |     |
| 6  | 30 | 60 | 110 | 225 | 450 |     |
| 10 | 35 | 70 | 125 | 250 | 500 |     |

Example part number (series & amperage): TLN450

### Recommended Fuse Blocks

LR250 Series  
Refer to the Blocks & Holders section of this catalog for additional information.

### Features

- 170 VDC
- Fast acting and current-limiting
- 1 to 600 amperes
- Dimensionally similar to 250V Class R fuses

**Replaces competitors' TPN and TGN Series.**

The TLN Series fuses are specifically designed for the protection of telecommunications DC power distribution circuits.

| Ampere Rating   | Dimensions in Inches (mm in parentheses) |            |                |                |            |              |                |             |               |               |
|-----------------|------------------------------------------|------------|----------------|----------------|------------|--------------|----------------|-------------|---------------|---------------|
|                 | A                                        | B          | C              | D              | E          | F            | G              | H           | J             | K             |
| <b>Figure 1</b> |                                          |            |                |                |            |              |                |             |               |               |
| 1 – 30          | 2 (50.8)                                 | ½ (12.7)   | ½ (12.7)       | 9/16 (14.3)    | 5/64 (2.0) | 5/32 (4.0)   | 3/8 (9.5)      | —           | —             | —             |
| 35 – 60         | 3 (76.2)                                 | ¾ (19.1)   | 5/8 (15.9)     | 13/16 (20.6)   | 3/32 (2.4) | 3/16 (4.8)   | 5/8 (15.9)     | —           | —             | —             |
| <b>Figure 2</b> |                                          |            |                |                |            |              |                |             |               |               |
| 70 – 100        | 5 7/8 (149.2)                            | 1 (25.4)   | 1 1/16 (27.0)  | 1 1/16 (27.0)  | 1/8 (3.2)  | 3/4 (19.1)   | 1 1/4 (31.6)   | 1/4 (6.4)   | 9/32 (7.1)    | 1/2 (12.7)    |
| 110 – 200       | 7 1/8 (181.0)                            | 1 ½ (38.1) | 1 15/32 (37.3) | 1 19/32 (40.5) | 3/16 (4.8) | 1 1/8 (28.6) | 1 27/32 (46.8) | 7/16 (11.1) | 9/32 (7.1)    | 1 1/16 (17.5) |
| 225 – 400       | 8 5/8 (219.1)                            | 2 (50.8)   | 1 15/16 (49.2) | 2 3/32 (53.2)  | 1/4 (6.4)  | 1 5/8 (41.3) | 2 11/32 (59.5) | 5/8 (15.9)  | 13/32 (10.3)  | 1 5/16 (23.8) |
| 450 – 600       | 10 3/8 (263.5)                           | 2 ½ (63.5) | 2 3/8 (60.3)   | 2 19/32 (65.9) | 1/4 (6.4)  | 2 (50.8)     | 2 27/32 (72.2) | 3/4 (19.1)  | 1 7/32 (13.5) | 1 1/8 (28.6)  |

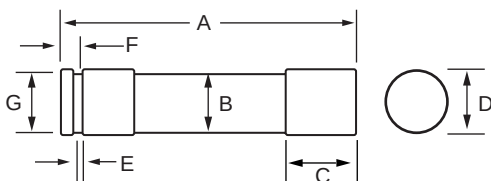


FIG. 1

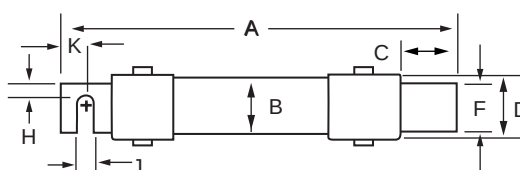


FIG. 2

## TLS Series Telecommunications Power Fuse



170 VDC • Current-Limiting • 1 – 125 Amperes



Littelfuse TLS Series fuses are designed specifically for the protection of telecommunications equipment. TLS fuses have been engineered to operate up to 170 VDC to provide current-limiting short-circuit protection for cables and components found in the DC power distribution circuits of telecommunications systems. The compact design and multiple mounting configurations of the TLS series allow it to be used in a variety of applications.

### Features

- 170 VDC
- Current-limiting
- 1 to 125 amperes
- Multiple mounting configurations
- RoHS Compliant

### Specifications

|                      |                                                                 |
|----------------------|-----------------------------------------------------------------|
| Voltage Rating:      | 170 VDC                                                         |
| Interrupting Rating: | 100,000 amperes                                                 |
| Ampere Range:        | 1 – 125 amperes                                                 |
| Approvals:           | UL Recognized under the components program<br>(File No: E71611) |
| Construction:        | Caps: Silver-plated brass                                       |
| Body:                | Glass melamine                                                  |

### Ampere Ratings

|   |    |    |    |     |
|---|----|----|----|-----|
| 1 | 6  | 25 | 50 | 90  |
| 2 | 10 | 30 | 60 | 100 |
| 3 | 15 | 35 | 70 | 110 |
| 5 | 20 | 40 | 80 | 125 |

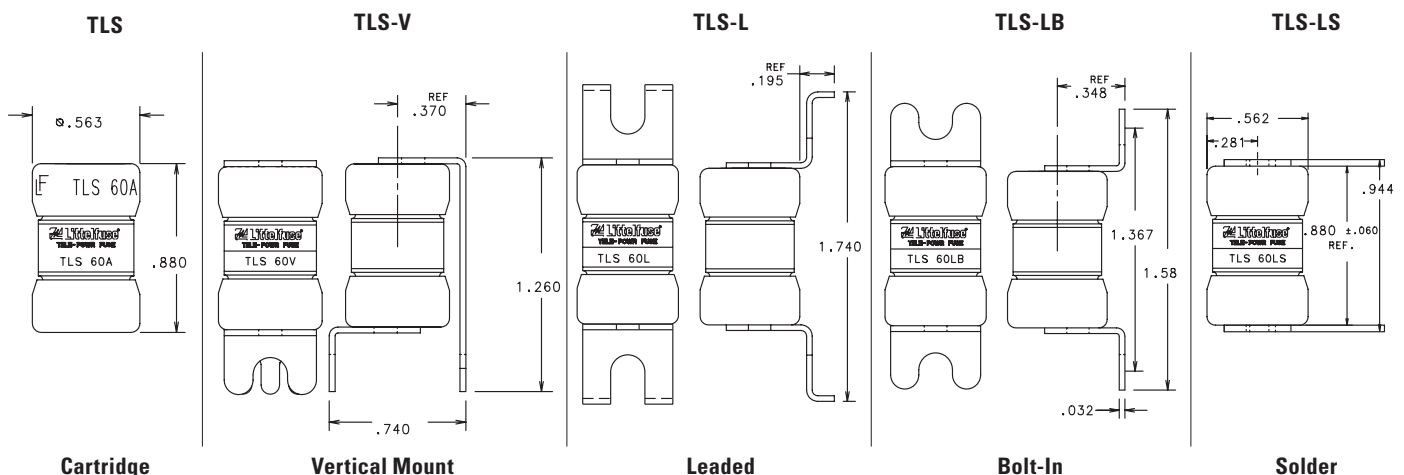
Example part number (series & amperage): TLS050

Note: To order leaded versions of TLS fuses, add suffix V, L, LB, or LS to part number.

### Recommended Fuse Blocks

LTFD series disconnect switches  
LT30060 for TLS series cartridge style fuse  
Contact factory for more information.

**Contact Littelfuse for characteristic curves. Dimensions for reference only. Replaces competitors' TPS and TGS Series.**



## Telecommunications Power Fuses

### Alarm Indicating Fuses



#### 70 Series Alarm Indicating Fuses

The 70 Series alarm indicating fuses are designed for use in telecommunications equipment. A color coded tip provides visual identification of the ampere rating and the fuse status.

##### Features

- Color coded tip
- Rated 125 VAC, 300 VDC

##### Specifications

**Voltage Rating:** 125 VAC, 300 VDC  
**Interrupting Rating:** 1,000 amperes @ 125 VAC  
 1,000 amperes @ 300 VDC

##### Ampere Ratings

|       |       |       |     |    |
|-------|-------|-------|-----|----|
| 100mA | 200mA | 500mA | 2   | 5  |
| 150mA | 250mA | 750mA | 3   | 8  |
| 180mA | 350mA | 1.33  | 3.5 | 10 |

##### Ordering Information

| 10 Minute Rating | Catalog Number | System Number | Color Code    |
|------------------|----------------|---------------|---------------|
| 100mA            | 70P            | 70P00000Z     | Grey/White    |
| 150mA            | 70R            | 70R00000Z     | Red/White     |
| 180mA            | 70E            | 70E00000Z     | Yellow        |
| 200mA            | 70X            | 70X00000Z     | Black         |
| 250mA            | 70F            | 70F00000Z     | Violet        |
| 250mA            | 70K            | 70K00000Z     | Violet/White  |
| 350mA            | 70S            | 70S00000Z     | Gray          |
| 500mA            | 70G            | 70G00000Z     | Red           |
| 750mA            | 70H            | 70H00000Z     | Brown         |
| 1.33A            | 70A            | 70A00000Z     | White         |
| 2A               | 70B            | 70B00000Z     | Orange        |
| 3A               | 70C            | 70C00000Z     | Blue          |
| 3.5A             | 70J            | 70J00000Z     | Black/White   |
| 5A               | 70D            | 70D00000Z     | Green/Black   |
| 8A               | 70M            | 70M00000Z     | Tan/White     |
| 10A              | 70N            | 70N00000Z     | Yellow/Purple |



#### 481 Series Alarm Indicating Fuses

For telecommunications equipment and similar applications. Color coded indicator flags indicate ampere rating. Body is constructed of black polyphenylene sulfide with UL 94V0 flammability rating, contacts are of bright alloy-plated beryllium copper. Available with or without protective lens.

##### Specifications

**Voltage Rating:** 125V AC, DC  
**Approvals:** UL Recognized under the Components Program and CSA Recognized under the Component Acceptance Program.

##### Ampere Ratings

|                  |                  |                |                |                |                |    |
|------------------|------------------|----------------|----------------|----------------|----------------|----|
| $\frac{18}{100}$ | $\frac{3}{8}$    | $\frac{3}{4}$  | $1\frac{1}{2}$ | 3              | 5              | 12 |
| $\frac{1}{5}$    | $\frac{1}{2}$    | 1              | 2              | $3\frac{1}{2}$ | $7\frac{1}{2}$ | 15 |
| $\frac{1}{4}$    | $\frac{65}{100}$ | $1\frac{1}{3}$ | $2\frac{1}{2}$ | 4              | 10             | 20 |

Example part number (series & amperage): 481005

##### Recommended Fuse Blocks

482 Series  
 Available 1-20 pole with PCB or panel mounting  
 To order with protective lens add suffix XL

*NOTE: For 481 Dummy fuse order 481000.*

## LTFD 101 Series Telecommunications Disconnect Switch

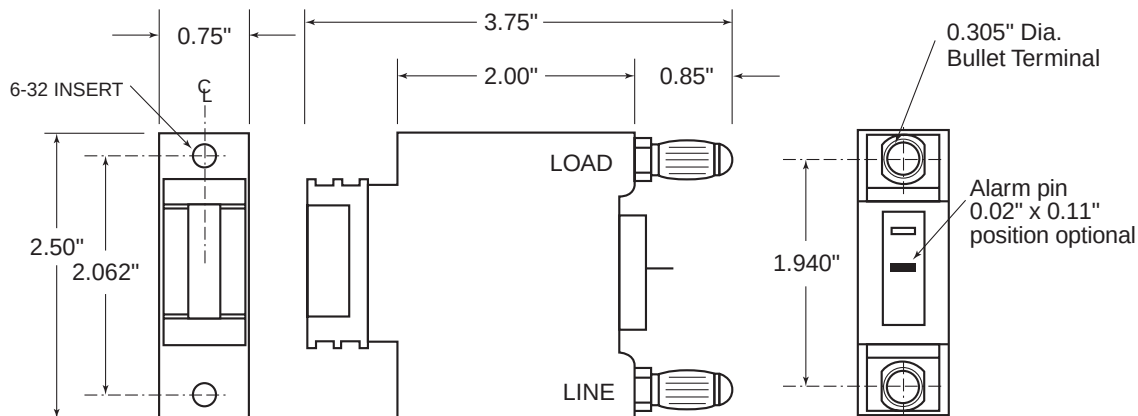
80 VDC • 1 – 125 Amperes



Littelfuse compact LTFD 101 fuseholders for TLS fuses are designed for quick installation into telecom equipment panels. Their modular design fits into spaces originally designed for circuit breakers and they can be front panel mounted or rear mounted using bullet connectors. The innovative new pull-out design eliminates the need for tools to replace fuses and includes an alarm signaling circuit to identify the blown fuse.

### Features

- Extremely compact
- Quick mounting
- Replaces circuit breakers
- Includes alarm signaling circuit



Dimensions for reference only. For additional options and dimensions, contact the factory.

### Specifications

**Voltage Rating:** 80 VDC  
**Ampere Range:** 1 – 125 A  
**Approvals:** UL Recognized (File No. E122874)

### Recommended Fuses

Littelfuse TLS Series fuses  
 Littelfuse 481 Series Alarm fuses

### Ordering Information

| Catalog Number | System Number | Terminal Type |
|----------------|---------------|---------------|
| LTFD101-1      | LTFD0101ZX1   | Bullet        |
| LTFD101-2      | LTFD0101ZX2   | Screw         |
| LTFD101-3      | LTFD0101ZX3   | Stud          |
| LTFD101-4      | LTFD0101ZX4   | Clip          |

## LTFD Series Telecommunications Disconnect Switch

145 VDC, 60 VDC • 70 – 1200 Amperes



Littelfuse compact LTFD Series holders are designed for use as a combination fuseholder and disconnect switch for telecommunications equipment. The rugged unit utilizes a pull-out fuse carrier to safely disconnect power and provide easy fuse replacement.

### Features

- Innovative pullout design of the 1200A switch eliminates the need for tools to replace the fuse
- Thermoplastic housing material
- Alarm signaling circuit

### Specifications

**Voltage Rating:** 145 VDC for 70 – 600 amperes  
60 VDC for 800 – 1200 amperes

**Ampere Range:** 70 – 1200 amperes

**Approvals:** UL Recognized (E122674)

### Recommended fuses

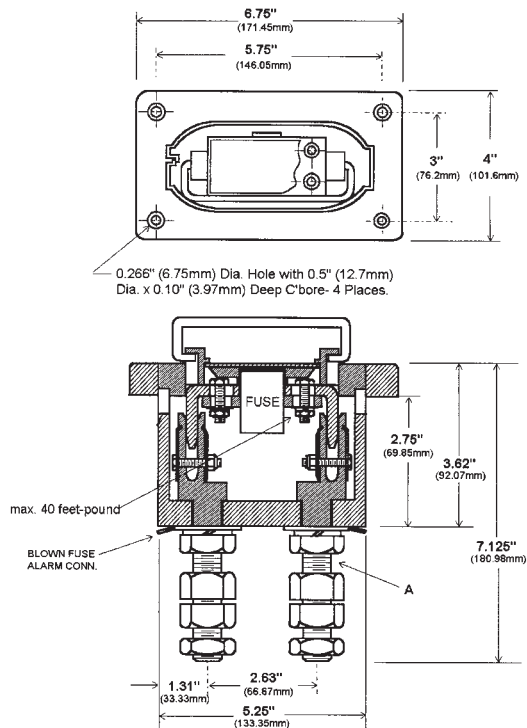
L17T Series fuses

### Ordering Information

| Catalog Number | Stud Size (A)      | Amperes    | Contact Nut Max. Torque |
|----------------|--------------------|------------|-------------------------|
| LTFD6001-00    | 3/4 – 16 x 3.5 in. | 70 – 600   | 100 feet-pound          |
| LTFD6001-01    | 7/8 – 14 x 3.5 in. | 70 – 800   | 120 feet-pound          |
| LTFD1200-01    | 1.12 – 12 x 4 in   | 900 – 1200 | 120 feet-pound          |
| LTFD1200-01A   | 1.12 – 12 x 4 in   | 900 – 1200 | 120 feet-pound          |

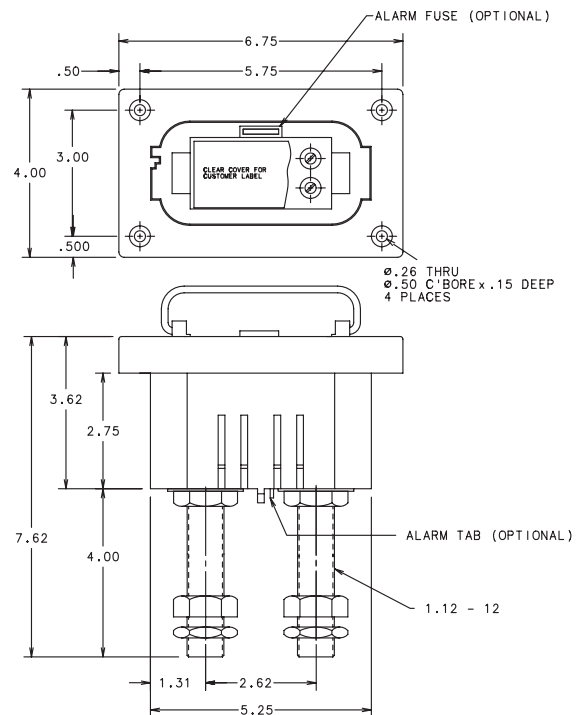
### LTFD 6001 Series

(70–800 Amperes)



### LTFD 1200A

(900–1200 Amperes)



## Special Purpose Fuses



|                                         |                |
|-----------------------------------------|----------------|
| <i>Semiconductor Fuses</i>              | <b>84</b>      |
| <i>Traditional Semiconductor Fuses</i>  | <b>85-87</b>   |
| <i>LA15QS Semiconductor Fuses</i>       | <b>88-89</b>   |
| <i>LA30QS Semiconductor Fuses</i>       | <b>90-91</b>   |
| <i>LA50QS Semiconductor Fuses</i>       | <b>92-93</b>   |
| <i>LA60Q Semiconductor Fuses</i>        | <b>94</b>      |
| <i>LA60X Semiconductor Fuses</i>        | <b>95</b>      |
| <i>LA70QS Semiconductor Fuses</i>       | <b>96-97</b>   |
| <i>LA70QS French Cylindrical Fuses</i>  | <b>98</b>      |
| <i>LA100P Semiconductor Fuses</i>       | <b>99-100</b>  |
| <i>LA120X Semiconductor Fuses</i>       | <b>101</b>     |
| <i>Square Body Semiconductor Fuses</i>  | <b>102-106</b> |
| <i>Fork-Lift and Stud-Mounted Fuses</i> | <b>107</b>     |
| <i>Cable Limiters</i>                   | <b>108</b>     |
| <i>LGR/LMF In-Line Fuses</i>            | <b>109</b>     |
| <i>LHR Holder</i>                       | <b>109</b>     |

## Semiconductor Fuses

150 – 1300 VAC • Very Fast Acting • 1 – 6000 Amperes



### Semiconductor Fuses

Littelfuse Semiconductor fuses are very fast acting fuses designed specifically for the protection of diodes, thyristors, triacs, and other solid-state power semiconductor devices. These fuses are used in power electronic applications including variable speed drives, power rectifiers, UPS systems, and DC power supplies. They can be used wherever extremely fast acting, current-limiting fuses are needed to provide superior protection against the potentially damaging effects of short-circuit currents.

The extensive line of Littelfuse Semiconductor fuses includes the traditional round body fuses, enhanced state-of-the-art round body fuses, and North American style square body fuses. Available ratings range from 150 to 1300 volts and up to 6000 amps.

### Applications

Semiconductor fuses are designed specifically for supplementary protection of semiconducting devices such as silicon controlled rectifiers (SCR's), diodes, thyristors, triacs, transistors, and similar solid-state devices. These devices are used in power equipment including variable speed drives, power rectifiers, UPS systems, DC power supplies, and in a wide range of electronic equipment.

May be used wherever extremely fast acting, current-limiting fuses with no time-delay are required.

### Features & Benefits

- Extremely current-limiting
- Low  $I^2t$  and peak let-through currents
- Low watts loss
- High Interrupting ratings
- UL Recognized
- Wide range of ampere ratings
- Optional mounting types
- DC ratings
- Superior cycling abilities
- Compact sizes
- Optional blown fuse indicators

### Ratings

|        |            |
|--------|------------|
| 150V:  | 1 – 6000A  |
| 250V:  | 1 – 4500A  |
| 300V:  | 35 – 4500A |
| 500V:  | 10 – 1200A |
| 600V:  | 1 – 2000A  |
| 700V:  | 6 – 2500A  |
| 1000V: | 15 – 1000A |
| 1200V: | 1 – 30A    |
| 1300V: | 50 – 1800A |

### Recommended Fuse Blocks:

LSCR and 1LS series: Refer to the Blocks & Holders section of this catalog for additional information.



## Traditional Semiconductor Fuses

150/250/500/600/700 VAC • Very Fast Acting • 1 – 1200 Amperes

| Ampere Ratings | Series & Voltage                                                    |                                                                      |                                   |                        |                        |                                   |
|----------------|---------------------------------------------------------------------|----------------------------------------------------------------------|-----------------------------------|------------------------|------------------------|-----------------------------------|
|                | <b>L15S</b><br>150V AC<br>150V DC (1 – 60A)<br>100V DC (70 – 1000A) | <b>L25S</b><br>250V AC<br>250V DC (1 – 200A)<br>200V DC (225 – 800A) | <b>L50S</b><br>500V AC<br>450V DC | <b>L60S</b><br>600V AC | <b>KLC†</b><br>600V AC | <b>L70S</b><br>700V AC<br>650V DC |
| 1              | L15S 1                                                              | L25S 1                                                               | –                                 | L60S 1                 | KLC 1                  | –                                 |
| 2              | L15S 2                                                              | L25S 2                                                               | –                                 | L60S 2                 | KLC 2                  | –                                 |
| 3              | L15S 3                                                              | L25S 3                                                               | –                                 | L60S 3                 | KLC 3                  | –                                 |
| 4              | L15S 4                                                              | L25S 4                                                               | –                                 | L60S 4                 | KLC 4                  | –                                 |
| 5              | L15S 5                                                              | L25S 5                                                               | –                                 | L60S 5                 | KLC 5                  | –                                 |
| 6              | L15S 6                                                              | L25S 6                                                               | –                                 | L60S 6                 | KLC 6                  | –                                 |
| 7              | L15S 7                                                              | –                                                                    | –                                 | –                      | KLC 7                  | –                                 |
| 8              | L15S 8                                                              | L25S 8                                                               | –                                 | L60S 8                 | KLC 8                  | –                                 |
| 9              | L15S 9                                                              | –                                                                    | –                                 | –                      | –                      | –                                 |
| 10             | L15S 10                                                             | L25S 10                                                              | L50S 10                           | L60S 10                | KLC 10                 | L70S 10                           |
| 12             | L15S 12                                                             | L25S 12                                                              | L50S 12                           | L60S 12                | KLC 12                 | –                                 |
| 15             | L15S 15                                                             | L25S 15                                                              | L50S 15                           | L60S 15                | KLC 15                 | L70S 15                           |
| 17½            | –                                                                   | –                                                                    | –                                 | L60S 17½               | KLC 17½                | –                                 |
| 20             | L15S 20                                                             | L25S 20                                                              | L50S 20                           | L60S 20                | KLC 20                 | L70S 20                           |
| 25             | L15S 25                                                             | L25S 25                                                              | L50S 25                           | L60S 25                | KLC 25                 | L70S 25                           |
| 30             | L15S 30                                                             | L25S 30                                                              | L50S 30                           | L60S 30                | KLC 30                 | L70S 30                           |
| 35             | L15S 35                                                             | L25S 35                                                              | L50S 35                           | L60S 35                | KLC 35                 | L70S 35                           |
| 40             | L15S 40                                                             | L25S 40                                                              | L50S 40                           | L60S 40                | KLC 40                 | L70S 40                           |
| 45             | L15S 45                                                             | L25S 45                                                              | –                                 | L60S 45                | KLC 45                 | –                                 |
| 50             | L15S 50                                                             | L25S 50                                                              | L50S 50                           | L60S 50                | KLC 50                 | L70S 50                           |
| 60             | L15S 60                                                             | L25S 60                                                              | L50S 60                           | L60S 60                | KLC 60                 | L70S 60                           |
| 70             | L15S 70                                                             | L25S 70                                                              | L50S 70                           | L60S 70                | KLC 70                 | L70S 70                           |
| 80             | L15S 80                                                             | L25S 80                                                              | L50S 80                           | L60S 80                | KLC 80                 | L70S 80                           |
| 90             | L15S 90                                                             | L25S 90                                                              | L50S 90                           | L60S 90                | KLC 90                 | L70S 90                           |
| 100            | L15S 100                                                            | L25S 100                                                             | L50S 100                          | L60S 100               | KLC 100                | L70S 100                          |
| 110            | –                                                                   | –                                                                    | –                                 | –                      | KLC 110                | –                                 |
| 125            | L15S 125                                                            | L25S 125                                                             | L50S 125                          | L60S 125               | KLC 125                | L70S 125                          |
| 150            | L15S 150                                                            | L25S 150                                                             | L50S 150                          | L60S 150               | KLC 150                | L70S 150                          |
| 175            | –                                                                   | L25S 175                                                             | L50S 175                          | L60S 175               | KLC 175                | L70S 175                          |
| 200            | L15S 200                                                            | L25S 200                                                             | L50S 200                          | L60S 200               | KLC 200                | L70S 200                          |
| 225            | –                                                                   | L25S 225                                                             | L50S 225                          | L60S 225               | KLC 225                | L70S 225                          |
| 250            | L15S 250                                                            | L25S 250                                                             | L50S 250                          | L60S 250               | KLC 250                | L70S 250                          |
| 275            | –                                                                   | L25S 275                                                             | L50S 275                          | –                      | –                      | –                                 |
| 300            | L15S 300                                                            | L25S 300                                                             | L50S 300                          | L60S 300               | KLC 300                | L70S 300                          |
| 350            | L15S 350                                                            | L25S 350                                                             | L50S 350                          | L60S 350               | KLC 350                | L70S 350                          |
| 400            | L15S 400                                                            | L25S 400                                                             | L50S 400                          | L60S 400               | KLC 400                | L70S 400                          |
| 450            | L15S 450                                                            | L25S 450                                                             | L50S 450                          | L60S 450               | KLC 450                | L70S 450                          |
| 500            | L15S 500                                                            | L25S 500                                                             | L50S 500                          | L60S 500               | KLC 500                | L70S 500                          |
| 550            | –                                                                   | –                                                                    | L50S 550                          | –                      | –                      | –                                 |
| 600            | L15S 600                                                            | L25S 600                                                             | L50S 600                          | L60S 600               | KLC 600                | L70S 600                          |
| 700            | –                                                                   | L25S 700                                                             | L50S 700                          | L60S 700               | KLC 700                | L70S 700                          |
| 800            | L15S 800                                                            | L25S 800                                                             | L50S 800                          | L60S 800               | KLC 800                | L70S 800                          |
| 900            | –                                                                   | –                                                                    | LA50P9004                         | –                      | –                      | LA70P9004                         |
| 1000           | L15S 1000                                                           | –                                                                    | LA50P10004                        | –                      | –                      | LA70P10004                        |
| 1200           | –                                                                   | –                                                                    | LA50P12004                        | –                      | –                      | LA70P12004                        |

† KLC series fuses are recommended for replacement use only.

### Specifications

#### Voltage Ratings:

|       |                                                                        |
|-------|------------------------------------------------------------------------|
| L15S: | 150 V AC/DC (1 – 60A)<br>150 VAC (70 – 1000A)<br>100 VDC (70 – 1000A)  |
| L25S: | 250 V AC/DC (1 – 200A)<br>250 VAC (225 – 800A)<br>200 VDC (225 – 800A) |
| L50S: | 500 VAC/450 VDC                                                        |
| L60S: | 600 VAC                                                                |
| KLC:  | 600 VAC                                                                |
| L70S: | 700VAC/650VDC                                                          |

#### Interrupting Rating:

|     |                                               |
|-----|-----------------------------------------------|
| AC: | 200,000 rms amperes<br>(L15S series 100,000A) |
| DC: | 20,000 amperes                                |

#### Ampere Range:

1 – 1200 amperes  
See Rating Table for ratings available in each series.

#### Approvals:

UL Recognized under the Components Program and CSA Recognized under the Component Acceptance Program.  
UL File No: E71611  
CSA File No: LR29862  
L25S series fuses are Littelfuse Certified for DC ratings shown in Rating Table.

## Traditional Semiconductor Fuses

150/250/500/600/700 VAC • Very Fast Acting • 1 – 1000 Amperes



**L15S SERIES, 150 VOLTS AC**  
(Replaces KLA, KLW, L13S)

| Ampere Rating | Fig. No. | Dimensions in Inches (mm in parentheses) |                   |                  |                   |               |                 |                 |               |
|---------------|----------|------------------------------------------|-------------------|------------------|-------------------|---------------|-----------------|-----------------|---------------|
|               |          | A                                        | B                 | C                | D                 | E             | F               | G               | H             |
| 1 – 30        | 1        | 1½<br>(38.1)                             | —                 | ¾<br>(9.5)       | 13/32<br>(10.3)   | —             | —               | —               | —             |
| 31 – 60       | 1        | 2<br>(50.8)                              | —                 | 5/8<br>(15.9)    | 13/16<br>(20.6)   | —             | —               | —               | —             |
| 61 – 450      | 3        | 1 5/32<br>(29.4)                         | 1 7/8<br>(47.6)   | 2 3/16<br>(55.6) | 2 21/32<br>(67.5) | 1<br>(25.4)   | 43/64<br>(17.1) | 5/16<br>(7.9)   | 3/16<br>(4.8) |
| 451 – 1000    | 3        | 1 ¼<br>(31.8)                            | 1 15/16<br>(49.2) | 2 9/16<br>(65.1) | 3 ½<br>(88.9)     | 1 ½<br>(38.1) | 1<br>(25.4)     | 13/32<br>(10.3) | ¼<br>(6.4)    |



**L25S SERIES, 250 VOLTS AC**  
(Replaces KLB)

| Ampere Rating | Fig. No. | Dimensions in Inches (mm in parentheses) |                  |                   |                   |                  |                 |                 |               |
|---------------|----------|------------------------------------------|------------------|-------------------|-------------------|------------------|-----------------|-----------------|---------------|
|               |          | A                                        | B                | C                 | D                 | E                | F               | G               | H             |
| 1 – 30        | 1        | 2<br>(50.8)                              | —                | ½<br>(12.7)       | 9/16<br>(14.3)    | —                | —               | —               | —             |
| 31 – 60       | 2        | 1 5/8<br>(41.3)                          | 2 ¼<br>(57.2)    | 2 ½<br>(63.5)     | 3 3/16<br>(81.0)  | 13/16<br>(20.6)  | 23/32<br>(18.3) | 11/32<br>(8.7)  | 1/8<br>(3.2)  |
| 61 – 200      | 3        | 1 5/8<br>(41.3)                          | 2 5/16<br>(58.7) | 2 7/16<br>(61.9)  | 3 3/8<br>(79.4)   | 1 1/32<br>(31.0) | 1<br>(25.4)     | 5/16<br>(7.9)   | 3/16<br>(4.8) |
| 201 – 700     | 3        | 1 19/32<br>(40.5)                        | 2 9/32<br>(57.9) | 2 29/32<br>(73.8) | 3 27/32<br>(97.6) | 1 ½<br>(38.1)    | 1<br>(25.4)     | 13/32<br>(10.3) | ¼<br>(6.4)    |
| 701 – 800     | 3        | 1 19/32<br>(40.5)                        | 2 9/32<br>(57.9) | 2 29/32<br>(73.8) | 3 27/32<br>(97.6) | 2<br>(50.8)      | 1 ½<br>(38.1)   | 13/32<br>(10.3) | ¼<br>(6.4)    |



**L50S SERIES, 500 VOLTS AC / 450 VOLTS DC**  
(Replaces KLH)

| Ampere Rating | Fig. No. | Dimensions in Inches (mm in parentheses) |                   |                   |                    |                  |                 |                  |               |
|---------------|----------|------------------------------------------|-------------------|-------------------|--------------------|------------------|-----------------|------------------|---------------|
|               |          | A                                        | B                 | C                 | D                  | E                | F               | G                | H             |
| 10 – 30       | 1        | 2<br>(50.8)                              | —                 | ½<br>(12.7)       | 9/16<br>(14.3)     | —                | —               | —                | —             |
| 31 – 60       | 2        | 1 5/8<br>(41.3)                          | 2 ¼<br>(57.2)     | 2 ½<br>(63.5)     | 3 3/16<br>(81.0)   | 13/16<br>(20.6)  | 23/32<br>(18.3) | 11/32<br>(8.7)   | 1/8<br>(3.2)  |
| 61 – 100      | 3        | 2 ½<br>(54.0)                            | 2 11/16<br>(68.3) | 3<br>(76.2)       | 3 5/8<br>(92.1)    | 1<br>(25.4)      | 3/4<br>(19.1)   | 11/32<br>(8.7)   | 1/8<br>(3.2)  |
| 101 – 200     | 3        | 2 ½<br>(54.0)                            | 2 13/16<br>(71.4) | 2 15/16<br>(74.6) | 3 5/8<br>(92.1)    | 1 1/32<br>(31.0) | 1<br>(25.4)     | 5/16<br>(7.9)    | 3/16<br>(4.8) |
| 201 – 400     | 3        | 2 3/32<br>(53.2)                         | 2 25/32<br>(70.6) | 3 13/32<br>(86.5) | 4 11/32<br>(110.3) | 1 ½<br>(38.1)    | 1<br>(25.4)     | 13/32<br>(10.3)  | ¼<br>(6.4)    |
| 401 – 600     | 3        | 2 7/32<br>(56.4)                         | 2 29/32<br>(73.8) | 3 17/32<br>(89.7) | 4 15/32<br>(113.5) | 2<br>(50.8)      | 1 ½<br>(38.1)   | 13/32<br>(10.3)  | ¼<br>(6.4)    |
| 601 – 800     | 3        | 2 7/32<br>(56.4)                         | 4 9/32<br>(108.7) | 4 5/8<br>(117.5)  | 6 15/32<br>(164.3) | 2 ½<br>(63.5)    | 2<br>(50.8)     | 1 7/32<br>(13.5) | 3/8<br>(9.5)  |

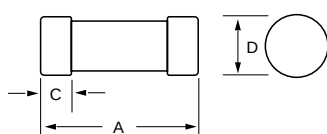


Fig. 1

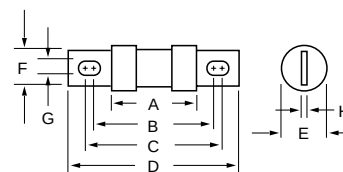


Fig. 2

Contact Littelfuse for characteristic curves.

## Traditional Semiconductor Fuses

150/250/500/600/700 VAC • Very Fast Acting • 1 – 1000 Amperes



L60S SERIES, 600 VOLTS AC

| Ampere Rating | Fig. No. | Dimensions in Inches (mm in parentheses) |                             |                             |                             |                            |                           |                           |                         |
|---------------|----------|------------------------------------------|-----------------------------|-----------------------------|-----------------------------|----------------------------|---------------------------|---------------------------|-------------------------|
|               |          | A                                        | B                           | C                           | D                           | E                          | F                         | G                         | H                       |
| 1 – 30        | 1        | 5<br>(127.0)                             | —                           | $\frac{5}{8}$<br>(15.9)     | $\frac{13}{16}$<br>(20.6)   | —                          | —                         | —                         | —                       |
| 31 – 60       | 2        | $2\frac{25}{32}$<br>(70.6)               | $3\frac{7}{16}$<br>(87.3)   | $3\frac{11}{16}$<br>(93.7)  | $4\frac{3}{8}$<br>(111.1)   | $\frac{13}{16}$<br>(20.6)  | $\frac{23}{32}$<br>(18.3) | $\frac{11}{32}$<br>(8.7)  | $\frac{1}{8}$<br>(3.2)  |
| 61 – 100      | 2        | $2\frac{29}{32}$<br>(73.8)               | $3\frac{17}{32}$<br>(89.7)  | $3\frac{25}{32}$<br>(96.0)  | $4\frac{15}{32}$<br>(113.5) | $\frac{1}{16}$<br>(27.0)   | $\frac{23}{32}$<br>(18.3) | $\frac{11}{32}$<br>(8.7)  | $\frac{1}{8}$<br>(3.2)  |
| 101 – 200     | 2        | $2\frac{29}{32}$<br>(73.8)               | $3\frac{9}{16}$<br>(90.5)   | $3\frac{3}{4}$<br>(95.3)    | $4\frac{13}{32}$<br>(111.9) | $1\frac{5}{16}$<br>(33.3)  | 1<br>(25.4)               | $\frac{5}{16}$<br>(7.9)   | $\frac{3}{16}$<br>(4.8) |
| 201 – 400     | 2        | $2\frac{29}{32}$<br>(73.8)               | $3\frac{31}{32}$<br>(100.8) | $4\frac{5}{32}$<br>(105.6)  | $5\frac{1}{8}$<br>(130.2)   | $1\frac{37}{64}$<br>(40.1) | 1<br>(25.4)               | $\frac{13}{32}$<br>(10.3) | $\frac{1}{4}$<br>(6.4)  |
| 401 – 600     | 2        | $2\frac{7}{8}$<br>(73.0)                 | $3\frac{31}{32}$<br>(100.8) | $4\frac{9}{64}$<br>(105.2)  | $5\frac{1}{8}$<br>(130.2)   | $2\frac{1}{16}$<br>(52.8)  | $1\frac{1}{2}$<br>(38.1)  | $\frac{13}{32}$<br>(10.3) | $\frac{1}{4}$<br>(6.4)  |
| 601 – 800     | 2        | $3\frac{1}{32}$<br>(77.0)                | $5\frac{5}{32}$<br>(133.4)  | $5\frac{11}{32}$<br>(135.7) | $7\frac{1}{4}$<br>(184.2)   | $2\frac{1}{2}$<br>(63.5)   | 2<br>(50.8)               | $\frac{17}{32}$<br>(13.5) | $\frac{3}{8}$<br>(9.5)  |



L70S SERIES, 700 VOLTS AC / 650 VOLTS DC

| Ampere Rating | Fig. No. | Dimensions in Inches (mm in parentheses) |                             |                             |                            |                           |                           |                           |                         |                         |
|---------------|----------|------------------------------------------|-----------------------------|-----------------------------|----------------------------|---------------------------|---------------------------|---------------------------|-------------------------|-------------------------|
|               |          | A                                        | B                           | C                           | D                          | E                         | F                         | G                         | H                       | J                       |
| 10 – 30       | 1        | 2<br>(50.8)                              | —                           | $\frac{1}{2}$<br>(12.7)     | $\frac{9}{16}$<br>(14.3)   | —                         | —                         | —                         | —                       | —                       |
| 31 – 60       | 3        | $2\frac{7}{8}$<br>(73.0)                 | $3\frac{7}{16}$<br>(87.3)   | $3\frac{25}{32}$<br>(96.0)  | $4\frac{3}{8}$<br>(111.1)  | 1<br>(25.4)               | $\frac{43}{64}$<br>(17.1) | $\frac{11}{32}$<br>(8.7)  | $\frac{1}{8}$<br>(3.2)  | —                       |
| 61 – 100      | 3        | $2\frac{7}{8}$<br>(73.0)                 | $3\frac{9}{16}$<br>(90.5)   | $3\frac{11}{16}$<br>(93.7)  | $4\frac{3}{8}$<br>(111.1)  | $1\frac{1}{32}$<br>(31.0) | $\frac{29}{32}$<br>(22.9) | $\frac{5}{16}$<br>(7.9)   | $\frac{3}{16}$<br>(4.8) | —                       |
| 101 – 200     | 3        | $2\frac{27}{32}$<br>(72.2)               | $3\frac{17}{32}$<br>(89.7)  | $4\frac{5}{32}$<br>(105.6)  | $5\frac{3}{32}$<br>(129.4) | $1\frac{1}{2}$<br>(38.1)  | 1<br>(25.4)               | $\frac{13}{32}$<br>(10.3) | $\frac{1}{4}$<br>(6.4)  | —                       |
| 201 – 400     | 3        | $2\frac{27}{32}$<br>(72.2)               | $3\frac{17}{32}$<br>(89.7)  | $4\frac{5}{32}$<br>(105.6)  | $5\frac{3}{32}$<br>(129.4) | 2<br>(50.8)               | $1\frac{1}{2}$<br>(38.1)  | $\frac{13}{32}$<br>(10.3) | $\frac{1}{4}$<br>(6.4)  | —                       |
| 401 – 600     | 3        | $2\frac{27}{32}$<br>(72.2)               | $4\frac{29}{32}$<br>(124.6) | $5\frac{1}{4}$<br>(133.4)   | $7\frac{3}{32}$<br>(180.2) | $2\frac{1}{2}$<br>(63.5)  | 2<br>(50.8)               | $\frac{17}{32}$<br>(13.5) | $\frac{3}{8}$<br>(9.5)  | —                       |
| 601 – 800     | 4        | $3\frac{5}{16}$<br>(84.1)                | $5\frac{5}{16}$<br>(134.9)  | $6\frac{13}{16}$<br>(173.0) | —                          | $2\frac{7}{8}$<br>(73.0)  | 2<br>(50.8)               | $\frac{5}{8}$<br>(15.9)   | $\frac{3}{8}$<br>(9.5)  | $\frac{5}{16}$<br>(7.9) |

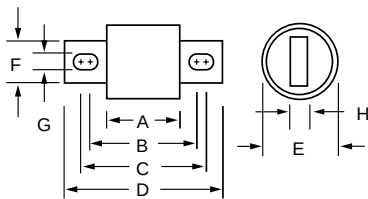


Fig. 3

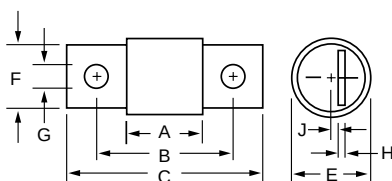


Fig. 4

KLC SERIES, 600 VOLTS AC

| Ampere Rating | Fig. No. | Dimensions in Inches (mm in parentheses) |                             |                             |                            |                           |                           |                           |                         |
|---------------|----------|------------------------------------------|-----------------------------|-----------------------------|----------------------------|---------------------------|---------------------------|---------------------------|-------------------------|
|               |          | A                                        | B                           | C                           | D                          | E                         | F                         | G                         | H                       |
| 1 – 30        | 2        | $1\frac{1}{8}$<br>(47.6)                 | $2\frac{1}{2}$<br>(63.5)    | —                           | $2\frac{7}{8}$<br>(73.0)   | $\frac{9}{16}$<br>(14.3)  | $\frac{13}{32}$<br>(10.3) | $\frac{1}{4}$<br>(6.4)    | $\frac{3}{64}$<br>(1.2) |
| 31 – 60       | 2        | $2\frac{3}{4}$<br>(69.9)                 | $3\frac{3}{8}$<br>(85.7)    | $3\frac{5}{8}$<br>(92.1)    | $4\frac{5}{16}$<br>(109.5) | $\frac{13}{16}$<br>(20.6) | $\frac{23}{32}$<br>(18.3) | $\frac{11}{32}$<br>(8.7)  | $\frac{1}{8}$<br>(3.2)  |
| 61 – 100      | 3        | $2\frac{7}{8}$<br>(73.0)                 | $3\frac{21}{32}$<br>(92.9)  | $4\frac{1}{16}$<br>(103.2)  | 5<br>(127.0)               | 1<br>(25.4)               | $\frac{3}{4}$<br>(19.1)   | $\frac{13}{32}$<br>(10.3) | $\frac{1}{8}$<br>(3.2)  |
| 101 – 200     | 3        | $2\frac{27}{32}$<br>(72.2)               | $3\frac{17}{32}$<br>(89.7)  | $4\frac{3}{8}$<br>(111.1)   | $5\frac{3}{32}$<br>(129.4) | $1\frac{1}{2}$<br>(38.1)  | 1<br>(25.4)               | $\frac{13}{32}$<br>(10.3) | $\frac{1}{4}$<br>(6.4)  |
| 201 – 400     | 3        | $2\frac{27}{32}$<br>(72.2)               | $4\frac{21}{32}$<br>(118.3) | $4\frac{27}{32}$<br>(123.0) | $6\frac{1}{4}$<br>(158.8)  | 2<br>(50.8)               | $1\frac{5}{8}$<br>(41.3)  | $\frac{9}{16}$<br>(14.3)  | $\frac{1}{4}$<br>(6.4)  |
| 401 – 800     | 3        | $2\frac{27}{32}$<br>(72.2)               | $4\frac{21}{32}$<br>(118.3) | $5\frac{11}{32}$<br>(135.7) | $6\frac{1}{4}$<br>(158.8)  | $2\frac{1}{2}$<br>(63.5)  | 2<br>(50.8)               | $\frac{9}{16}$<br>(14.3)  | $\frac{3}{8}$<br>(9.5)  |

Contact Littelfuse for characteristic curves.

## LA15QS Semiconductor Fuses

150 VAC • Very Fast Acting • 1 – 6000 Amperes



Littelfuse LA15QS series Semiconductor fuses were designed for the specific protection of diodes and other semiconductor devices rated 150VAC/DC. The LA15QS product line compact design is perfect for those applications that have limitations on available space.

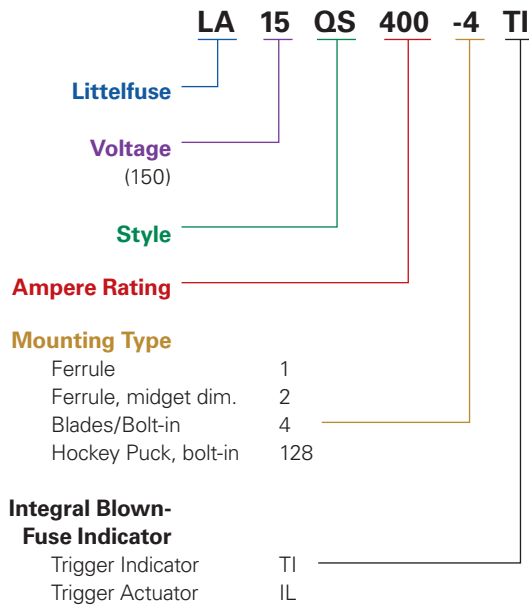
### Features

- Low  $I^2t$  minimizes damage to protected components on short-circuit.
- Controlled arc voltage reduces stress to circuit components during fuse clearing.
- Choice of mounting types provides options for unique termination requirements.
- Indicator options allow identification of blown fuses.

### Applications

Protection of heavy duty devices such as electromechanical rectifiers.

### Ordering Information



*Note: Mounting types and integral blown fuse indicators are optional for specified ratings.*

### Specifications

|                             |                                             |
|-----------------------------|---------------------------------------------|
| <b>Voltage Rating:</b>      | AC: 150 volts<br>DC: 150 volts              |
| <b>Interrupting Rating:</b> | 100,000 Amperes                             |
| <b>Ampere Range:</b>        | 1 – 6000 Amperes                            |
| <b>Approvals:</b>           | UL Recognized under the components program. |

Contact Littelfuse for characteristic curves.

## LA15QS Semiconductor Fuses

150 VAC • Very Fast Acting • 1 – 6000 Amperes

### Catalog Numbers & Technical Data

| Ampere Rating | Littelfuse Catalog Number | Mounting Type | Maximum Clearing I <sup>2</sup> t @150 VAC (A <sup>2</sup> S x 10 <sup>3</sup> ) | Watts Loss @ Rated Current (W) |
|---------------|---------------------------|---------------|----------------------------------------------------------------------------------|--------------------------------|
| 1             | LA15QS1-2                 | 2             | 0.0002                                                                           | 0.68                           |
| 2             | LA15QS2-2                 | 2             | 0.001                                                                            | 1.3                            |
| 3             | LA15QS3-2                 | 2             | 0.003                                                                            | 1.7                            |
| 4             | LA15QS4-2                 | 2             | 0.007                                                                            | 2.1                            |
| 5             | LA15QS5-2                 | 2             | 0.012                                                                            | 2.8                            |
| 6             | LA15QS6-2                 | 2             | 0.022                                                                            | 3.1                            |
| 7             | LA15QS7-2                 | 2             | 0.011                                                                            | 2.2                            |
| 8             | LA15QS8-2                 | 2             | 0.015                                                                            | 2.5                            |
| 10            | LA15QS10-2                | 2             | 0.019                                                                            | 2.6                            |
| 12            | LA15QS12-2                | 2             | 0.030                                                                            | 3                              |
| 15            | LA15QS15-2                | 2             | 0.042                                                                            | 3                              |
| 20            | LA15QS20-2                | 2             | 0.072                                                                            | 4                              |
| 25            | LA15QS25-2                | 2             | 0.14                                                                             | 5.2                            |
| 30            | LA15QS30-2                | 2             | 0.25                                                                             | 5.6                            |
| 35            | LA15QS35-1                | 1             | 0.21                                                                             | 9                              |
| 40            | LA15QS40-1                | 1             | 0.28                                                                             | 10                             |
| 40            | LA15QS40-4TI              | 4TI           | 0.39                                                                             | 3.1                            |
| 45            | LA15QS45-1                | 1             | 0.34                                                                             | 12                             |
| 50            | LA15QS50-1                | 1             | 0.47                                                                             | 13                             |
| 50            | LA15QS50-4                | 4             | 0.64                                                                             | 4                              |
| 55            | LA15QS55-1                | 1             | Contact Factory                                                                  | Contact Factory                |
| 60            | LA15QS60-1                | 1             | 0.94                                                                             | 14                             |
| 70            | LA15QS70-4                | 4             | 2                                                                                | 5.6                            |
| 70            | LA15QS70-4TI              | 4TI           | 2                                                                                | 5.6                            |
| 80            | LA15QS80-4                | 4             | 2.5                                                                              | 8                              |
| 80            | LA15QS80-4TI              | 4TI           | 2.5                                                                              | 8                              |
| 90            | LA15QS90-4                | 4             | 3.1                                                                              | 9                              |
| 100           | LA15QS100-4               | 4             | 3.6                                                                              | 10                             |
| 100           | LA15QS100-4TI             | 4TI           | 3.6                                                                              | 10                             |
| 130           | LA15QS130-4               | 4             | 5.3                                                                              | 14                             |
| 130           | LA15QS130-4TI             | 4TI           | 5.3                                                                              | 14                             |
| 150           | LA15QS150-4               | 4             | 6.8                                                                              | 16                             |
| 150           | LA15QS150-4IL             | 4IL           | 6.8                                                                              | 16                             |
| 150           | LA15QS150-4TI             | 4TI           | 6.8                                                                              | 16                             |
| 200           | LA15QS200-4               | 4             | 9                                                                                | 22                             |
| 200           | LA15QS200-4IL             | 4IL           | 9                                                                                | 22                             |
| 250           | LA15QS250-4               | 4             | 15                                                                               | 22                             |

| Ampere Rating | Littelfuse Catalog Number | Mounting Type | Maximum Clearing I <sup>2</sup> t @150 VAC (A <sup>2</sup> S x 10 <sup>3</sup> ) | Watts Loss @ Rated Current (W) |
|---------------|---------------------------|---------------|----------------------------------------------------------------------------------|--------------------------------|
| 250           | LA15QS250-4TI             | 4TI           | 15                                                                               | 27                             |
| 300           | LA15QS300-4               | 4             | 22                                                                               | 33                             |
| 300           | LA15QS300-4IL             | 4IL           | 22                                                                               | 33                             |
| 300           | LA15QS300-4TI             | 4TI           | 22                                                                               | 33                             |
| 350           | LA15QS350-4               | 4             | 32                                                                               | 40                             |
| 350           | LA15QS350-4TI             | 4TI           | 32                                                                               | 40                             |
| 400           | LA15QS400-4               | 4             | 40                                                                               | 45                             |
| 400           | LA15QS400-4IL             | 4IL           | 40                                                                               | 45                             |
| 400           | LA15QS400-4TI             | 4TI           | 40                                                                               | 45                             |
| 450           | LA15QS450-4               | 4             | 50                                                                               | 50                             |
| 450           | LA15QS450-4IL             | 4IL           | 50                                                                               | 50                             |
| 500           | LA15QS500-4               | 4             | 90                                                                               | 30                             |
| 500           | LA15QS500-4IL             | 4IL           | 90                                                                               | 30                             |
| 600           | LA15QS600-4               | 4             | 130                                                                              | 35                             |
| 600           | LA15QS600-4IL             | 4IL           | 130                                                                              | 35                             |
| 800           | LA15QS800-4               | 4             | 290                                                                              | 57                             |
| 1000          | LA15QS1000-4              | 4             | 520                                                                              | 75                             |
| 1000          | LA15QS1000-4IL            | 4IL           | 520                                                                              | 75                             |
| 1000          | LA15QS1000-4TI            | 4TI           | 520                                                                              | 75                             |
| 1000          | LA15QS1000-128            | 128           | 540                                                                              | 88                             |
| 1000          | LA15QS1000-128IL          | 128IL         | 540                                                                              | 88                             |
| 1200          | LA15QS1200-128            | 128           | 680                                                                              | 100                            |
| 1200          | LA15QS1200-128IL          | 128IL         | 680                                                                              | 100                            |
| 1500          | LA15QS1500-128            | 128           | 1200                                                                             | 130                            |
| 1500          | LA15QS1500-128IL          | 128IL         | 1200                                                                             | 130                            |
| 2000          | LA15QS2000-128            | 128           | 1900                                                                             | 165                            |
| 2000          | LA15QS2000-128IL          | 128IL         | 1900                                                                             | 165                            |
| 2500          | LA15QS2500-128            | 128           | 3200                                                                             | 195                            |
| 2500          | LA15QS2500-128IL          | 128IL         | 3200                                                                             | 195                            |
| 3000          | LA15QS3000-128            | 128           | 4800                                                                             | 240                            |
| 3000          | LA15QS3000-128IL          | 128IL         | 4800                                                                             | 240                            |
| 3500          | LA15QS3500-128            | 128           | 6500                                                                             | 260                            |
| 4000          | LA15QS4000-128            | 128           | 8500                                                                             | 270                            |
| 4000          | LA15QS4000-128IL          | 128IL         | 8500                                                                             | 270                            |
| 5000          | LA15QS5000-128            | 128           | Contact Factory                                                                  | Contact Factory                |
| 6000          | LA15QS6000-128            | 128           | Contact Factory                                                                  | Contact Factory                |

Figure 1



Figure 2

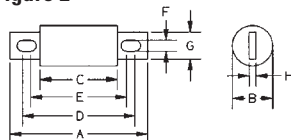


Figure 3

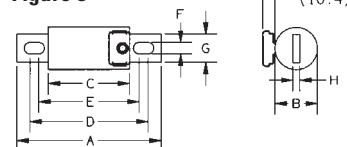


Figure 4

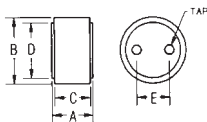


Figure 5

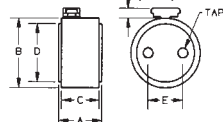


Figure 6

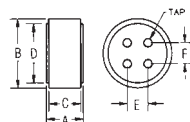


Figure 7

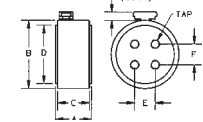
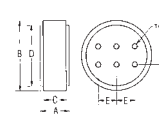


Figure 8



### Dimensions

Dimensions for reference only.

| Amperes     | Mount. Type   | Fig. No. | Dimensions in Inches (mm in parentheses) |             |             |             |             |             |             |            | Tap             |
|-------------|---------------|----------|------------------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|------------|-----------------|
|             |               |          | A                                        | B           | C           | D           | E           | F           | G           | H          |                 |
| 1 – 30      | 2             | 1        | 1.50 (38.1)                              | 0.41 (10.4) | —           | —           | —           | —           | —           | —          | —               |
| 35 – 60     | 1             | 1        | 2.00 (50.8)                              | 0.81 (20.6) | —           | —           | —           | —           | —           | —          | —               |
| 70 – 450    | 4, 4TI*, 4IL* | 2, 3*    | 2.66 (67.6)                              | 1.13 (28.7) | 1.16 (29.5) | 2.19 (55.6) | 1.91 (48.5) | 0.31 (7.9)  | 0.88 (22.4) | 0.19 (4.8) | —               |
| 500 – 1000  | 4, 4TI*, 4IL* | 2, 3*    | 3.50 (88.9)                              | 1.50 (38.1) | 1.25 (31.8) | 2.56 (65.0) | 1.94 (49.3) | 0.41 (10.4) | 1.00 (25.4) | 0.25 (6.4) | —               |
| 750 – 2000  | 128, 128IL*   | 4, 5*    | 1.88 (47.9)                              | 2.00 (50.8) | 1.63 (41.4) | 1.75 (44.5) | 1.00 (25.4) | —           | —           | —          | 3/8-24-1/2 deep |
| 2500 – 3000 | 128, 128IL*   | 4, 5*    | 1.88 (47.9)                              | 3.00 (76.2) | 1.63 (41.4) | 2.50 (63.5) | 1.50 (38.1) | —           | —           | —          | 1/2-20-1/2 deep |
| 3500 – 4000 | 128, 128IL*   | 6, 7*    | 1.88 (47.9)                              | 3.50 (88.9) | 1.63 (41.4) | 3.00 (76.2) | 1.06 (27.0) | 1.06 (27.0) | —           | —          | 1/2-20-1/2 deep |
| 5000 – 6000 | 128           | 8        | 2.38 (60.5)                              | 5.75 (146)  | 1.88 (47.7) | 5.00 (127)  | 1.50 (38.1) | 1.50 (38.1) | —           | —          | 1/2-20-1/2 deep |

\* Optional Trigger Actuator (IL)

## LA30QS Semiconductor Fuses

300 VAC • Very Fast Acting • 35 – 4500 Amperes



Littelfuse LA30QS series Semiconductor protection fuses are intended for the protection of Power Semiconductors such as diodes, phase control SCR's and other power semiconductor devices. The LA30QS is recommended for new applications providing solutions for your critical protection needs for 300V and less semiconductors.

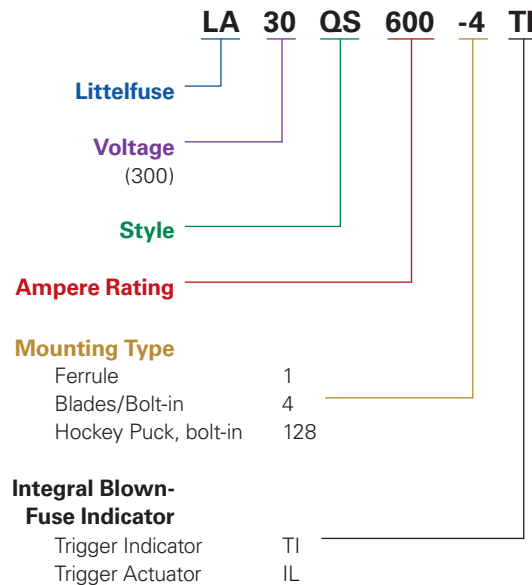
### Features

- Low  $I^2t$  minimizes damage to protected components on short-circuit.
- Controlled arc voltage reduces stress to circuit components during fuse clearing.
- Choice of mounting types provides options for unique termination requirements.
- Indicator options allow identification of blown fuses.
- Superior DC capabilities.

### Applications

Protection of 300 volt heavy duty rectifiers and similar heavy duty power supplies.

### Ordering Information



*Note: Mounting types and integral blown fuse indicators are optional for specified ratings.*

### Specifications

|                             |                                             |
|-----------------------------|---------------------------------------------|
| <b>Voltage Rating:</b>      | AC: 300 volts<br>DC: 300 volts              |
| <b>Interrupting Rating:</b> | 200,000 Amperes                             |
| <b>Ampere Range:</b>        | 35 – 4500 Amperes                           |
| <b>Approvals:</b>           | UL Recognized under the components program. |

Contact Littelfuse for characteristic curves.

## LA30QS Semiconductor Fuses

300 VAC • Very Fast Acting • 35 – 4500 Amperes

### Catalog Numbers & Technical Data

| Ampere Rating | Littelfuse Catalog Number | Mounting Type | Maximum Clearing I <sup>2</sup> t @300 VAC (A <sup>2</sup> S x 10 <sup>3</sup> ) | Watts Loss @ Rated Current (W) |
|---------------|---------------------------|---------------|----------------------------------------------------------------------------------|--------------------------------|
| 35            | LA30QS35-4                | 4             | 0.9                                                                              | 6.4                            |
| 40            | LA30QS40-4                | 4             | 1.2                                                                              | 7                              |
| 50            | LA30QS50-4                | 4             | 2                                                                                | 9.9                            |
| 60            | LA30QS60-4                | 4             | 2.7                                                                              | 11.6                           |
| 70            | LA30QS70-4                | 4             | 1.6                                                                              | 11                             |
| 80            | LA30QS80-4                | 4             | 2.6                                                                              | 11                             |
| 90            | LA30QS90-4                | 4             | 3.2                                                                              | 13                             |
| 100           | LA30QS100-4               | 4             | 4.1                                                                              | 13                             |
| 100           | LA30QS100-4TI             | 4TI           | 4.1                                                                              | 13                             |
| 125           | LA30QS125-4               | 4             | 6.3                                                                              | 16                             |
| 130           | LA30QS130-4               | 4             | 6.3                                                                              | 16                             |
| 150           | LA30QS150-4               | 4             | 9.3                                                                              | 19                             |
| 150           | LA30QS150-4TI             | 4TI           | 9.3                                                                              | 19                             |
| 175           | LA30QS175-4               | 4             | 10                                                                               | 27                             |
| 200           | LA30QS200-4               | 4             | 15                                                                               | 30                             |
| 200           | LA30QS200-4TI             | 4TI           | 15                                                                               | 30                             |
| 225           | LA30QS225-4               | 4             | 22                                                                               | 33                             |
| 250           | LA30QS250-4               | 4             | 25                                                                               | 41                             |
| 250           | LA30QS250-4TI             | 4TI           | 25                                                                               | 41                             |
| 300           | LA30QS300-4               | 4             | 37                                                                               | 47                             |
| 300           | LA30QS300-4TI             | 4TI           | 37                                                                               | 47                             |
| 350           | LA30QS350-4               | 4             | 62                                                                               | 49                             |
| 400           | LA30QS400-4               | 4             | 83                                                                               | 56                             |
| 400           | LA30QS400-4IL             | 4IL           | 83                                                                               | 56                             |
| 400           | LA30QS400-4TI             | 4TI           | 83                                                                               | 56                             |
| 450           | LA30QS450-4               | 4             | 130                                                                              | 53                             |

| Ampere Rating | Littelfuse Catalog Number | Mounting Type | Maximum Clearing I <sup>2</sup> t @300 VAC (A <sup>2</sup> S x 10 <sup>3</sup> ) | Watts Loss @ Rated Current (W) |
|---------------|---------------------------|---------------|----------------------------------------------------------------------------------|--------------------------------|
| 500           | LA30QS500-4               | 4             | 160                                                                              | 59                             |
| 550           | LA30QS550-4               | 4             | 190                                                                              | 65                             |
| 600           | LA30QS600-4               | 4             | 230                                                                              | 69                             |
| 600           | LA30QS600-4TI             | 4TI           | 230                                                                              | 69                             |
| 600           | LA30QS600-4IL             | 4IL           | 230                                                                              | 69                             |
| 700           | LA30QS700-4               | 4             | 260                                                                              | 90                             |
| 700           | LA30QS700-128             | 128           | 260                                                                              | 73                             |
| 800           | LA30QS800-4               | 4             | 330                                                                              | 108                            |
| 800           | LA30QS800-4IL             | 4IL           | 330                                                                              | 108                            |
| 800           | LA30QS800-128             | 128           | 330                                                                              | 84                             |
| 1000          | LA30QS1000-128            | 128           | 460                                                                              | 105                            |
| 1000          | LA30QS1000-128IL          | 128IL         | 460                                                                              | 105                            |
| 1200          | LA30QS1200-128            | 128           | 880                                                                              | 110                            |
| 1500          | LA30QS1500-128            | 128           | 1400                                                                             | 140                            |
| 1500          | LA30QS1500-128IL          | 128IL         | 1400                                                                             | 140                            |
| 1600          | LA30QS1600-128            | 128           | 1690                                                                             | 150                            |
| 2000          | LA30QS2000-128            | 128           | 2600                                                                             | 190                            |
| 2000          | LA30QS2000-128IL          | 128IL         | 2600                                                                             | 190                            |
| 2500          | LA30QS2500-128            | 128           | 4000                                                                             | 230                            |
| 2500          | LA30QS2500-128IL          | 128IL         | 4000                                                                             | 230                            |
| 3000          | LA30QS3000-128            | 128           | 4700                                                                             | 340                            |
| 3500          | LA30QS3500-128            | 128           | 6500                                                                             | 380                            |
| 3500          | LA30QS3500-128IL          | 128IL         | 6500                                                                             | 380                            |
| 4000          | LA30QS4000-128            | 128           | 8600                                                                             | 450                            |
| 4500          | LA30QS4500-128            | 128           | 11000                                                                            | 500                            |

Figure 1

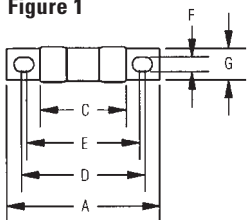


Figure 2

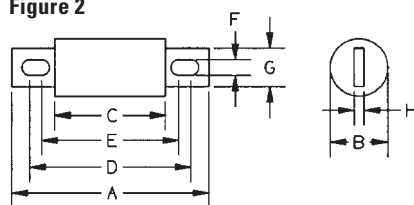


Figure 3

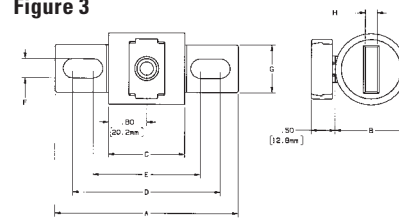


Figure 4

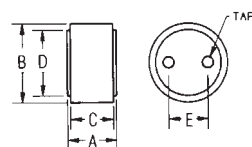


Figure 5

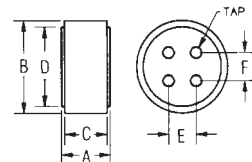
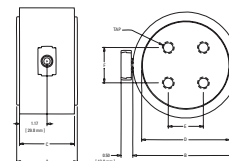


Figure 6



### Dimensions

Dimensions for reference only.

| Amperes     | Mount. Type | Fig. No. | Dimensions in Inches (mm in parentheses) |             |             |             |             |             |             |            | Tap             |
|-------------|-------------|----------|------------------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|------------|-----------------|
|             |             |          | A                                        | B           | C           | D           | E           | F           | G           | H          |                 |
| 35 – 60     | 4           | 1        | 3.19 (81.0)                              | 0.81 (20.6) | 1.63 (41.4) | 2.50 (63.5) | 2.25 (57.5) | 0.34 (8.6)  | 0.72 (18.3) | 0.13 (3.3) | —               |
| 70 – 200    | 4           | 2        | 3.13 (79.5)                              | 1.22 (31.0) | 1.63 (41.4) | 2.44 (62.0) | 2.31 (58.7) | 0.31 (7.9)  | 1.00 (25.4) | 0.19 (4.8) | —               |
| 225 – 700   | 4, 4IL*     | 2, 3*    | 3.84 (97.5)                              | 1.50 (38.1) | 1.59 (40.1) | 2.91 (73.9) | 2.28 (57.9) | 0.41 (10.4) | 1.00 (25.4) | 0.25 (6.4) | —               |
| 700 – 1200  | 128         | 4        | 2.59 (65.8)                              | 3.00 (76.2) | 2.34 (59.4) | 2.50 (63.5) | 1.50 (38.1) | —           | —           | —          | 3/8-24-1/2 deep |
| 1500 – 2500 | 128, 128IL* | 5, 6*    | 2.59 (65.8)                              | 3.50 (88.9) | 2.34 (59.4) | 3.00 (76.2) | 1.50 (38.1) | 1.50 (38.1) | —           | —          | 3/8-24-1/2 deep |
| 3000 – 4500 | 128, 128IL* | 5, 6*    | 2.59 (65.8)                              | 4.50 (114)  | 2.34 (59.4) | 3.75 (95.3) | 1.50 (38.1) | 1.50 (38.1) | —           | —          | 1/2-20-1/2 deep |

\* Optional Actuator (IL)

## LA50QS Semiconductor Fuses

500 VAC • Very Fast Acting • 35 – 1200 Amperes



In response to new equipment requirements, Littelfuse LA50QS series fuses were developed to improve the overall performance of semiconductor fuses. The LA50QS provides the best protection features including lower  $I^2t$ , longer life when subjected to cyclic loading and lower watts loss. LA50QS is today's choice for the protection of dynamic solid state equipment.

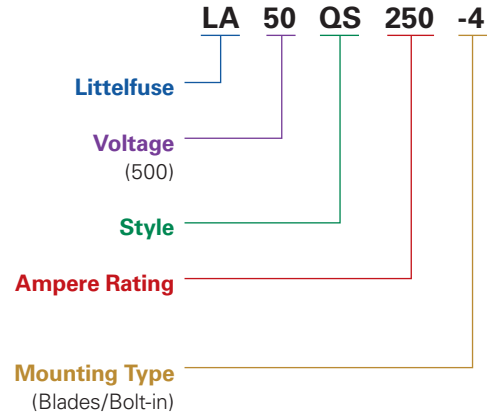
### Features

- Lowest  $I^2t$  for greatest protection of semiconductor circuits.
- Low watts loss for cooler operation.
- Superior cycling ability gives an equipment design advantage.
- State-of-the-art protection for 500 volt equipment.
- Ultra compact sizes allow down-sizing of existing equipment.

### Applications

Protection of 500 volts or less solid state equipment such as motor drives, UPS, inverters, etc.

### Ordering Information



### Specifications

|                             |                                                              |
|-----------------------------|--------------------------------------------------------------|
| <b>Voltage Rating:</b>      | AC: 500 volts<br>DC: 500 volts                               |
| <b>Interrupting Rating:</b> | AC: 200,000 Amperes<br>DC: 100,000 Amperes                   |
| <b>Ampere Range:</b>        | 35 – 1200 Amperes                                            |
| <b>Approvals:</b>           | UL Recognized under the components program<br>CSA Certified. |

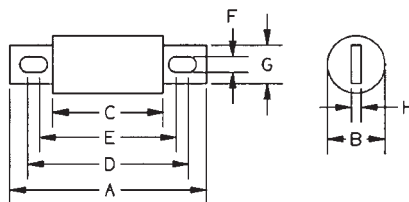
## LA50QS Semiconductor Fuses

500 VAC • Very Fast Acting • 35 – 1200 Amperes

### Catalog Numbers & Technical Data

| Ampere Rating | Littelfuse Catalog Number | Mounting Type | Maximum Clearing I <sup>2</sup> t @ 500 VAC (A <sup>2</sup> S x 10 <sup>3</sup> ) | Watts Loss @ Rated Current (W) |
|---------------|---------------------------|---------------|-----------------------------------------------------------------------------------|--------------------------------|
| 35            | LA50QS35-4                | 4             | 0.56                                                                              | 6                              |
| 40            | LA50QS40-4                | 4             | 0.69                                                                              | 7                              |
| 50            | LA50QS50-4                | 4             | 1.1                                                                               | 8                              |
| 60            | LA50QS60-4                | 4             | 1.8                                                                               | 10                             |
| 70            | LA50QS70-4                | 4             | 1.9                                                                               | 12                             |
| 80            | LA50QS80-4                | 4             | 2.6                                                                               | 14                             |
| 90            | LA50QS90-4                | 4             | 3.6                                                                               | 15                             |
| 100           | LA50QS100-4               | 4             | 4.4                                                                               | 17                             |
| 125           | LA50QS125-4               | 4             | 5.6                                                                               | 21                             |
| 150           | LA50QS150-4               | 4             | 9                                                                                 | 25                             |
| 175           | LA50QS175-4               | 4             | 15                                                                                | 29                             |
| 200           | LA50QS200-4               | 4             | 20                                                                                | 33                             |
| 225           | LA50QS225-4               | 4             | 25                                                                                | 37                             |

| Ampere Rating | Littelfuse Catalog Number | Mounting Type | Maximum Clearing I <sup>2</sup> t @ 500 VAC (A <sup>2</sup> S x 10 <sup>3</sup> ) | Watts Loss @ Rated Current (W) |
|---------------|---------------------------|---------------|-----------------------------------------------------------------------------------|--------------------------------|
| 250           | LA50QS250-4               | 4             | 29                                                                                | 41                             |
| 300           | LA50QS300-4               | 4             | 55                                                                                | 49                             |
| 350           | LA50QS350-4               | 4             | 88                                                                                | 57                             |
| 400           | LA50QS400-4               | 4             | 98                                                                                | 65                             |
| 450           | LA50QS450-4               | 4             | 130                                                                               | 69                             |
| 500           | LA50QS500-4               | 4             | 160                                                                               | 77                             |
| 600           | LA50QS600-4               | 4             | 220                                                                               | 92                             |
| 700           | LA50QS700-4               | 4             | 270                                                                               | 110                            |
| 800           | LA50QS800-4               | 4             | 360                                                                               | 130                            |
| 900           | LA50QS900-4               | 4             | 500                                                                               | 140                            |
| 1000          | LA50QS1000-4              | 4             | 560                                                                               | 160                            |
| 1200          | LA50QS1200-4              | 4             | 930                                                                               | 175                            |



### Dimensions

Dimensions for reference only.

| Amperes    | Mount. Type | Dimensions in Inches (mm in parentheses) |                |                |                 |                 |                |                |                |
|------------|-------------|------------------------------------------|----------------|----------------|-----------------|-----------------|----------------|----------------|----------------|
|            |             | A                                        | B              | C              | D               | E               | F              | G              | H              |
| 35 – 100   | 4           | 3.63<br>(92.2)                           | 1.00<br>(25.4) | 2.13<br>(54.1) | 2.94<br>(74.7)  | 2.75<br>(69.9)  | 0.31<br>(7.9)  | 0.75<br>(19.1) | 0.13<br>(3.3)  |
| 125 – 200  | 4           | 3.63<br>(92.2)                           | 1.22<br>(31.0) | 2.13<br>(54.1) | 2.94<br>(74.7)  | 2.81<br>(71.4)  | 0.31<br>(7.9)  | 1.00<br>(25.4) | 0.19<br>(4.8)  |
| 225 – 400  | 4           | 4.34<br>(110)                            | 1.50<br>(38.1) | 2.09<br>(53.1) | 3.41<br>(86.6)  | 2.78<br>(70.6)  | 0.41<br>(10.4) | 1.00<br>(25.4) | 0.25<br>(6.4)  |
| 450 – 600  | 4           | 4.47<br>(114)                            | 2.00<br>(50.8) | 2.22<br>(56.4) | 3.53<br>(89.7)  | 2.91<br>(73.9)  | 0.41<br>(10.4) | 1.50<br>(38.1) | 0.25<br>(6.4)  |
| 700 – 800  | 4           | 6.47<br>(164.3)                          | 2.50<br>(63.5) | 2.22<br>(56.4) | 5.00<br>(127.0) | 3.44<br>(87.3)  | 0.53<br>(13.5) | 1.50<br>(38.1) | 0.25<br>(6.4)  |
| 900 – 1200 | 4           | 6.97<br>(177.0)                          | 3.00<br>(76.2) | 3.22<br>(81.8) | 5.47<br>(138.9) | 4.47<br>(113.5) | 0.63<br>(15.9) | 2.38<br>(60.3) | 0.44<br>(11.1) |

Contact Littelfuse for characteristic curves.

## LA60Q Semiconductor Fuses

600 VAC • Very Fast Acting • 5 – 40 Amperes

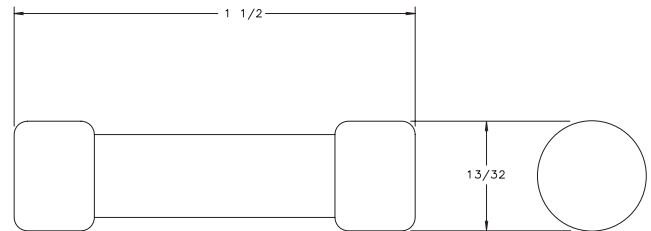


Littelfuse LA60Q semiconductor protection fuses feature a 600 volt AC/DC rating in a compact size (1½" x 13/32"). LA60Q also has the lowest I<sup>2</sup>t of all similar fuses and excellent cycling ability. Applications include inverters and small equipment requiring extremely fast response to faults, without the need to carry sustained heavy overloads.

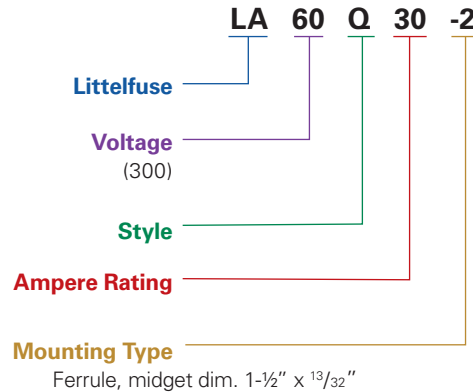
### Features

- Lowest I<sup>2</sup>t of any fuse this size for greater protection.
- Excellent cycling ability gives advantage in equipment design.

### Dimensions (in inches)



### Ordering Information



### Catalog Numbers & Technical Data

| Ampere Rating | Littelfuse Catalog Number | Mounting Type | Maximum Clearing I <sup>2</sup> t @600 VAC (A <sup>2</sup> S) | Watts Loss @ Rated Current (W) |
|---------------|---------------------------|---------------|---------------------------------------------------------------|--------------------------------|
| 5             | LA60Q5-2                  | 2             | 60                                                            | 0.7                            |
| 8             | LA60Q8-2                  | 2             | 70                                                            | 1.1                            |
| 10            | LA60Q10-2                 | 2             | 110                                                           | 1.6                            |
| 12            | LA60Q12-2                 | 2             | 150                                                           | 2                              |
| 15            | LA60Q15-2                 | 2             | 180                                                           | 3                              |
| 20            | LA60Q20-2                 | 2             | 330                                                           | 4.4                            |
| 25            | LA60Q25-2                 | 2             | 440                                                           | 5.5                            |
| 30            | LA60Q30-2                 | 2             | 860                                                           | 5.6                            |
| 35            | LA60Q35-2                 | 2             | 1300                                                          | 6.4                            |
| 40            | LA60Q40-2                 | 2             | 1800                                                          | 7                              |

### Specifications

|                             |                                             |
|-----------------------------|---------------------------------------------|
| <b>Voltage Rating:</b>      | AC: 600 volts<br>DC: 600 volts              |
| <b>Interrupting Rating:</b> | AC: 200,000 Amperes<br>DC: 100,000 Amperes  |
| <b>Ampere Range:</b>        | 5 – 40 Amperes                              |
| <b>Approvals:</b>           | UL Recognized under the components program. |

### Recommended Fuse Blocks

LPSM or L60Q30M

Contact Littelfuse for characteristic curves.

## LA60X Semiconductor Fuses

600 VAC • Very Fast Acting • 700 – 2000 Amperes



Littelfuse LA60X semiconductor protection fuses are popular for the protection of higher voltage heavy rectifiers such as traction rectifiers. They can carry long sustained overloads common with heavy-duty apparatus. The compact “hockey puck” design provides high power protection in a small space.

### Features

- Lowest  $I^2t$  minimizes damage to protected components on short-circuit.
- Controlled arc voltage reduces stress to circuit components during fuse clearing.

### Applications

Protection of heavy traction and electrochemical as well as rectifiers and other heavy-duty equipment.

### Ordering Information

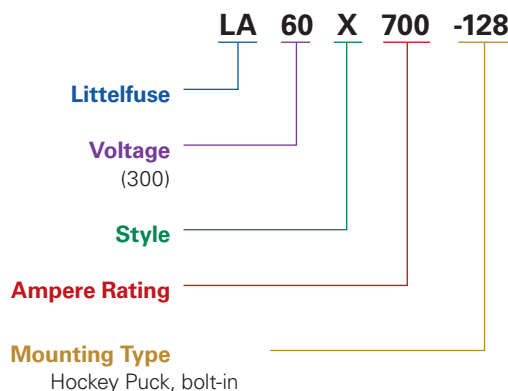


Figure 1

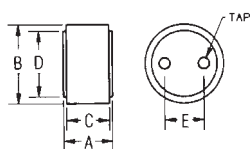
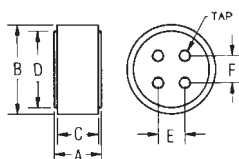


Figure 2



### Dimensions

Dimensions for reference only.

| Amperes     | Mount. Type | Fig. No. | Dimensions in Inches (mm in parentheses) |                |                |                |                |                | Tap             |
|-------------|-------------|----------|------------------------------------------|----------------|----------------|----------------|----------------|----------------|-----------------|
|             |             |          | A                                        | B              | C              | D              | E              | F              |                 |
| 700 – 800   | 128         | 1        | 4.00<br>(102)                            | 3.00<br>(76.2) | 3.75<br>(95.3) | 2.50<br>(63.5) | 1.50<br>(38.1) | -              | 3/8-24-1/2 deep |
| 1000 – 1200 | 128         | 2        | 4.00<br>(102)                            | 3.50<br>(88.9) | 3.75<br>(95.3) | 3.00<br>(76.2) | 1.50<br>(38.1) | 1.50<br>(38.1) | 3/8-24-1/2 deep |
| 1500 – 2000 | 128         | 2        | 4.00<br>(102)                            | 4.50<br>(114)  | 3.75<br>(95.3) | 3.75<br>(95.3) | 1.50<br>(38.1) | 1.50<br>(38.1) | 1/2-20-1/2 deep |

### Specifications

|                             |                                             |
|-----------------------------|---------------------------------------------|
| <b>Voltage Rating:</b>      | AC: 600 volts                               |
| <b>Interrupting Rating:</b> | AC: 100,000 Amperes                         |
| <b>Ampere Range:</b>        | 700 – 2000 Amperes                          |
| <b>Approvals:</b>           | UL Recognized under the components program. |

### Ampere Ratings

|      |      |      |
|------|------|------|
| 700  | 1200 | 1800 |
| 800  | 1500 | 2000 |
| 1000 | 1600 |      |

Contact Littelfuse for technical information.

## LA70QS Semiconductor Fuses

700 VAC • Very Fast Acting • 35 – 800 Amperes



Littelfuse LA70QS semiconductor fuses were developed to provide improved performance required by today's new equipment. The LA70QS features lower  $I^2t$ , improved cycling, and lower watts loss. It is the best choice for the protection of dynamic solid-state equipment.

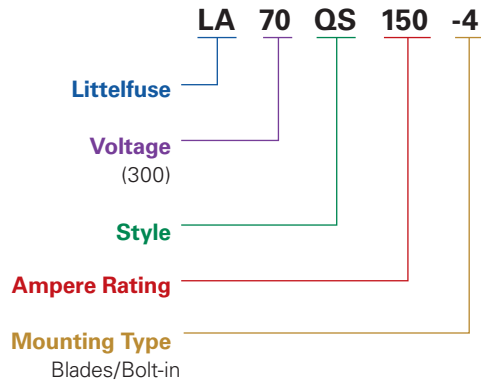
### Features

- Very low  $I^2t$  improved protection of equipment.
- Superior cycling ability for long, reliable life on high cycling loading.
- Lower watts loss for cooler operation.
- 700 Volt AC/DC rating provides greater design versatility.
- Compact sizes allow downsizing of equipment.

### Applications

Protection of 700 volt or less solid state equipment such as motor drives, UPS, inverters, etc.

### Ordering Information



### Specifications

|                             |                                                               |
|-----------------------------|---------------------------------------------------------------|
| <b>Voltage Rating:</b>      | AC: 700 Volts<br>DC: 700 Volts                                |
| <b>Interrupting Rating:</b> | AC: 200,000 Amperes<br>DC: 100,000 Amperes                    |
| <b>Ampere Range:</b>        | 35 – 800 Amperes                                              |
| <b>Approvals:</b>           | UL Recognized under the components program.<br>CSA Certified. |

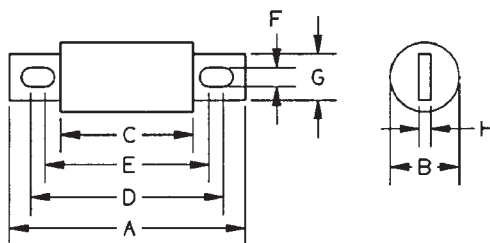
## LA70QS Semiconductor Fuses

700 VAC • Very Fast Acting • 35 – 800 Amperes

### Catalog Numbers & Technical Data

| Ampere Rating | Littelfuse Catalog Number | Mounting Type | Maximum Clearing $I^2t$ @700 VAC ( $A^2S \times 10^3$ ) | Watts Loss @ Rated Current (W) |
|---------------|---------------------------|---------------|---------------------------------------------------------|--------------------------------|
| 35            | LA70QS35-4                | 4             | 0.47                                                    | 6.2                            |
| 40            | LA70QS40-4                | 4             | 0.58                                                    | 7.5                            |
| 50            | LA70QS50-4                | 4             | 0.88                                                    | 9.8                            |
| 60            | LA70QS60-4                | 4             | 1.2                                                     | 12                             |
| 70            | LA70QS70-4                | 4             | 1.8                                                     | 15                             |
| 80            | LA70QS80-4                | 4             | 2.3                                                     | 16                             |
| 90            | LA70QS90-4                | 4             | 3                                                       | 20                             |
| 100           | LA70QS100-4               | 4             | 3.6                                                     | 24                             |
| 125           | LA70QS125-4               | 4             | 6.9                                                     | 22                             |
| 125           | LA70QS125-4K              | 4K            | 6.9                                                     | 22                             |
| 150           | LA70QS150-4               | 4             | 11                                                      | 28                             |
| 150           | LA70QS150-4K              | 4K            | 11                                                      | 29                             |
| 175           | LA70QS175-4               | 4             | 14                                                      | 35                             |
| 175           | LA70QS175-4K              | 4K            | 14                                                      | 35                             |

| Ampere Rating | Littelfuse Catalog Number | Mounting Type | Maximum Clearing $I^2t$ @700 VAC ( $A^2S \times 10^3$ ) | Watts Loss @ Rated Current (W) |
|---------------|---------------------------|---------------|---------------------------------------------------------|--------------------------------|
| 200           | LA70QS200-4               | 4             | 19                                                      | 41                             |
| 200           | LA70QS200-4K              | 4             | 19                                                      | 41                             |
| 250           | LA70QS250-4               | 4             | 42                                                      | 42                             |
| 300           | LA70QS300-4               | 4             | 55                                                      | 53                             |
| 350           | LA70QS350-4               | 4             | 72                                                      | 64                             |
| 400           | LA70QS400-4               | 4             | 99                                                      | 75                             |
| 450           | LA70QS450-4               | 4             | 125                                                     | 75                             |
| 450           | LA70QS450-4K              | 4K            | 125                                                     | 75                             |
| 500           | LA70QS500-4               | 4             | 150                                                     | 92                             |
| 500           | LA70QS500-4K              | 4K            | 160                                                     | 92                             |
| 600           | LA70QS600-4               | 4             | 222                                                     | 116                            |
| 600           | LA70QS600-4K              | 4K            | 222                                                     | 116                            |
| 700           | LA70QS700-4               | 4             | 332                                                     | 125                            |
| 800           | LA70QS800-4               | 4             | 433                                                     | 143                            |



### Dimensions

Dimensions for reference only.

| Amperes   | Mount. Type | Dimensions in Inches (mm in parentheses) |                |                |                |                |                |                |               |
|-----------|-------------|------------------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|---------------|
|           |             | A                                        | B              | C              | D              | E              | F              | G              | H             |
| 35 – 100  | 4           | 4.38<br>(111)                            | 1.00<br>(25.4) | 2.88<br>(73)   | 3.69<br>(93.6) | 3.50<br>(88.9) | 0.31<br>(7.9)  | 0.75<br>(19.0) | 0.13<br>(3.2) |
| 125 – 200 | 4           | 4.38<br>(111)                            | 1.22<br>(31.0) | 2.88<br>(73)   | 3.69<br>(93.6) | 3.56<br>(90.5) | 0.31<br>(7.9)  | 1.00<br>(25.4) | 0.19<br>(4.8) |
| 125 – 200 | 4K          | 5.09<br>(129)                            | 1.22<br>(31.0) | 2.88<br>(73)   | 4.19<br>(106)  | 3.50<br>(88)   | 0.41<br>(10.3) | 1.00<br>(25.4) | 0.19<br>(4.8) |
| 225 – 400 | 4           | 5.09<br>(129)                            | 1.50<br>(38.1) | 2.84<br>(72.2) | 4.16<br>(106)  | 3.53<br>(89.7) | 0.40<br>(10.3) | 1.50<br>(38.1) | 0.25<br>(6.4) |
| 450 – 600 | 4           | 5.09<br>(129)                            | 2.00<br>(50.8) | 2.84<br>(72.2) | 4.16<br>(106)  | 3.53<br>(89.7) | 0.41<br>(10.3) | 1.50<br>(38.1) | 0.25<br>(6.4) |
| 450 – 600 | 4K          | 7.09<br>(180)                            | 2.00<br>(50.8) | 2.84<br>(72.2) | 6.16<br>(156)  | 3.53<br>(89.7) | 0.53<br>(13.5) | 1.50<br>(38.1) | 0.25<br>(6.4) |
| 700 – 800 | 4           | 7.09<br>(180)                            | 2.50<br>(63.5) | 2.84<br>(72.2) | 5.28<br>(134)  | 4.91<br>(125)  | 0.53<br>(13.5) | 2.00<br>(50.8) | 0.38<br>(9.5) |

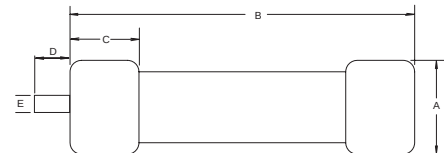
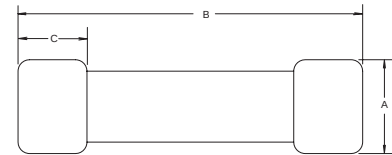
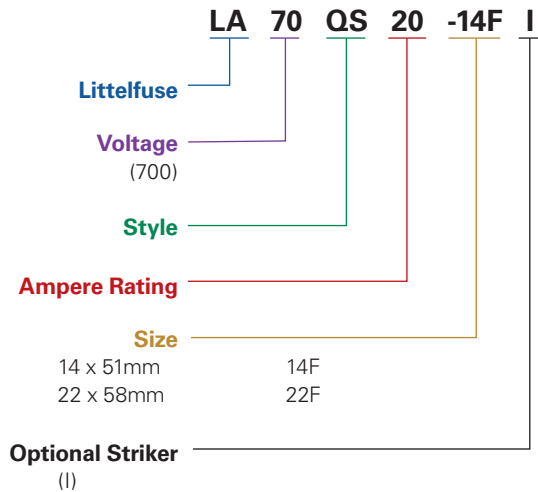
Contact Littelfuse for characteristic curves.

## LA70QS French Cylindrical Fuses

690 Volts • Very Fast Acting • 10 – 100 Amperes



### Ordering Information



Littelfuse French Cylindrical style semiconductor fuses are an extension to the LA70QS series. They offer a solid-fill design with high interrupting ratings and an optional striker for visual or remote blown fuse indication. The international 14x51mm and 22x58mm sizes are accepted worldwide.

### Catalog Numbers & Technical Data

| Ampere Rating | Littelfuse Catalog Number (No Striker) | Littelfuse Catalog Number (With Striker) | Body Size | Maximum Clearing I <sup>2</sup> t @ 700 VAC (A <sup>2</sup> S x 10 <sup>3</sup> ) | Watts Loss @ Rated Current (W) |
|---------------|----------------------------------------|------------------------------------------|-----------|-----------------------------------------------------------------------------------|--------------------------------|
| 10            | LA70QS10-14F                           | LA70QS10-14FI                            | 14x51     | 0.04                                                                              | 3.5                            |
| 12            | LA70QS12-14F                           | LA70QS12-14FI                            | 14x51     | 0.06                                                                              | 4.4                            |
| 16            | LA70QS16-14F                           | LA70QS16-14FI                            | 14x51     | 0.10                                                                              | 4.8                            |
| 20            | LA70QS20-14F                           | LA70QS20-14FI                            | 14x51     | 0.16                                                                              | 5.2                            |
| 25            | LA70QS25-14F                           | LA70QS25-14FI                            | 14x51     | 0.27                                                                              | 5.8                            |
| 32            | LA70QS32-14F                           | LA70QS32-14FI                            | 14x51     | 1.50                                                                              | 7.0                            |
| 40            | LA70QS40-14F                           | LA70QS40-14FI                            | 14x51     | 0.70                                                                              | 10.7                           |
| 50            | LA70QS50-14F                           | LA70QS50-14FI                            | 14x51     | 1.50                                                                              | 11.6                           |
| 20            | LA70QS20-22F                           | LA70QS20-22FI                            | 22x58     | 0.076                                                                             | 8.0                            |
| 25            | LA70QS25-22F                           | LA70QS25-22FI                            | 22x58     | 0.125                                                                             | 10.0                           |
| 32            | LA70QS32-22F                           | LA70QS32-22FI                            | 22x58     | 0.27                                                                              | 11.0                           |
| 40            | LA70QS40-22F                           | LA70QS40-22FI                            | 22x58     | 0.48                                                                              | 13.0                           |
| 50            | LA70QS50-22F                           | LA70QS50-22FI                            | 22x58     | 0.80                                                                              | 14.9                           |
| 63            | LA70QS63-22F                           | LA70QS63-22FI                            | 22x58     | 1.85                                                                              | 16.0                           |
| 80            | LA70QS80-22F                           | LA70QS80-22FI                            | 22x58     | 3.80                                                                              | 17.8                           |
| 100           | LA70QS100-22F                          | LA70QS100-22FI                           | 22x58     | 8.00                                                                              | 19.0                           |

| Fuse Size            | Dimensions in mm |    |    |     |     |
|----------------------|------------------|----|----|-----|-----|
|                      | A                | B  | C  | D   | E   |
| 14x51 (no striker)   | 14               | 51 | 14 | —   | —   |
| 22x58 (no striker)   | 22               | 58 | 16 | —   | —   |
| 14x51 (with striker) | 14               | 51 | 14 | 7.5 | 3.8 |
| 22x58 (with striker) | 22               | 58 | 16 | 7.5 | 3.8 |

Dimensions for reference only.

### Specifications

|                             |                                                               |
|-----------------------------|---------------------------------------------------------------|
| <b>Voltage Rating:</b>      | AC: 690 Volts<br>DC: 700 Volts                                |
| <b>Interrupting Rating:</b> | AC: 200,000 Amperes<br>DC: 100,000 Amperes                    |
| <b>Ampere Range:</b>        | 10 – 100 Amperes                                              |
| <b>Approvals:</b>           | UL Recognized under the components program.<br>CSA Certified. |

### Recommended Fuse Blocks

CYH series for non-striker fuses LA70QS(amp)22F  
LPSG series for the striker style LA70QS(amp)22FI

## LA100P Semiconductor Fuses

1000 VAC • Very Fast Acting • 15 – 1000 Amperes



Littelfuse LA100P semiconductor protection fuses are rated 1000V, extending the range of protection for UPS systems, AC and DC drives, reduced voltage motor starters and similar applications where lower  $I^2t$  and superior reliability are needed. With ratings from 15-1000 amperes, a wide range of high voltage applications can be served.

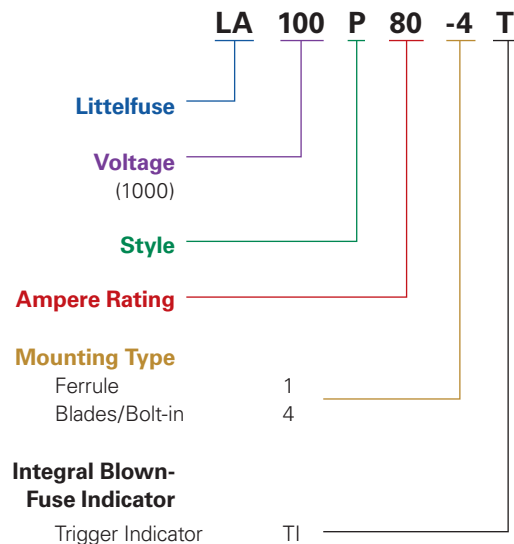
### Features

- Low  $I^2t$  minimizes damage to protected components on short-circuit.
- Controlled arc voltage reduces stress to circuit components during fuse clearing.

### Applications

Protection of UPS systems, AC/DC drives, reduced voltage motor starters and other 1000V or less semiconductor devices.

### Ordering Information



*Note: Mounting types and integral blown fuse indicators are optional for specified ratings.*

### Specifications

|                             |                                             |
|-----------------------------|---------------------------------------------|
| <b>Voltage Rating:</b>      | AC: 1000 Volts<br>DC: 750 Volts             |
| <b>Interrupting Rating:</b> | 100,000 Amperes                             |
| <b>Ampere Range:</b>        | 15 – 1000 Amperes                           |
| <b>Approvals:</b>           | UL Recognized under the components program. |

## LA100P Semiconductor Fuses

1000 VAC • Very Fast Acting • 15 – 1000 Amperes

### Catalog Numbers & Technical Data

| Ampere Rating | Littelfuse Catalog Number | Mounting Type | Maximum Clearing I <sup>2</sup> t @1000 VAC (A <sup>2</sup> S x 10 <sup>3</sup> ) | Watts Loss @ Rated Current (W) |
|---------------|---------------------------|---------------|-----------------------------------------------------------------------------------|--------------------------------|
| 15            | LA100P15-1                | 1             | 0.6                                                                               | 3.4                            |
| 20            | LA100P20-1                | 1             | 0.8                                                                               | 5.9                            |
| 25            | LA100P25-1                | 1             | 1.3                                                                               | 9                              |
| 30            | LA100P30-1                | 1             | 1.5                                                                               | 12.8                           |
| 35            | LA100P35-4                | 4             | 2.2                                                                               | 7.3                            |
| 40            | LA100P40-4                | 4             | 2.9                                                                               | 8.3                            |
| 50            | LA100P50-4                | 4             | 4.5                                                                               | 11                             |
| 50            | LA100P50-4TI              | 4TI           | 4.5                                                                               | 11                             |
| 60            | LA100P60-4                | 4             | 6.5                                                                               | 13                             |
| 60            | LA100P60-4TI              | 4TI           | 6.5                                                                               | 13                             |
| 70            | LA100P70-4TI              | 4TI           | 8.8                                                                               | 13                             |
| 80            | LA100P80-4                | 4             | 12                                                                                | 14                             |
| 80            | LA100P80-4TI              | 4TI           | 12                                                                                | 14                             |
| 100           | LA100P100-4               | 4             | 18                                                                                | 18                             |
| 100           | LA100P100-4TI             | 4TI           | 18                                                                                | 18                             |
| 125           | LA100P125-4               | 4             | 28                                                                                | 23                             |
| 125           | LA100P125-4TI             | 4TI           | 28                                                                                | 23                             |
| 150           | LA100P150-4               | 4             | 41                                                                                | 28                             |
| 150           | LA100P150-4TI             | 4TI           | 41                                                                                | 28                             |

| Ampere Rating | Littelfuse Catalog Number | Mounting Type | Maximum Clearing I <sup>2</sup> t @1000 VAC (A <sup>2</sup> S x 10 <sup>3</sup> ) | Watts Loss @ Rated Current (W) |
|---------------|---------------------------|---------------|-----------------------------------------------------------------------------------|--------------------------------|
| 200           | LA100P200-4               | 4             | 72                                                                                | 36                             |
| 200           | LA100P200-4TI             | 4TI           | 72                                                                                | 36                             |
| 225           | LA100P225-4               | 4             | 91                                                                                | 40                             |
| 250           | LA100P250-4               | 4             | 110                                                                               | 46                             |
| 300           | LA100P300-4               | 4             | 160                                                                               | 55                             |
| 300           | LA100P300-4TI             | 4TI           | 160                                                                               | 55                             |
| 350           | LA100P350-4               | 4             | 220                                                                               | 65                             |
| 350           | LA100P350-4TI             | 4TI           | 220                                                                               | 65                             |
| 400           | LA100P400-4               | 4             | 290                                                                               | 70                             |
| 400           | LA100P400-4TI             | 4TI           | 290                                                                               | 70                             |
| 500           | LA100P500-4               | 4             | 450                                                                               | 90                             |
| 500           | LA100P500-4TI             | 4TI           | 450                                                                               | 90                             |
| 600           | LA100P600-4               | 4             | 650                                                                               | 110                            |
| 600           | LA100P600-4TI             | 4TI           | 650                                                                               | 110                            |
| 650           | LA100P650-4               | 4             | 780                                                                               | 120                            |
| 700           | LA100P700-4               | 4             | 880                                                                               | 125                            |
| 800           | LA100P800-4               | 4             | 1200                                                                              | 140                            |
| 800           | LA100P800-4TI             | 4TI           | 1200                                                                              | 140                            |
| 1000          | LA100P1000-4              | 4             | 1900                                                                              | 190                            |

Figure 1



Figure 2

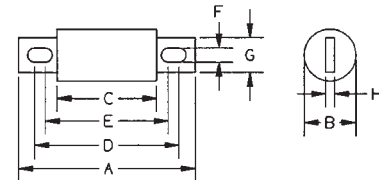


Figure 3

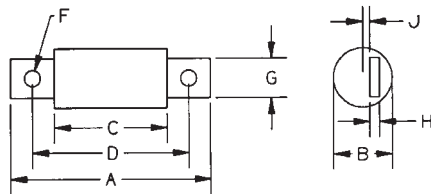
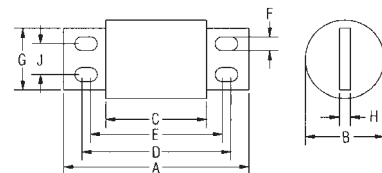


Figure 4



### Dimensions

Dimensions for reference only.

| Amperes   | Mount. Type | Fig. No. | Dimensions in Inches (mm in parentheses) |                |                |               |               |                |                |                |                |
|-----------|-------------|----------|------------------------------------------|----------------|----------------|---------------|---------------|----------------|----------------|----------------|----------------|
|           |             |          | A                                        | B              | C              | D             | E             | F              | G              | H              | J              |
| 15 – 30   | 1           | 1        | 2.53<br>(66.8)                           | 0.56<br>(14.2) | –              | –             | –             | –              | –              | –              | –              |
| 35 – 60   | 4, 4TI      | 2        | 5.00<br>(127)                            | 1.00<br>(25.4) | 3.50<br>(173)  | 4.31<br>(109) | 4.19<br>(106) | 0.31<br>(7.9)  | 0.75<br>(19.1) | 0.13<br>(3.3)  | –              |
| 65 – 100  | 4, 4TI      | 2        | 5.00<br>(127)                            | 1.22<br>(31)   | 3.50<br>(173)  | 4.31<br>(109) | 4.19<br>(106) | 0.31<br>(7.9)  | 1.00<br>(25.4) | 0.19<br>(4.8)  | –              |
| 125 – 200 | 4, 4TI      | 2        | 5.72<br>(145)                            | 2.00<br>(38.1) | 3.47<br>(88.1) | 4.78<br>(121) | 4.16<br>(106) | 0.41<br>(10.4) | 1.00<br>(25.4) | 0.25<br>(6.4)  | –              |
| 225 – 400 | 4, 4TI      | 2        | 5.72<br>(145)                            | 2.00<br>(50.8) | 3.47<br>(88.1) | 4.78<br>(121) | 4.16<br>(106) | 0.41<br>(10.4) | 1.50<br>(25.4) | 0.25<br>(6.4)  | –              |
| 500 – 600 | 4, 4TI      | 2        | 7.72<br>(196)                            | 2.50<br>(63.5) | 3.47<br>(88.1) | 5.88<br>(149) | 5.56<br>(147) | 0.53<br>(13.5) | 2.00<br>(50.8) | 0.38<br>(9.7)  | –              |
| 650 – 800 | 4, 4TI      | 3        | 7.44<br>(189)                            | 2.88<br>(73.2) | 3.94<br>(100)  | 5.94<br>(151) | –             | 0.63<br>(16)   | 2.00<br>(50.8) | 0.38<br>(9.7)  | 0.31<br>(7.9)  |
| 1000      | 4           | 4        | 8.22<br>(209)                            | 3.50<br>(88.9) | 4.47<br>(114)  | 6.59<br>(167) | 5.84<br>(148) | 0.63<br>(16)   | 2.75<br>(69.9) | 0.50<br>(12.7) | 1.38<br>(35.1) |

Contact Littelfuse for characteristic curves.

## LA120X Semiconductor Fuses

1200 VAC • Very Fast Acting • 1/2 – 30 Amperes



Littelfuse LA120X semiconductor protection fuses, rated 1/2 through 30A, 1200 VAC are popular for use in traction drive auxiliary circuits and similar applications. LA120X fuses are also suitable for use on 1000VDC auxiliary circuits with low time constants.

### Features

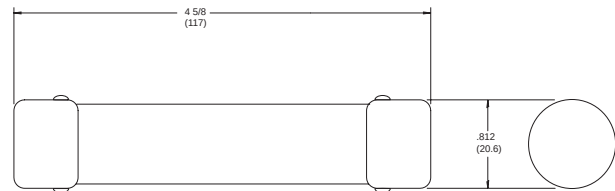
- 1000 Volt DC rating for a wide range of circuits.
- Compact size fits in where competitive sizes will not fit.

### Applications

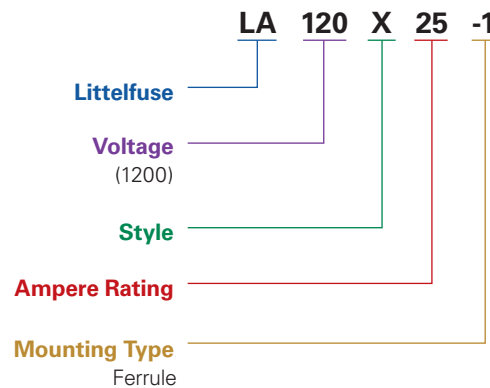
Protection of traction drive auxiliary circuits, etc.

### Dimensions

In Inches (mm in parentheses)



### Ordering Information



### Catalog Numbers & Technical Data

| Ampere Rating | Littelfuse Catalog Number | Mounting Type | Maximum Clearing I <sup>2</sup> t @1200 VAC (A <sup>2</sup> S) |
|---------------|---------------------------|---------------|----------------------------------------------------------------|
| 1/2           | LA120A1/2-1               | 1             | 1.9                                                            |
| 1             | LA120X1-1                 | 1             | 7.5                                                            |
| 2             | LA120X2-1                 | 1             | 30                                                             |
| 3             | LA120X3-1                 | 1             | 69                                                             |
| 4             | LA120X4-1                 | 1             | 120                                                            |
| 5             | LA120X5-1                 | 1             | 190                                                            |
| 6             | LA120X6-1                 | 1             | 280                                                            |
| 10            | LA120X10-1                | 1             | 970                                                            |
| 15            | LA120X15-1                | 1             | 2100                                                           |
| 20            | LA120X20-1                | 1             | 3700                                                           |
| 25            | LA120X25-1                | 1             | 5700                                                           |
| 30            | LA120X30-1                | 1             | 8300                                                           |

### Specifications

**Voltage Rating:** AC: 1200 Volts  
DC: 1000 Volts

**Interrupting Rating:** 100,000 Amperes

**Ampere Range:** 1/2 – 30 Amperes

*Note: Mounting type 1 can use 109002 and 129002 clips.*

## Square Body Semiconductor Fuses

700/1300 VAC • Very Fast Acting • 40 – 2500 Amperes



Littelfuse North American style square body semiconductor fuses provide maximum flexibility in equipment design and ultimate protection for today's power conversion equipment. Available in different body sizes and multiple mounting styles, the broad range of ampere ratings allows great flexibility in equipment design.

Engineered to provide state-of-the-art protection for SCR's, diodes, thyristors, GTO's, and IGBT devices, Littelfuse square body fuses have pure die-cut elements embedded in solidified sand to control arcing and lower  $I^2t$ . All fuses are also equipped with a blown fuse trip indicator.

### Features

- Choice of mounting styles provides a wide choice for equipment design.
- Broad range of ampere ratings in a given body size for design flexibility.
- Very low  $I^2t$  minimizes damage to protected components.
- Superior cycling ability for long, reliable life on high cyclic loading.
- Extremely fast acting and current-limiting for improved protection to equipment.

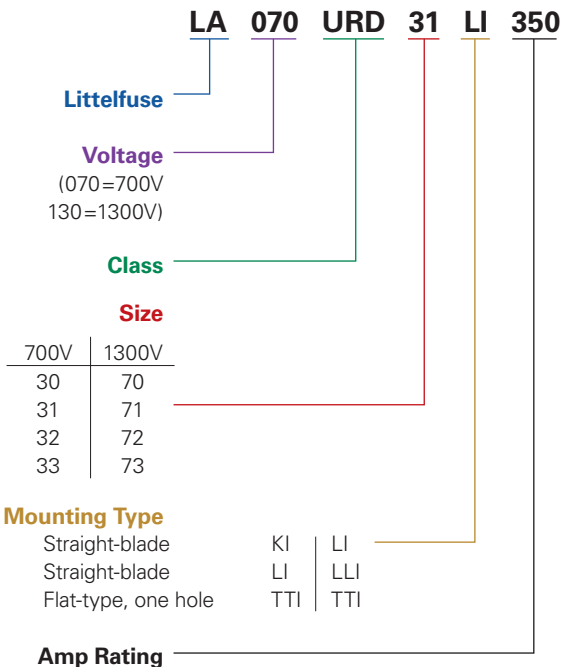
### Applications

Protection of rectifiers, inverters, DC drives, UPS systems, reduced voltage motor starters, and other equipment in globally accepted applications.

### Specifications

|                             |                                                        |
|-----------------------------|--------------------------------------------------------|
| <b>Voltage Rating:</b>      | AC: 700 Volts (LA070)                                  |
|                             | 1300 Volts (LA130)                                     |
| <b>Interrupting Rating:</b> | DC: Contact factory                                    |
|                             | AC: 200,000 Amperes (LA070)<br>100,000 Amperes (LA130) |
| <b>Ampere Range:</b>        | DC: Contact factory                                    |
|                             | 40 – 2500 Amperes                                      |
| <b>Approvals:</b>           | UL Recognized Component                                |

### Ordering Information



## Square Body Semiconductor Fuses

700/1300 VAC • Very Fast-Acting • 40 – 2500 Amperes

### 700 Volt North American Style Ratings and Application Data

| Body Size | Amp Rating | Rated Voltage | Melting I <sup>2</sup> t (A <sup>2</sup> S x 10 <sup>3</sup> ) | Total I <sup>2</sup> t @ Rated Voltage (A <sup>2</sup> S x 10 <sup>3</sup> ) | **Watts Loss @ Rated Current (W) | Long Blade Catalog No. Type LI | Short Blade Catalog No. Type KI | Tapped Terminal Catalog No. Type TTI |
|-----------|------------|---------------|----------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------|--------------------------------|---------------------------------|--------------------------------------|
| 30        | 63         | 700           | 0.2                                                            | 1.2                                                                          | 14                               | LA070URD30LI0063               | LA070URD30KI0063                | LA070URD30TTI0063                    |
|           | 80         | 700           | 0.33                                                           | 1.9                                                                          | 19                               | LA070URD30LI0080               | LA070URD30KI0080                | LA070URD30TTI0080                    |
|           | 100        | 700           | 0.47                                                           | 2.7                                                                          | 26                               | LA070URD30LI0100               | LA070URD30KI0100                | LA070URD30TTI0100                    |
|           | 125        | 700           | 0.85                                                           | 4.9                                                                          | 30                               | LA070URD30LI0125               | LA070URD30KI0125                | LA070URD30TTI0125                    |
|           | 160        | 700           | 1.6                                                            | 9.2                                                                          | 37                               | LA070URD30LI0160               | LA070URD30KI0160                | LA070URD30TTI0160                    |
|           | 200        | 700           | 3                                                              | 16.7                                                                         | 42/43                            | LA070URD30LI0200               | LA070URD30KI0200                | LA070URD30TTI0200                    |
|           | 250        | 700           | 5.8                                                            | 32.4                                                                         | 48/50                            | LA070URD30LI0250               | LA070URD30KI0250                | LA070URD30TTI0250                    |
|           | 315        | 700           | 12                                                             | 67                                                                           | 53/55                            | LA070URD30LI0315               | LA070URD30KI0315                | LA070URD30TTI0315                    |
|           | 350        | 700           | 15.5                                                           | 86                                                                           | 57/60                            | LA070URD30LI0350               | LA070URD30KI0350                | LA070URD30TTI0350                    |
|           | 400        | 700           | 23                                                             | 130                                                                          | 60/65                            | LA070URD30LI0400               | LA070URD30KI0400                | LA070URD30TTI0400                    |
|           | 450        | 700           | 26                                                             | 165                                                                          | 80/88                            | LA070URD30LI0450               | LA070URD30KI0450                | LA070URD30TTI0450                    |
|           | 500        | 700           | 41                                                             | 264                                                                          | 80/88                            | LA070URD30LI0500               | LA070URD30KI0500                | LA070URD30TTI0500                    |
| 31        | 550        | 700           | 52                                                             | 330                                                                          | 80/90                            | LA070URD30LI0550               | LA070URD30KI0550                | LA070URD30TTI0550                    |
|           | 200        | 700           | 2.5                                                            | 14.6                                                                         | 45                               | LA070URD31LI0200               | LA070URD31KI0200                | LA070URD31TTI0200                    |
|           | 250        | 700           | 4.7                                                            | 27                                                                           | 52                               | LA070URD31LI0250               | LA070URD31KI0250                | LA070URD31TTI0250                    |
|           | 315        | 700           | 7.5                                                            | 43                                                                           | 65                               | LA070URD31LI0315               | LA070URD31KI0315                | LA070URD31TTI0315                    |
|           | 350        | 700           | 10.5                                                           | 59                                                                           | 67                               | LA070URD31LI0350               | LA070URD31KI0350                | LA070URD31TTI0350                    |
|           | 400        | 700           | 19                                                             | 110                                                                          | 68                               | LA070URD31LI0400               | LA070URD31KI0400                | LA070URD31TTI0400                    |
|           | 450        | 700           | 26.5                                                           | 150                                                                          | 70                               | LA070URD31LI0450               | LA070URD31KI0450                | LA070URD31TTI0450                    |
|           | 500        | 700           | 37                                                             | 210                                                                          | 70/72                            | LA070URD31LI0500               | LA070URD31KI0500                | LA070URD31TTI0500                    |
|           | 550        | 700           | 52                                                             | 300                                                                          | 70/75                            | LA070URD31LI0550               | LA070URD31KI0550                | LA070URD31TTI0550                    |
|           | 630        | 700           | 75                                                             | 421                                                                          | 75/85                            | LA070URD31LI0630               | LA070URD31KI0630                | LA070URD31TTI0630                    |
|           | 700        | 700           | 95                                                             | 530                                                                          | 85/95                            | LA070URD31LI0700               | LA070URD31KI0700                | LA070URD31TTI0700                    |
|           | 800        | 700           | 140                                                            | 880                                                                          | 105/120                          | LA070URD31LI0800               | LA070URD31KI0800                | LA070URD31TTI0800                    |
| 32        | 400        | 700           | 15                                                             | 86                                                                           | 72/75                            | LA070URD32LI0400               | LA070URD32KI0400                | LA070URD32TTI0400                    |
|           | 450        | 700           | 22                                                             | 124                                                                          | 77/80                            | LA070URD32LI0450               | LA070URD32KI0450                | LA070URD32TTI0450                    |
|           | 500        | 700           | 28                                                             | 157                                                                          | 85/90                            | LA070URD32LI0500               | LA070URD32KI0500                | LA070URD32TTI0500                    |
|           | 550        | 700           | 37                                                             | 211                                                                          | 90/95                            | LA070URD32LI0550               | LA070URD32KI0550                | LA070URD32TTI0550                    |
|           | 630        | 700           | 54                                                             | 302                                                                          | 95/105                           | LA070URD32LI0630               | LA070URD32KI0630                | LA070URD32TTI0630                    |
|           | 700        | 700           | 76                                                             | 432                                                                          | 100/110                          | LA070URD32LI0700               | LA070URD32KI0700                | LA070URD32TTI0700                    |
|           | 800        | 700           | 115                                                            | 648                                                                          | 110/120                          | LA070URD32LI0800               | LA070URD32KI0800                | LA070URD32TTI0800                    |
|           | 900        | 700           | 170                                                            | 972                                                                          | 110/125                          | LA070URD32LI0900               | LA070URD32KI0900                | LA070URD32TTI0900                    |
|           | 1000       | 700           | 240                                                            | 1350                                                                         | 115/135                          | LA070URD32LI1000               | LA070URD32KI1000                | LA070URD32TTI1000                    |
|           | 1100       | 650           | 270                                                            | 1620                                                                         | 140/165                          | LA065URD32LI1100               | —                               | LA065URD32TTI1100                    |
|           | 1250       | 600           | 410                                                            | 2100                                                                         | 150/180                          | LA060URD32LI1250               | —                               | LA060URD32TTI1250                    |
|           | 1400       | 550           | 555                                                            | 2600                                                                         | 160/190                          | LA055URD32LI1400               | —                               | LA055URD32TTI1400                    |
|           | 1600       | 550           | 870                                                            | 4000                                                                         | 165/195                          | LA055URD32LI1600               | —                               | LA055URD32TTI1600                    |
| 33        | 1800       | 500           | 1050                                                           | 4400                                                                         | 195/330                          | LA050URD32LI1800               | —                               | LA050URD32TTI1800                    |
|           | 500        | 700           | 19                                                             | 108                                                                          | 105                              | LA070URD33LI0500               | LA070URD33KI0500                | LA070URD33TTI0500                    |
|           | 550        | 700           | 27                                                             | 151                                                                          | 105/110                          | LA070URD33LI0550               | LA070URD33KI0550                | LA070URD33TTI0550                    |
|           | 630        | 700           | 40                                                             | 227                                                                          | 110/120                          | LA070URD33LI0630               | LA070URD33KI0630                | LA070URD33TTI0630                    |
|           | 700        | 700           | 55                                                             | 324                                                                          | 115/125                          | LA070URD33LI0700               | LA070URD33KI0700                | LA070URD33TTI0700                    |
|           | 800        | 700           | 95                                                             | 529                                                                          | 120/130                          | LA070URD33LI0800               | LA070URD33KI0800                | LA070URD33TTI0800                    |
|           | 900        | 700           | 135                                                            | 760                                                                          | 120/135                          | LA070URD33LI0900               | LA070URD33KI0900                | LA070URD33TTI0900                    |
|           | 1000       | 700           | 170                                                            | 970                                                                          | 135/155                          | LA070URD33LI1000               | LA070URD33KI1000                | LA070URD33TTI1000                    |
|           | 1100       | 700           | 240                                                            | 1360                                                                         | 135/160                          | LA070URD33LI1100               | LA070URD33KI1100                | LA070URD33TTI1100                    |
|           | 1250       | 700           | 350                                                            | 2000                                                                         | 150/180                          | LA070URD33LI1250               | LA070URD33KI1250                | LA070URD33TTI1250                    |
|           | 1400       | 700           | 480                                                            | 2700                                                                         | 160/200                          | LA070URD33LI1400               | LA070URD33KI1400                | LA070URD33TTI1400                    |
|           | 1600       | 650           | 555                                                            | 3250                                                                         | 210/240                          | LA065URD33LI1600               | —                               | LA065URD33TTI1600                    |
| 34        | 1800       | 650           | 720                                                            | 4330                                                                         | 225/260                          | LA065URD33LI1800               | —                               | LA065URD33TTI1800                    |
|           | 2000       | 600           | 950                                                            | 5000                                                                         | 250/290                          | LA060URD33LI2000               | —                               | LA060URD33TTI2000                    |
|           | 2250       | 550           | 1250                                                           | 5900                                                                         | 280/330                          | LA050URD33LI2250               | —                               | LA055URD33TTI2250                    |
|           | 2500       | 500           | 1870                                                           | 7600                                                                         | 280/330                          | LA050URD33LI2500               | —                               | LA050URD33TTI2500                    |

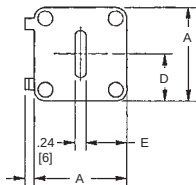
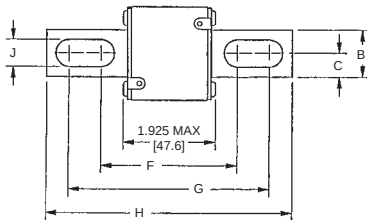
\*\* Watts loss data is published for both blade and tapped style mounting configurations. When two watts loss values are shown, this represents tapped/blade values respectively. Contact Littelfuse for characteristic curves.

## Square Body Semiconductor Fuses

700/1300 VAC • Very Fast Acting • 40 – 2500 Amperes

### North American Straight Blade, Type KI

#### TYPES KI AND LI



#### Dimensions - 700V Fuses

Dimensions for reference only.

| Catalog Number          | Dimensions in Inches (mm in parentheses) |              |                |                |                |                |                 |                 |                |
|-------------------------|------------------------------------------|--------------|----------------|----------------|----------------|----------------|-----------------|-----------------|----------------|
|                         | A                                        | B            | C              | D              | E              | F              | G               | H               | J              |
| LA070URD30KI (63-550)   | 1.57<br>(40)                             | 0.98<br>(25) | 0.49<br>(12.5) | 0.83<br>(21)   | 0.71<br>(18)   | 2.68<br>(68)   | 4.21<br>(107)   | 5.08<br>(129)   | 0.41<br>(10.5) |
| LA070URD31KI (200-800)  | 2.01<br>(51)                             | 0.98<br>(25) | 0.49<br>(12.5) | 1.0<br>(25.5)  | 0.89<br>(22.5) | 2.66<br>(67.6) | 4.22<br>(107.1) | 5.07<br>(128.8) | 0.56<br>(14.3) |
| LA070URD32KI (400-1000) | 2.36<br>(60)                             | 1.26<br>(32) | 0.63<br>(16)   | 1.18<br>(30)   | 1.06<br>(27)   | 2.92<br>(74.2) | 4.29<br>(109)   | 5.28<br>(134)   | 0.57<br>(14.6) |
| LA070URD33KI (500-1400) | 2.93<br>(74.5)                           | 1.57<br>(40) | 0.79<br>(20)   | 1.46<br>(37.2) | 1.35<br>(34.2) | 2.97<br>(75.4) | 4.24<br>(107.6) | 5.28<br>(134)   | 0.63<br>(15.9) |

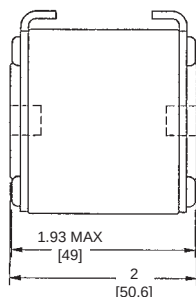
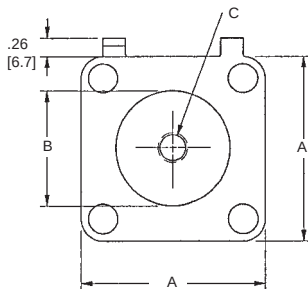
### North American Straight Blade Types LI

#### Dimensions - 700V Fuses

Dimensions for reference only.

| Catalog Number                                                                                                           | Dimensions in Inches (mm in parentheses) |              |                |                |                |                |                 |                 |                |
|--------------------------------------------------------------------------------------------------------------------------|------------------------------------------|--------------|----------------|----------------|----------------|----------------|-----------------|-----------------|----------------|
|                                                                                                                          | A                                        | B            | C              | D              | E              | F              | G               | H               | J              |
| LA070URD30LI (63-550)                                                                                                    | 1.57<br>(40)                             | 0.98<br>(25) | 0.49<br>(12.5) | 0.83<br>(21)   | 0.71<br>(18)   | 3.45<br>(87.6) | 4.98<br>(126.6) | 5.85<br>(148.6) | 0.41<br>(10.5) |
| LA070URD31LI (200-800)                                                                                                   | 2.01<br>(51)                             | 0.98<br>(25) | 0.49<br>(12.5) | 1.0<br>(25.5)  | 0.89<br>(22.5) | 3.61<br>(91.6) | 4.82<br>(122.4) | 5.85<br>(148.6) | 0.57<br>(14.6) |
| LA070URD32LI (400-1000)<br>LA065URD32LI (1250)<br>LA055URD32LI (1400-1600)<br>LA050URD32LI (1800)                        | 2.36<br>(60)                             | 1.26<br>(32) | 0.63<br>(16)   | 1.18<br>(30)   | 1.06<br>(27)   | 3.71<br>(94.2) | 5.08<br>(129)   | 6.02<br>(153)   | 0.57<br>(14.6) |
| LA070URD33LI (500-1400)<br>LA065URD33LI (1600-1800)<br>LA060URD33LI (2000)<br>LA055URD33LI (2250)<br>LA050URD33LI (2500) | 2.93<br>(74.5)                           | 1.57<br>(40) | 0.79<br>(20)   | 1.46<br>(37.2) | 1.35<br>(34.2) | 3.72<br>(94.4) | 4.98<br>(126.6) | 6.02<br>(153)   | 0.63<br>(15.9) |

#### TYPE TTI



### North American Flat Single Hole, Type TTI

#### Dimensions - 700V Fuses

Dimensions for reference only.

| Catalog Number                                                                                                                                   | Dimensions in Inches (mm in parentheses) |                |                |
|--------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|----------------|----------------|
|                                                                                                                                                  | A                                        | B              | C              |
| LA070URD30TTI (100-550)                                                                                                                          | 1.57<br>(40)                             | 1.00<br>(25)   | 5/16-18 x 0.35 |
| LA070URD31TTI (200-800)                                                                                                                          | 2.00<br>(50.8)                           | 1.19<br>(30.2) | 5/16-18 x 0.35 |
| LA070URD32TTI (400-1000)<br>LA065URD32TTI (1100)<br>LA060URD32TTI (1250)<br>LA055URD32TTI (1400-1600)                                            | 2.37<br>(60.3)                           | 1.50<br>(38.1) | 3/8-16 x 0.35  |
| LA060URD33TTI (1800)<br>LA070URD33TTI (500-1400)<br>LA065URD33TTI (1600)<br>LA060URD33TTI (2000)<br>LA055URD33TTI (2250)<br>LA050URD33TTI (2500) | 2.94<br>(74.5)                           | 1.81<br>(46)   | 1/2-18 x 0.35  |

## Square Body Semiconductor Fuses

700/1300 VAC • Very Fast Acting • 40 – 2500 Amperes

### 1300 Volt North American Style Ratings and Application Data

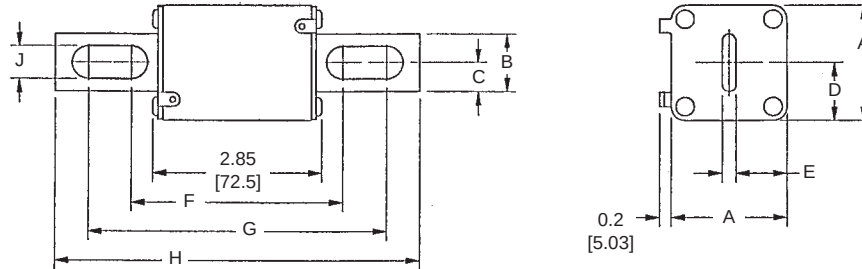
| Body Size | Amp Rating | Rated Voltage | Melting I <sup>2</sup> t<br>(A <sup>2</sup> S x 10 <sup>3</sup> ) | Total I <sup>2</sup> t @<br>Rated Voltage<br>(A <sup>2</sup> S x 10 <sup>3</sup> ) | **Watts Loss @<br>Rated Current (W) | Long Blade<br>Catalog No. Type LI/LLI | Tapped Terminal<br>Catalog No. Type TTI |
|-----------|------------|---------------|-------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------|---------------------------------------|-----------------------------------------|
| 70        | 63         | 1300          | 0.21                                                              | 1.8                                                                                | 26                                  | LA130URD70LI0063                      | LA130URD70TTI0063                       |
|           | 80         | 1300          | 0.47                                                              | 4                                                                                  | 27                                  | LA130URD70LI0080                      | LA130URD70TTI0080                       |
|           | 100        | 1300          | 0.83                                                              | 7.2                                                                                | 30                                  | LA130URD70LI0100                      | LA130URD70TTI0100                       |
|           | 125        | 1300          | 1.3                                                               | 11                                                                                 | 38                                  | LA130URD70LI0125                      | LA130URD70TTI0125                       |
|           | 160        | 1300          | 2.5                                                               | 22                                                                                 | 45                                  | LA130URD70LI0160                      | LA130URD70TTI0160                       |
|           | 200        | 1300          | 4.7                                                               | 40                                                                                 | 54/56                               | LA130URD70LI0200                      | LA130URD70TTI0200                       |
|           | 250        | 1300          | 9.6                                                               | 82                                                                                 | 58/61                               | LA130URD70LI0250                      | LA130URD70TTI0250                       |
|           | 315        | 1300          | 20                                                                | 172                                                                                | 66/72                               | LA130URD70LI0315                      | LA130URD70TTI0315                       |
|           | 350        | 1200          | 28                                                                | 205                                                                                | 68/75                               | LA120URD70LI0350                      | LA120URD70TTI0350                       |
| 71        | 160        | 1300          | 2.6                                                               | 22                                                                                 | 46                                  | LA130URD71LI0160                      | LA130URD71TTI0160                       |
|           | 200        | 1300          | 4.7                                                               | 40                                                                                 | 54                                  | LA130URD71LI0200                      | LA130URD71TTI0200                       |
|           | 250        | 1300          | 8.9                                                               | 76                                                                                 | 61                                  | LA130URD71LI0250                      | LA130URD71TTI0250                       |
|           | 280        | 1300          | 12                                                                | 102                                                                                | 68/70                               | LA130URD71LI0280                      | LA130URD71TTI0280                       |
|           | 315        | 1300          | 16                                                                | 138                                                                                | 73/76                               | LA130URD71LI0315                      | LA130URD71TTI0315                       |
|           | 350        | 1300          | 22                                                                | 190                                                                                | 76/80                               | LA130URD71LI0350                      | LA130URD71TTI0350                       |
|           | 400        | 1300          | 38                                                                | 330                                                                                | 76/80                               | LA130URD71LI0400                      | LA130URD71TTI0400                       |
|           | 450        | 1300          | 47                                                                | 405                                                                                | 87/95                               | LA130URD71LI0450                      | LA130URD71TTI0450                       |
|           | 500        | 1200          | 68                                                                | 500                                                                                | 90/100                              | LA120URD71LI0500                      | LA120URD71TTI0500                       |
|           | 550        | 1200          | 84                                                                | 620                                                                                | 98/112                              | LA120URD71LI0550                      | LA120URD71TTI0550                       |
|           | 630        | 1100          | 125                                                               | 930                                                                                | 105                                 | LA110URD71LI0630                      | —                                       |
| 72        | 630        | 1200          | 125                                                               | 930                                                                                | 120                                 | —                                     | LA120URD71TTI0630                       |
|           | 280        | 1300          | 10                                                                | 90                                                                                 | 72                                  | LA130URD72LI0280                      | LA130URD72TTI0280                       |
|           | 315        | 1300          | 15                                                                | 130                                                                                | 76                                  | LA130URD72LI0315                      | LA130URD72TTI0315                       |
|           | 350        | 1300          | 21                                                                | 180                                                                                | 77                                  | LA130URD72LI0350                      | LA130URD72TTI0350                       |
|           | 400        | 1300          | 32                                                                | 285                                                                                | 80                                  | LA130URD72LI0400                      | LA130URD72TTI0400                       |
|           | 450        | 1300          | 44                                                                | 380                                                                                | 87/89                               | LA130URD72LI0450                      | LA130URD72TTI0450                       |
|           | 500        | 1300          | 57                                                                | 500                                                                                | 94/98                               | LA130URD72LI0500                      | LA130URD72TTI0500                       |
|           | 550        | 1300          | 68                                                                | 590                                                                                | 110/120                             | LA130URD72LI0550                      | LA130URD72TTI0550                       |
|           | 630        | 1200          | 105                                                               | 920                                                                                | 113                                 | LA120URD72LI0630                      | —                                       |
|           | 630        | 1300          | 105                                                               | 920                                                                                | 125                                 | —                                     | LA130URD72TTI0630                       |
|           | 700        | 1100          | 145                                                               | 1040                                                                               | 122                                 | LA110URD72LI0700                      | —                                       |
|           | 700        | 1200          | 145                                                               | 1040                                                                               | 140                                 | —                                     | LA120URD72TTI0700                       |
|           | 800        | 1100          | 215                                                               | 1590                                                                               | 125                                 | LA110URD72LI0800                      | —                                       |
|           | 800        | 1200          | 215                                                               | 1590                                                                               | 146                                 | —                                     | LA120URD72TTI0800                       |
| 73        | 315        | 1300          | 12                                                                | 102                                                                                | 84                                  | LA130URD73LI0315                      | LA130URD73TTI0315                       |
|           | 350        | 1300          | 17                                                                | 150                                                                                | 86                                  | LA130URD73LI0350                      | LA130URD73TTI0350                       |
|           | 400        | 1300          | 25                                                                | 220                                                                                | 93                                  | LA130URD73LI0400                      | LA130URD73TTI0400                       |
|           | 450        | 1300          | 35                                                                | 310                                                                                | 99/100                              | LA130URD73LI0450                      | LA130URD73TTI0450                       |
|           | 500        | 1300          | 44                                                                | 390                                                                                | 110/112                             | LA130URD73LI0500                      | LA130URD73TTI0500                       |
|           | 550        | 1300          | 57                                                                | 500                                                                                | 116/120                             | LA130URD73LI0550                      | LA130URD73TTI0550                       |
|           | 630        | 1300          | 84                                                                | 730                                                                                | 125/132                             | LA130URD73LI0630                      | LA130URD73TTI0630                       |
|           | 700        | 1300          | 110                                                               | 960                                                                                | 135/146                             | LA130URD73LI0700                      | LA130URD73TTI0700                       |
|           | 800        | 1200          | 190                                                               | 1630                                                                               | 136                                 | LA120URD73LI0800                      | —                                       |
|           | 800        | 1300          | 190                                                               | 1630                                                                               | 148                                 | —                                     | LA130URD73TTI0800                       |
|           | 900        | 1100          | 250                                                               | 2160                                                                               | 150                                 | LA110URD73LI0900                      | —                                       |
|           | 900        | 1300          | 250                                                               | 2160                                                                               | 170                                 | —                                     | LA130URD73TTI0900                       |
|           | 1000       | 1100          | 370                                                               | 2430                                                                               | 152/174                             | LA100URD73LI1000                      | LA100URD73TTI1000                       |
|           | 1100       | 1000          | 445                                                               | 2580                                                                               | 168/208                             | LA100URD73LI1100                      | LA100URD73TTI1100                       |
|           | 1250       | 1000          | 585                                                               | 3480                                                                               | 186/200                             | LA100URD73LI1250                      | LA100URD73TTI1250                       |
|           | 1400       | 900           | 755                                                               | 3880                                                                               | 210/228                             | LA090URD73LI1400                      | LA090URD73TTI1400                       |
|           | 1600       | 700           | 1430                                                              | 5630                                                                               | 203                                 | LA070URD73LI1600                      | LA070URD73TTI1600                       |
|           | 1800       | 660           | 2040                                                              | 7600                                                                               | 206                                 | LA065URD73LI1800                      | LA065URD73TTI1800                       |

\*\* Watts loss data is published for both blade and tapped style mounting configurations.  
When two watts loss values are shown, this represents tapped/blade values respectively.  
Contact Littelfuse for characteristic curves.

## Square Body Semiconductor Fuses

700/1300 VAC • Very Fast Acting • 40 – 2500 Amperes

### TYPES LI AND LLI



### North American Straight Blade, Types LI and LLI

#### Dimensions - 1300V Fuses

Dimensions for reference only.

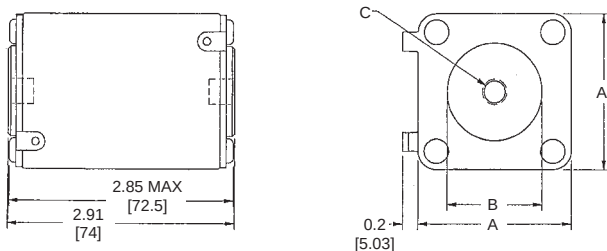
| Catalog Number                                                                                                                               | Dimensions In Inches (mm in parentheses) |              |                |                |                |                |                 |                 |                |
|----------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|--------------|----------------|----------------|----------------|----------------|-----------------|-----------------|----------------|
|                                                                                                                                              | A                                        | B            | C              | D              | E              | F              | G               | H               | J              |
| LA130URD70LI (63-315)<br>LA120URD70LI (350)                                                                                                  | 1.57<br>(40)                             | 0.98<br>(25) | 0.49<br>(12.5) | 0.83<br>(21)   | 0.71<br>(18)   | 3.60<br>(91.4) | 5.13<br>(130.4) | 6.00<br>(152.4) | 0.41<br>(10.5) |
| LA130URD71LLI (160-450)<br>LA120URD71LLI (500-550)<br>LA110URD71LLI (630)                                                                    | 2.01<br>(51)                             | 0.98<br>(25) | 0.49<br>(12.5) | 1.0<br>(26.5)  | 0.89<br>(22.5) | 3.60<br>(91.4) | 5.13<br>(130.4) | 6.00<br>(152.4) | 0.57<br>(14.6) |
| LA130URD72LI (280-550)<br>LA120URD72LI (800)<br>LA110URD72LI (700-800)                                                                       | 2.36<br>(60)                             | 1.26<br>(32) | 0.63<br>(16)   | 1.18<br>(30)   | 1.06<br>(27)   | 3.84<br>(97.6) | 5.2<br>(132.4)  | 6.20<br>(157.4) | 0.57<br>(14.6) |
| LA130URD73LI (315-700)<br>LA120URD73LI (800)<br>LA110URD73LI (900-1000)<br>LA090URD73LI (1400)<br>LA070URD73LI (1600)<br>LA065URD73LI (1800) | 2.93<br>(74.5)                           | 1.57<br>(40) | 0.79<br>(20)   | 1.46<br>(37.2) | 1.35<br>(34.2) | 3.89<br>(98.8) | 5.21<br>(132.4) | 6.20<br>(157.4) | 0.63<br>(15.9) |

### North American Flat Single Hole, Type TTI

#### Dimensions - 1300V Fuses

Dimensions for reference only.

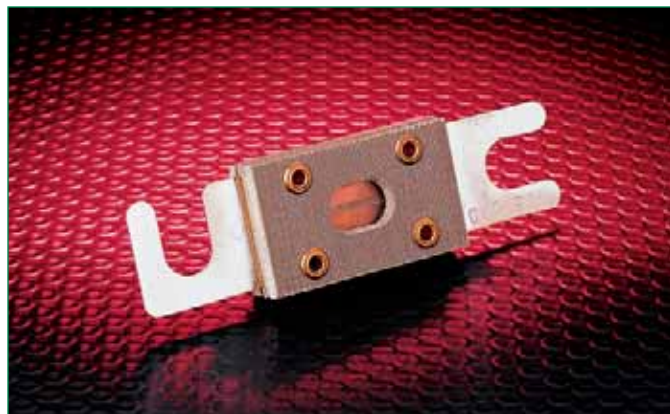
### TYPE TTI



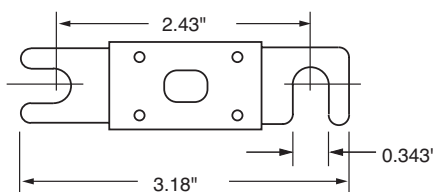
| Catalog Number                                                                                                                                  | Dimensions in Inches (mm) |                |                   |
|-------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|----------------|-------------------|
|                                                                                                                                                 | A                         | B              | C                 |
| LA130URD70TTI (63-315)<br>LA120URD70TTI (350)                                                                                                   | 1.57<br>(40)              | 1.00<br>(26.4) | 5/16-18 x 0.23 DP |
| LA130URD71TTI (160-450)<br>LA120URD71TTI (550-630)                                                                                              | 2.01<br>(51)              | 1.19<br>(30.2) | 5/16-18 x 0.36 DP |
| LA130URD72TTI (280-630)<br>LA120URD72TTI (700-800)                                                                                              | 2.36<br>(60)              | 1.50<br>(38.1) | 3/8-18 x 0.36 DP  |
| LA130URD73TTI (315-900)<br>LA120URD73TTI (1000)<br>LA110URD73TTI (1250)<br>LA090URD73TTI (1400)<br>LA070URD73TTI (1600)<br>LA065URD73TTI (1800) | 2.93<br>(74.5)            | 1.81<br>(46)   | 1/2-18 x 0.36 DP  |

## Fork-Lift and Stud-Mounted Fuses

32 – 130 Volts DC • Fast Acting and Time-Delay



CNL fast-acting and CNN very fast acting fuses are recommended for use on battery operated lift trucks and other low voltage battery operated equipment.



### CNL/CNN Limiter Fuses

#### Specifications

|                             |                                                   |
|-----------------------------|---------------------------------------------------|
| <b>Voltage Ratings:</b>     | CNL: 32 Volts DC<br>CNN: 48 Volts DC, 75 Volts AC |
| <b>Interrupting Rating:</b> | 2,500 amperes                                     |
| <b>Ampere Range:</b>        | 10 – 800 amperes                                  |
| <b>Maximum Torque:</b>      | 90 Inch lbs.                                      |

#### Recommended Fuse Block

LFFB001

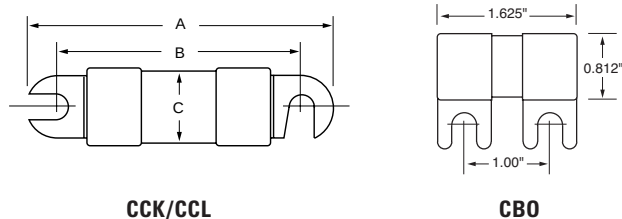
#### Ampere ratings

|            |    |     |     |     |     |
|------------|----|-----|-----|-----|-----|
| <b>CNL</b> | 35 | 80  | 150 | 250 | 350 |
|            | 40 | 100 | 175 | 275 | 400 |
|            | 50 | 125 | 200 | 300 | 500 |
|            | 60 | 130 | 225 | 325 |     |
| <b>CNN</b> | 10 | 80  | 175 | 300 | 500 |
|            | 35 | 90  | 200 | 325 | 600 |
|            | 40 | 100 | 225 | 350 | 700 |
|            | 50 | 125 | 250 | 400 | 800 |
|            | 60 | 150 | 275 |     |     |

Example part number (series & amperage): CNN 700



| Part No.     | A     | B     | C     |
|--------------|-------|-------|-------|
| CCK 1-15A    | 2.810 | 2.204 | 0.510 |
| CCK 20-30A   | 3.060 | 2.454 | 0.510 |
| CCK 35-60A   | 3.629 |       | 0.750 |
| CCK 70-120A  | 4.129 | 3.454 | 1.00  |
| CCK 140-200A | 4.362 | 3.579 | 1.00  |
| CCK 225-300A | 4.612 | 3.829 | 1.00  |
| CCL 30-60A   | 3.060 | 2.454 | 0.51  |
| CCL 80-120A  | 3.38  | 2.70  | 0.75  |



CCK/CCL

CBO

### CBO/CCK/CCL Lift-Truck Fuses

CBO fast acting, and CCK and CCL dual-element time-delay fuses are recommended for fork lift trucks and other similar battery operated equipment.

#### Specifications

|                                               |                                                                                                                         |
|-----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| <b>Voltage Ratings:</b>                       | CBO: 32 Volts DC<br>CCK: 130 Volts DC (1-100A)<br>72 Volts DC (120-200A)<br>48 Volts DC (225-300A)<br>CCL: 125 Volts DC |
| <b>Interrupting Rating:</b>                   | CBO, CCK & CCL: 10,000A                                                                                                 |
| <b>Ampere Range:</b>                          | 1 – 300 amperes                                                                                                         |
| For operating characteristics contact factory |                                                                                                                         |

#### Ampere ratings

|                    |    |    |     |     |     |
|--------------------|----|----|-----|-----|-----|
| <b>CBO</b>         | 10 | 25 | 50  | 80  |     |
| <i>Fast Acting</i> | 12 | 30 | 60  | 100 |     |
|                    | 15 | 35 | 70  | 125 |     |
|                    | 20 | 40 | 75  | 150 |     |
| <b>CCK</b>         | 1  | 25 | 60  | 120 | 200 |
| <i>Time-Delay</i>  | 2  | 30 | 70  | 140 | 225 |
|                    | 10 | 35 | 75  | 150 | 250 |
|                    | 15 | 40 | 80  | 160 | 300 |
|                    | 20 | 50 | 100 | 175 |     |
| <b>CCL</b>         | 30 | 40 | 60  | 100 |     |
| <i>Time-Delay</i>  | 35 | 50 | 80  | 120 |     |

Example part number (series & amperage): CCK 150

## Cable Limiters

600 Volts AC



Cable limiters are fusible devices that provide very fast short-circuit protection, primarily to faulted cables, but also to other conductors such as busway. Cable limiters do not have an ampere rating, and cannot be used to provide overload protection. They are instead selected by cable size; for example, a 500 kcmil cable requires a 500 kcmil cable limiter. Their main use is to isolate faulted cables in circuits containing three or more parallel conductors per phase. They may be installed on the line side of the main service to provide short-circuit protection to the service conductors. This is especially important when service conductors are tapped from large low voltage networks or from large low impedance transformers.

Cable limiters have terminals which permit them to be installed in a variety of equipment. The most common configuration is the offset blade on one end and the crimp terminal on the other end. This permits the limiter to replace a cable terminal (lug).

### Applications

Service entrance conductors  
Between transformer or network bus and busway terminal boxes  
Large feeders with three or more conductors per phase

### Features

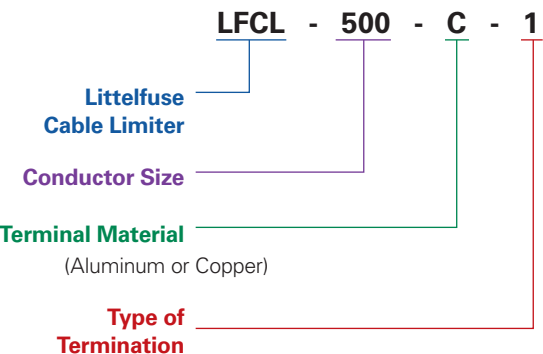
- Current-limiting characteristics provide protection to conductor insulation and reduce damage when faults occur.
- Properly applied cable limiters may permit the use of equipment with reduced withstand ratings
- Wide variety of terminations and cable ratings permit use in almost every situation.

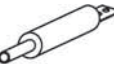
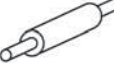
### Specifications

**Voltage Rating:** 600 volts AC  
**Interrupting Rating:** 200,000 Amperes  
**Cable Size Range:** 4/0 – 750MCM Copper or Aluminum

Note: For Type 5 and Type 8 Aluminum cable limiters, use the Copper Type C5 and C8.

### Ordering Information



| Description |                                                                                     |            | Catalog Number |           |
|-------------|-------------------------------------------------------------------------------------|------------|----------------|-----------|
| Type        | Termination                                                                         | Cable Size | Cable Type     |           |
|             |                                                                                     |            | Copper         | Aluminum  |
| 1           |  | 4/0        | LFCL4/0C1      | LFCL4/0A1 |
|             |                                                                                     | 250MCM     | LFCL250C1      | LFCL250A1 |
|             |                                                                                     | 350MCM     | LFCL350C1      | LFCL350A1 |
|             |                                                                                     | 500MCM     | LFCL500C1      | LFCL500A1 |
| 3           |  | 4/0        | LFCL4/0C3      | LFCL4/0A3 |
|             |                                                                                     | 250MCM     | LFCL250C3      | LFCL250A3 |
|             |                                                                                     | 350MCM     | LFCL350C3      | LFCL350A3 |
|             |                                                                                     | 500MCM     | LFCL500C3      | LFCL500A3 |
| 5           |  | 4/0        | LFCL4/0C5      | —         |
|             |                                                                                     | 250MCM     | LFCL250C5      | —         |
|             |                                                                                     | 350MCM     | LFCL350C5      | —         |
|             |                                                                                     | 500MCM     | LFCL500C5      | —         |
| 6           |  | 4/0        | LFCL4/0C6      | LFCL4/0A6 |
|             |                                                                                     | 250MCM     | LFCL250C6      | LFCL250A6 |
|             |                                                                                     | 350MCM     | LFCL350C6      | LFCL350A6 |
|             |                                                                                     | 500MCM     | LFCL500C6      | LFCL500A6 |
| 8           |  | 4/0        | LFCL4/0C8      | —         |
|             |                                                                                     | 250MCM     | LFCL250C8      | —         |
|             |                                                                                     | 350MCM     | LFCL350C8      | —         |
|             |                                                                                     | 500MCM     | LFCL500C8      | —         |

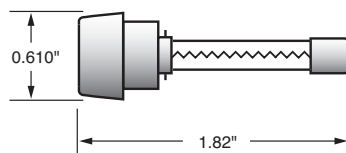
## LGR/LMF In-Line Fuses and LHR Holder



### LGR Fuses

Fast Acting • 300 VAC

Used as in-line protection for fluorescent fixtures, this fast acting fuse is ideal for increasing the safety and reliability of lighting fixtures.



### Specifications

**Voltage Rating:**

300 volts AC

**Maximum Interrupting Rating:**

10,000A

**Approvals:**

Standard 248-14,

UL Listed (File No: E10480)

CSA Certified (File No: LR29862)

### Ampere Ratings

|       |        |   |   |    |    |
|-------|--------|---|---|----|----|
| 1/2   | 1 6/10 | 3 | 6 | 9  | 15 |
| 1     | 2      | 4 | 7 | 10 |    |
| 1 1/2 | 2 1/2  | 5 | 8 | 12 |    |

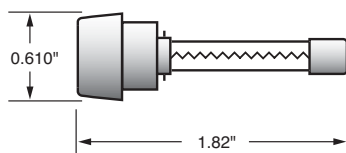
Example part number (series & amperage): LGR 1 1/2



### LMF Fuses

Time-Delay • 300 VAC

Perfect for use in lighting systems, this 300 VAC time-delay fuse is designed to handle ballast transformer in-rush currents.



### Specifications

**Voltage Rating:**

300 volts AC

**Maximum Interrupting Rating:**

10,000A

**Approvals:**

Standard 248-14,

UL Listed (File No: E10480)

CSA Certified (File No: LR29862)

### Ampere Ratings

|      |       |        |        |       |    |
|------|-------|--------|--------|-------|----|
| 3/10 | 8/10  | 1 6/10 | 2 8/10 | 4     | 7  |
| 1/2  | 1     | 2      | 3      | 5     | 8  |
| 5/10 | 1 1/4 | 2 1/2  | 3 2/10 | 6 1/4 | 10 |

Example part number (series & amperage): LMF 2 1/2



### LHR Fuse Holder

Used as in-line protection for fluorescent fixtures, the Littelfuse LGR and LMF series fuses and LHR holder offer increased safety and reliability to lighting systems. On a 277 volt system, a fault occurring in an unfused fixture could take out the entire branch circuit affecting as many as 100 fixtures. This could cause safety problems as well as shut down operations.

By individually fusing fixtures, these problems will be avoided. The

added benefits of this is the ability to quickly identify the problem fixture and reduce the repair time.

Fuse holders are rated up to 10 amperes at 300 volts and are equipped with 7" 18 AWG leads. Order part number LHR 000 for two leads, and part number LHR 001 for one lead with the other terminal used for insertion of 18 AWG ballast lead.

### Specifications

**Voltage Rating:**

300 volts AC

**Ampere Rating:**

LHR 000: 10A

LHR 001: 10A

**Approvals:**

UL Recognized

**Flammability Rating:**

94V0

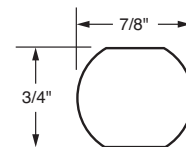
**Example part number:**

LHR 000

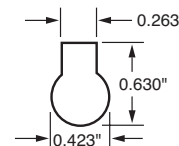
### Mounting Information

LHR 001/LHR 000 will fit keyhole punch or 0.875" knock-out hole. Anti-rotation feature is provided when used with keyhole punch.

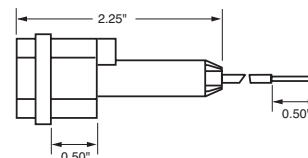
A "U-shaped" clip is available for panel mounting (packaged 10 clips per bag): Order part number LHR OCA.



**Knock-out Hole**



**Keyhole Punch**



## Blocks and Holders



|                                                   |                |
|---------------------------------------------------|----------------|
| <i>Fuse Blocks</i>                                | <b>111</b>     |
| <i>Class H/K5 and R Fuse Blocks</i>               | <b>112-116</b> |
| <i>Class J Fuse Blocks</i>                        | <b>117-119</b> |
| <i>Class T Fuse Blocks</i>                        | <b>120-123</b> |
| <i>Class G Fuse Blocks</i>                        | <b>124</b>     |
| <i>Class CC/CD and Midget Fuse Blocks</i>         | <b>125-126</b> |
| <i>Class CC and Midget Fuse Block Accessories</i> | <b>127</b>     |
| <i>Fuse Block, Holders and Accessories</i>        | <b>128-133</b> |
| <i>Semiconductor Fuse Blocks</i>                  | <b>134-136</b> |
| <i>POWR-BLOKS™ Distribution/Splicer Blocks</i>    | <b>137-144</b> |
| <i>In-Line Watertight Fuseholders</i>             | <b>145-150</b> |

## Fuse Blocks

### General Information



### Fuse Block Selection

The following guidelines should help simplify the selection of proper fuse blocks:

#### 1. Determine the system voltage

Since fuses are selected on the basis of system voltage, fuse blocks are selected to match the voltage rating of the fuse.

#### 2. Determine the design short-circuit current

Available and/or design short-circuit current is an important consideration when determining the class of fuse and fuse blocks to use. If available short-circuit current cannot be determined, or if it will vary with equipment location, select fuses with a 200,000 ampere interrupting rating (A.I.R.) and mating fuse blocks with a withstand rating of 200,000 amperes for maximum safety.

Class H fuse blocks will accept Class H or K5 fuses (which have an interrupting rating of up to 50,000 amperes) and Class R fuses (which have a 200,000 A.I.R.). To prevent the possibility of inserting a fuse with the incorrect interrupting rating, the use of Class R fuse blocks is recommended for use with Class R fuses. Use Class H fuse blocks with Class H or K5 fuses. These fuse blocks are dimensionally the same, but the Class R fuse blocks incorporate a rejection feature which allows only Class R fuses to be inserted.

#### 3. Determine the type and ampere rating of the fuse to be used

In addition to voltage and interrupting rating as discussed above, the fuse ampere rating, opening characteristics (fast acting or time-delay) and size are other important considerations in fuse selection. Once the fuse type is selected, the mating fuse block can be chosen. Fuse blocks are available in 30, 60, 100, 200, 400 and 600 amp ratings, and may be used with a fuse rated at the corresponding ampere rating or below. For example, a fuse block rated at 30 amperes may be used with a fuse rated from 0 to 30 amperes.

#### 4. Determine if NEC, CSA, UL, or other requirements are applicable

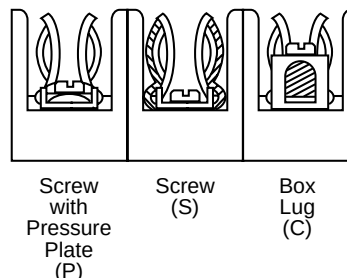
If fuse blocks will be installed in equipment to be submitted for agency approval, the requirements should be obtained from the approving agency in advance of fuse and fuse block selection.

#### 5. Select the type of wire termination

A choice of three types of wire termination is available:

- Screw\* — for use with spade lugs or ring terminals.
- Screw with Pressure Plate\* — for use with solid or stranded wire without terminal. Recommended where vibration will be a factor.
- Box Lug — the most durable. For use with all types of solid wire and Class B and Class C stranded wire. Not for use with welding cable or other rope-stranded conductors.

\* 1/4" Quick Connect terminals rated for up to 20A are available on the Midget and Class CC fuse blocks.



#### 6. Decide on the number of poles in each block

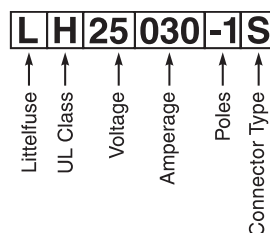
The number of poles for each set of fuses is determined by the characteristics of the circuit. The option to gang individual fuse blocks into long strips will be determined by the available space and by the type of wire being used.

#### 7. Determine if fuse clips need to be reinforced

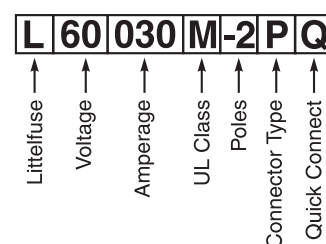
Fuse clips may have a tendency to lose some of their tension over a period of time. This may be prevented by specifying reinforced fuse clips. Reinforced clips are standard on certain fuse blocks (see individual product pages).

### Ordering Information

The Littelfuse fuse block part number consists of 6 or 7 components, as shown below and in the individual fuse block data tables.



For all Class R, H, J, T and 15, 20 & 60A Class G Fuse Blocks



For all Class CC, Midget and 30A Class G Fuse Blocks

## Class H/K5 and R Fuse Blocks

250 and 600 Volt



Class H and Class R fuse blocks are dimensionally the same, but Class R blocks incorporate a rejection feature, which only allows Class R fuses to be inserted.

### Features/Benefits

- Class H and Class R fuse blocks feature clip designs to maximize electrical contact and minimize heat rise.
- Reinforcing clips are standard on all Class H fuse blocks rated 100 amp and higher. *Note: For reinforcing clips on Class H blocks rated 30-60 amp, add "R" suffix to connector type.*
- Reinforcing clips are standard on all Class R fuse blocks

### Specifications

**Voltage Rating:** 250 Volts; 600 Volts  
**Ampere Ratings:** 0 – 600 amperes  
**Approvals:** UL Listed (File No. E14721)  
 CSA Certified (File No. LR73091)

### Recommended Fuses

| Class H Blocks |      |  | Class R Blocks |                |  |
|----------------|------|--|----------------|----------------|--|
| 250V           | 600V |  | 250V           | 600V           |  |
| NLN            | NLS  |  | FLNR/FLNR_ID   | FLSR/FLSR_ID   |  |
| RLN            | RLS  |  | KLNR           | KLSR           |  |
|                |      |  | LLNRK          | LLSRK/LLSRK_ID |  |
|                |      |  | TLN            | IDSR           |  |

*Note: For optional fuse block covers, refer to POWR-Covers section of this catalog.*

#### Class H 250V

| Amp Rating | No. of Poles | Catalog Number | Connector Type<br>(Add Suffix Shown) |                |         | Maximum Wire Size |
|------------|--------------|----------------|--------------------------------------|----------------|---------|-------------------|
|            |              |                | Screw                                | Pressure Plate | Box Lug |                   |
| 30         | 1            | LH25030-1      | S (R)                                | P (R)          | C (R)   | S & P = #10 CU    |
|            | 2            | LH25030-2      | S (R)                                | P (R)          | C (R)   | C = #6 CU-AL      |
|            | 3            | LH25030-3      | S (R)                                | P (R)          | C (R)   |                   |
| 60         | 1            | LH25060-1      | S (R)                                |                | C (R)   | S = #10 CU        |
|            | 2            | LH25060-2      | S (R)                                |                | C (R)   | C = #2 CU-AL      |
|            | 3            | LH25060-3      | S (R)                                |                | C (R)   |                   |
| 100        | 1            | LH25100-1      |                                      |                | C       |                   |
|            | 2            | LH25100-2      |                                      |                | C       | #2/0 CU-AL        |
|            | 3            | LH25100-3      |                                      |                | C       |                   |
| 200        | 1            | LH25200-1      |                                      |                | C       |                   |
|            | 3            | LH25200-3      |                                      |                | C       | 250 MCM CU-AL     |
| 400        | 1            | LH25400-1      |                                      |                | CR      |                   |
|            | 3            | LH25400-3      |                                      |                | CR      | (2) 350 MCM CU-AL |
| 600        | 1            | LH25600-1      |                                      |                | C       |                   |
|            | 3            | LH25600-3      |                                      |                | C       | (2) 500 MCM CU-AL |

*Note: Reinforcing springs standard on all Class H fuseblocks 100 amperes and above.*

#### Class R 250V

| Amp Rating | No. of Poles | Catalog Number | Connector Type<br>(Add Suffix Shown) |                |         | Maximum Wire Size |
|------------|--------------|----------------|--------------------------------------|----------------|---------|-------------------|
|            |              |                | Screw                                | Pressure Plate | Box Lug |                   |
| 30         | 1            | LR25030-1      | SR                                   | PR             | CR      | S & P = #10 CU    |
|            | 2            | LR25030-2      | SR                                   | PR             | CR      | C = #6 CU-AL      |
|            | 3            | LR25030-3      | SR                                   | PR             | CR      |                   |
| 60         | 1            | LR25060-1      |                                      |                | CR      | S = #10 CU        |
|            | 2            | LR25060-2      |                                      |                | CR      | C = #2 CU-AL      |
|            | 3            | LR25060-3      |                                      |                | CR      |                   |
| 100        | 1            | LR25100-1      |                                      |                | C       |                   |
|            | 2            | LR25100-2      |                                      |                | C       | #2/0 CU-AL        |
|            | 3            | LR25100-3      |                                      |                | C       |                   |
| 200        | 1            | LR25200-1      |                                      |                | C       |                   |
|            | 3            | LR25200-3      |                                      |                | C       | 250 MCM CU-AL     |
| 400        | 1            | LR25400-1      |                                      |                | CR      |                   |
|            | 3            | LR25400-3      |                                      |                | CR      | (2) 350 MCM CU-AL |
| 600        | 1            | LR25600-1      |                                      |                | C       |                   |
|            | 3            | LR25600-3      |                                      |                | C       | (2) 500 MCM CU-AL |

*Note: Reinforcing springs standard on all Class R fuse blocks.*

#### Class H 600V

| Amp Rating | No. of Poles | Catalog Number | Connector Type<br>(Add Suffix Shown) |                |         | Maximum Wire Size |
|------------|--------------|----------------|--------------------------------------|----------------|---------|-------------------|
|            |              |                | Screw                                | Pressure Plate | Box Lug |                   |
| 30         | 1            | LH60030-1      | S (R)                                | P (R)          | C (R)   | S & P = #10 CU    |
|            | 2            | LH60030-2      | S (R)                                | P (R)          | C (R)   | C = #6 CU-AL      |
|            | 3            | LH60030-3      | S (R)                                | P (R)          | C (R)   |                   |
| 60         | 1            | LH60060-1      |                                      |                | C (R)   | S = #10 CU        |
|            | 2            | LH60060-2      |                                      |                | C (R)   | C = #2 CU-AL      |
|            | 3            | LH60060-3      |                                      |                | C (R)   |                   |
| 100        | 1            | LH60100-1      |                                      |                | C       |                   |
|            | 2            | LH60100-2      |                                      |                | C       | #2/0 CU-AL        |
|            | 3            | LH60100-3      |                                      |                | C       |                   |
| 200        | 1            | LH60200-1      |                                      |                | C       |                   |
|            | 3            | LH60200-3      |                                      |                | C       | 250 MCM CU-AL     |
| 400        | 1            | LH60400-1      |                                      |                | CR      |                   |
|            | 3            | LH60400-3      |                                      |                | CR      | (2) 350 MCM CU-AL |
| 600        | 1            | LH60600-1      |                                      |                | C       |                   |
|            | 3            | LH60600-3      |                                      |                | C       | (2) 500 MCM CU-AL |

*Note: Reinforcing springs standard on all Class H fuse blocks 100 amperes and above.*

#### Class R 600V

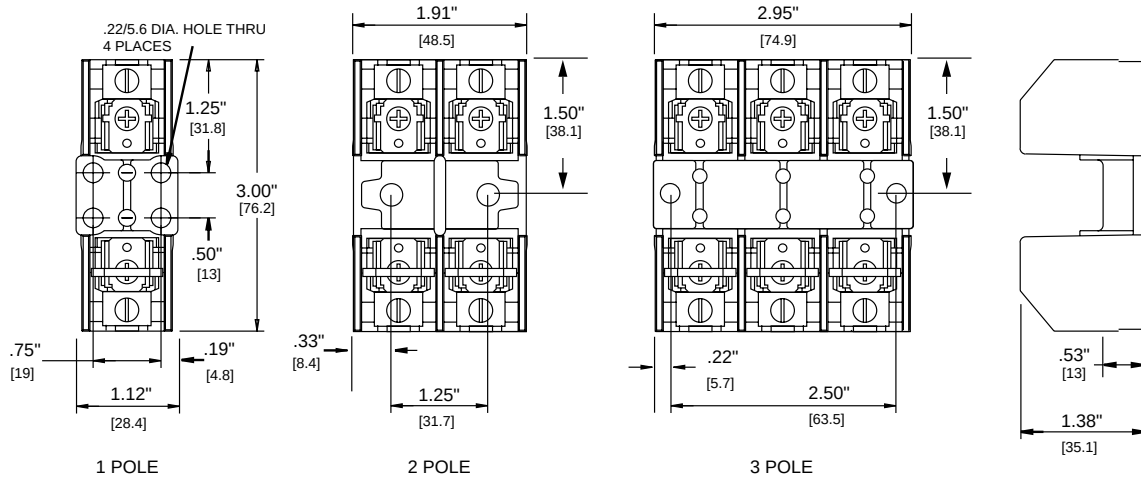
| Amp Rating | No. of Poles | Catalog Number | Connector Type<br>(Add Suffix Shown) |                |         | Maximum Wire Size |
|------------|--------------|----------------|--------------------------------------|----------------|---------|-------------------|
|            |              |                | Screw                                | Pressure Plate | Box Lug |                   |
| 30         | 1            | LR60030-1      | SR                                   | PR             | CR      | S & P = #10 CU    |
|            | 2            | LR60030-2      | SR                                   | PR             | CR      | C = #6 CU-AL      |
|            | 3            | LR60030-3      | SR                                   | PR             | CR      |                   |
| 60         | 1            | LR60060-1      |                                      |                | CR      | S = #10 CU        |
|            | 2            | LR60060-2      |                                      |                | CR      | C = #2 CU-AL      |
|            | 3            | LR60060-3      |                                      |                | CR      |                   |
| 100        | 1            | LR60100-1      |                                      |                | C       |                   |
|            | 2            | LR60100-2      |                                      |                | C       | #2/0 CU-AL        |
|            | 3            | LR60100-3      |                                      |                | C       |                   |
| 200        | 1            | LR60200-1      |                                      |                | C       |                   |
|            | 3            | LR60200-3      |                                      |                | C       | 250 MCM CU-AL     |
| 400        | 1            | LR60400-1      |                                      |                | CR      |                   |
|            | 3            | LR60400-3      |                                      |                | CR      | (2) 350 MCM CU-AL |
| 600        | 1            | LR60600-1      |                                      |                | C       |                   |
|            | 3            | LR60600-3      |                                      |                | C       | (2) 500 MCM CU-AL |

*Note: Reinforcing springs standard on all Class R fuse blocks.*

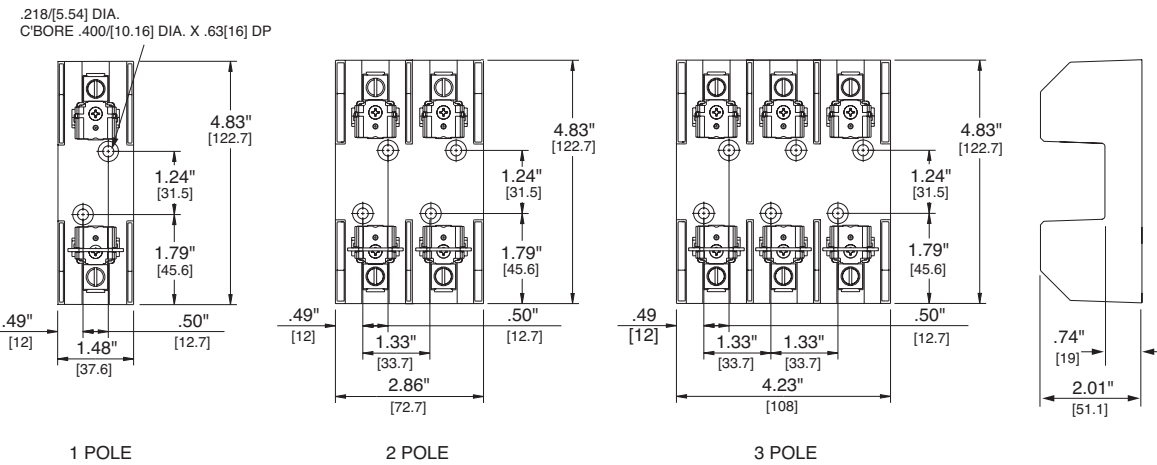
## Class H/K5 and R Fuse Blocks

### 250 Volt

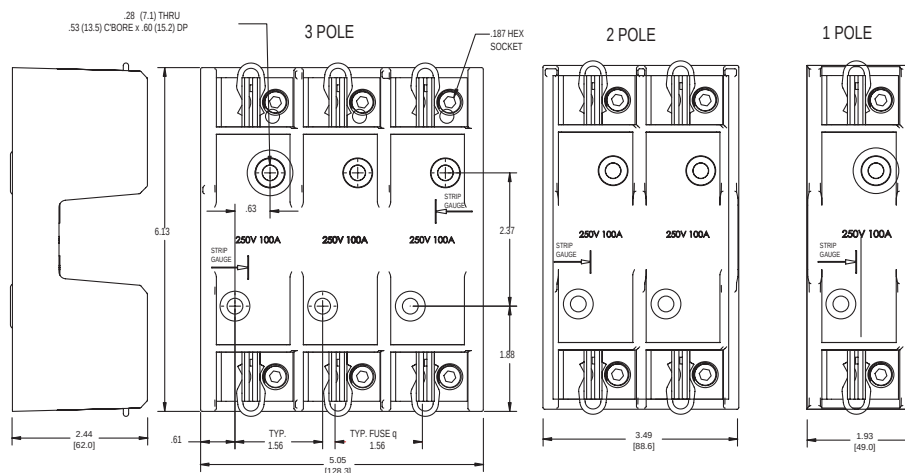
#### 250V 30A



#### 250V 60A



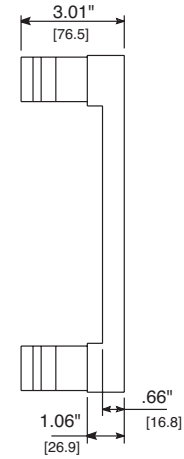
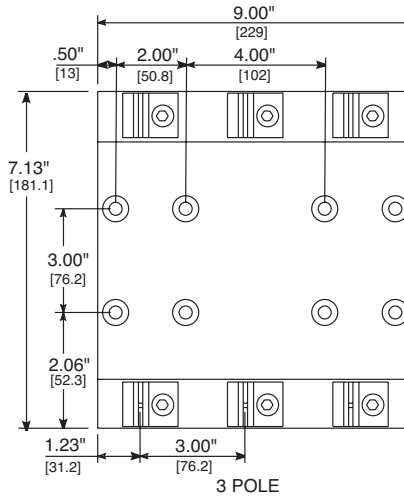
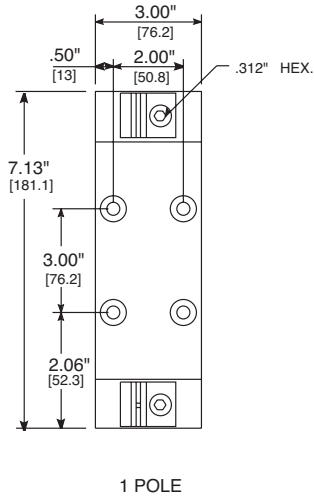
#### 250V 100A



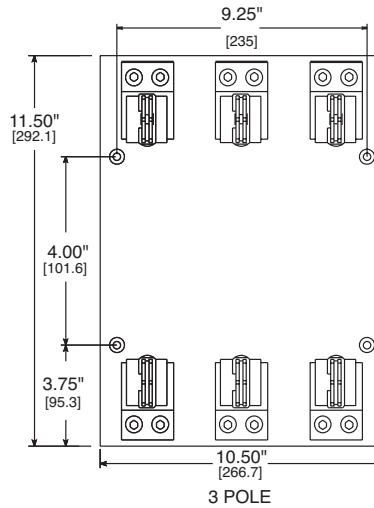
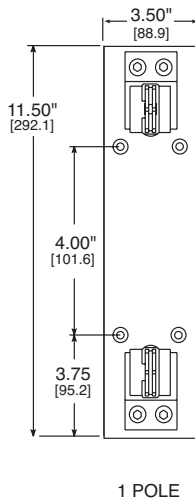
## Class H/K5 and R Fuse Blocks

### 250 Volt

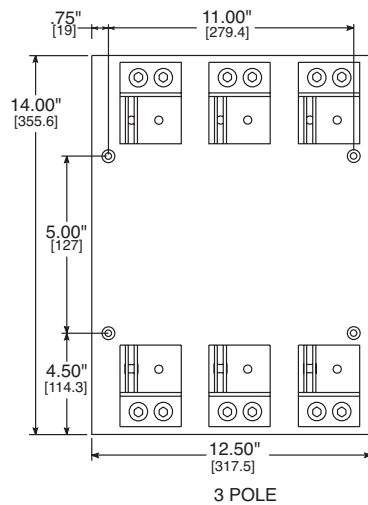
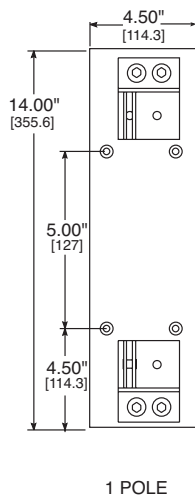
#### 250V 200A



#### 250V 400A



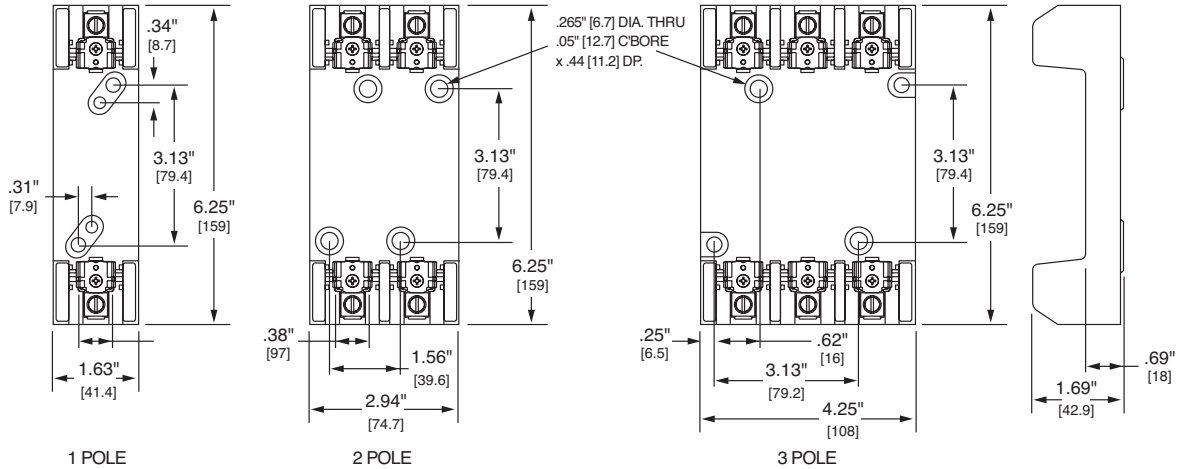
#### 250V 600A



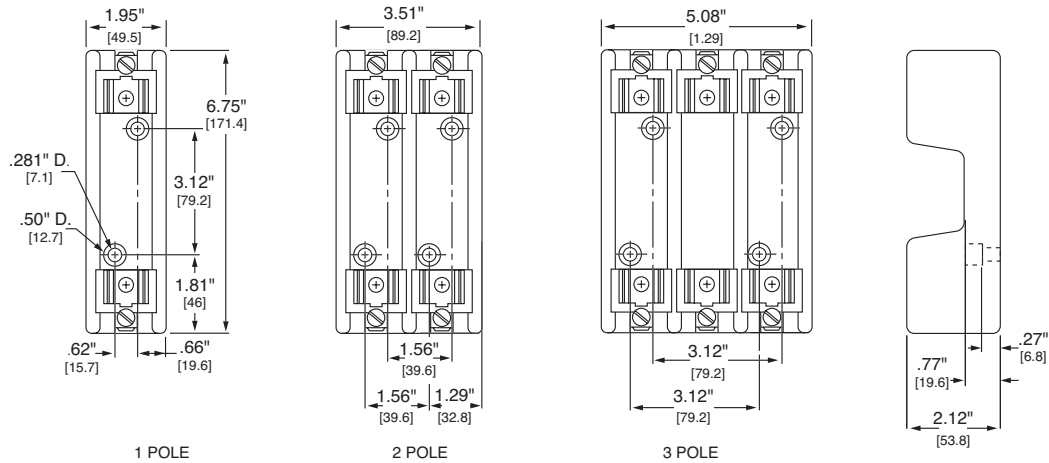
## Class H/K5 and R Fuse Blocks

### 600 Volt

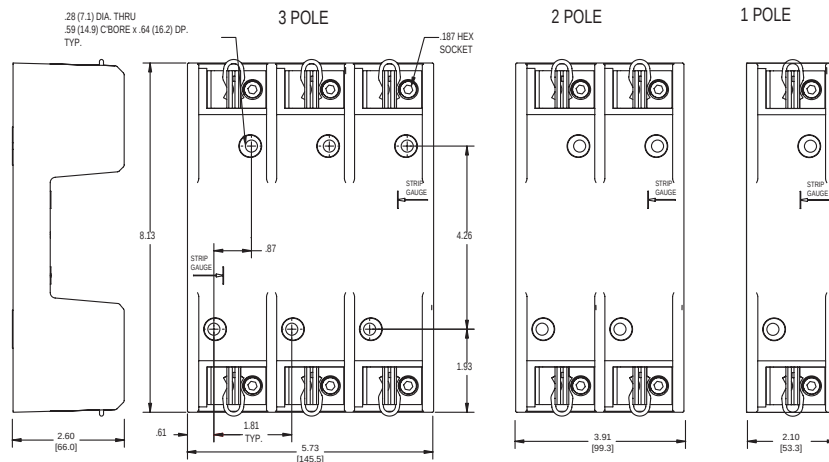
#### 600V 30A



#### 600V 60A



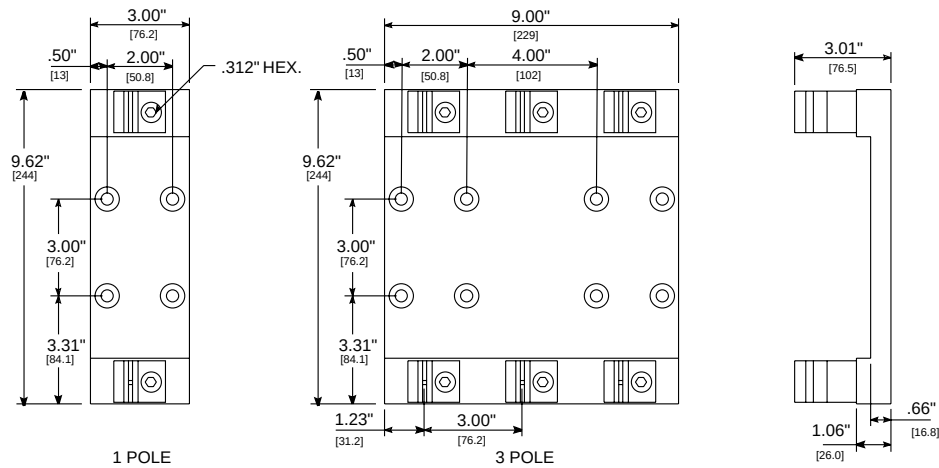
#### 600V 100A



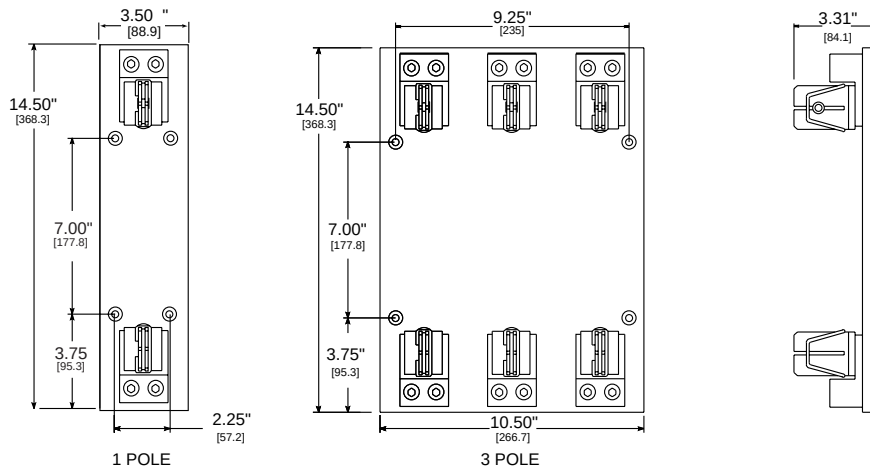
## Class H/K5 and R Fuse Blocks

600 Volt

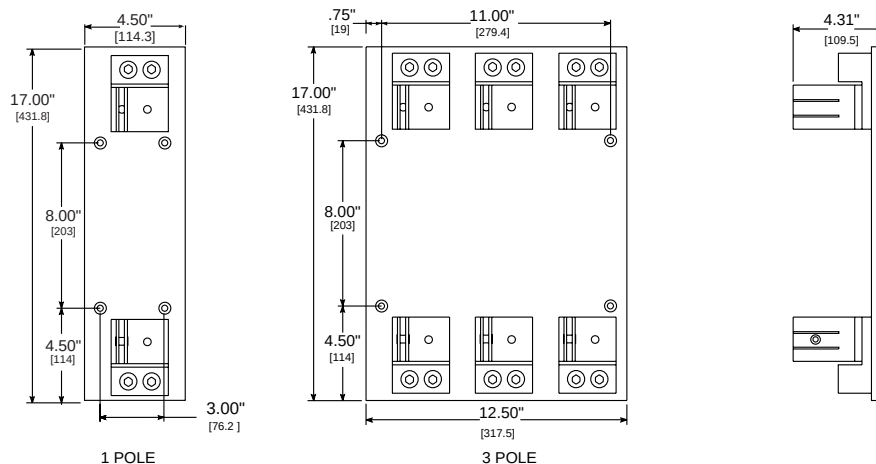
600V 200A



600V 400A



600V 600A



## Class J Fuse Blocks

600 Volt



### Class J 600V

| Amp Rating | No. of Poles | Catalog Number | Connector Type<br>(Add Suffix Shown) |                |         | Maximum Wire Size           |
|------------|--------------|----------------|--------------------------------------|----------------|---------|-----------------------------|
|            |              |                | Screw                                | Pressure Plate | Box Lug |                             |
| 30         | 1            | LJ60030-1      | S (R)                                | P (R)          | C (R)   | S & P = #10 CU<br>C = #6 CU |
|            | 2            | LJ60030-2      | S (R)                                | P (R)          | C (R)   |                             |
|            | 3            | LJ60030-3      | S (R)                                | P (R)          | C (R)   |                             |
|            | Adder        | LJ60030-A      | S (R)                                | P (R)          | C (R)   |                             |
| 60         | 1            | LJ60060-1      |                                      |                | C (R)   | C = #2 CU-AL                |
|            | 2            | LJ60060-2      |                                      |                | C (R)   |                             |
|            | 3            | LJ60060-3      |                                      |                | C (R)   |                             |
| 100        | 1            | LJ60100-1      |                                      |                | CR      | #2/0 CU-AL                  |
|            | 3            | LJ60100-3      |                                      |                | CR      |                             |
| 200        | 1            | LJ60200-1      |                                      |                | C       | 250 MCM CU-AL               |
|            | 3            | LJ60200-3      |                                      |                | C       |                             |
| 400        | 1            | LJ60400-1      |                                      |                | CR      | (2) 350 MCM CU-AL           |
|            | 3            | LJ60400-3      |                                      |                | CR      |                             |
| 600        | 1            | LJ60600-1      |                                      |                | CR      | (2) 500 MCM CU-AL           |
|            | 3            | LJ60600-3      |                                      |                | CR      |                             |

*Note: Reinforcing springs standard on all Class J fuse blocks rated 100A and above.*

\*For optional fuse block covers, refer to POWER-Covers section of this catalog. For reinforcing clips on blocks rated 30-60 amp, add "R" suffix to connector type.

### Features/Benefits

- Phenolic blocks have side barriers for isolation.
- Spring reinforced fuse clips are standard on 100A and larger blocks. Reinforcing springs are optional on 30 and 60 amp blocks.
- **Space saving 30A design** — Up to 45% smaller than existing 30A fuse blocks. 30A interlocking adder block available to create any number of poles (consult factory for availability). Integral DIN rail mount allows this block to be securely fastened to 35 mm "hat" type DIN rails without the use of tools.

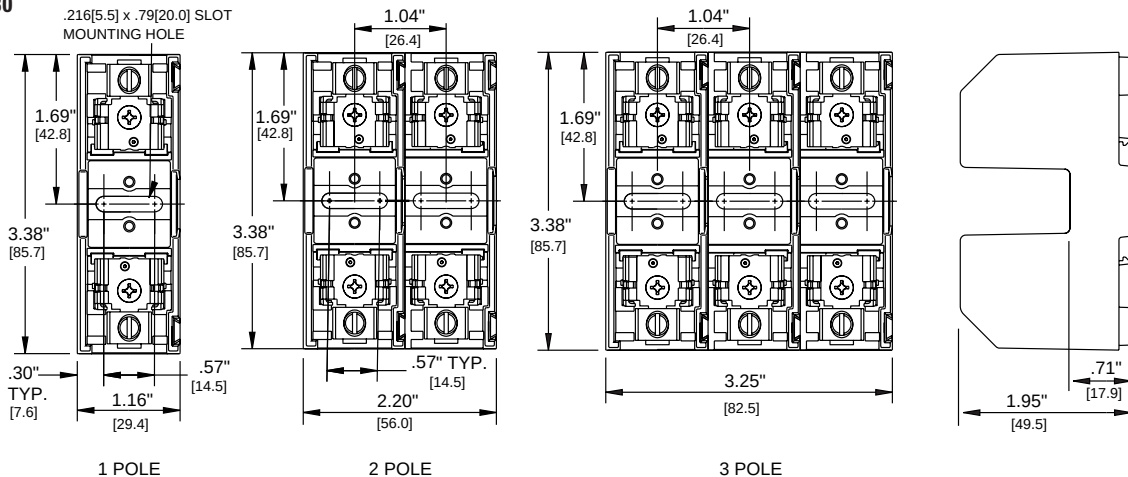
### Specifications

|                         |                                                               |
|-------------------------|---------------------------------------------------------------|
| <b>Voltage Ratings:</b> | 600 Volts                                                     |
| <b>Ampere Ratings:</b>  | 0 – 600 amperes                                               |
| <b>Approvals:</b>       | UL Listed: File No. E14721<br>CSA Certified: File No. LR73091 |

### Recommended Fuses

JTD\_ID/JTD (time-delay) and JLS (fast acting) series fuses

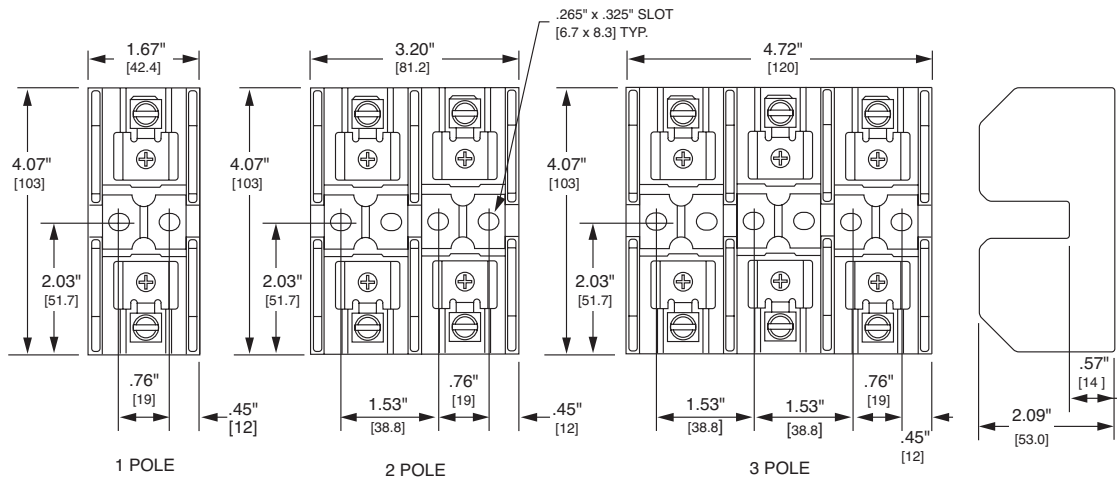
#### LJ60030



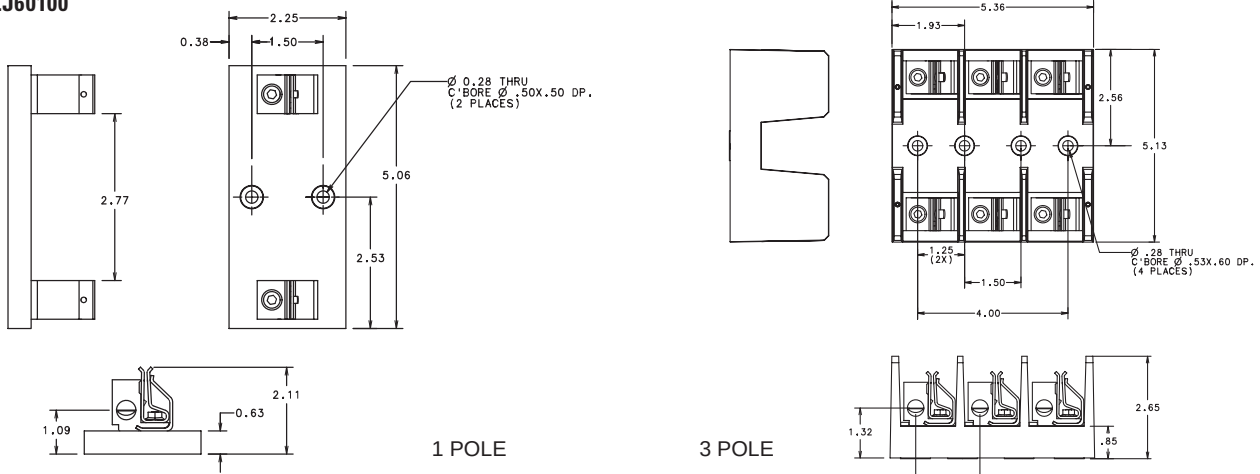
## Class J Fuse Blocks

600 Volt

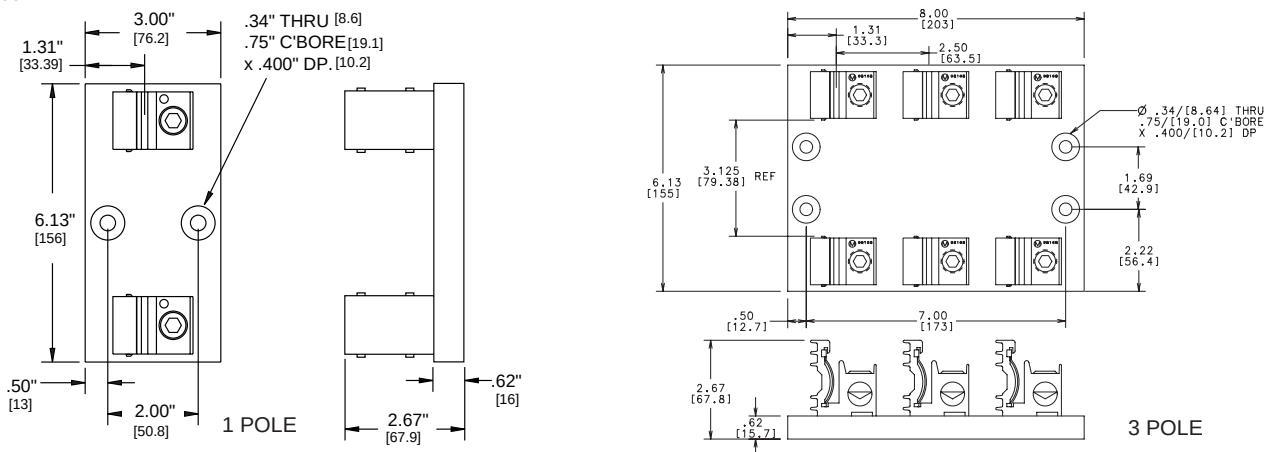
### LJ60060



### LJ60100



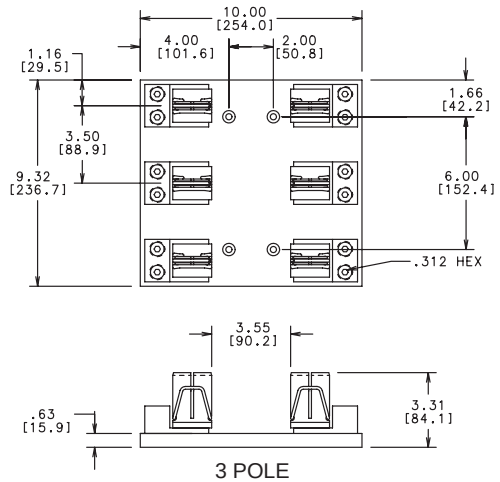
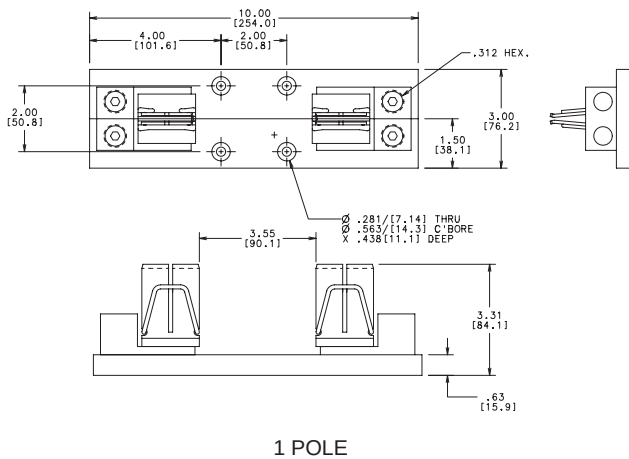
### LJ60200



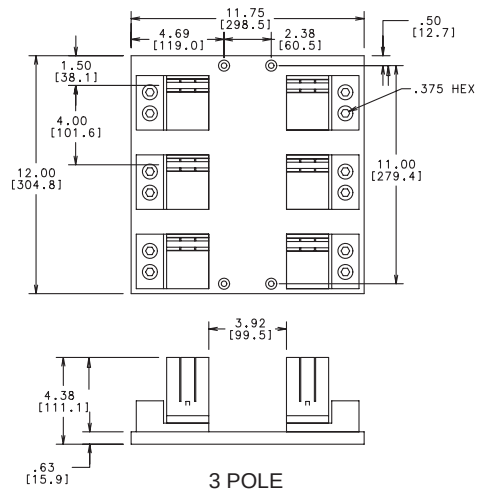
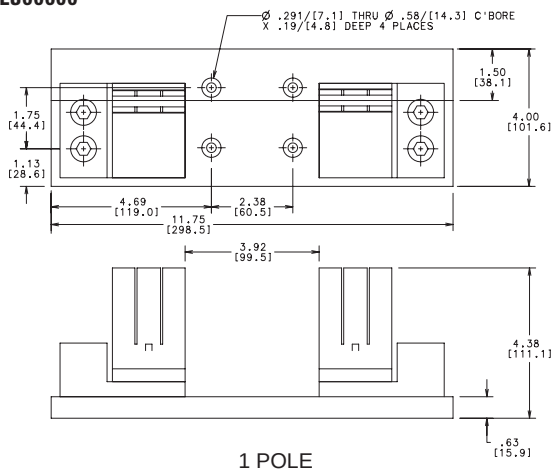
## Class J Fuse Blocks

### 600 Volt

#### LJ60400



#### LJ60600



## Class T Fuse Blocks

300 and 600 Volt



### Features/Benefits

Bases are molded phenolic. To provide a low resistance connection and long-range reliability, steel reinforcing springs are supplied as standard. Larger blocks employ an integral heat sink for maximum heat dissipation.

### Specifications

|                         |                                                                 |
|-------------------------|-----------------------------------------------------------------|
| <b>Voltage Ratings:</b> | 300 Volts AC<br>600 Volts AC                                    |
| <b>Ampere Ratings:</b>  | 0 – 600 amperes                                                 |
| <b>Approvals:</b>       | UL Listed (File No. E14721)<br>CSA Certified (File No. LR73091) |

### Recommended Fuses

JLLN (300V) and JLLS (600V) series fuses  
300 and 600 volt fuse blocks are designed for use with miniaturized Class T fuses. Class T fuses are very fast acting, current-limiting, and approximately one-third the size of electrically comparable Class RK1 fuses.

#### Class T 300V

| Amp Rating | No. of Poles | Catalog Number | Connector Type (Add Suffix Shown) |         | Maximum Wire Size |
|------------|--------------|----------------|-----------------------------------|---------|-------------------|
|            |              |                | Screw                             | Box Lug |                   |
| 30         | 2            | LT30030-2      |                                   | CR      | S = #10 CU        |
|            | 3            | LT30030-3      |                                   | CR      | C = #2 CU         |
| 60         | 2            | LT30060-2      |                                   | CR      | C = #2 CU-AL      |
|            | 3            | LT30060-3      |                                   | CR      |                   |
|            | 4            | LT30060-4      |                                   | CR      |                   |
| 100        | 1            | LT30100-1      |                                   | C       | #2/0 CU-AL        |
|            | 2            | LT30100-2      |                                   | C       |                   |
|            | 3            | LT30100-3      |                                   | C       |                   |
| 200        | 1            | LT30200-1      |                                   | C       | 250 MCM CU-AL     |
| 400        | 1            | LT30400-1      |                                   | C       | (2) 250 MCM CU-AL |
| 600        | 1            | LT30600-1      |                                   | C       | (2) 500 MCM CU-AL |

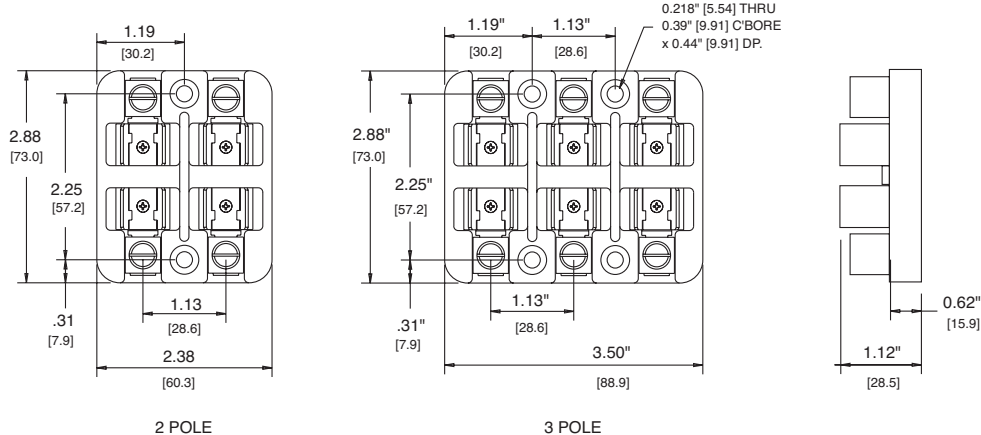
*Note: Reinforcing springs standard on all 300 volt Class T fuse blocks up to 100 amperes. 300 volt Class T blocks 200 amperes and larger have stud mountings.*

#### Class T 600V

| Amp Rating | No. of Poles | Catalog Number | Connector Type (Add Suffix Shown) |         | Maximum Wire Size |
|------------|--------------|----------------|-----------------------------------|---------|-------------------|
|            |              |                | Screw                             | Box Lug |                   |
| 30         | 1            | LT60030-1      | SR                                | CR      | S = #10 CU        |
|            | 2            | LT60030-2      | SR                                | CR      | C = #2 CU-AL      |
|            | 3            | LT60030-3      | SR                                | CR      |                   |
| 60         | 1            | LT60060-1      |                                   | CR      | C = #2 CU-AL      |
|            | 2            | LT60060-2      |                                   | CR      |                   |
|            | 3            | LT60060-3      |                                   | CR      |                   |
| 100        | 1            | LT60100-1      |                                   | C       | #2/0 CU-AL        |
|            | 2            | LT60100-2      |                                   | C       |                   |
|            | 3            | LT60100-3      |                                   | C       |                   |
| 200        | 1            | LT60200-1      |                                   | C       | 250 MCM CU-AL     |
| 400        | 1            | LT60400-1      |                                   | C       | (2) 250 MCM CU-AL |
| 600        | 1            | LT60600-1      |                                   | C       | (2) 500 MCM CU-AL |

*Note: Reinforcing springs standard on all 600 volt Class T fuse blocks up to 60 amperes. 600 volt Class T blocks 100 amperes and larger have stud mountings.*

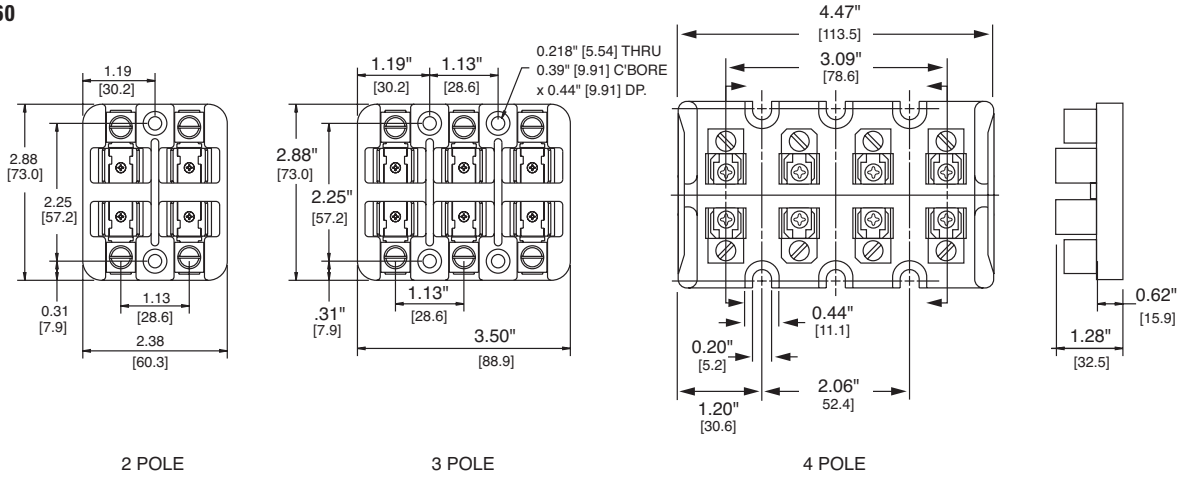
#### LT30030



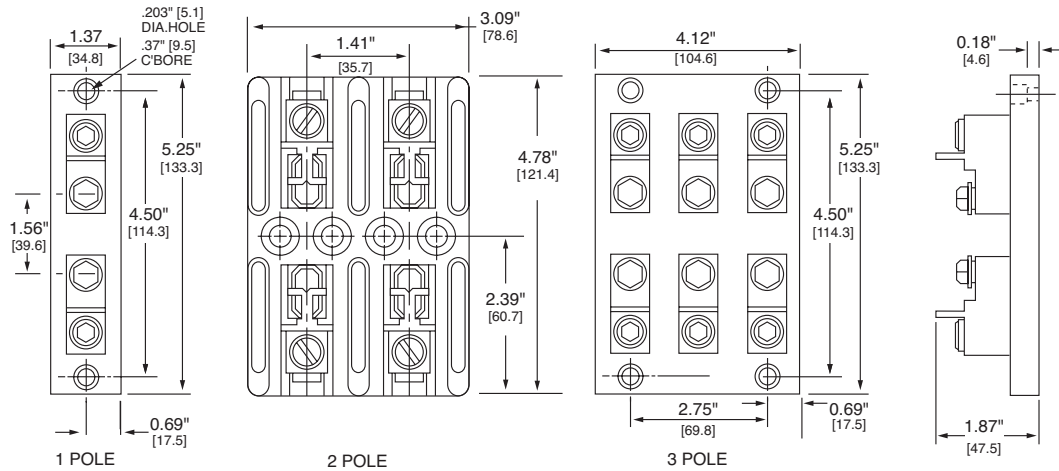
## Class T Fuse Blocks

300 Volt

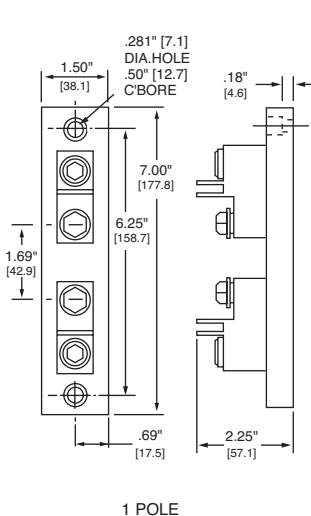
### LT30060



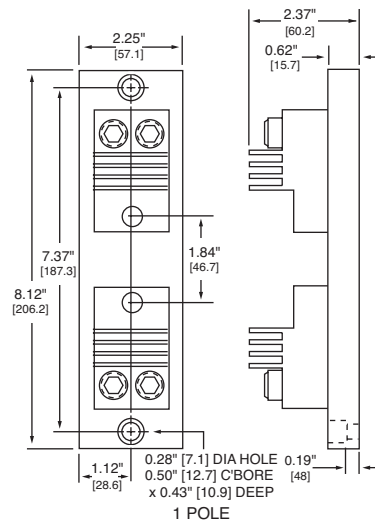
### LT30100



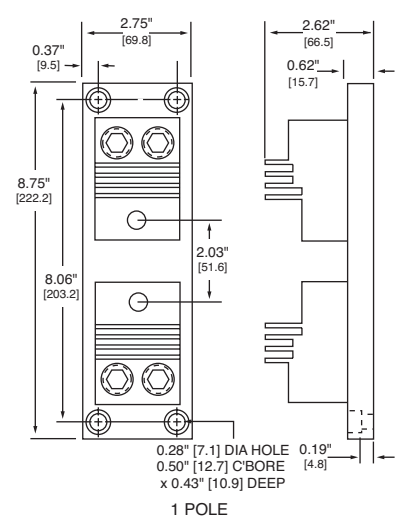
### LT30200



### LT30400



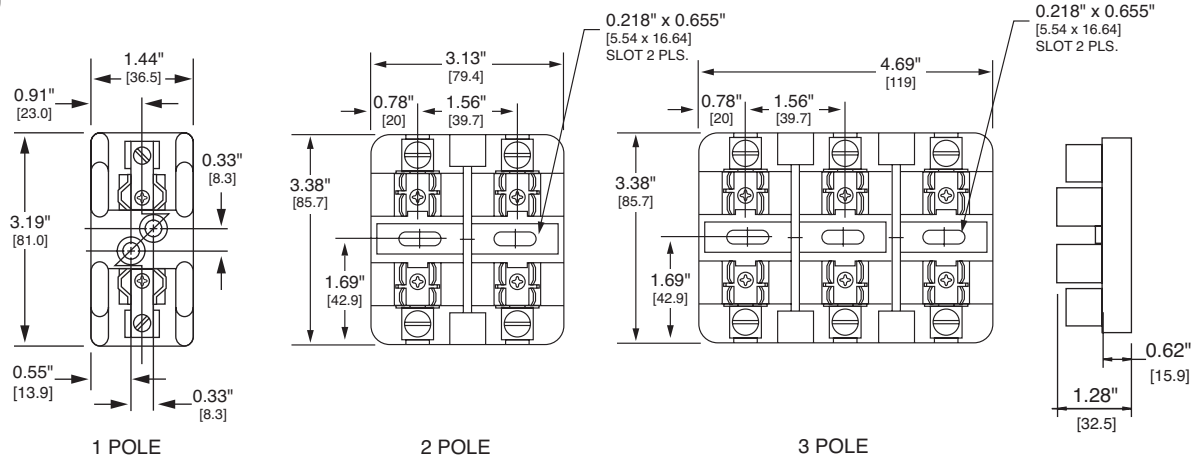
### LT30600



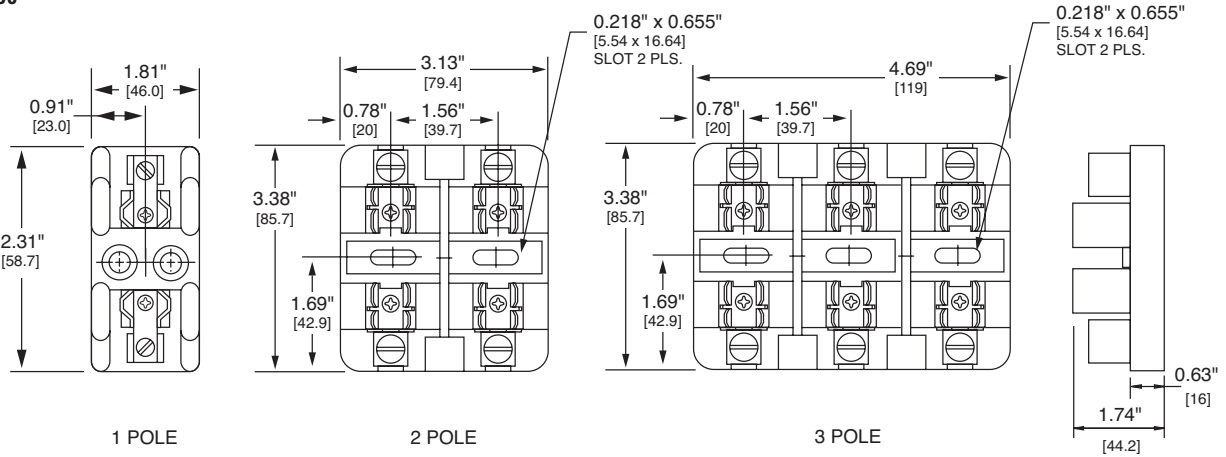
## Class T Fuse Blocks

600 Volt

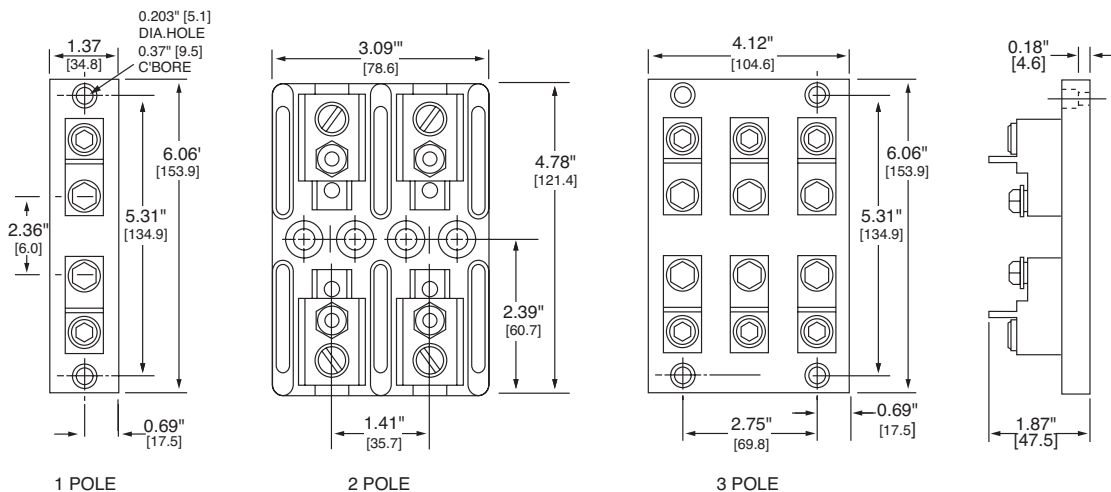
### LT60030



### LT60060



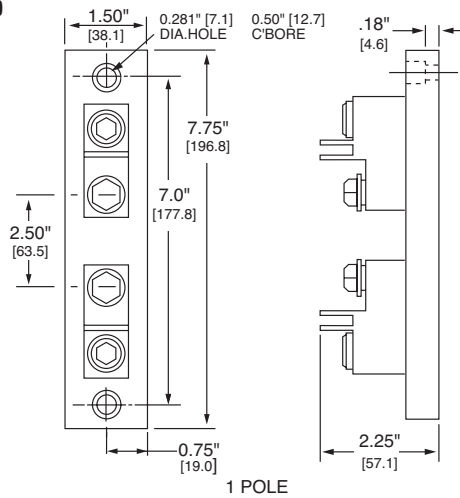
### LT60100



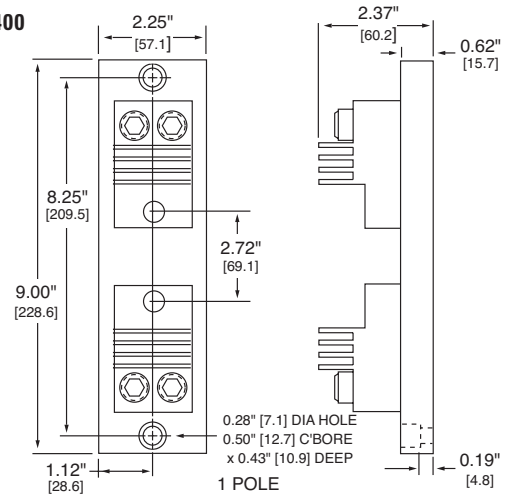
## Class T Fuse Blocks

600 Volt

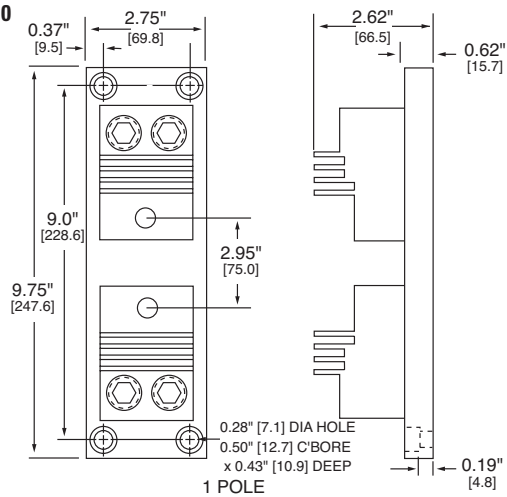
**LT60200**



**LT60400**



**LT60600**



## Class G Fuse Blocks



Class G fuse blocks are designed for use with 480 volt time-delay, current-limiting Class G fuses. They meet requirements for branch circuit protection.

### Specifications

|                         |                                                                                                                                               |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Voltage Ratings:</b> | 600 Volts AC (0 – 20A)<br>480 Volts AC (25 – 60A)                                                                                             |
| <b>Ampere Ratings:</b>  | 0 – 60 amperes                                                                                                                                |
| <b>Approvals:</b>       | UL Listed: 15, 20 & 30A (File No. E14721)<br>60A (File No. E14853)<br>CSA Certified: 15, 20 & 30A (File No. LR7316)<br>60A (File No. LR47235) |

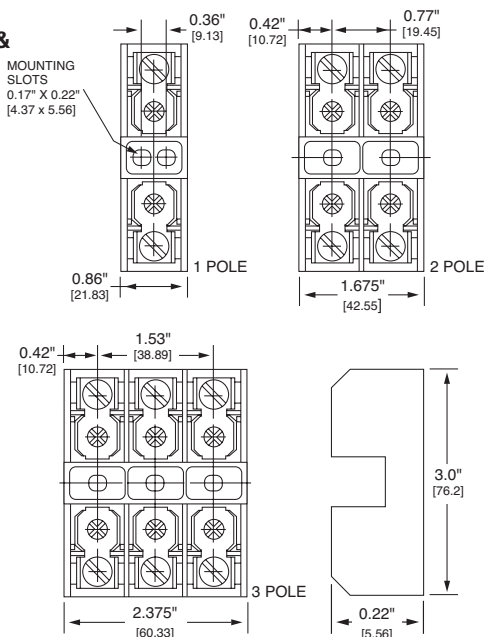
### Recommended Fuses

SLC series fuses

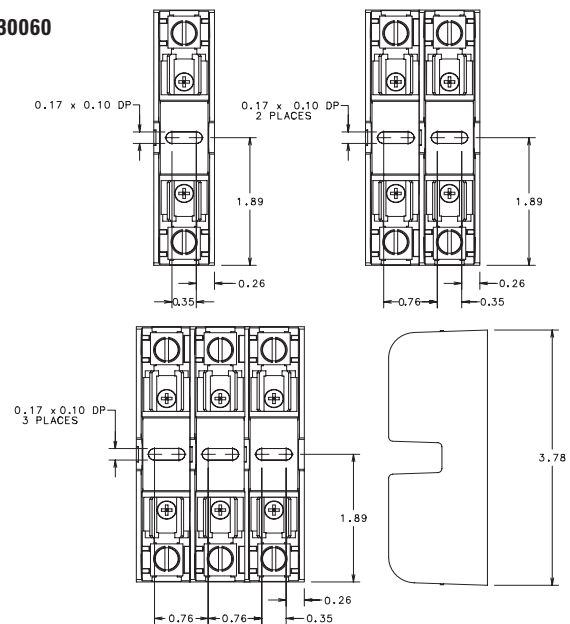
| Amp Rating | No. of Poles | Catalog Number | Connector Type (Add Suffix Shown) |                |         | Maximum Wire Size |
|------------|--------------|----------------|-----------------------------------|----------------|---------|-------------------|
|            |              |                | Screw                             | Pressure Plate | Box Lug |                   |
| 15*        | 1            | LG30015-1      | SQ                                |                |         | #10 CU            |
|            | 2            | LG30015-2      | SQ                                |                |         |                   |
|            | 3            | LG30015-3      | SQ                                |                |         |                   |
| 20*        | 1            | LG30020-1      | SQ                                |                |         | #10 CU            |
|            | 2            | LG30020-2      | SQ                                |                |         |                   |
|            | 3            | LG30020-3      | SQ                                |                |         |                   |
| 30*        | 1            | L30030G-1      | SQ                                | PQ             |         | #10 CU            |
|            | 2            | L30030G-2      | SQ                                | PQ             |         |                   |
|            | 3            | L30030G-3      | SQ                                | PQ             |         |                   |
| 60         | 1            | LG30060-1      |                                   |                | CR      | #2 CU-AL          |
|            | 2            | LG30060-2      |                                   |                | CR      |                   |
|            | 3            | LG30060-3      |                                   |                | CR      |                   |

\* Note: 15, 20 & 30A Class G fuse blocks are equipped with 20A Quick Connect Terminals. 60A fuse block equipped with reinforcing spring as standard.

#### LG30015 & LG30020



#### LG30060



Note: Refer to the Midget/Class CC Fuse Blocks for L30030G 30A Class G Block dimensions.

## Class CC/CD and Midget Fuse Blocks

### 600 Volt



Space saving 600 volt, 30 amp molded case fuse blocks with side barriers for isolation. Class CC blocks and Midget blocks are identical except Class CC blocks incorporate a rejection feature to assure proper fusing.

### Safety

- Rejection feature — Class CC fuse blocks have a rejection feature which prevents the insertion of fuses with lower interrupting rating or voltage ratings. Class CC fuses are rated 600 volts and have an

interrupting rating of 200,000 amperes. Midget fuse voltage ratings vary and their interrupting rating may be as low as 10,000 amperes.

*Note that Class CC fuses may be used in Midget fuse blocks, but Midget fuses cannot be used in Class CC blocks.*

### Long life

- High-strength materials — Class CC and Midget fuse blocks are molded of high-strength, high-temperature material to minimize block breakage during handling and installation, as well as damage caused by overheating.
- Reduced resistance, less heat — High conductivity, one-piece copper alloy fuse clips have lower resistance than traditional two-piece brass or phosphor bronze fuse clips, which minimizes heat rise and watts loss within the fuse block.

### Reduced inventory

- Gangable — Interlocking fuse blocks allow ganging to produce a fuse block with any number of poles.
- Flexible terminal arrangements — 30A Class CC and Midget fuse blocks are available with type C box lug, type SQ screw, or type PQ pressure plate terminals. Type SQ terminals have binding-head screws, while type PQ terminals have captive pressure plates. Both terminal types can accommodate side or top mounted quick-connect terminals. This flexibility allows the accommodation of most needs and reduces part inventory requirements.
- 60A CD fuse blocks are available with type C box lug terminals.
- DIN rail mountable — FBDIN1 adapters permit snap-mounting Littelfuse Class CC and Midget 30 amp fuse blocks directly to standard or low profile 35mm symmetrical “hat” and 32mm asymmetrical DIN rails. Patented DIN rail adapters snap securely to Littelfuse fuse blocks and to DIN rails without tools. They can be readily removed from rails by lifting the disconnect tab.
- L60060C 60A fuse blocks have patented integral DIN rail adapters which allow direct mounting to 35mm “hat” type DIN rails.

### Specifications

|                                          |                                                          |                                 |  |
|------------------------------------------|----------------------------------------------------------|---------------------------------|--|
| <b>Voltage Rating:</b>                   | 600 Volts AC/600 Volts DC                                |                                 |  |
| <b>Ampere ratings:</b>                   | L60030C: 30 amps<br>L60030M: 30 amps<br>L60060C: 60 amps |                                 |  |
| <b>Dielectric strength:</b>              | 1200 volts minimum                                       |                                 |  |
| <b>Clip/terminals:</b>                   | Tin-plated copper alloy                                  |                                 |  |
| <b>Box lug:</b>                          | Copper                                                   |                                 |  |
| <b>Screw and captive pressure plate:</b> | Zinc-plated steel                                        |                                 |  |
| <b>Base:</b>                             | Thermoplastic. UL 94V0 flammability rating.              |                                 |  |
| <b>Approvals:</b>                        | Class CC:                                                | UL Listed (File No. E14721)     |  |
|                                          | Midget:                                                  | UL Recognized (File No. E14721) |  |
|                                          | Class CC/Midget:                                         | CSA Certified (File No. LR7316) |  |

### Recommended Fuses

#### Class CC Blocks:

CCMR | KLDR | KLKR

#### Midget Blocks:

BLF | BLS | FLM | FLU | KLKD | LA60Q-2  
BLN | FLA | FLQ | KLK | KLQ

#### Class CD Blocks:

CCMR

*Note: L60030M can be used up to 40A.*

## Class CC/CD and Midget Fuse Blocks

### 600 Volt

#### Class CC 30A Fuse Blocks

| Amp Rating | No. of Poles | Catalog Number | Connector Type (Add Suffix Shown) | Maximum Wire Size |
|------------|--------------|----------------|-----------------------------------|-------------------|
| 30         | 1            | L60030C-1C     | Box Lug                           | #6 CU             |
|            | 2            | L60030C-2C     |                                   |                   |
|            | 3            | L60030C-3C     |                                   |                   |
| 30         | 1            | L60030C-1PQ    | Pressure Plate/<br>Q. C. Terminal | #10 CU            |
|            | 2            | L60030C-2PQ    |                                   |                   |
|            | 3            | L60030C-3PQ    |                                   |                   |
| 30         | 1            | L60030C-1SQ    | Screw/ Q. C. Terminal             | #10 CU            |
|            | 2            | L60030C-2SQ    |                                   |                   |
|            | 3            | L60030C-3SQ    |                                   |                   |

Note: Quick Connect Terminals are rated at 20 amperes.

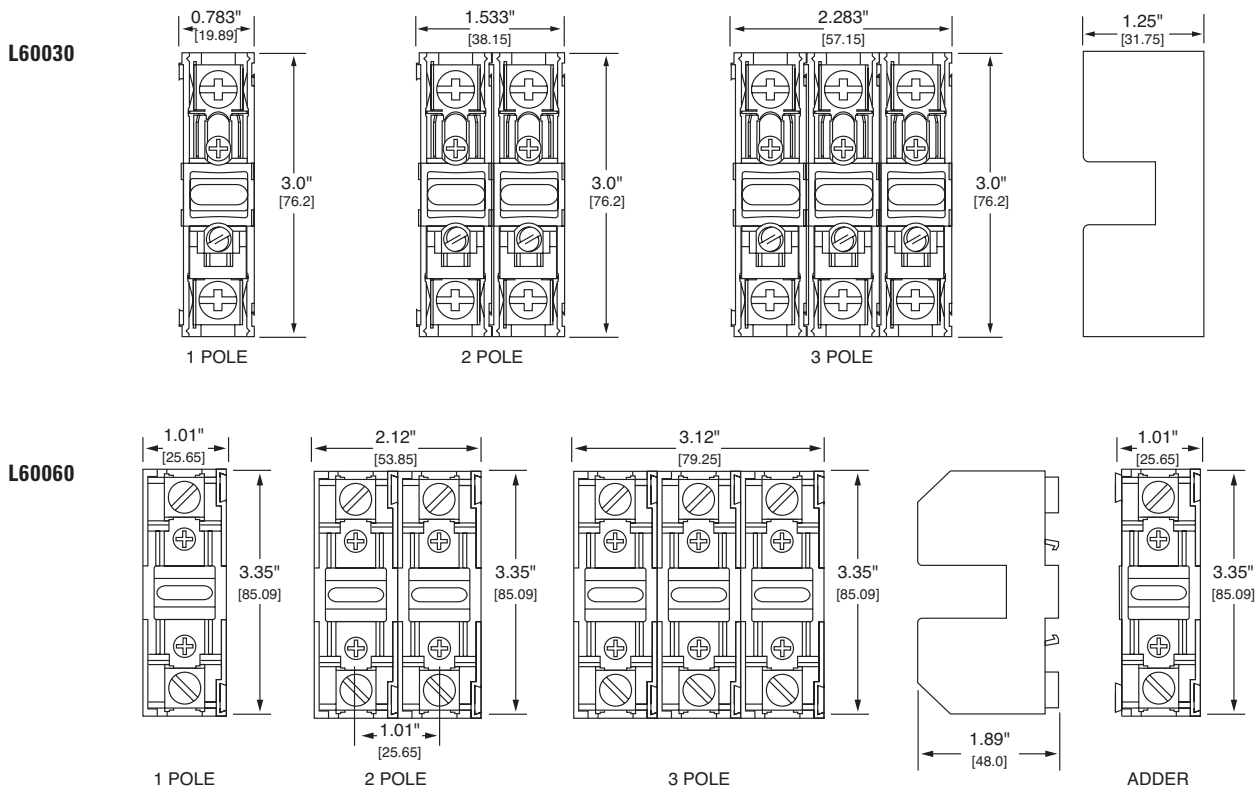
#### Class CD 60A Fuse Blocks

| Amp Rating | No. of Poles | Catalog Number | Connector Type (Add Suffix Shown) | Maximum Wire Size |
|------------|--------------|----------------|-----------------------------------|-------------------|
| 60         | 1            | L60060C-1C     | Box Lug                           | #6 CU             |
|            | 2            | L60060C-2C     |                                   |                   |
|            | 3            | L60060C-3C     |                                   |                   |
| 60         | Adder Block  | L60060C-AC     | Box Lug                           | #6 CU             |

#### Midget Fuse Blocks

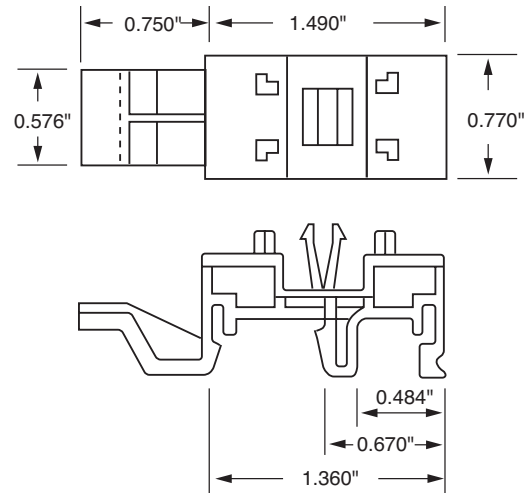
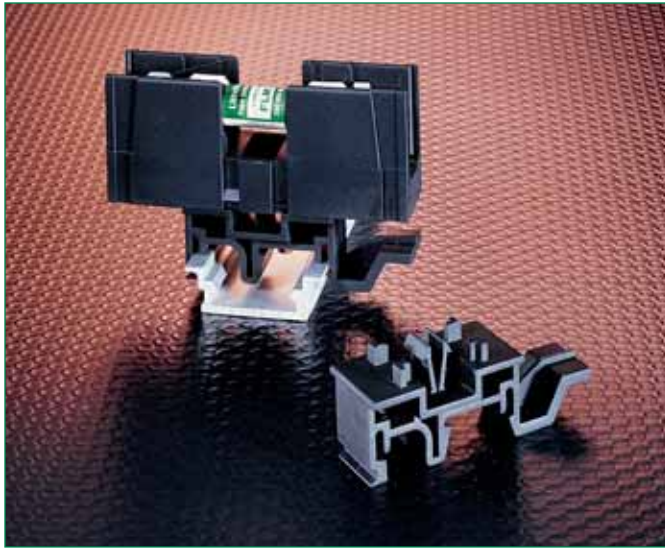
| Amp Rating | No. of Poles | Catalog Number | Connector Type (Add Suffix Shown) | Maximum Wire Size |
|------------|--------------|----------------|-----------------------------------|-------------------|
| 30         | 1            | L60030M-1C     | Box Lug                           | #6 CU             |
|            | 2            | L60030M-2C     |                                   |                   |
|            | 3            | L60030M-3C     |                                   |                   |
| 30         | 1            | L60030M-1PQ    | Pressure Plate/<br>Q. C. Terminal | #10 CU            |
|            | 2            | L60030M-2PQ    |                                   |                   |
|            | 3            | L60030M-3PQ    |                                   |                   |
| 30         | 1            | L60030M-1SQ    | Screw/ Q. C. Terminal             | #10 CU            |
|            | 2            | L60030M-2SQ    |                                   |                   |
|            | 3            | L60030M-3SQ    |                                   |                   |

Note: Quick Connect Terminals are rated at 20 amperes.



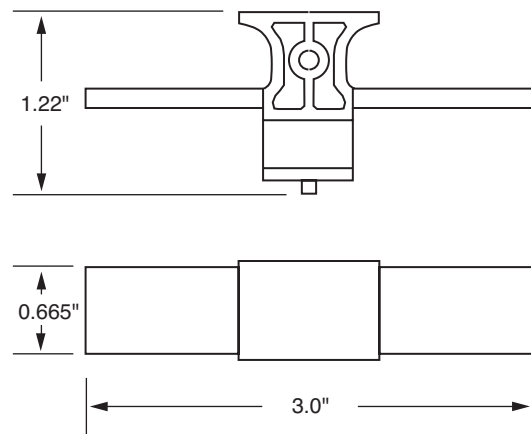
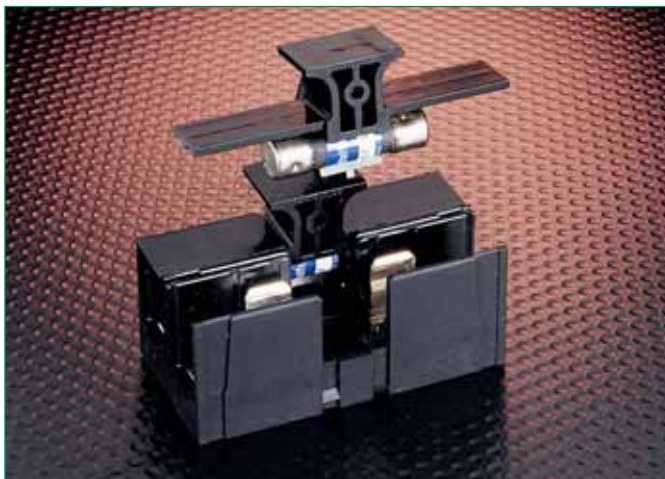
## Class CC and Midget Fuse Block Accessories

### DIN Rail Adapters and Cover Pullers



#### DIN Rail Adapter — FBDIN1

FBDIN1 is for use with 30A Midget, Class CC and Class G fuse blocks. The patented design permits snap-mounting of Littelfuse Class CC and Midget 30A fuse blocks directly to standard and low profile 35mm symmetrical "hat" and 32mm asymmetrical DIN rails. Adapters snap securely to Littelfuse fuse blocks and to DIN rails without tools. They may be readily removed from rails by lifting the disconnect tab.



#### Cover Puller — SPL001

Littelfuse Class CC and Midget fuse cover puller is designed to provide protection to personnel, as well as make removal of fuses from fuse blocks easy and safe. Once installed on the fuse, the cover puller allows removal of the fuse without the use of a separate puller.

- Meets "Dead Front" requirements for use in control panels.
- Permits safe, easy removal.

- Works with existing fuse block. No special hinged fuse blocks are required.
- Easily gangable with 1/8" diameter wire.
- For use with all 600 volt Class CC and Midget 1/10 — 30A fuses.
- Use with Class CC L60030C series and L60030M series fuse blocks.
- Label provided for easy fuse identification.
- For 2-pole cover puller, order DSPL001.

## Fuse Blocks, Holders and Accessories

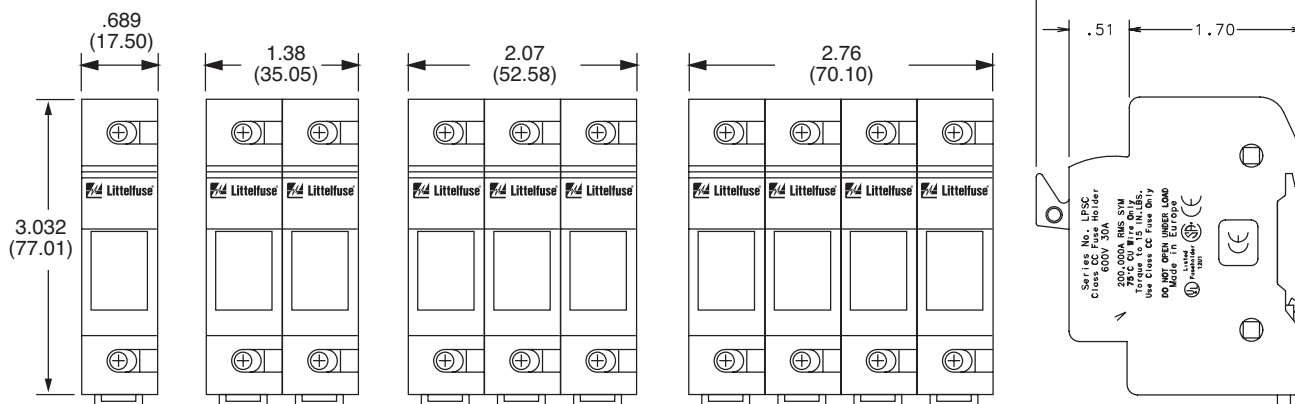
### POWR-SAFE "Dead Front" Holders



Littelfuse POWR-SAFE "Dead Front" holders provide optimum protection to personnel. Indicating and non-indicating versions are available in 1, 2, 3, or 4 poles for Class CC and Midget fuses.

### Dimensions in inches (mm in parentheses)

- LPSM/LPSC POWR-SAFE Holders



### Specifications

**Voltage Rating:** 600 Volts AC/DC  
**Ampere Rating:** 30 amperes  
**Interrupting Rating:** 200 kA (Class CC)  
 100 kA (Midget)  
**Terminal type:** Pressure plate  
**Suggested Torque:** 15 lb.  
**Wire Range:** #6—#14CU

### Features/benefits

- Meets "Dead Front" requirements and IEC Type IP20 Protection
- Mountable on 35mm Din Rail
- Blown fuse identification (Indicating versions only)
- Easy installation and removal of fuses. No special fuse pullers or tools required.
- UL Listed for branch circuit protection (Class CC versions only)
- Compact design
- Ventilated design for cooler operation
- Indicates above 80 volts (ID versions only)

### Ordering information

| Indicating Part Number | Non-Indicating Part Number | Fuse Type | Number of Poles |
|------------------------|----------------------------|-----------|-----------------|
| LPSC001ID              | LPSC001                    | Class CC  | 1               |
| LPSC002ID              | LPSC002                    | Class CC  | 2               |
| LPSC003ID              | LPSC003                    | Class CC  | 3               |
| LPSC004ID              | LPSC004                    | Class CC  | 4               |
| LPSM001ID              | LPSM001                    | Midget    | 1               |
| LPSM002ID              | LPSM002                    | Midget    | 2               |
| LPSM003ID              | LPSM003                    | Midget    | 3               |
| LPSM004ID              | LPSM004                    | Midget    | 4               |

**Multi-pole Assembly Kit:** Order No: CYHP001  
 (Kit contains 20 connector pincers and 10 handle pins.)

*NOTE: Contact factory for DC rated versions.*

**Material:** Thermo-Plastic  
**Flammability Rating:** 94V0  
**Approvals:** UL Listed (LPSC File No: E14721)  
 UL Recognized (LPSM File No: E14721)  
 CSA Certified (LPSC/LPSM File No: LR7316)  
 IEC Type IP20 Protection  
 CE Certified

## Fuse Blocks, Holders and Accessories

### Class J POWR-SAFE Holders



Littelfuse POWR-SAFE “Dead Front” fuseholders provide optimum protection to personnel. An integral DIN-Rail adapter system allows fuse holders to be mounted on 35mm DIN-Rail without the use of tools or special parts. Indicating and non-indicating versions are available in 1, 2, or 3 poles for Class J fuses.

### Features/benefits

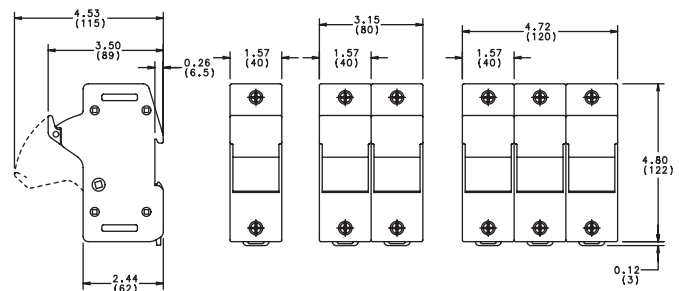
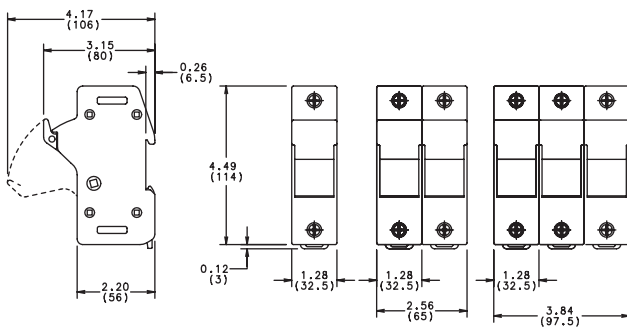
- Meets “Dead Front” requirements and IEC Type IP20 protection.
- Mountable on 35mm DIN-Rail.
- Blown fuse identification (Indicating versions only).
- Easy installation and removal of fuses. No special fuse pullers or tools required.
- UL listed for branch circuit protection.
- Ventilated design for cooler operation.

### Ordering Information

| Littelfuse Catalog No. | Littelfuse System No. | No. of Poles | Pack Qty. | Voltage Rating | Ampere Rating | Options    |
|------------------------|-----------------------|--------------|-----------|----------------|---------------|------------|
| LPSJ30-1               | LPSJ301.Z             | 1            | 6         | 600V           | 30A           | —          |
| LPSJ30-2               | LPSJ302.Z             | 2            | 3         | 600V           | 30A           | —          |
| LPSJ30-3               | LPSJ303.Z             | 3            | 2         | 600V           | 30A           | —          |
| LPSJ30-1ID             | LPSJ301.ZXID          | 1            | 6         | 600V           | 30A           | Indicating |
| LPSJ30-2ID             | LPSJ302.ZXID          | 2            | 3         | 600V           | 30A           | Indicating |
| LPSJ30-3ID             | LPSJ303.ZXID          | 3            | 2         | 600V           | 30A           | Indicating |
| LPSJ60-1               | LPSJ601.Z             | 1            | 6         | 600V           | 60A           | —          |
| LPSJ60-2               | LPSJ602.Z             | 2            | 3         | 600V           | 60A           | —          |
| LPSJ60-3               | LPSJ603.Z             | 3            | 2         | 600V           | 60A           | —          |
| LPSJ60-1ID             | LPSJ601.ZXID          | 1            | 6         | 600V           | 60A           | Indicating |
| LPSJ60-2ID             | LPSJ602.ZXID          | 2            | 3         | 600V           | 60A           | Indicating |
| LPSJ60-3ID             | LPSJ603.ZXID          | 3            | 2         | 600V           | 60A           | Indicating |

**Multi-Pole Assembly Kit:** Order No: US3J2PAK to assemble two LPSJ30-1  
 US3J3PAK to assemble three LPSJ30-1  
 US6J2PAK to assemble two LPSJ60-1  
 US6J3PAK to assemble three LPSJ60-1

### Dimensions in inches (mm in parentheses)



### Specifications

**Voltage Rating:** 600 VAC  
**Interrupting Rating:** 200 kA  
**Ampere Rating:** 30 and 60 amperes  
**Terminal Type:** Pressure plate  
**Suggested Torque:** 30A – 35 inch-pounds  
 60A – 45 inch-pounds  
**Wire Range:** #2 – #14CU

**Material:** Thermo-plastic  
**Flammability Rating:** 94V0  
**Approvals:** UL Listed  
 CSA Certified  
 IEC Type IP20 Protection  
 CE

## Fuse Blocks, Holders and Accessories



### POWR-Covers - Fuse Block Covers

Littelfuse fuse block covers protect personnel from accidentally contacting energized contacts. Covers are available for Class H, R, J, and CD type fuses up to 100 amps.

### Features/benefits

- Meets “Dead Front” requirements and IEC Type IP20 Protection for most applications (see note)
- Easily gangable with optional “gang-slide” adapters
- Added safety to personnel
- Unique design allows Littelfuse Indicator® fuses to be seen through covers
- Ventilated to avoid fuse derating
- Covers are reusable
- Covers fit most competitor blocks
- LJ60100-3PC is a three pole clear plastic cover

For “Gang Slide” Adapters order:

PCGS-2 for 2 poles

PCGS-3 for 3 poles

*NOTE: Contact Factory for specific applications.*

### Ordering information

| Littelfuse Part Number | For Use With Fuse Block Number | Voltage | Amp | Fuse Class |
|------------------------|--------------------------------|---------|-----|------------|
| LH25030-PC             | LH25030/LR25030 series         | 250     | 30  | H/R        |
| LH25060-PC             | LH25060/LR25060 series         | 250     | 60  | H/R        |
| LH25100-PC             | LH25100/LR25100 series         | 250     | 100 | H/R        |
| LH60030-PC             | LH60030/LR60030 series         | 600     | 30  | H/R        |
| LH60060-PC             | LH60060/LR60060 series         | 600     | 60  | H/R        |
| LH60100-PC             | LH60100/LR60100 series         | 600     | 100 | H/R        |
| LJ60030-PC             | LJ60030 series only            | 600     | 30  | J          |
| LJ60060-PC             | LJ60060 series only            | 600     | 60  | J          |
| LJ60100-PC*            | LJ60100-1CR only               | 600     | 100 | J          |
| LJ60100-3PC            | LJ60100-3CR only               | 600     | 100 | J          |
| L60060C-PC             | L60060C series only            | 600     | 60  | CD         |

*\*Note: For use with Class J fuses with 1" diameter, Littelfuse series JLS.*

### Specifications

**Voltage Rating:** 600 Volts  
**Ampere Rating:** Class H: 0-100 amps  
Class R: 0-100 amps  
Class J: 0-100 amps  
Class CD: 0-60 amps

**Material:** Thermoplastic  
**Approvals:** UL Listed (File No: E184929)  
CSA Certified (File No: LR7316)

## Fuse Blocks, Holders and Accessories



### Fuse Pullers

Littelfuse ergonomically designed fuse pullers are the safe way of handling power fuses. They offer greater ease in removing fuses. This new molded design is superior to standard pullers because it offers a more comfortable and natural grip when pulling fuses, improving performance. Part No. LPFP

### Part Number & Application

|                           |         |                                                                                            |
|---------------------------|---------|--------------------------------------------------------------------------------------------|
| <b>Midget Fuse Puller</b> | MFP:    | For $\frac{3}{16}$ " to $\frac{1}{2}$ " dia. fuses.                                        |
| <b>Pocket Fuse Puller</b> | LPFP:   | For 0 – 200A 250V,<br>0 – 100A 600V<br>( $\frac{9}{16}$ " – $1\frac{19}{32}$ " dia. fuses) |
| <b>Giant Fuse Puller</b>  | GFP:    | 61 – 600A 250V,<br>61 – 400A 600V<br>( $1\frac{1}{16}$ " – $2\frac{19}{32}$ " dia. fuses)  |
| <b>Tri-Puller</b>         | 097023: | For ATO® and glass fuses.                                                                  |



### POWR-JAW Clip Clamps

POWR-JAW clamps improve the contact between fuse and clip. The unnecessary heat from poor contact due to the loss of spring force in the clips can cause nuisance fuse opening and premature aging of surrounding components.

- High temperature phenolic resin knob designed for the most severe environments.
- 7 sizes to provide effective coverage.
- Simple design makes installation easy.

| Part Number | Volts   | Amperes |
|-------------|---------|---------|
| LCC 1       | 250     | 0-30    |
| LCC 2       | 250     | 35-60   |
| LCC 2       | 600     | 0-30    |
| LCC 4       | 600     | 35-60   |
| LCC 5       | 250/600 | 70-100  |
| LCC 6       | 250/600 | 110-200 |
| LCC 7       | 250/600 | 225-400 |
| LCC 8       | 250/600 | 450-600 |

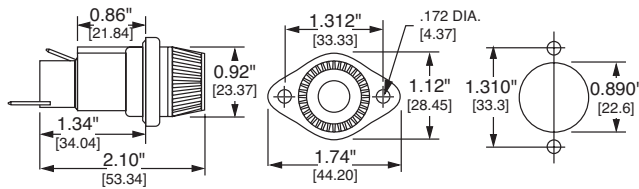
*Note: POWR-JAW Clip Clamps are sold individually, not in pairs. A minimum of  $\frac{1}{8}$ " of clearance between the fuse block barrier and fuse clip is required to install clip clamps.*

## Fuse Blocks, Holders and Accessories



### 571 Series Panel Mounted Fuseholders

Panel mount fuseholders are available for supplementary or Class CC branch circuit protection. Class CC fuses have a rejection feature on one end cap which mates with the rejection feature of Littelfuse Class CC fuse blocks and fuseholders to prevent the installation of fuses with lower voltage ratings or interrupting ratings. Watertight version must be front panel mounted.



Mounting Hole

### Ordering Information

| Part Number |            | Bottom Terminal | Fuse Length Range*                                                  | For Use With   |
|-------------|------------|-----------------|---------------------------------------------------------------------|----------------|
| Standard    | Watertight |                 |                                                                     |                |
| 571 027     | 571 027P   | Straight        | 1 <sup>5</sup> / <sub>16</sub> " – 1 <sup>3</sup> / <sub>8</sub> "  | Midget Fuses   |
| 571 028     | 571 028P   | Rt. Angle       |                                                                     |                |
| 571 007     | 571 007P   | Straight        | 1 <sup>13</sup> / <sub>32</sub> " – 1 <sup>1</sup> / <sub>2</sub> " | Midget Fuses   |
| 571 008     | 571 008P   | Rt. Angle       |                                                                     |                |
| 571 OCC     | 571 OCCP   | Straight        | 1 <sup>1</sup> / <sub>2</sub> "                                     | Class CC Fuses |
| 571 RCC     | 571 RCCP   | Rt. Angle       |                                                                     |                |

\*Fuse diameter is 13/32".

Note: Contact the factory for versions with pre-assembled wire leads.

O-Rings: 901-184 (body)  
901-260 (knob)

### Specifications

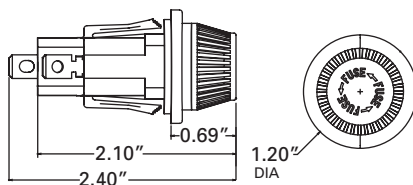
|                             |                                                                                                                                              |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Voltage Rating:</b>      | 600 Volts                                                                                                                                    |
| <b>Ampere Rating:</b>       | 30 amperes for Class CC and Midget fuses                                                                                                     |
| <b>Dielectric strength:</b> | 4000 Volts                                                                                                                                   |
| <b>Terminals:</b>           | Tin-plated brass combination solder and quick-connect                                                                                        |
| <b>Molded parts:</b>        | Black thermoplastic                                                                                                                          |
| <b>Approvals:</b>           | UL Recognized (File No. E14721) — 571 series<br>UL Recognized for branch circuit protection — 571 OCC/RCC<br>CSA Certified (File No. LR7316) |

NEW



### 572 Series Panel Mounted Fuseholders

The 572 series panel mount fuse holders are designed to minimize installation time. The unique design incorporates a snap-mount feature that allows the holder to be installed without any tools or mounting hardware.



### Ordering Information

| Part Number |            | Bottom Terminal | Fuse Length Range*                                                  | For Use With   |
|-------------|------------|-----------------|---------------------------------------------------------------------|----------------|
| Standard    | Watertight |                 |                                                                     |                |
| 572 027     | 572 027P   | Straight        | 1 <sup>5</sup> / <sub>16</sub> " – 1 <sup>3</sup> / <sub>8</sub> "  | Midget Fuses   |
| 572 028     | 572 028P   | Rt. Angle       |                                                                     |                |
| 572 007     | 572 007P   | Straight        | 1 <sup>13</sup> / <sub>32</sub> " – 1 <sup>1</sup> / <sub>2</sub> " | Midget Fuses   |
| 572 008     | 572 008P   | Rt. Angle       |                                                                     |                |
| 572 OCC     | 572 OCCP   | Straight        | 1 <sup>1</sup> / <sub>2</sub> "                                     | Class CC Fuses |
| 572 RCC     | 572 RCCP   | Rt. Angle       |                                                                     |                |

\*Fuse diameter is 13/32".

Note: Contact the factory for versions with preassembled wire leads.

### Specifications

|                             |                                                                                                                                              |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Voltage Rating:</b>      | 600 Volts                                                                                                                                    |
| <b>Ampere Rating:</b>       | 30 Amperes for Class CC and Midget fuses                                                                                                     |
| <b>Dielectric Strength:</b> | 4000 Volts                                                                                                                                   |
| <b>Terminals:</b>           | Tin-plated brass combination solder and quick-connect                                                                                        |
| <b>Molder Parts:</b>        | Black thermoplastic                                                                                                                          |
| <b>Approvals:</b>           | UL Recognized (File No. E14721) – 572 Series<br>UL Recognized for branch circuit protection – 571 OCC/RCC<br>CSA Certified (File No. LR7316) |
| <b>Mounting:</b>            | Designed to fit 14-18 gauge panels with Double "D" punch or 0.875" knock-out hole.                                                           |

## Fuse Blocks, Holders and Accessories



### LFFB Series Limiter Fuse Block

The Littelfuse LFFB fuse block is designed to accept CNL and CNN style limiter fuses. Typical applications include: forklifts, golf carts, and other low voltage battery-operated equipment.

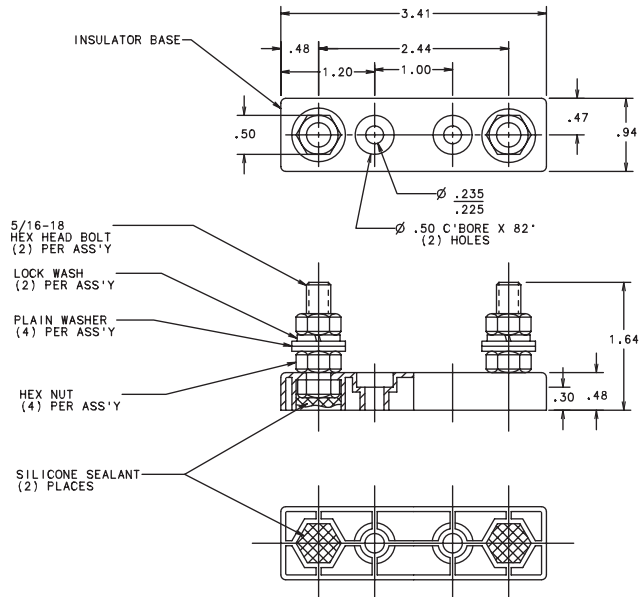
### Specifications

|                        |                                                   |
|------------------------|---------------------------------------------------|
| <b>Voltage Rating:</b> | 150 VAC/VDC                                       |
| <b>Ampere Range:</b>   | 1 – 400 amperes                                   |
| <b>Approvals:</b>      | Pending                                           |
| <b>Construction:</b>   | Base — thermoplastic<br>Studs — steel zinc plated |

### Ordering Information

Example catalog number: LFFB001  
Example system number: LFFB0001Z

### Dimensions



### Recommended fuses

Littelfuse CNL/CNN limiter fuses and competitors' equivalents.



### LHFB Inline Fuse Holder

The Littelfuse LHFB waterproof inline fuse holder is ideal for harsh environments. The easy to assemble one-piece molded thermoplastic body is a bright green color for high visibility. The LHFB holder accepts #12 to #18 gauge wire and features the voltage and ampere rating molded into the body, along with a wire strip gauge. Withstands solvents and vibration, for use with 1/4" x 1 1/4" fuses.

### Installation Instructions

1. Thread wire through fuse holder body.
2. Strip wire insulation per strip gauge.
3. Crimp wire to fuse clip.\*
4. Pull wire through and seat fuse clip in the holder body.
5. Insert desired fuse type and rating.
6. Snap holder body together.

\*Recommended crimping tools: Thomas & Betts No. WT-111M

*NOTE: Wire is not supplied with the holder.*

### Specifications

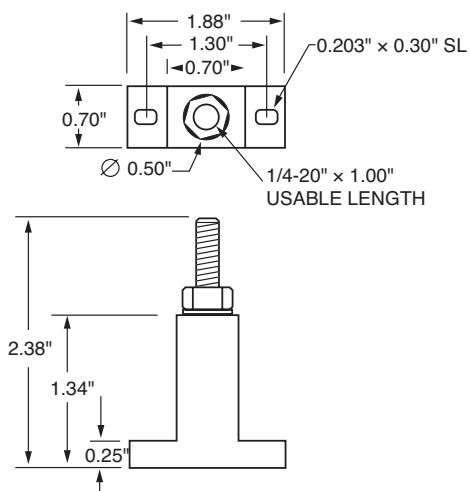
|                        |            |
|------------------------|------------|
| <b>Voltage Rating:</b> | 32 Volts   |
| <b>Ampere Rating:</b>  | 30 amperes |

## Semiconductor Fuse Blocks

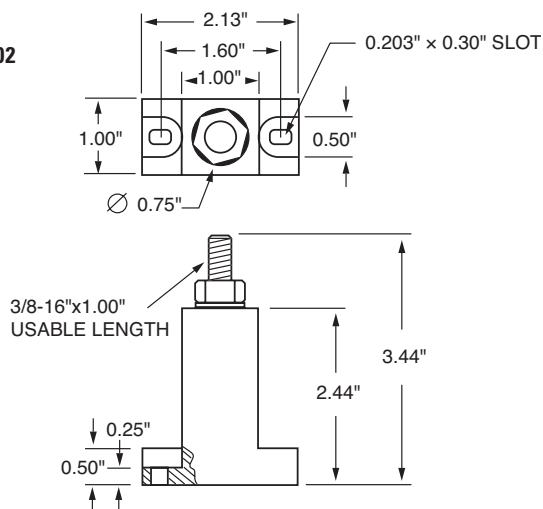


Modular-designed Semiconductor fuse blocks are designed to accommodate a wide range of Semiconductor fuses, with a maximum diameter of 3". This modular design greatly reduces inventory requirements. They are sold in pairs and are constructed of molded phenolic, with plated steel studs.

### LSCR001



### LSCR002



## Recommended Fuses

Semiconductor fuses. See tables below.

### LSCR001

#### Semiconductor fuse block selection guide

| Fuse Series  | Ampere Rating |
|--------------|---------------|
| L15S         | 70 – 400      |
| L25S, LA30QS | 35 – 60       |
| L25S         | 70 – 200      |
| L50S, LA50QS | 35 – 60       |
| L50S, LA50QS | 70 – 100      |
| L50S         | 125 – 200     |
| L60S         | 35 – 60       |
| L60S         | 70 – 100      |
| L60S         | 125 – 200     |
| L70S, LA70QS | 35 – 60       |
| L70S, LA70QS | 70 – 100      |
| KLC          | 1 – 30        |
| KLC          | 35 – 60       |
| LA100P       | 35 – 60       |

### LSCR002

#### Semiconductor fuse block selection guide

| Fuse Series  | Ampere Rating |
|--------------|---------------|
| L15S, LA15QS | 500 – 800     |
| L25S, LA30QS | 225 – 700     |
| L25S, LA30QS | 800           |
| L50S, LA50QS | 225 – 400     |
| L50S, LA50QS | 450 – 600     |
| L50S, LA50QS | 700 – 800     |
| L60S         | 225 – 400     |
| L60S         | 450 – 600     |
| L60S         | 700 – 800     |
| L70S, LA70QS | 125 – 200     |
| L70S, LA70QS | 225 – 400     |
| L70S, LA70QS | 450 – 800     |
| KLC          | 70 – 100      |
| KLC          | 125 – 200     |
| KLC          | 225 – 400     |
| KLC          | 450 – 800     |
| LA100P       | 70 – 800      |
| JLLN         | 700 – 1200    |

## Specifications

- Voltage rating:** LSCR001: Accepts fuses 1" diameter or less at 600V. Also accepts 1<sup>3</sup>/<sub>16</sub>" diameter fuses at 700 – 1000V. LSCR002: Accepts fuses up to 3" diameter at 1000V.
- Ampere ratings:** LSCR001: 1 – 400 ampere capacity. LSCR002: 70 – 800 ampere capacity.
- Approvals:** UL Recognized (File No. E14721)
- Stud Size:** LSCR001: ¼ - 20 thread (Torque: 65 In. LBS.) LSCR002: ⅜ - 16 thread (Torque: 192 In. LBS.)
- Base:** Molded phenolic. 150° C temperature rating.
- Terminal construction:** Plated steel. Supplied with nut and belleville washer.

## Semiconductor Fuse Blocks



Littelfuse 1LS series modular style semiconductor fuse blocks accommodate a wide range of semiconductor fuses. Blocks are provided in pairs with fuse mounting hardware.

- 2-piece modular design
- General purpose phenolic base
- Tin plated aluminum box lugs
- Dove-tailed interlocking feature (1LS101 only)
- Hex-head bolts and Belleville washers provided

### Ordering Information

| Littelfuse Catalog No. | Ampere Rating | Wire Range        | Torque Rating | Approvals      |
|------------------------|---------------|-------------------|---------------|----------------|
| 1LS101                 | 100A          | #2/0 - 14 CU/AL   | 120 IN. LBS.  | UL Recognized  |
| 1LS102                 | 400A          | 250MCM - #6 CU/AL | 275 IN. LBS.  | UL Recognized  |
| 1LS103                 | 400A          | 250MCM - #6 CU/AL | 275 IN. LBS.  | UL Recognized  |
| 1LS104                 | 600A          | 500MCM - #6 CU/AL | 375 IN. LBS.  | UL Recognized  |
| 1LS108                 | 400A          | 250MCM - #6 CU/AL | 275 IN. LBS.  | Self-Certified |
| 1LS109                 | 400A          | 250MCM - #6 CU/AL | 275 IN. LBS.  | Self-Certified |
| 1LS110                 | 400A          | 250MCM - #6 CU/AL | 275 IN. LBS.  | Self-Certified |

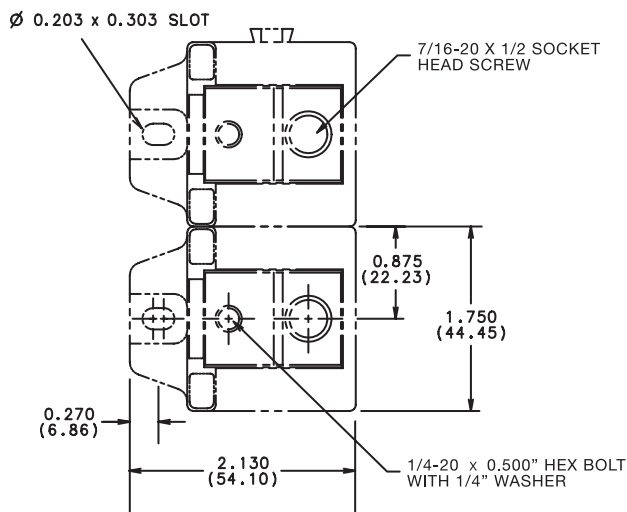
### Specifications

|                        |                                            |
|------------------------|--------------------------------------------|
| <b>Voltage Rating:</b> | 600 Volts                                  |
| <b>Ampere Range:</b>   | 1 – 600 amperes                            |
| <b>Approvals:</b>      | UL Recognized under the components program |
| <b>Insulator Base:</b> | 150° C general purpose phenolic            |
|                        | Box Lug Terminal: Tin plated aluminum      |

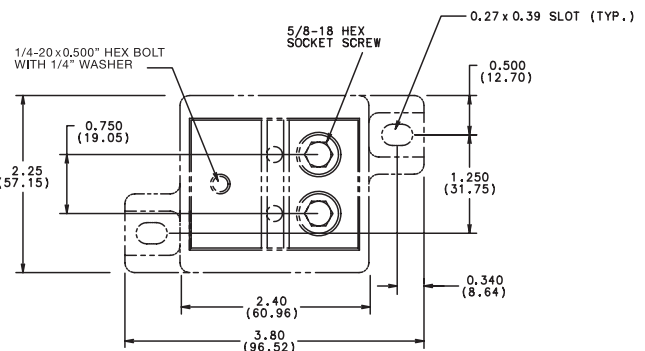
### Dimensions

Dimensions for reference only.

#### 1LS101



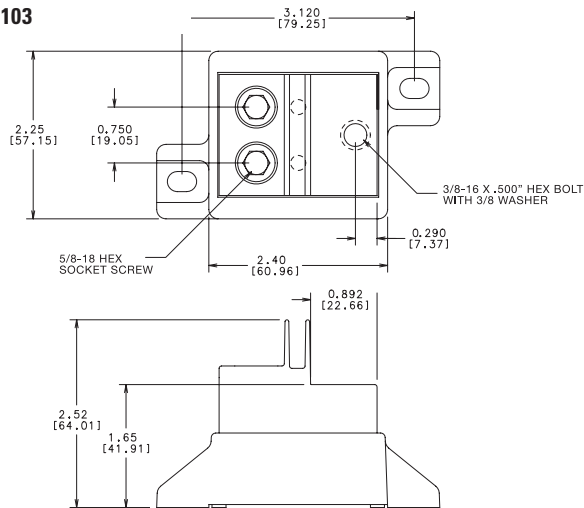
#### 1LS102



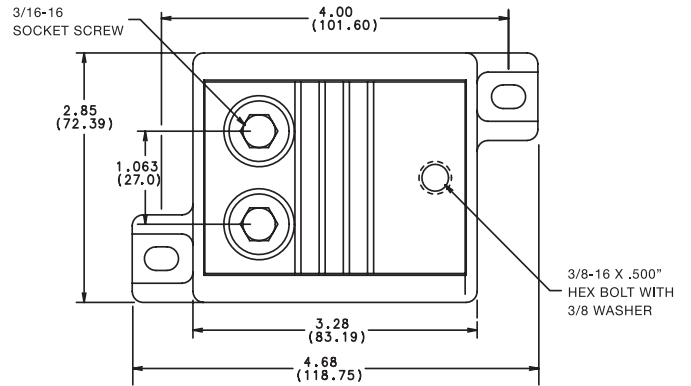
## Semiconductor Fuse Blocks

### Dimensions

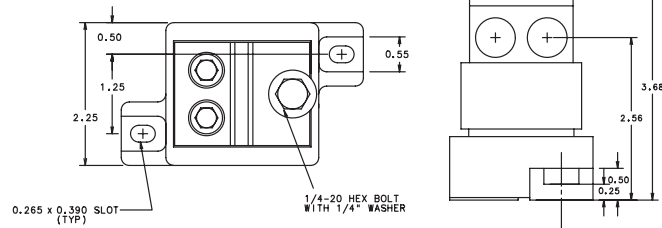
**1LS103**



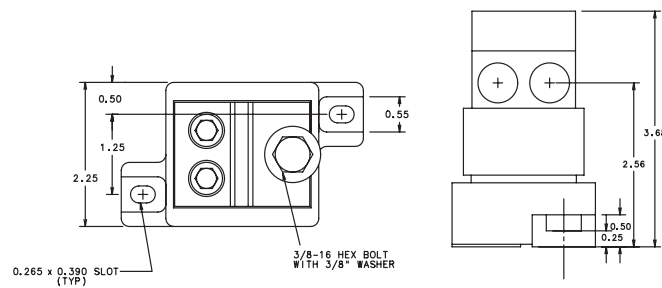
**1LS104**



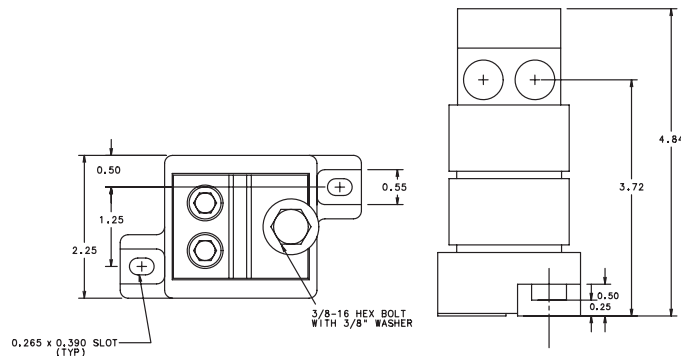
**1LS108**



**1LS109**



**1LS110**



## POWR-BLOCKS™

### Distribution/Splicer Blocks and Covers



POWR-BLOCKS power distribution blocks offer a safe, convenient way of splicing cables, providing a fixed junction tap-off point or splitting primary power into secondary circuits. LX2xxx-DIN series offers integral DIN-Rail mount and an optional hinged safety cover.

### Applications

Typical applications include heating, air conditioning and refrigeration systems, elevator systems, material handling equipment, control panels, motor controls, switchgear, and anywhere power needs to be distributed to more than one load.

### Specifications

|                        |                                                                                          |
|------------------------|------------------------------------------------------------------------------------------|
| <b>Voltage Rating:</b> | 600V                                                                                     |
| <b>Amperage:</b>       | Based on NEC Table 310.16, using 75°C copper wire                                        |
| <b>Material:</b>       | Phenolic rated at 150°C and Thermoplastic rated at 125°C (LD1400 and LS1300 series only) |

### Connectors

Box lug connectors are designed for use with a single, solid or class B or C stranded conductor. Use of more than one conductor per connector opening or use of extra-flexible, fine stranded conductors, such as welding cable, voids the UL Listing, and may cause overheating. Manufacturers of cable terminations can furnish crimp-on sleeves for fine stranded conductors which permit these conductors to be used with box lugs.

### Ampere Ratings

The ampere rating per pole for power distribution blocks is based on the line ampacity of 75°C insulated conductors per NEC Table 310.16. If 60°C insulated conductors are used, load must not exceed the ampacity of 60°C conductors. Use of conductors rated in excess of 75°C is permitted (for example 90°C), however, load must not exceed the ampacity of 75°C conductors.

### Ordering Information

#### Distribution Block Example Part No.

|   |   |      |    |
|---|---|------|----|
| L | D | 2570 | -3 |
|---|---|------|----|

↑  
Littelfuse  
Distribution  
Block  
 ↑  
Series  
 ↑  
No. of Poles

#### Splicer Block Example Part No.

|   |   |      |    |
|---|---|------|----|
| L | S | 3126 | -2 |
|---|---|------|----|

↑  
Littelfuse  
Splicer  
Block  
 ↑  
Series  
 ↑  
No. of Poles

*Note: Aluminum blocks can use copper or aluminum wire; copper blocks can only use copper wire.*

## POWR-BLOKS™

### Distribution/Splicer Blocks and Covers



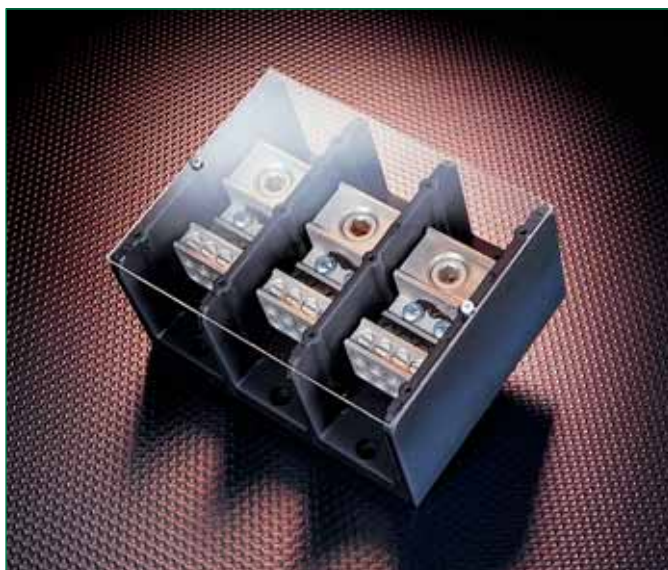
Littelfuse optional power distribution block covers provide protection against accidental shorting between poles caused by loose wires, tools, or other conductive material. They also protect personnel from accidentally contacting energized connectors. Clear plastic covers are available for most blocks. New Lx2xxx-xDIN series blocks offer a hinged cover. To order protective covers, match the number of poles for the block to the cover.

### Distribution Block Covers

#### Hinged Plastic Covers

| Littelfuse Part Number | For use with Distribution/Splicer Block No. | Number of Poles |
|------------------------|---------------------------------------------|-----------------|
| LCH132-1               | LD2xxx-1DIN / LS2xxx-1DIN                   | 1               |
| LCH132-2               | LD2xxx-2DIN / LS2xxx-2DIN                   | 2               |
| LCH132-3               | LD2xxx-3DIN / LS2xxx-3DIN                   | 3               |

*Note: Optional hinged covers snap on to blocks.*



#### Clear Plastic Covers

| Littelfuse Part Number | For use with Distribution/Splicer Block No. | Number of Poles |
|------------------------|---------------------------------------------|-----------------|
| LPBC0-2                | LD0xxx-2 / LS0xxx-2                         | 2               |
| LPBC0-3                | LD0xxx-3 / LS0xxx-3                         | 3               |
| LPBC2-1                | LD2xxx-1 / LS2xxx-1                         | 1               |
| LPBC2-2                | LD2xxx-2 / LS2xxx-2                         | 2               |
| LPBC2-3                | LD2xxx-3 / LS2xxx-3                         | 3               |
| LPBC3-1                | LD3xxx-1 / LS3xxx-1                         | 1               |
| LPBC3-2                | LD3xxx-2 / LS3xxx-2                         | 2               |
| LPBC3-3                | LD3xxx-3 / LS3xxx-3                         | 3               |
| LPBC4-1                | LD4xxx-1 / LS4xxx-1                         | 1               |
| LPBC4-2                | LD4xxx-2 / LS4xxx-2                         | 2               |
| LPBC4-3                | LD4xxx-3 / LS4xxx-3                         | 3               |
| LPBC5-1                | LD5xxx-1 / LS5xxx-1                         | 1               |
| LPBC5-2                | LD5xxx-2 / LS5xxx-2                         | 2               |
| LPBC5-3                | LD5xxx-3 / LS5xxx-3                         | 3               |

*Note: For installation of optional clear plastic covers, use the screws provided with each cover.*

## POWR-BLOKS™

### Distribution/Splicer Blocks and Covers

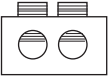
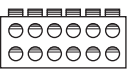
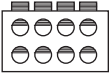
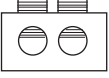
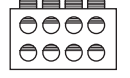
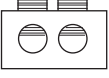
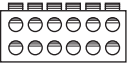
#### Distribution Block Selection Guide

| Connector Configuration |                                                                                     |                                                                                     | Amp Rating per Pole | Number of Poles | Line        |                   | Load       |                   | Figure | Littelfuse Catalog Number |
|-------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------|-----------------|-------------|-------------------|------------|-------------------|--------|---------------------------|
| Mat'l                   | Line                                                                                | Load                                                                                |                     |                 | Wire Range  | Openings per Pole | Wire Range | Openings per Pole |        |                           |
| AL                      |    |    | 115                 | 1               | #2 - #14    | 1                 | #10 - #18  | 4                 | 2      | LD1400-1                  |
|                         |                                                                                     |                                                                                     | 115                 | 2               | #2 - #14    | 1                 | #10 - #18  | 4                 | 2      | LD1400-2                  |
|                         |                                                                                     |                                                                                     | 115                 | 3               | #2 - #14    | 1                 | #10 - #18  | 4                 | 2      | LD1400-3                  |
|                         |                                                                                     |                                                                                     | 115                 | 4               | #2 - #14    | 1                 | #10 - #18  | 4                 | 2      | LD1400-4                  |
| AL                      |    |    | 175                 | 2               | 2/0 - #14   | 1                 | #4 - #14   | 6                 | 1      | LD0401-2                  |
|                         |                                                                                     |                                                                                     | 175                 | 3               | 2/0 - #14   | 1                 | #4 - #14   | 6                 | 1      | LD0401-3                  |
| AL                      |    |    | 175                 | 2               | 2/0 - #14   | 1                 | #4 - #14   | 4                 | 1      | LD0402-2                  |
|                         |                                                                                     |                                                                                     | 175                 | 3               | 2/0 - #14   | 1                 | #4 - #14   | 4                 | 1      | LD0402-3                  |
| AL                      |    |    | 310                 | 2               | 350mcm - #6 | 1                 | #4 - #14   | 6                 | 1      | LD0404-2                  |
|                         |                                                                                     |                                                                                     | 310                 | 3               | 350mcm - #6 | 1                 | #4 - #14   | 6                 | 1      | LD0404-3                  |
| AL                      |    |    | 175                 | 1               | 2/0 - #14   | 1                 | #4 - #14   | 4                 | 3      | LD2570-1                  |
|                         |                                                                                     |                                                                                     | 175                 | 2               | 2/0 - #14   | 1                 | #4 - #14   | 4                 | 3      | LD2570-2                  |
|                         |                                                                                     |                                                                                     | 175                 | 3               | 2/0 - #14   | 1                 | #4 - #14   | 4                 | 3      | LD2570-3                  |
| CU                      |   |   | 175                 | 1               | 2/0 - #14   | 1                 | #4 - #14   | 4                 | 3      | LD2970-1                  |
|                         |                                                                                     |                                                                                     | 175                 | 2               | 2/0 - #14   | 1                 | #4 - #14   | 4                 | 3      | LD2970-2                  |
|                         |                                                                                     |                                                                                     | 175                 | 3               | 2/0 - #14   | 1                 | #4 - #14   | 4                 | 3      | LD2970-3                  |
| AL                      |  |  | 335                 | 1               | 400mcm - #6 | 1                 | #2 - #14   | 4                 | 5      | LD3552-1                  |
|                         |                                                                                     |                                                                                     | 335                 | 2               | 400mcm - #6 | 1                 | #2 - #14   | 4                 | 5      | LD3552-2                  |
|                         |                                                                                     |                                                                                     | 335                 | 3               | 400mcm - #6 | 1                 | #2 - #14   | 4                 | 5      | LD3552-3                  |
| AL                      |  |  | 335                 | 1               | 400mcm - #6 | 1                 | #2 - #14   | 6                 | 5      | LD3553-1                  |
|                         |                                                                                     |                                                                                     | 335                 | 2               | 400mcm - #6 | 1                 | #2 - #14   | 6                 | 5      | LD3553-2                  |
|                         |                                                                                     |                                                                                     | 335                 | 3               | 400mcm - #6 | 1                 | #2 - #14   | 6                 | 5      | LD3553-3                  |
| AL                      |  |  | 350                 | 1               | 2/0 - #14   | 2                 | #4 - #14   | 6                 | 5      | LD3555-1                  |
|                         |                                                                                     |                                                                                     | 350                 | 2               | 2/0 - #14   | 2                 | #4 - #14   | 6                 | 5      | LD3555-2                  |
|                         |                                                                                     |                                                                                     | 350                 | 3               | 2/0 - #14   | 2                 | #4 - #14   | 6                 | 5      | LD3555-3                  |
| CU                      |  |  | 380                 | 1               | 500mcm - #4 | 1                 | #2 - #14   | 6                 | 5      | LD3953-1                  |
|                         |                                                                                     |                                                                                     | 380                 | 2               | 500mcm - #4 | 1                 | #2 - #14   | 6                 | 5      | LD3953-2                  |
|                         |                                                                                     |                                                                                     | 380                 | 3               | 500mcm - #4 | 1                 | #2 - #14   | 6                 | 5      | LD3953-3                  |
| CU                      |  |  | 350                 | 1               | 2/0 - #14   | 2                 | #4 - #14   | 6                 | 5      | LD3955-1                  |
|                         |                                                                                     |                                                                                     | 350                 | 2               | 2/0 - #14   | 2                 | #4 - #14   | 6                 | 5      | LD3955-2                  |
|                         |                                                                                     |                                                                                     | 350                 | 3               | 2/0 - #14   | 2                 | #4 - #14   | 6                 | 5      | LD3955-3                  |
| AL                      |  |  | 380                 | 1               | 500mcm - #4 | 1                 | #2 - #14   | 6                 | 6      | LD4551-1                  |
|                         |                                                                                     |                                                                                     | 380                 | 2               | 500mcm - #4 | 1                 | #2 - #14   | 6                 | 6      | LD4551-2                  |
|                         |                                                                                     |                                                                                     | 380                 | 3               | 500mcm - #4 | 1                 | #2 - #14   | 6                 | 6      | LD4551-3                  |
| AL                      |  |  | 335                 | 1               | 400mcm - #6 | 1                 | #2 - #14   | 8                 | 6      | LD4560-1                  |
|                         |                                                                                     |                                                                                     | 335                 | 2               | 400mcm - #6 | 1                 | #2 - #14   | 8                 | 6      | LD4560-2                  |
|                         |                                                                                     |                                                                                     | 335                 | 3               | 400mcm - #6 | 1                 | #2 - #14   | 8                 | 6      | LD4560-3                  |
| AL                      |  |  | 380                 | 1               | 500mcm - #4 | 1                 | #2 - #14   | 12                | 7      | LD5552-1                  |
|                         |                                                                                     |                                                                                     | 380                 | 2               | 500mcm - #4 | 1                 | #2 - #14   | 12                | 7      | LD5552-2                  |
|                         |                                                                                     |                                                                                     | 380                 | 3               | 500mcm - #4 | 1                 | #2 - #14   | 12                | 7      | LD5552-3                  |
| AL                      |  |  | 380                 | 1               | 500mcm - #4 | 1                 | 2/0 - #14  | 6                 | 7      | LD5579-1                  |
|                         |                                                                                     |                                                                                     | 380                 | 2               | 500mcm - #4 | 1                 | 2/0 - #14  | 6                 | 7      | LD5579-2                  |
|                         |                                                                                     |                                                                                     | 380                 | 3               | 500mcm - #4 | 1                 | 2/0 - #14  | 6                 | 7      | LD5579-3                  |
| AL                      |  |  | 760                 | 1               | 500mcm - #4 | 2                 | 2/0 - #14  | 8                 | 7      | LD5586-1                  |
|                         |                                                                                     |                                                                                     | 760                 | 2               | 500mcm - #4 | 2                 | 2/0 - #14  | 8                 | 7      | LD5586-2                  |
|                         |                                                                                     |                                                                                     | 760                 | 3               | 500mcm - #4 | 2                 | 2/0 - #14  | 8                 | 7      | LD5586-3                  |
| AL                      |  |  | 665                 | 1               | 500mcm - #4 | 1                 | 2/0 - #14  | 4                 | 7      | LD5587-1                  |
|                         |                                                                                     |                                                                                     |                     |                 | 350mcm - #6 | 1                 |            |                   |        |                           |
|                         |                                                                                     |                                                                                     | 665                 | 2               | 500mcm - #4 | 1                 | 2/0 - #14  | 4                 | 7      | LD5587-2                  |
|                         |                                                                                     |                                                                                     |                     |                 | 350mcm - #6 | 1                 |            |                   |        |                           |
|                         |                                                                                     |                                                                                     | 665                 | 3               | 500mcm - #4 | 1                 | 2/0 - #14  | 4                 | 7      | LD5587-3                  |
|                         |                                                                                     |                                                                                     |                     |                 | 350mcm - #6 | 1                 |            |                   |        |                           |

## POWR-BLOKS™

### Distribution/Splicer Blocks and Covers

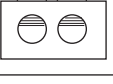
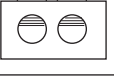
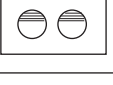
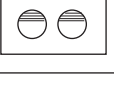
#### Distribution Block Selection Guide

| Connector Configuration |                                                                                     |                                                                                     | Amp Rating per Pole | Number of Poles | Line       |                   | Load       |                   | Figure | Littelfuse Catalog Number |
|-------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------|-----------------|------------|-------------------|------------|-------------------|--------|---------------------------|
| Mat'l                   | Line                                                                                | Load                                                                                |                     |                 | Wire Range | Openings per Pole | Wire Range | Openings per Pole |        |                           |
| AL                      |    |    | 760                 | 1               | 500mcm-#4  | 2                 | #4 - #14   | 12                | 7      | LD5592-1                  |
|                         |                                                                                     |                                                                                     | 760                 | 2               | 500mcm-#4  | 2                 | #4 - #14   | 12                | 7      | LD5592-2                  |
|                         |                                                                                     |                                                                                     | 760                 | 3               | 500mcm-#4  | 2                 | #4 - #14   | 12                | 7      | LD5592-3                  |
| AL                      |    |    | 380                 | 1               | 500mcm-#4  | 1                 | #2 - #14   | 8                 | 7      | LD5594-1                  |
|                         |                                                                                     |                                                                                     | 380                 | 2               | 500mcm-#4  | 1                 | #2 - #14   | 8                 | 7      | LD5594-2                  |
|                         |                                                                                     |                                                                                     | 380                 | 3               | 500mcm-#4  | 1                 | #2 - #14   | 8                 | 7      | LD5594-3                  |
| CU                      |    |    | 760                 | 1               | 500mcm-#4  | 2                 | 2/0 - #14  | 8                 | 7      | LD5986-1                  |
|                         |                                                                                     |                                                                                     | 760                 | 2               | 500mcm-#4  | 2                 | 2/0 - #14  | 8                 | 7      | LD5986-2                  |
|                         |                                                                                     |                                                                                     | 760                 | 3               | 500mcm-#4  | 2                 | 2/0 - #14  | 8                 | 7      | LD5986-3                  |
| CU                      |    |    | 760                 | 1               | 500mcm-#4  | 2                 | #2 - #14   | 12                | 7      | LD5992-1                  |
|                         |                                                                                     |                                                                                     | 760                 | 2               | 500mcm-#4  | 2                 | #2 - #14   | 12                | 7      | LD5992-2                  |
|                         |                                                                                     |                                                                                     | 760                 | 3               | 500mcm-#4  | 2                 | #2 - #14   | 12                | 7      | LD5992-3                  |
| AL                      |   |   | 175                 | 1               | 2/0 - #14  | 1                 | #4 - #14   | 4                 | 4      | LD2570-1DIN               |
|                         |                                                                                     |                                                                                     | 175                 | 2               | 2/0 - #14  | 1                 | #4 - #14   | 4                 | 4      | LD2570-2DIN               |
|                         |                                                                                     |                                                                                     | 175                 | 3               | 2/0 - #14  | 1                 | #4 - #14   | 4                 | 4      | LD2570-3DIN               |
|                         |                                                                                     |                                                                                     | 175                 | Adder           | 2/0 - #14  | 1                 | #4 - #14   | 4                 | 4      | LD2570-ADIN               |
| AL                      |  |  | 175                 | 1               | 2/0 - #14  | 1                 | #4 - #14   | 6                 | 4      | LD2580-1DIN               |
|                         |                                                                                     |                                                                                     | 175                 | 2               | 2/0 - #14  | 1                 | #4 - #14   | 6                 | 4      | LD2580-2DIN               |
|                         |                                                                                     |                                                                                     | 175                 | 3               | 2/0 - #14  | 1                 | #4 - #14   | 6                 | 4      | LD2580-3DIN               |
|                         |                                                                                     |                                                                                     | 175                 | Adder           | 2/0 - #14  | 1                 | #4 - #14   | 6                 | 4      | LD2580-ADIN               |
| CU                      |  |  | 175                 | 1               | 2/0 - #14  | 1                 | #4 - #14   | 4                 | 4      | LD2970-1DIN               |
|                         |                                                                                     |                                                                                     | 175                 | 2               | 2/0 - #14  | 1                 | #4 - #14   | 4                 | 4      | LD2970-2DIN               |
|                         |                                                                                     |                                                                                     | 175                 | 3               | 2/0 - #14  | 1                 | #4 - #14   | 4                 | 4      | LD2970-3DIN               |
|                         |                                                                                     |                                                                                     | 175                 | Adder           | 2/0 - #14  | 1                 | #4 - #14   | 4                 | 4      | LD2970-ADIN               |

## POWR-BLOKS™

### Distribution/Splicer Blocks and Covers

#### Splicer Block Selection Guide

| Connector Configuration |                                                                                     |                                                                                     | Amp Rating per Pole | Number of Poles | Line       |                   | Load       |                   | Figure | Littelfuse Catalog Number |
|-------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------|-----------------|------------|-------------------|------------|-------------------|--------|---------------------------|
| Mat'l                   | Line                                                                                | Load                                                                                |                     |                 | Wire Range | Openings per Pole | Wire Range | Openings per Pole |        |                           |
| AL                      |    |    | 310                 | 2               | 350mcm-#6  | 1                 | 350mcm-#6  | 1                 | 1      | LS0303-2                  |
|                         |                                                                                     |                                                                                     | 310                 | 3               | 350mcm-#6  | 1                 | 350mcm-#6  | 1                 | 1      | LS0303-3                  |
| AL                      |    |    | 115                 | 1               | #2 - #14   | 1                 | #2 - #14   | 1                 | 2      | LS1300-1                  |
|                         |                                                                                     |                                                                                     | 115                 | 2               | #2 - #14   | 1                 | #2 - #14   | 1                 | 2      | LS1300-2                  |
|                         |                                                                                     |                                                                                     | 115                 | 3               | #2 - #14   | 1                 | #2 - #14   | 1                 | 2      | LS1300-3                  |
|                         |                                                                                     |                                                                                     | 115                 | 4               | #2 - #14   | 1                 | #2 - #14   | 1                 | 2      | LS1300-4                  |
| CU                      |    |    | 150                 | 1               | 1/0 - #18  | 1                 | 1/0 - #18  | 1                 | 3      | LS2121-1                  |
|                         |                                                                                     |                                                                                     | 150                 | 2               | 1/0 - #18  | 1                 | 1/0 - #18  | 1                 | 3      | LS2121-2                  |
|                         |                                                                                     |                                                                                     | 150                 | 3               | 1/0 - #18  | 1                 | 1/0 - #18  | 1                 | 3      | LS2121-3                  |
| AL                      |    |    | 115                 | 1               | #2 - #14   | 1                 | #2 - #14   | 1                 | 3      | LS2552-1                  |
|                         |                                                                                     |                                                                                     | 115                 | 2               | #2 - #14   | 1                 | #2 - #14   | 1                 | 3      | LS2552-2                  |
|                         |                                                                                     |                                                                                     | 115                 | 3               | #2 - #14   | 1                 | #2 - #14   | 1                 | 3      | LS2552-3                  |
| AL                      |   |   | 175                 | 1               | 2/0 - #14  | 1                 | 2/0 - #14  | 1                 | 3      | LS2572-1                  |
|                         |                                                                                     |                                                                                     | 175                 | 2               | 2/0 - #14  | 1                 | 2/0 - #14  | 1                 | 3      | LS2572-2                  |
|                         |                                                                                     |                                                                                     | 175                 | 3               | 2/0 - #14  | 1                 | 2/0 - #14  | 1                 | 3      | LS2572-3                  |
| AL                      |  |  | 255                 | 1               | 250mcm-#6  | 1                 | 250mcm-#6  | 1                 | 5      | LS3123-1                  |
|                         |                                                                                     |                                                                                     | 255                 | 2               | 250mcm-#6  | 1                 | 250mcm-#6  | 1                 | 5      | LS3123-2                  |
|                         |                                                                                     |                                                                                     | 255                 | 3               | 250mcm-#6  | 1                 | 250mcm-#6  | 1                 | 5      | LS3123-3                  |
| CU                      |  |  | 255                 | 1               | 250mcm-#6  | 1                 | 250mcm-#6  | 1                 | 5      | LS3124-1                  |
|                         |                                                                                     |                                                                                     | 255                 | 2               | 250mcm-#6  | 1                 | 250mcm-#6  | 1                 | 5      | LS3124-2                  |
|                         |                                                                                     |                                                                                     | 255                 | 3               | 250mcm-#6  | 1                 | 250mcm-#6  | 1                 | 5      | LS3124-3                  |
| AL                      |  |  | 310                 | 1               | 350mcm-#6  | 1                 | 350mcm-#6  | 1                 | 5      | LS3126-1                  |
|                         |                                                                                     |                                                                                     | 310                 | 2               | 350mcm-#6  | 1                 | 350mcm-#6  | 1                 | 5      | LS3126-2                  |
|                         |                                                                                     |                                                                                     | 310                 | 3               | 350mcm-#6  | 1                 | 350mcm-#6  | 1                 | 5      | LS3126-3                  |
| AL                      |  |  | 420                 | 1               | 600mcm-#4  | 1                 | 600mcm-#4  | 1                 | 6      | LS4557-1                  |
|                         |                                                                                     |                                                                                     | 420                 | 2               | 600mcm-#4  | 1                 | 600mcm-#4  | 1                 | 6      | LS4557-2                  |
|                         |                                                                                     |                                                                                     | 420                 | 3               | 600mcm-#4  | 1                 | 600mcm-#4  | 1                 | 6      | LS4557-3                  |
| AL                      |  |  | 620                 | 1               | 350mcm-#4  | 2                 | 350mcm-#4  | 2                 | 7      | LS5129-1                  |
|                         |                                                                                     |                                                                                     | 620                 | 2               | 350mcm-#4  | 2                 | 350mcm-#4  | 2                 | 7      | LS5129-2                  |
|                         |                                                                                     |                                                                                     | 620                 | 3               | 350mcm-#4  | 2                 | 350mcm-#4  | 2                 | 7      | LS5129-3                  |
| AL                      |  |  | 760                 | 1               | 500mcm-#4  | 2                 | 500mcm-#4  | 2                 | 7      | LS5301-1                  |
|                         |                                                                                     |                                                                                     | 760                 | 2               | 500mcm-#4  | 2                 | 500mcm-#4  | 2                 | 7      | LS5301-2                  |
|                         |                                                                                     |                                                                                     | 760                 | 3               | 500mcm-#4  | 2                 | 500mcm-#4  | 2                 | 7      | LS5301-3                  |
| AL                      |  |  | 175                 | 1               | 2/0 - #14  | 1                 | 2/0 - #14  | 1                 | 4      | LS2572-1DIN               |
|                         |                                                                                     |                                                                                     | 175                 | 2               | 2/0 - #14  | 1                 | 2/0 - #14  | 1                 | 4      | LS2572-2DIN               |
|                         |                                                                                     |                                                                                     | 175                 | 3               | 2/0 - #14  | 1                 | 2/0 - #14  | 1                 | 4      | LS2572-3DIN               |
|                         |                                                                                     |                                                                                     | 175                 | A               | 2/0 - #14  | 1                 | 2/0 - #14  | 1                 | 4      | LS2572-ADIN               |
| CU                      |  |  | 175                 | 1               | 2/0 - #14  | 1                 | 2/0 - #14  | 1                 | 4      | LS2972-1DIN               |
|                         |                                                                                     |                                                                                     | 175                 | 2               | 2/0 - #14  | 1                 | 2/0 - #14  | 1                 | 4      | LS2972-2DIN               |
|                         |                                                                                     |                                                                                     | 175                 | 3               | 2/0 - #14  | 1                 | 2/0 - #14  | 1                 | 4      | LS2972-3DIN               |
|                         |                                                                                     |                                                                                     | 175                 | A               | 2/0 - #14  | 1                 | 2/0 - #14  | 1                 | 4      | LS2972-ADIN               |

## POWR-BLOKS™

### Distribution/Splicer Blocks and Covers

#### LX0XXX

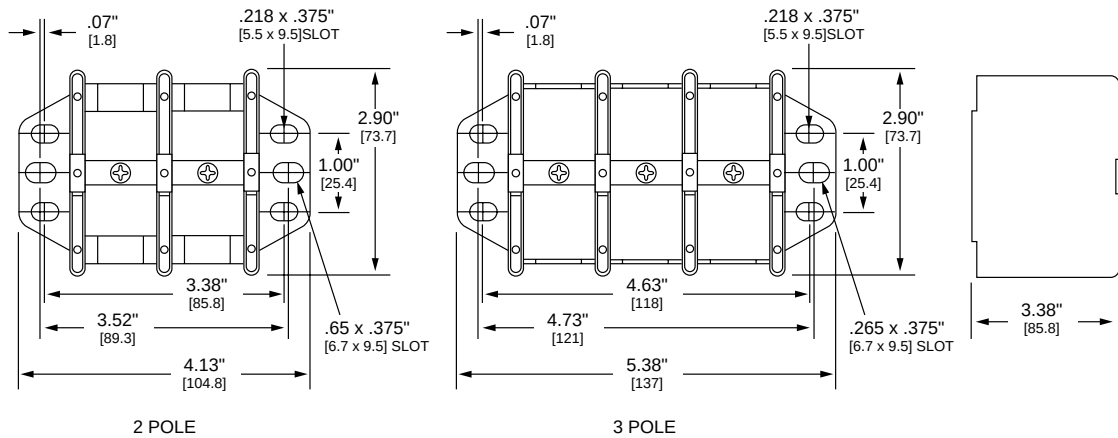


Figure 1

#### LX1XXX

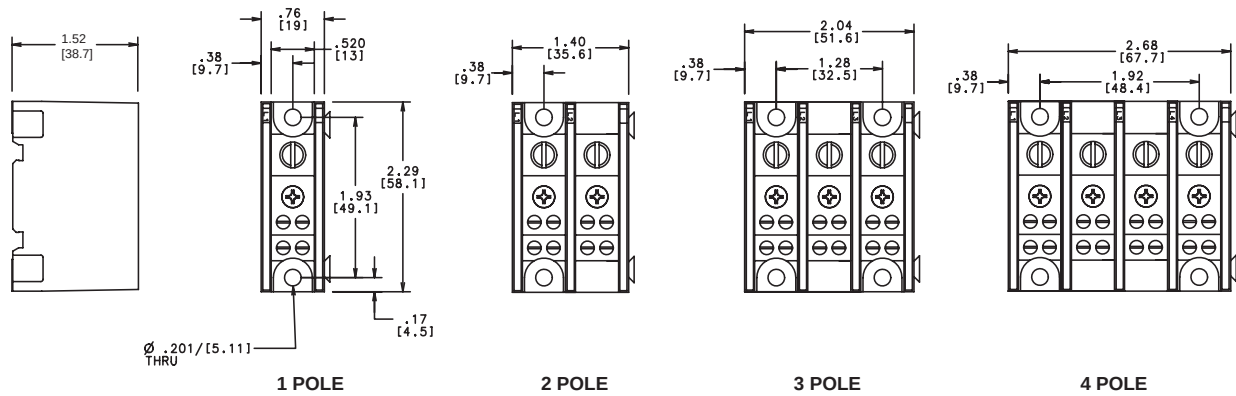


Figure 2

#### LX2XXX

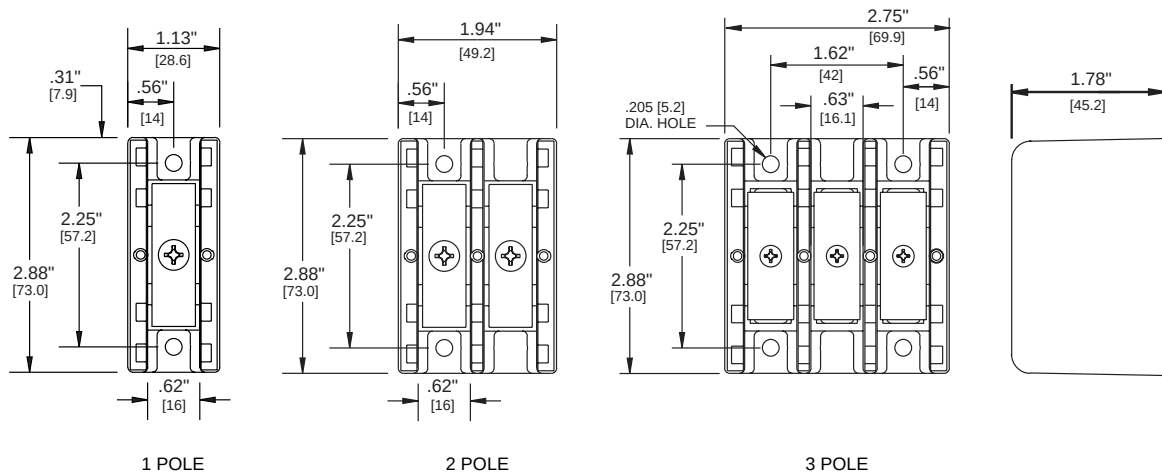


Figure 3

# POWR-BLOKS™

## Distribution/Splicer Blocks and Covers

### LX2XXX-XDIN

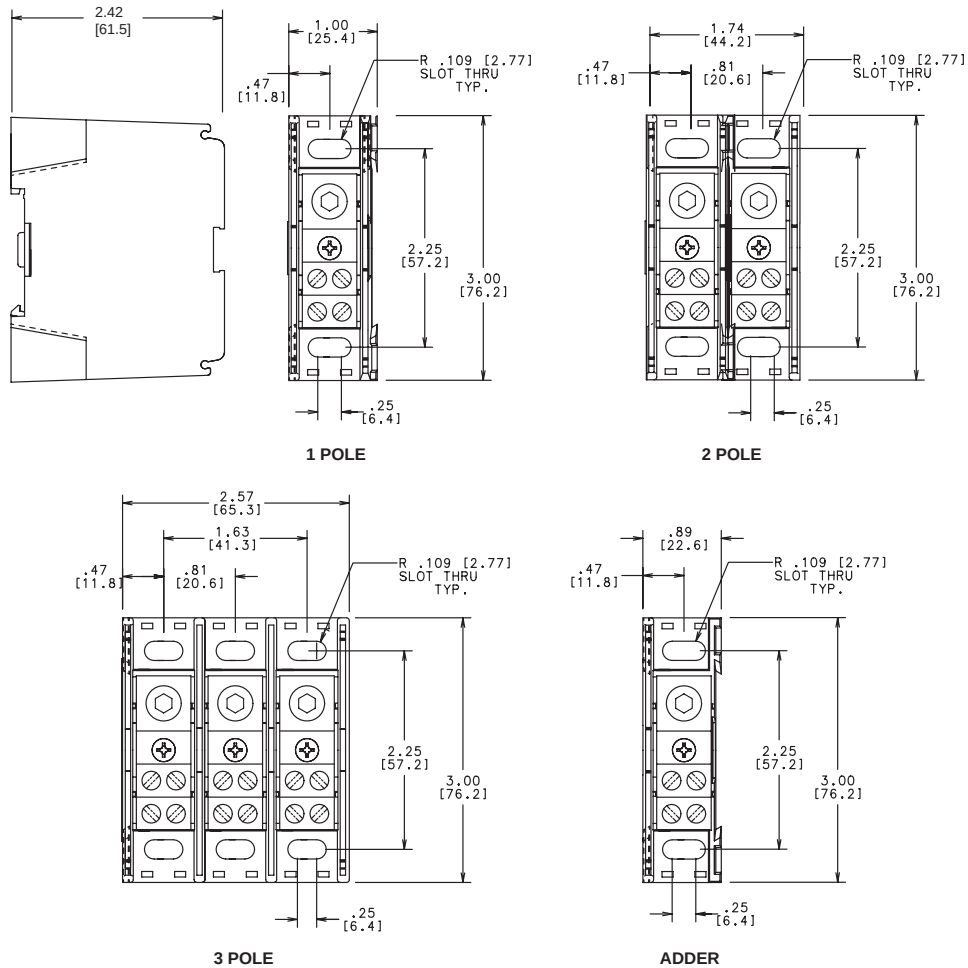


Figure 4

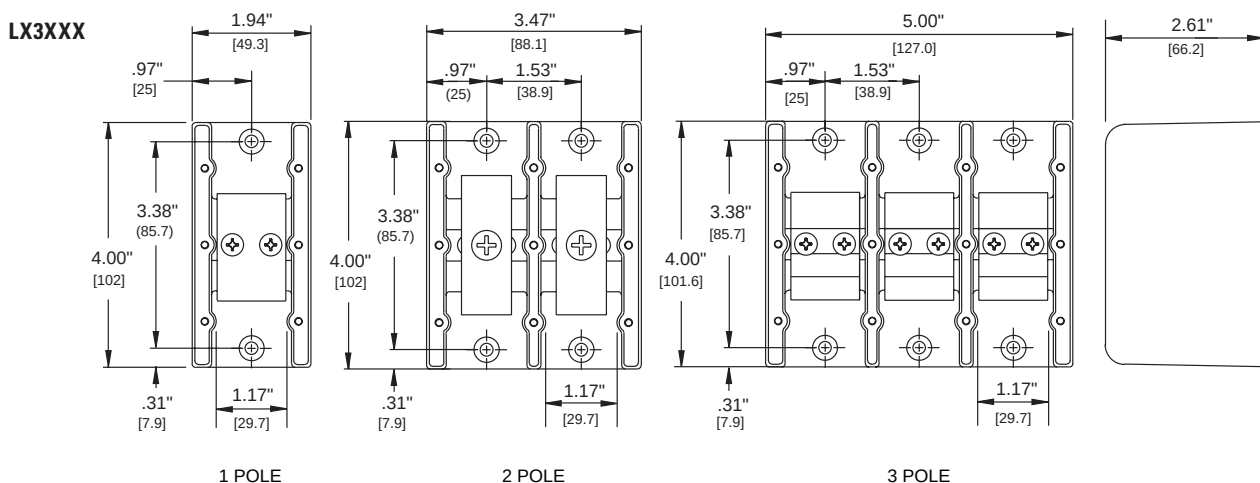


Figure 5

## POWR-BLOKS™

### Distribution/Splicer Blocks and Covers

#### LX4XXX

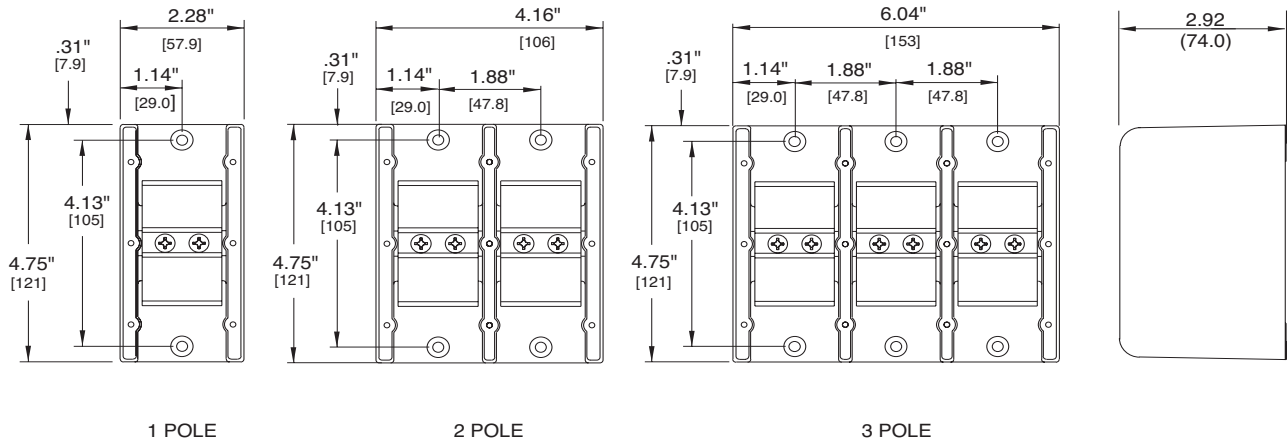


Figure 6

#### LX5XXX

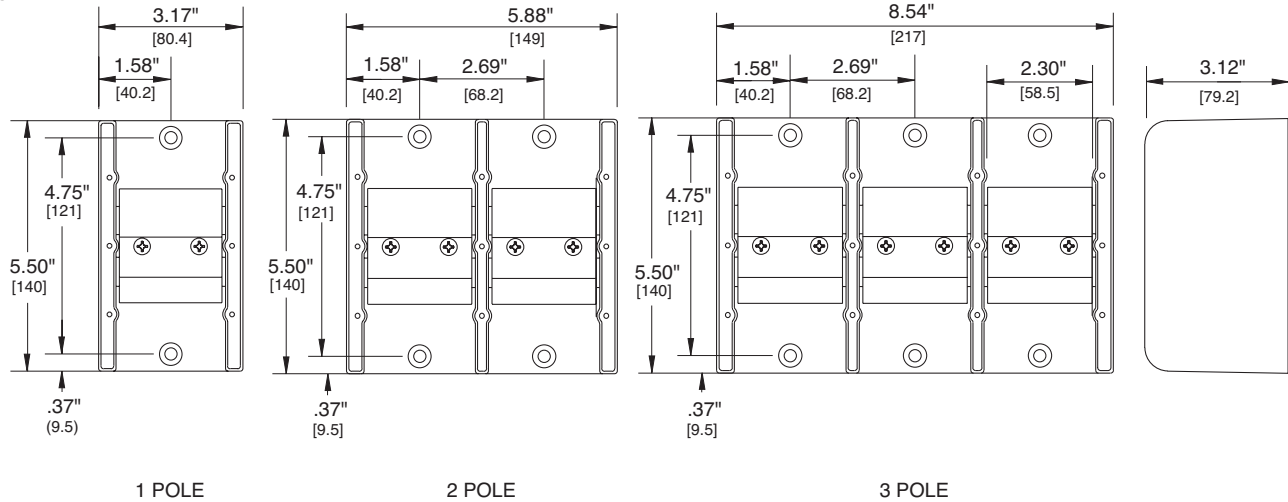
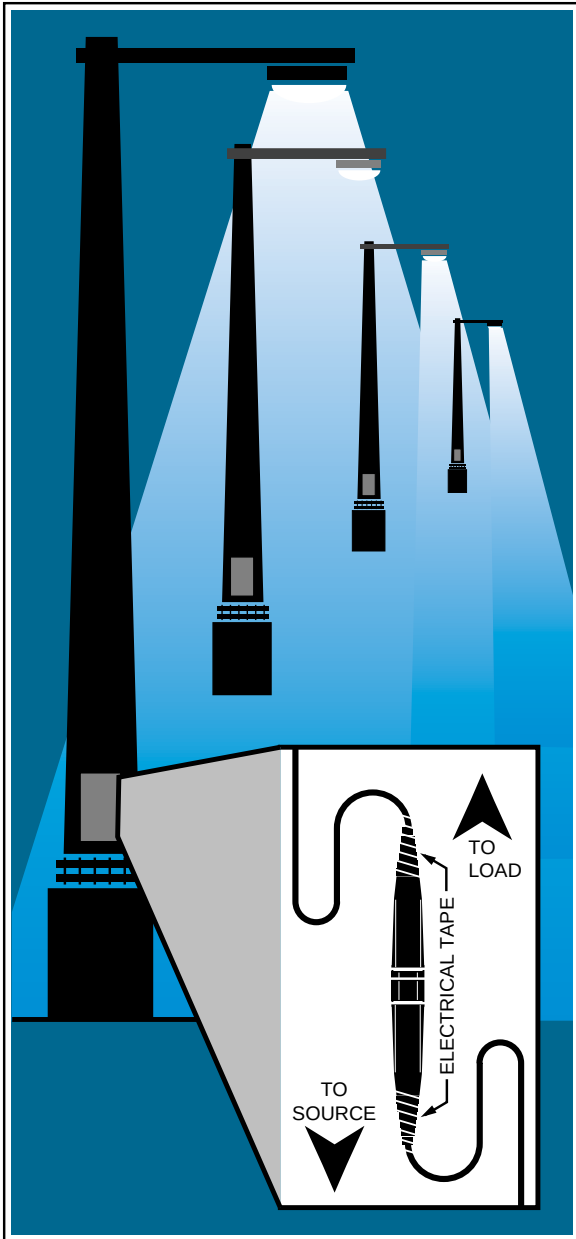


Figure 7

## In-Line Watertight Fuseholders



Littelfuse 600 volt in-line watertight fuse holders are the ideal answer for all high humidity and corrosive environments where fuses are required. Available in both breakaway and non-breakaway, single and double pole versions, these fuseholders allow maximum flexibility for any application.

### Applications

Street, alley, and parking lot lighting  
Security and perimeter lighting  
Traffic signals  
Outdoor illuminated signs  
Sports lighting  
Boat electrical circuits  
Tractors and yard equipment  
General outdoor circuit protection

### Benefits

- Safety — Permits individual fixture or device to be disconnected from circuit for servicing. Eliminates possibility of shock.
- Individual fixture fusing — Prevents loss of one fixture through accident, vandalism, or end of life from darkening the entire circuit.
- Simplifies maintenance — Being able to immediately identify the one faulted fixture eliminates testing the entire circuit, speeds repair, and allows the individual unit to be serviced while the rest of the circuit is functioning.
- Reduces damage from fault — Can prevent faulted ballast or other failure from severely damaging fixture or device, reducing necessary repair or need of replacement.

### Features

- Watertight — Internal O-ring provides watertight seal.
- Superior terminal seals — Ultrasonically-welded terminals provide maximum strength and eliminate leaking at terminals.
- Break resistant — Fiberglass reinforced polymer body resists damage from dropping or impact much better than phenolic look-alikes.
- Flexible terminations — Accommodates a wide range of stranded or solid copper or aluminum conductors. Terminations are available for one or two conductors, with either crimp or screw terminals.
- One-pole and two-pole models available to accommodate all system voltages up to 600V.

### Specifications

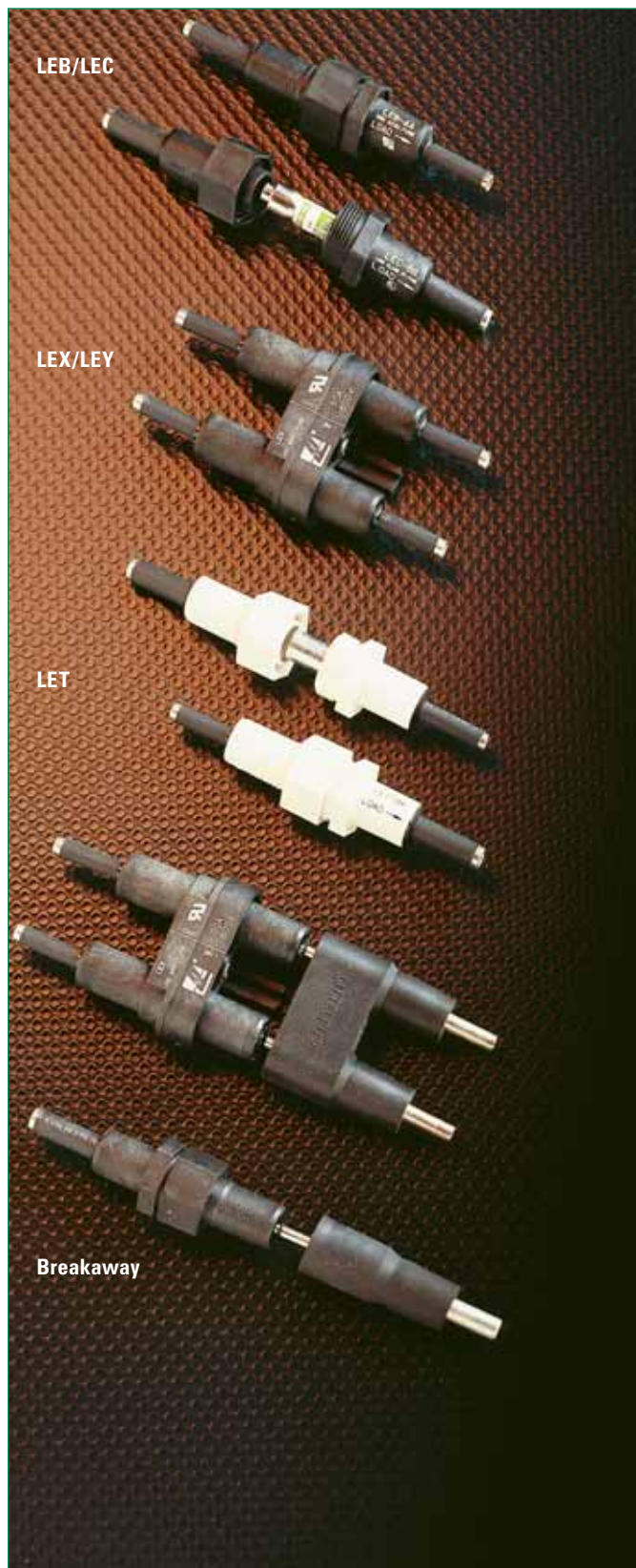
|                        |                                                                                                                                |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| <b>Voltage rating:</b> | 600 Volts                                                                                                                      |
| <b>Ampere rating:</b>  | 30 amperes<br>200,000 amperes rms symmetrical (with Class CC fuses)                                                            |
| <b>Approvals:</b>      |                                                                                                                                |
| <b>LEB/LEX series:</b> | UL Recognized Miscellaneous Fuseholder per UL 512 (File No. E14721)<br>CSA Certified per C22.2, No. 39 (File No. LR7316)       |
| <b>LEC/LEY series:</b> | UL Listed Class CC Branch Circuit Fuseholder per UL 512 (File No. E14721)<br>CSA Certified per C22.2, No. 39 (File No. LR7316) |

#### Mating fuses

**LEB/LEX series:** Accepts all 1 1/2" x 13/32" Midget and Class CC fuses  
Littelfuse types BLF, BLN, FLM, FLQ, KLK, KLKD, KLKR, KLDR and CCMR.

**LEC/LEY series:** Accepts only Class CC fuses.  
Littelfuse types KLKR, KLDR and CCMR.

## In-Line Watertight Fuseholders



### One-pole LEB and LEC Fuseholders

Basic single-pole LEB and LEC watertight fuseholders provide protection for a variety of circuits. LEB fuseholders accept all  $\frac{13}{32}$ " x  $1\frac{1}{2}$ " midget fuses providing supplemental overcurrent protection. LEC fuseholders are UL Listed Class CC fuseholders which accept only Class CC fuses and meet National Electrical Code requirements for branch circuit protection. The most common use for either fuseholder is for protection of lighting circuits. However, consider them wherever there is a need for secure in-line protection, from boat circuits to electric wheelchairs. Great flexibility is achieved when the basic holders are combined with breakaway receptacles, Y-terminals and insulating boots.

### Two-pole LEX and LEY Fuseholders

LEX and LEY fuseholders are intended for use on line-to-line circuits up to 600 volts and are ideal for line-to-line loads such as 240 or 480 volt ballasts. When the line and load sections of LEX and LEY fuseholders are separated, or when the fuseholder is removed from a two-pole breakaway receptacle, both lines are disconnected simultaneously. This prevents the possibility of shock from backfeeding through an exposed fuse, which could happen with single-pole fuseholders. The LEX holder is a two-pole version of the LEB and accepts midget fuses, providing supplementary overcurrent protection. The LEY holder is a two-pole version of the LEC, which accepts only Class CC fuses, and may be used to provide branch circuit protection. Both fuseholders may be equipped with Y-terminals, breakaway receptacles and insulating boots.

### One-pole LET Solid Neutral Disconnects

The LET solid neutral disconnect is designed for use as a no-load non-fused disconnect. Similar in design to the LEB series fuseholders, the LET is easily identified by its all white body. Internally, it has a permanently installed solid tin-plated copper neutral slug which eliminates the possibility of placing a fuse in the neutral side of the circuit. Fusing the neutral side causes a safety hazard and also violates the National Electrical Code. The LET is available in both breakaway and non-breakaway configurations with a wide variety of terminations.

### Breakaway Feature

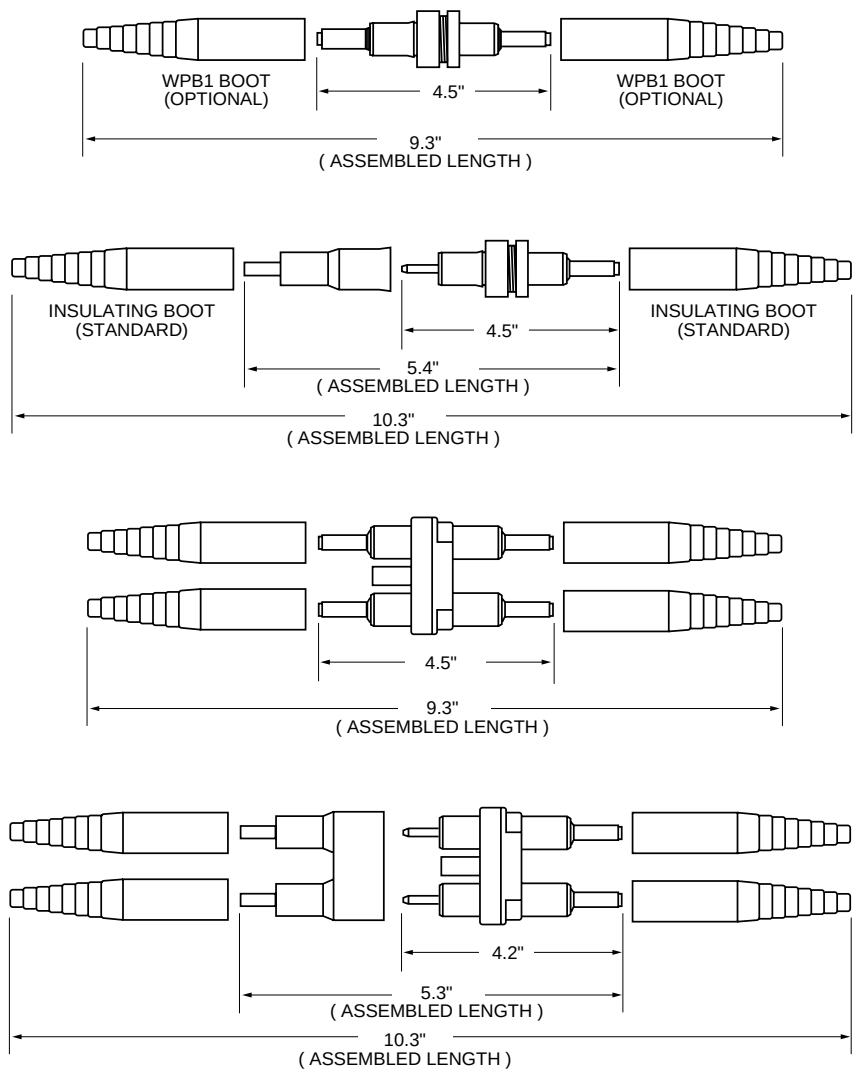
Littelfuse LEB, LEC, and LET single-pole fuseholders and LEX and LEY two-pole fuseholders are available with an optional breakaway feature required to meet state and federal highway commission standards requiring fuseholders to readily disconnect from the line in case of a pole knockdown. The breakaway feature consists of a receptacle permanently attached to the power line and a fuseholder with matching terminals. When knockdown occurs, the parts separate readily. The breakaway receptacle terminal is deeply recessed so that energized parts are not exposed. The fuse remains safely enclosed inside the now de-energized watertight fuseholder. After the pole has been reinstalled, the fuseholder is easily plugged into the receptacle, immediately restoring service. The breakaway feature may also be used in marinas, travel trailer parks and other locations where circuits subjected to strain must be safely disconnected.

## In-Line Watertight Fuseholders



### Insulating Boots

Molded from engineering grade thermoplastics, the WPB1 and WPB2 provide a high resistance to corrosive environments and deliver a watertight seal. Boots are supplied as standard with all breakaway versions. Weatherproof boots WPB1 and WPB2 can be purchased separately for all non-breakaway holders. Part number WPB1 contains one standard boot for use with A, B, C, D, or J termination. Part number WPB2 contains one Y-pole boot for use with the Y-pole termination. For watertight protection of non-breakaway Y-pole fuseholders, order one WPB1 and one WPB2 boot. For non-breakaway double-pole LEX and LEY holders with A, B, C, D, or J terminations, order four WPB1 boots. These insulating boots are designed to fit snugly onto wire insulation, but for best results with varying wire insulation sizes, a tape wrap should be completed.



### Recommended Crimping Tools

The following crimping tools or equivalents may be used on either the non-breakaway or breakaway watertight in-line fuseholders.

| Terminal Size | T&B Part No. | Burndy Part No. |
|---------------|--------------|-----------------|
| A             | WT161M       | —               |
| B             | WT161M       | MR4C            |
| C             | WT115A       | Hypress Y34A    |
| D             | WT115A       | Hypress Y34A    |

### Ordering Information

To order Littelfuse in-line fuseholders and disconnects by part number, refer to the charts on the next page.



| Fuseholder Type | Description                                               |
|-----------------|-----------------------------------------------------------|
| <b>LEB</b>      | One-pole in-line fuseholder for Midget and Class CC fuses |
| <b>LEC</b>      | One-pole in-line fuseholder for Class CC fuses            |
| <b>LET</b>      | One-pole in-line solid neutral disconnect                 |
| <b>LEX</b>      | Two-pole in-line fuseholder for Midget and Class CC fuses |
| <b>LEY</b>      | Two-pole in-line fuseholder for Class CC fuses            |

## In-Line Watertight Fuseholders

### Selection Guide For Single Pole LEB/LEC Fuseholders

| Standard Part No. | Breakaway Part No. | Fuse Type | Load Terminal Selection |                               |                           |            |               | Line Terminal Selection |                               |                           |            |               |
|-------------------|--------------------|-----------|-------------------------|-------------------------------|---------------------------|------------|---------------|-------------------------|-------------------------------|---------------------------|------------|---------------|
|                   |                    |           | Terminal Type           | Load Terminal Wire Size Range | No. of Wires per Terminal | Solid Wire | Stranded Wire | Terminal Type           | Line Terminal Wire Size Range | No. of Wires per Terminal | Solid Wire | Stranded Wire |
| LEB-AA            | LEB-AA-S           | Midget    | Copper                  | #12 to #8                     | 1                         | X          | X             | Copper                  | #12 to #8                     | 1                         | X          | X             |
| LEC-AA            | LEC-AA-S           | Class CC  | Crimp                   | #12                           | 2                         | X          | X             | Crimp                   | #12                           | 2                         | X          | X             |
| LEB-AB            | LEB-AB-S           | Midget    | Copper                  | #12 to #8                     | 1                         | X          | X             | Copper                  | #10                           | 2                         | X          | X             |
| LEC-AB            | LEC-AB-S           | Class CC  | Crimp                   | #12                           | 2                         | X          | X             | Crimp                   | #6                            | 1                         | X          | X             |
| LEB-AC            | —                  | Midget    | Copper                  | #12 to #8                     | 1                         | X          | X             | Copper                  | #4                            | 1                         | —          | X             |
| LEC-AC            | —                  | Class CC  | Crimp                   | #12                           | 2                         | X          | X             | Crimp                   | #8                            | 2                         | X          | X             |
| LEB-AD            | —                  | Midget    | Copper                  | #12 to #8                     | 1                         | X          | X             | Copper                  | #4                            | 1                         | —          | X             |
| LEC-AD            | —                  | Class CC  | Crimp                   | #12                           | 2                         | X          | X             | Crimp                   | #6                            | 2                         | X          | X             |
| LEB-AJ            | LEB-AJ-S           | Midget    | Copper                  | #12 to #8                     | 1                         | X          | X             | Crimp                   | #2                            | 1                         | —          | X             |
| LEC-AJ            | LEC-AJ-S           | Class CC  | Crimp                   | #12                           | 2                         | X          | X             | Set-Screw               | #12 to #8                     | 1                         | X          | —             |
| LEB-AYC           | LEB-AYC-S          | Midget    | Copper                  | #12 to #8                     | 1                         | X          | X             | "Y" Type                | #10 to #2                     | 1                         | —          | X             |
| LEC-AYC           | LEC-AYC-S          | Class CC  | Crimp                   | #12                           | 2                         | X          | X             | Copper Set-Screw        | #12 to #8                     | 1                         | X          | —             |
| LEB-BA            | LEB-BA-S           | Midget    | Copper                  | #10                           | 2                         | X          | X             | Copper                  | #10 to #2                     | 1                         | —          | X             |
| LEC-BA            | LEC-BA-S           | Class CC  | Crimp                   | #6                            | 1                         | X          | X             | Crimp                   | #12                           | 2                         | X          | X             |
| LEB-BB            | LEB-BB-S           | Midget    | Copper                  | #4                            | 1                         | —          | X             | Crimp                   | #10                           | 2                         | X          | X             |
| LEC-BB            | LEC-BB-S           | Class CC  | Crimp                   | #6                            | 1                         | X          | X             | Crimp                   | #6                            | 1                         | X          | X             |
| LEB-BC            | —                  | Midget    | Copper                  | #4                            | 1                         | —          | X             | Crimp                   | #4                            | 1                         | —          | X             |
| LEC-BC            | —                  | Class CC  | Crimp                   | #10                           | 2                         | X          | X             | Crimp                   | #8                            | 2                         | X          | X             |
| LEB-BD            | —                  | Midget    | Copper                  | #6                            | 1                         | X          | X             | Crimp                   | #4                            | 1                         | —          | X             |
| LEC-BD            | —                  | Class CC  | Crimp                   | #4                            | 1                         | —          | X             | Crimp                   | #6                            | 2                         | X          | X             |
| LEB-BJ            | LEB-BJ-S           | Midget    | Copper                  | #2                            | 1                         | —          | X             | Crimp                   | #2                            | 1                         | —          | X             |
| LEC-BJ            | LEC-BJ-S           | Class CC  | Crimp                   | #10                           | 2                         | X          | X             | Crimp                   | #12 to #8                     | 1                         | X          | —             |
| LEB-BYC           | LEB-BYC-S          | Midget    | Copper                  | #6                            | 1                         | X          | X             | Set-Screw               | #10 to #2                     | 1                         | —          | X             |
| LEC-BYC           | LEC-BYC-S          | Class CC  | Crimp                   | #4                            | 1                         | —          | X             | "Y" Type                | #12 to #8                     | 1                         | X          | —             |
| LEB-CA            | —                  | Midget    | Copper                  | #8                            | 2                         | X          | X             | Copper                  | #10 to #2                     | 1                         | —          | X             |
| LEC-CA            | —                  | Class CC  | Crimp                   | #4                            | 1                         | —          | X             | Crimp                   | #12 to #8                     | 1                         | X          | X             |
| LEB-CB            | —                  | Midget    | Copper                  | #8                            | 2                         | X          | X             | Crimp                   | #12                           | 2                         | X          | X             |
| LEC-CB            | —                  | Class CC  | Crimp                   | #4                            | 1                         | —          | X             | Crimp                   | #10                           | 2                         | X          | X             |
| LEB-CC            | —                  | Midget    | Copper                  | #6                            | 1                         | X          | X             | Crimp                   | #6                            | 1                         | X          | X             |
| LEC-CC            | —                  | Class CC  | Crimp                   | #4                            | 1                         | —          | X             | Crimp                   | #4                            | 1                         | —          | X             |
| LEB-CD            | —                  | Midget    | Copper                  | #8                            | 2                         | X          | X             | Crimp                   | #8                            | 2                         | X          | X             |
| LEC-CD            | —                  | Class CC  | Crimp                   | #4                            | 1                         | —          | X             | Crimp                   | #4                            | 1                         | —          | X             |
| LEB-CJ            | —                  | Midget    | Copper                  | #2                            | 1                         | —          | X             | Crimp                   | #2                            | 1                         | —          | X             |
| LEC-CJ            | —                  | Class CC  | Crimp                   | #8                            | 2                         | X          | X             | Set-Screw               | #12 to #8                     | 1                         | X          | —             |
| LEB-CYC           | —                  | Midget    | Copper                  | #4                            | 1                         | —          | X             | "Y" Type                | #10 to #2                     | 1                         | —          | X             |
| LEC-CYC           | —                  | Class CC  | Crimp                   | #8                            | 2                         | X          | X             | Copper Set-Screw        | #12 to #8                     | 1                         | X          | —             |
| LEB-DA            | —                  | Midget    | Copper                  | #6                            | 2                         | X          | X             | Crimp                   | #10 to #2                     | 1                         | —          | X             |
| LEC-DA            | —                  | Class CC  | Crimp                   | #2                            | 1                         | —          | X             | Crimp                   | #12                           | 2                         | X          | X             |
| LEB-DB            | —                  | Midget    | Copper                  | #6                            | 2                         | X          | X             | Crimp                   | #10                           | 2                         | X          | X             |
| LEC-DB            | —                  | Class CC  | Crimp                   | #2                            | 1                         | —          | X             | Crimp                   | #6                            | 1                         | X          | X             |
| LEB-DC            | —                  | Midget    | Copper                  | #6                            | 2                         | X          | X             | Crimp                   | #4                            | 1                         | —          | X             |
| LEC-DC            | —                  | Class CC  | Crimp                   | #2                            | 1                         | —          | X             | Crimp                   | #8                            | 2                         | X          | X             |
| LEB-DD            | —                  | Midget    | Copper                  | #6                            | 2                         | X          | X             | Crimp                   | #4                            | 1                         | —          | X             |
| LEC-DD            | —                  | Class CC  | Crimp                   | #2                            | 1                         | —          | X             | Crimp                   | #6                            | 2                         | X          | X             |
| LEB-DJ            | —                  | Midget    | Copper                  | #6                            | 2                         | X          | X             | Crimp                   | #2                            | 1                         | —          | X             |
| LEC-DJ            | —                  | Class CC  | Crimp                   | #2                            | 1                         | —          | X             | Set-Screw               | #12 to #8                     | 2                         | X          | X             |
| LEB-DYC           | —                  | Midget    | Copper                  | #6                            | 2                         | X          | X             | Set-Screw               | #10 to #2                     | 1                         | —          | X             |
| LEC-DYC           | —                  | Class CC  | Crimp                   | #2                            | 1                         | —          | X             | "Y" Type                | #12 to #8                     | 1                         | X          | —             |
| LEB-JJ            | LEB-JJ-S           | Midget    | Copper                  | #12 to #8                     | 1                         | X          | —             | Copper                  | #10 to #2                     | 1                         | —          | X             |
| LEC-JJ            | LEC-JJ-S           | Class CC  | Set Screw               | #10 to #2                     | 1                         | —          | X             | Set-Screw               | #12 to #8                     | 1                         | X          | —             |
| LEB-JYC           | LEB-JYC-S          | Midget    | Copper                  | #12 to #8                     | 1                         | X          | —             | "Y" Type                | #10 to #2                     | 1                         | —          | X             |
| LEC-JYC           | LEC-JYC-S          | Class CC  | Set Screw               | #10 to #2                     | 1                         | —          | X             | Copper Set-Screw        | #12 to #8                     | 1                         | X          | —             |

## In-Line Watertight Fuseholders

### Selection Guide For Double Pole LEX/LEY Fuseholders

| Standard Part No. | Breakaway Part No. | Fuse Type | Load Terminal Selection |                               |                           |            |               | Line Terminal Selection   |                               |                           |            |               |
|-------------------|--------------------|-----------|-------------------------|-------------------------------|---------------------------|------------|---------------|---------------------------|-------------------------------|---------------------------|------------|---------------|
|                   |                    |           | Terminal Type           | Load Terminal Wire Size Range | No. of Wires per Terminal | Solid Wire | Stranded Wire | Terminal Type             | Line Terminal Wire Size Range | No. of Wires per Terminal | Solid Wire | Stranded Wire |
| LEX-AA            | LEX-AA-S           | Midget    | Copper                  | #12 to #8                     | 1                         | X          | X             | Copper                    | #12 to #8                     | 1                         | X          | X             |
| LEY-AA            | LEY-AA-S           | Class CC  | Crimp                   | #12                           | 2                         | X          | X             | Crimp                     | #12                           | 2                         | X          | X             |
| LEX-AB            | LEX-AB-S           | Midget    | Copper                  | #12 to #8                     | 1                         | X          | X             | Copper                    | #10                           | 2                         | X          | X             |
| LEY-AB            | LEY-AB-S           | Class CC  | Crimp                   | #12                           | 2                         | X          | X             | Crimp                     | #6                            | 1                         | X          | X             |
| LEX-AC            | —                  | Midget    | Copper                  | #12 to #8                     | 1                         | X          | X             | Copper                    | #4                            | 1                         | —          | X             |
| LEY-AC            | —                  | Class CC  | Crimp                   | #12                           | 2                         | X          | X             | Crimp                     | #8                            | 2                         | X          | X             |
| LEX-AD            | —                  | Midget    | Copper                  | #12 to #8                     | 1                         | X          | X             | Copper                    | #4                            | 1                         | —          | X             |
| LEY-AD            | —                  | Class CC  | Crimp                   | #12                           | 2                         | X          | X             | Crimp                     | #6                            | 2                         | X          | X             |
| LEX-AYC           | LEX-AYC-S          | Midget    | Copper                  | #12 to #8                     | 1                         | X          | X             | Crimp                     | #2                            | 1                         | —          | X             |
| LEY-AYC           | LEY-AYC-S          | Class CC  | Crimp                   | #12                           | 2                         | X          | X             | "Y" Type Copper Set-Screw | #12 to #8                     | 1                         | X          | —             |
| LEX-BA            | LEX-BA-S           | Midget    | Copper                  | #10                           | 2                         | X          | X             | Copper                    | #10 to #2                     | 1                         | —          | X             |
| LEY-BA            | LEY-BA-S           | Class CC  | Crimp                   | #6                            | 1                         | X          | X             | Crimp                     | #12 to #8                     | 1                         | X          | X             |
| LEX-BB            | LEX-BB-S           | Midget    | Copper                  | #4                            | 1                         | —          | X             | Crimp                     | #12                           | 2                         | X          | X             |
| LEY-BB            | LEY-BB-S           | Class CC  | Crimp                   | #10                           | 2                         | X          | X             | Copper                    | #10                           | 2                         | X          | X             |
| LEX-BC            | —                  | Midget    | Copper                  | #6                            | 1                         | X          | X             | Crimp                     | #6                            | 1                         | X          | X             |
| LEY-BC            | —                  | Class CC  | Crimp                   | #4                            | 1                         | —          | X             | Crimp                     | #4                            | 1                         | —          | X             |
| LEX-BD            | —                  | Midget    | Copper                  | #10                           | 2                         | X          | X             | Copper                    | #8                            | 2                         | X          | X             |
| LEY-BD            | —                  | Class CC  | Crimp                   | #6                            | 1                         | X          | X             | Crimp                     | #4                            | 1                         | —          | X             |
| LEX-BYD           | —                  | Midget    | Copper                  | #4                            | 1                         | —          | X             | Crimp                     | #6                            | 2                         | X          | X             |
| LEY-BYD           | —                  | Class CC  | Crimp                   | #10                           | 2                         | X          | X             | Crimp                     | #2                            | 1                         | —          | X             |
| LEX-BYC           | LEX-BYC-S          | Midget    | Copper                  | #6                            | 1                         | X          | X             | "Y" Type Copper Set-Screw | #12 to #8                     | 1                         | X          | —             |
| LEY-BYC           | LEY-BYC-S          | Class CC  | Crimp                   | #4                            | 1                         | —          | X             | Crimp                     | #10 to #2                     | 1                         | —          | X             |
| LEX-CA            | —                  | Midget    | Copper                  | #8                            | 2                         | X          | X             | Copper                    | #12 to #8                     | 1                         | X          | X             |
| LEY-CA            | —                  | Class CC  | Crimp                   | #4                            | 1                         | —          | X             | Crimp                     | #12                           | 2                         | X          | X             |
| LEX-CB            | —                  | Midget    | Copper                  | #8                            | 2                         | X          | X             | Copper                    | #10                           | 2                         | X          | X             |
| LEY-CB            | —                  | Class CC  | Crimp                   | #4                            | 1                         | —          | X             | Crimp                     | #6                            | 1                         | X          | X             |
| LEX-CC            | —                  | Midget    | Copper                  | #4                            | 1                         | —          | X             | Crimp                     | #4                            | 1                         | —          | X             |
| LEY-CC            | —                  | Class CC  | Crimp                   | #8                            | 2                         | X          | X             | Crimp                     | #8                            | 2                         | X          | X             |
| LEX-CD            | —                  | Midget    | Copper                  | #4                            | 1                         | —          | X             | Crimp                     | #4                            | 1                         | —          | X             |
| LEY-CD            | —                  | Class CC  | Crimp                   | #8                            | 2                         | X          | X             | Crimp                     | #6                            | 2                         | X          | X             |
| LEX-CJ            | —                  | Midget    | Copper                  | #4                            | 1                         | —          | X             | Crimp                     | #2                            | 1                         | —          | X             |
| LEY-CJ            | —                  | Class CC  | Crimp                   | #8                            | 2                         | X          | X             | Crimp                     | #12 to #8                     | 1                         | X          | —             |
| LEX-CYC           | —                  | Midget    | Copper                  | #4                            | 1                         | —          | X             | "Y" Type Copper Set-Screw | #10 to #2                     | 1                         | —          | X             |
| LEY-CYC           | —                  | Class CC  | Crimp                   | #8                            | 2                         | X          | X             | Crimp                     | #12 to #8                     | 1                         | X          | —             |
| LEX-DA            | —                  | Midget    | Copper                  | #6                            | 2                         | X          | X             | Copper                    | #12 to #8                     | 1                         | X          | X             |
| LEY-DA            | —                  | Class CC  | Crimp                   | #2                            | 1                         | —          | X             | Crimp                     | 12                            | 2                         | X          | X             |
| LEX-DB            | —                  | Midget    | Copper                  | #6                            | 2                         | X          | X             | Copper                    | #10                           | 2                         | X          | X             |
| LEY-DB            | —                  | Class CC  | Crimp                   | #2                            | 1                         | —          | X             | Crimp                     | #6                            | 1                         | X          | X             |
| LEX-DC            | —                  | Midget    | Copper                  | #6                            | 2                         | X          | X             | Crimp                     | #4                            | 1                         | —          | X             |
| LEY-DC            | —                  | Class CC  | Crimp                   | #2                            | 1                         | —          | X             | Crimp                     | #8                            | 2                         | X          | X             |
| LEX-DD            | —                  | Midget    | Copper                  | #6                            | 2                         | X          | X             | Crimp                     | #6                            | 2                         | X          | X             |
| LEY-DD            | —                  | Class CC  | Crimp                   | #2                            | 1                         | —          | X             | Crimp                     | #2                            | 1                         | —          | X             |
| LEX-DJ            | —                  | Midget    | Copper                  | #6                            | 2                         | X          | X             | Crimp                     | #12 to #8                     | 1                         | X          | —             |
| LEY-DJ            | —                  | Class CC  | Crimp                   | #2                            | 1                         | —          | X             | Crimp                     | #10 to #2                     | 1                         | —          | X             |
| LEX-DYC           | —                  | Midget    | Copper                  | #6                            | 2                         | X          | X             | "Y" Type Copper Set-Screw | #12 to #8                     | 1                         | X          | —             |
| LEYDYC            | —                  | Class CC  | Crimp                   | #2                            | 1                         | —          | X             | Crimp                     | #10 to #2                     | 1                         | —          | X             |
| LEX-JJ            | LEX-JJ-S           | Midget    | Copper                  | #12 to #8                     | 1                         | X          | —             | Copper                    | #12 to #8                     | 1                         | X          | —             |
| LEY-JJ            | LEY-JJ-S           | Class CC  | Set-Screw               | #10 to #2                     | 1                         | —          | X             | Set-Screw                 | #12 to #8                     | 1                         | —          | X             |

## In-Line Watertight Fuseholders

### Selection Guide For Solid Neutral LET Fuseholders

| Standard Part No. | Breakaway Part No. | Fuse Type     | Load Terminal Selection |                               |                           |            |               | Line Terminal Selection   |                               |                           |            |               |
|-------------------|--------------------|---------------|-------------------------|-------------------------------|---------------------------|------------|---------------|---------------------------|-------------------------------|---------------------------|------------|---------------|
|                   |                    |               | Terminal Type           | Load Terminal Wire Size Range | No. of Wires per Terminal | Solid Wire | Stranded Wire | Terminal Type             | Line Terminal Wire Size Range | No. of Wires per Terminal | Solid Wire | Stranded Wire |
| LET-AA            | LET-AA-S           | Solid Neutral | Copper Crimp            | #12 to #8                     | 1                         | X          | X             | Copper Crimp              | #12 to #8                     | 1                         | X          | X             |
|                   |                    |               |                         | #12                           | 2                         | X          | X             |                           | #12                           | 2                         | X          | X             |
| LET-AB            | LET-AB-S           | Solid Neutral | Copper Crimp            | #12 to #8                     | 1                         | X          | X             | Copper Crimp              | #10                           | 2                         | X          | X             |
|                   |                    |               |                         | #12                           | 2                         | X          | X             |                           | #6                            | 1                         | X          | X             |
|                   |                    |               |                         |                               |                           |            |               |                           | #4                            | 1                         | —          | X             |
| LET-AYC           | LET-AYC-S          | Solid Neutral | Copper Crimp            | #12 to #8                     | 1                         | X          | X             | "Y" Type Copper Set-Screw | #12 to #8                     | 1                         | X          | —             |
|                   |                    |               |                         | #12                           | 2                         | X          | X             |                           | #10 to #2                     | 1                         | —          | X             |
| LET-BA            | LET-BA-S           | Solid Neutral | Copper Crimp            | #10                           | 2                         | X          | X             | Copper Crimp              | #12 to #8                     | 1                         | X          | X             |
|                   |                    |               |                         | #6                            | 1                         | X          | X             |                           | #12                           | 2                         | X          | X             |
|                   |                    |               |                         | #4                            | 1                         | —          | X             |                           |                               |                           |            |               |
| LET-BB            | LET-BB-S           | Solid Neutral | Copper Crimp            | #10                           | 2                         | X          | X             | Copper Crimp              | #10                           | 2                         | X          | X             |
|                   |                    |               |                         | #6                            | 1                         | X          | X             |                           | #6                            | 1                         | X          | X             |
|                   |                    |               |                         | #4                            | 1                         | —          | X             |                           | #4                            | 1                         | —          | X             |
| LET-BYC           | LET-BYC-S          | Solid Neutral | Copper Crimp            | #10                           | 2                         | X          | X             | "Y" Type Copper Set-Screw | #12 to #8                     | 1                         | X          | —             |
|                   |                    |               |                         | #6                            | 1                         | X          | X             |                           | #10 to #2                     | 1                         | —          | X             |
|                   |                    |               |                         | #4                            | 1                         | —          | X             |                           |                               |                           |            |               |
| LET-JJ            | LET-JJ-S           | Solid Neutral | Copper Set-Screw        | #12 to #8                     | 1                         | X          | —             | Copper Set-Screw          | #12 to #8                     | 1                         | X          | —             |
|                   |                    |               |                         | #10 to #2                     | 1                         | —          | X             |                           | #10 to #2                     | 1                         | —          | X             |
| LET-JYC           | LET-JYC-S          | Solid Neutral | Copper Set-Screw        | #12 to #8                     | 1                         | X          | —             | "Y" Type Copper Set-Screw | #12 to #8                     | 1                         | X          | —             |
|                   |                    |               |                         | #10 to #2                     | 1                         | —          | X             |                           | #10 to #2                     | 1                         | —          | X             |

### Terminal Selection Guide

| Terminal Designation | Terminal Description       | Number of Wires per Terminal | Wire Range | Wire Type      |
|----------------------|----------------------------|------------------------------|------------|----------------|
| A                    | Copper Crimp               | 1                            | #12-#8     | Solid/Stranded |
|                      |                            | 2                            | #12        | Solid/Stranded |
| B                    | Copper Crimp               | 2                            | #10        | Solid/Stranded |
|                      |                            | 1                            | #6         | Solid/Stranded |
|                      |                            | 1                            | #4         | Stranded       |
| C                    | Copper Crimp               | 2                            | #8         | Solid/Stranded |
|                      |                            | 1                            | #4         | Stranded       |
| D                    | Copper Crimp               | 2                            | #6         | Solid/Stranded |
|                      |                            | 1                            | #2         | Stranded       |
| J                    | Copper Set Screw           | 1                            | #12-#8     | Solid          |
|                      |                            | 2                            | #10-#2     | Stranded       |
| Y (2 terminals)      | "Y" Style Copper Set Screw | 1                            | #12-#8     | Solid          |
|                      |                            | 1                            | #10-#2     | Stranded       |

## Miscellaneous Products



|                                                                     |                |
|---------------------------------------------------------------------|----------------|
| <i>LPS Series POWR-Switch</i>                                       | <b>152-153</b> |
| <i>LPMP Series POWR-Switch Panel</i>                                | <b>154-155</b> |
| <i>Disconnect Switches</i>                                          | <b>156</b>     |
| <i>Misc. Products - Fuse Reducers</i>                               | <b>157</b>     |
| <i>Box Cover Units</i>                                              | <b>158-159</b> |
| <i>Misc. Products - Electronic Fuse Display; Spare Fuse Cabinet</i> | <b>160</b>     |

## LPS Series POWR-Switch



The Littelfuse POWR-Switch provides a simple and economical solution for applications that require selective coordination and shunt trip capabilities. Common applications include elevator circuits, data processing rooms, and building emergency systems.

By utilizing Class J time-delay fuses, the POWR-Switch is easily coordinated with other system overcurrent devices. The shunt trip capability allows the POWR-Switch to meet the ANSI/ASME standard that requires power to be automatically disconnected before water is turned on by the fire safety system. The POWR-Switch also features pre-wired control circuits that can help reduce installation costs.

### Standard Features

- 600V 3-pole fuse power switch
- 200,000 RMS interrupting rating
- Shunt trip 120V
- Control power terminal block
- Ground lug per NEC
- Class J fuse block
- NEMA 1 enclosures

### Optional Features

- Control power transformer with fuses and blocks
- Fire safety interface relay
- Key to test switch
- Pilot light "On"
- Isolated neutral lug
- Mechanical interlock auxiliary contact for hydraulic elevators with automatic recall (5 amp 120 VAC rated)
- Fire alarm voltage monitoring relay
- NEMA 3R, 4, and 12 enclosures

### Benefits

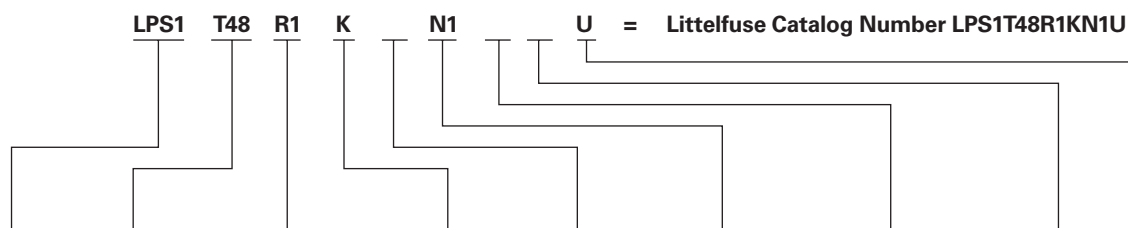
- Optional features offer flexibility for a variety of applications
- UL Listed package
- Lower installation costs than systems with many separate components
- Pre-wired control circuits lower installation time
- Lockable Operating handle meets all code and safety requirements
- No confusion over which building trade is supplying the components
- POWR-Switch is a single unit, which makes procurement easier than systems with multiple components

## LPS Series POWR-Switch

### Ordering Information

Complete catalog numbers consist of switch catalog numbers and the desired options. See example below.

#### Example Catalog Number:



| Littelfuse Switch Catalog Number |        | Control Power Transformer Std. 100VA with PRI & SEC Fuse (120V Sec.) |             | Fire Safety Interface Relay (3PDT, 10amp, 120V) |             | Key to Test Switch |             | Pilot Light "ON" |             | Isolated Neutral Lug |             | Mechanical Interlock Auxilliary Contact for Hydraulic Elevators w/ Automatic Recall (5 amp 120 VAC rated) |             | Fire Alarm Voltage Monitoring Relay (To Monitor Shunt Trip Voltage) |             | Optional Enclosures |             |
|----------------------------------|--------|----------------------------------------------------------------------|-------------|-------------------------------------------------|-------------|--------------------|-------------|------------------|-------------|----------------------|-------------|-----------------------------------------------------------------------------------------------------------|-------------|---------------------------------------------------------------------|-------------|---------------------|-------------|
| Catalog No.                      | Rating | Rating                                                               | Option Code | Rating                                          | Option Code | Rating             | Option Code | Rating           | Option Code | Rating               | Option Code | Rating                                                                                                    | Option Code | Rating                                                              | Option Code | Rating              | Option Code |
| LPS3                             | 30A    | 208V                                                                 | T20         | 24 VDC Coil                                     | R2          | 120V               | K           | Red              | R           | 30-60A               | N6          | 1 NO & 1 NC                                                                                               | A           | Single Pole                                                         | F1          | NEMA 3R             | U           |
| LPS6                             | 60A    | 240V                                                                 | T24         | 120 VAC Coil                                    | R1          |                    |             | Green            | G           | 100A                 | N1          | 2 NO & 2 NC                                                                                               | B           | Three Pole                                                          | F3          | NEMA 4              | Y           |
| LPS1                             | 100A   | 480V                                                                 | T48         |                                                 |             |                    |             | White            | W           | 200A                 | N2          |                                                                                                           |             |                                                                     |             | NEMA 12             | Z           |
| LPS2                             | 200A   | 600V                                                                 | T60         |                                                 |             |                    |             |                  |             | 400A                 | N4          |                                                                                                           |             |                                                                     |             |                     |             |
| LPS4                             | 400A   |                                                                      |             |                                                 |             |                    |             |                  |             |                      |             |                                                                                                           |             |                                                                     |             |                     |             |

Note: Desired options must appear in the order shown above. Typical options include Control Power Transformer, Fire Safety Interface Relay, Mechanical Interlock Auxiliary Contact and Fire Alarm Voltage Monitoring Relay.

### Enclosure Dimensions

| Catalog Series | Amp Rating | NEMA 1 Dimensions  | NEMA 3R Dimensions | NEMA 4, 12 Dimensions | Lug Size               |
|----------------|------------|--------------------|--------------------|-----------------------|------------------------|
| LPS3           | 30         | 24"H x 20"W x 9"D  | 24"H* x 20"W x 8"D | 24"H x 20"W x 10"D    | #14 - #8 AL or CU      |
| LPS6           | 60         | 24"H x 20"W x 9"D  | 24"H* x 20"W x 8"D | 24"H x 20"W x 10"D    | #14 - #2 AL or CU      |
| LPS1           | 100        | 24"H x 20"W x 9"D  | 24"H* x 20"W x 8"D | 24"H x 20"W x 10"D    | #8 - 1/0 AL or CU      |
| LPS2           | 200        | 30"H x 20"W x 9"D  | 30"H* x 20"W x 8"D | 30"H x 20"W x 10"D    | #6 - 250kcmil AL or CU |
| LPS4           | 400        | 48"H x 36"W x 12"D | Contact Factory    | Contact Factory       | 3/0 AL or CU           |

Note: Over-size enclosures used to accommodate control power transformer, interface relay and terminal blocks.

\*For NEMA 3R enclosures add 2 inches to height for mounting tabs.

### Specifications

**Approvals:** UL Listed and CSA Certified  
**Rating:** 30A, 60A, 100A, 200A, 400A  
**Shunt Trip Ratings:**

| Amp Rating | Voltage Rating | Max Inrush | Max Ontime | Momentary Inrush |
|------------|----------------|------------|------------|------------------|
| 30-400A    | 120V, 60Hz     | 4A         | 1.5 cycles | 140VA            |

## LPMP Series POWR-Switch Panel

600 Volts • Shunt-Trip Disconnect Switch

NEW



Littelfuse LPMP series POWR-Switch Panel is designed specifically for applications that require shunt-trip capabilities and the need to individually control power for a bank of equipment. The POWR-Switch Panel offers the flexibility to incorporate multiple switches into a panel enclosure and meet all applicable code requirements.

### Standard Features

- UL Listed Package
- NEMA 1 Enclosure
- Fusible Class J Switches (rated 30-400 amps)
- 200,000 amp RMS Short-Circuit Rating

### Optional Features

- Control Power Transformers
- Fire Safety Interface Relay
- Key to Test Switch
- Pilot Light "On"
- Mechanical Interlock Auxiliary Contact (for hydraulic elevators with recall)
- Fire Alarm Voltage Monitor Relay
- NEMA 3R Enclosures

### Ordering Information

#### Catalog Numbers

LPMP 400  
LPMP 600  
LPMP 800

### Specifications

|                              |                                                                  |
|------------------------------|------------------------------------------------------------------|
| <b>Voltage Rating:</b>       | 600V                                                             |
| <b>Short-Circuit Rating:</b> | 200,000 amps RMS                                                 |
| <b>Ampere Ratings:</b>       | 400, 600, 800A                                                   |
| <b>Approvals:</b>            | UL Listed to UL 67 Panelboards and<br>UL 891 Dead Front Switches |

## LPMP Series POWR-Switch Panel

600 Volts • Shunt-Trip Disconnect Switch

### Panel Spacing

|     |                  |             |
|-----|------------------|-------------|
| 6X  | Main Lugs Only   |             |
|     | Accessory Bucket |             |
|     | 30A Switch       | 30A Switch  |
|     | 60A Switch       | 60A Switch  |
|     | 100A Switch      | 100A Switch |
|     | 200A Switch      | 200A Switch |
|     | Accessory Bucket |             |
|     | 400A Switch      |             |
| 12X |                  |             |

Thru-Feed Lugs

Note: Main Lug Only is standard.

One Accessory bucket is required for every four switch units.

### Standard Panel Dimensions

| Panel Rating | Dimensions (in.)<br>H x W x D | Available Space (X units) |     |
|--------------|-------------------------------|---------------------------|-----|
|              |                               | 3W                        | 4W  |
| 400 A        | 57 x 40 x 12                  | 18X                       | 16X |
| 600 A        | 73.5 x 40 x 12                | 26X                       | 24X |
| 800 A        | 90 x 40 x 12                  | 38X                       | 35X |

Note: "X" Space = 1 $\frac{3}{4}$  inches (refers to height only)

### Main Lug Terminal Information

| Panel Rating | Cond. /Phase | Wire Range               | Bending Space |        |
|--------------|--------------|--------------------------|---------------|--------|
|              |              |                          | Top/Bot.      | Side   |
| 400 A        | (2)          | # 6 - 300 kcmil Al or Cu | 11.31"        | 10.00" |
|              | (1)          | 3/0 - 750 kcmil Al or Cu |               |        |
| 600 A        | (2)          | 3/0 - 500 kcmil Al or Cu | 11.31"        | 10.00" |
| 800 A        | (3)          | 3/0 - 500 kcmil Al or Cu | 11.31"        | 10.00" |
|              | (2)          | 3/0 - 750 kcmil Al or Cu |               |        |

Note: Local codes may change minimum wire bends.

### POWR-Switch Panel "Bucket" Options

| Bucket/Switch Rating | Description                      | Space | Conductors Per Phase | Wire Range               |
|----------------------|----------------------------------|-------|----------------------|--------------------------|
| 30/30                | Twin 30 amp switches             | 4X    | (1)                  | # 14 - # 8 Al or Cu      |
| 30/Blank             | Single 30 amp switch             | 4X    | (1)                  | # 14 - # 8 Al or Cu      |
| 60/60                | Twin 60 amp switches             | 4X    | (1)                  | # 14 - # 2 Al or Cu      |
| 60/Blank             | Single 60 amp switch             | 4X    | (1)                  | # 14 - # 2 Al or Cu      |
| 100/100              | Twin 100 amp switches            | 4X    | (1)                  | # 8 - 1/0 Al or Cu       |
| 100/Blank            | Single 100 amp switch            | 4X    | (1)                  | # 8 - 1/0 Al or Cu       |
| 200/200              | Twin 200 amp switches            | 6X    | (1)                  | # 6 - 250 kcmil Al or Cu |
| 200/Blank            | Single 200 amp switch            | 6X    | (1)                  | # 6 - 250 kcmil Al or Cu |
| 400                  | Single 400 amp switch            | 12X   | (2)                  | 3/0 - 750 kcmil Al or Cu |
| Accessory            | Contains CPT, Pilot Lights, etc. | 6X    | N/A                  | N/A                      |

## Disconnect Switches

### Fusible/Non-fusible



The LFFS series fusible switches eliminate the need for a separate fuse block by integrating a three pole fuse holder into the switch body. This saves precious panel space and reduces wiring time. These rod-operated devices are UL Listed and CSA Certified.

### Applications

Littelfuse disconnect switches are perfect for use where the National Electrical Code requires that a separate disconnect means be located within sight of all motor loads. Commonly used as a main switch or distribution switches, these units are also ideal for use as safety switches for air conditioners, pumps and compressors. The LFDS series disconnect switches can be used with external fuse blocks, permitting the use of Class RK1, RK5, J and CC fuses.

### Features/Benefits

- **Reduce panel costs** – Compact size minimizes panel space and reduces enclosure costs. The fusible 30 amp Class CC switch is the smallest available in the market.
- **Reduce installation time** – Panel-mount or integral DIN rail-mount allows quick and easy mounting.
- **Flexible design** – Optional accessories offer flexibility for various applications.
- **Protect personnel** – Dead-front design and optional terminal covers minimizes exposure to live parts.
- **Lockable operator knob/handle** – LFRK001 style knob meets OSHA standard for control of hazardous energy sources. Other knobs and handles meet IP65.

### Specifications

|                               |                                               |
|-------------------------------|-----------------------------------------------|
| <b>Voltage:</b>               | 600VAC                                        |
| <b>Interrupting Rating:</b>   | 10,000 amperes                                |
| <b>Required Screw Torque:</b> | 16 inch pounds                                |
| <b>Ampere Ratings:</b>        | 30–100 Amperes                                |
| <b>Approvals:</b>             | UL Listed (File No. E166081)<br>CSA Certified |

### Ordering Information

| Part Number | Description                 |
|-------------|-----------------------------|
| LFFS030CC   | 30A Fusible Class CC Switch |
| LFDS030     | 30A Non-Fusible Switch      |
| LFDS040     | 40A Non-Fusible Switch      |
| LFDS060     | 60A Non-Fusible Switch      |
| LFDS100     | 100A Non-Fusible Switch     |

*Note: Handles and accessories sold separately.*

### Accessories



|           |                |
|-----------|----------------|
| LFRH001*  | Red Handle     |
| LFRK001*  | Red Knob       |
| LFBH001*  | Black Handle   |
| LFBK001*  | Black Knob     |
| LFBK002** | Black Knob     |
| SHFT002   | Shaft (19.68") |
| SHFT003   | Shaft (11.81") |
| SHFT005   | Shaft (7.78")  |

\* Includes mounting hardware and standard length shaft for enclosures 3.5" through 8" deep.

\*\* Supplied with 2" shaft



|         |                                  |
|---------|----------------------------------|
| LFCB001 | Add-on Contact Block (N.O.)      |
| LFCB002 | Add-on Contact Block (N.C.)      |
| LFCB003 | 100A Add-on Contact Block (N.C.) |
| LFCB004 | 100A Add-on Contact Block (N.C.) |
| LFPP001 | 30A Add-on Power Pole (N.O.)     |
| LFPP002 | 30A Add-on Power Pole (N.C.)     |



|         |                                 |
|---------|---------------------------------|
| LFTC001 | Terminal Cover (1 Pair)         |
| LFTC002 | LFDS030 Terminal Cover (1 Pair) |
| LFTC003 | LFDS100 Terminal Cover (1 Pair) |

*Note: LFRH001, LFBH001, LFBK001 and LFBK002 are not lockable.*

## Miscellaneous Products

### Fuse Reducers



Littelfuse fuse reducers allow smaller size fuses to be installed into existing fuse clips to prevent overfusing.

- Allows lower ampere-rated fuses to be used in existing fuse clips.
- Simple installation.
- Reduces inventory requirements.
- Silver brazed joints for maximum strength.
- UL Listed (File No. E136855) CSA Certified (File No. LR92899)

Refer to fuse section of this catalog for fuse dimensions.

#### Class H/K5 Fuse Reducers

For use with Littelfuse NLN/NLS and RLN/RLS series fuses.

##### 250 Volt

| Part No. (pair) | Fuse Clip | Fuse Case Size |
|-----------------|-----------|----------------|
| LRU 263 M       | 60A       | 30A            |
| LRU 213 M       | 100A      | 30A            |
| LRU 216         | 100A      | 60A            |
| LRU 226         | 200A      | 60A            |
| LRU 2621        | 200A      | 100A           |
| LRU 2641        | 400A      | 100A           |
| LRU 2642        | 400A      | 200A           |
| LRU 2661        | 600A      | 100A           |
| LRU 2662        | 600A      | 200A           |
| LRU 2664        | 600A      | 400A           |

##### 600 Volt

| Part No. (pair) | Fuse Clip | Fuse Case Size |
|-----------------|-----------|----------------|
| LRU 663 M       | 60A       | 30A            |
| LRU 216         | 100A      | 30A            |
| LRU 616         | 100A      | 60A            |
| LRU 626         | 200A      | 60A            |
| LRU 2621        | 200A      | 100A           |
| LRU 2641        | 400A      | 100A           |
| LRU 2642        | 400A      | 200A           |
| LRU 2661        | 600A      | 100A           |
| LRU 2662        | 600A      | 200A           |
| LRU 2664        | 600A      | 400A           |

#### Class R Fuse Reducers

For use with Littelfuse FLNR\_ID/FLSR\_ID, IDSR, LLNRK/LLSRK, LLSRK\_ID, and KLNK/KLSR series fuses.

##### 250 Volt

| Part No. (pair) | Fuse Clip | Fuse Case Size |
|-----------------|-----------|----------------|
| LRU 263 R       | 60A       | 30A            |
| LRU 213 R       | 100A      | 30A            |
| LRU 216 R       | 100A      | 60A            |
| LRU 226 R       | 200A      | 60A            |
| LRU 2621 R      | 200A      | 100A           |
| LRU 2641 R      | 400A      | 100A           |
| LRU 2642 R      | 400A      | 200A           |
| LRU 2661 R      | 600A      | 100A           |
| LRU 2662 R      | 600A      | 200A           |
| *LRU 2664 R     | 600A      | 400A           |

\* Only one reducer required.

##### 600 Volt

| Part No. (pair) | Fuse Clip | Fuse Case Size |
|-----------------|-----------|----------------|
| LRU 663 R       | 60A       | 30A            |
| LRU 216 R       | 100A      | 30A            |
| LRU 616 R       | 100A      | 60A            |
| LRU 626 R       | 200A      | 60A            |
| LRU 2621 R      | 200A      | 100A           |
| LRU 2641 R      | 400A      | 100A           |
| LRU 2642 R      | 400A      | 200A           |
| LRU 2661 R      | 600A      | 100A           |
| LRU 2662 R      | 600A      | 200A           |
| *LRU 2664 R     | 600A      | 400A           |

\* Only one reducer required.

#### Class J Fuse Reducers

For use with Littelfuse JTD\_ID/JTD and JLS series fuses.

##### 600 Volt

| Part No. (pair) | Fuse Clip | Fuse Case Size |
|-----------------|-----------|----------------|
| LRUJ63          | 60A       | 30A            |
| LRUJ13          | 100A      | 30A            |
| LRUJ16*         | 100A      | 60A            |
| LRUJ26          | 200A      | 60A            |
| LRUJ21          | 200A      | 100A           |
| LRUJ41          | 400A      | 100A           |
| LRUJ42          | 400A      | 200A           |
| LRUJ64          | 600A      | 400A           |

\* Fuse and reducer combination is slightly larger in diameter than 100A Class J fuses. For specific applications, contact factory. Class J reducers can not be used in bolt-on applications.

## Box Cover Units

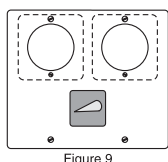
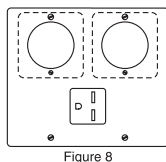
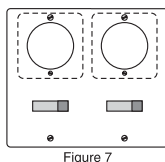
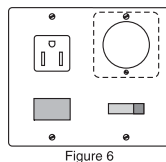
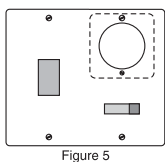
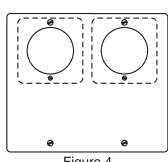
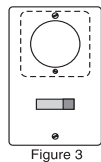
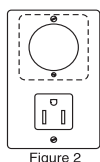
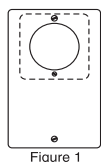


Box cover units provide an economical method of protecting small motors against overcurrent damage. For use with Edison-Base plug fuses (TOO, TLO) or Type S plug fuses (SOO, SLO) with adapters (SAO).

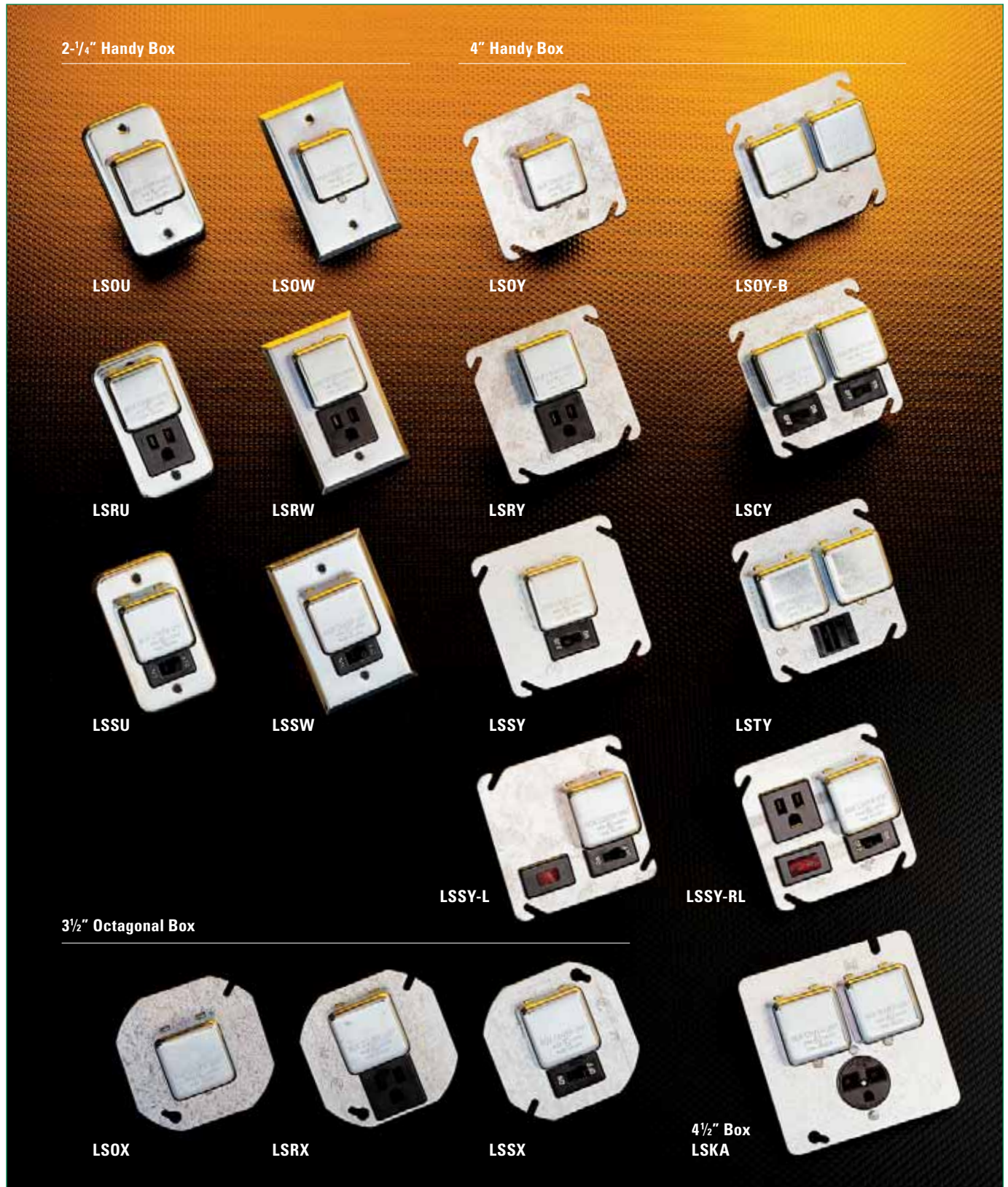
### Specifications

**Voltage:** 125V  
**Ampere Rating:** 15 Amperes  
**Approvals:** UL Listed

| Fig. No. | Littelfuse Part No. | Box Cover Features                                                                                | To Be Mounted On:   |
|----------|---------------------|---------------------------------------------------------------------------------------------------|---------------------|
| 1        | LSOU                | One Edison-Base Fuse Holder                                                                       | 2¼" Handy Box       |
|          | LSOW                | One Edison-Base Fuse Holder                                                                       | 2¾" Switch Box      |
|          | LSOX                | One Edison-Base Fuse Holder                                                                       | 4" Octagon Box      |
|          | LSOY                | One Edison-Base Fuse Holder                                                                       | 4" Square Box       |
| 2        | LSRU                | One Edison-Base Fuse Holder and Grounding Receptacle                                              | 2¼" Handy Box       |
|          | LSRW                | One Edison-Base Fuse Holder and Grounding Receptacle                                              | 2¾" Switch Box      |
|          | LSRX                | One Edison-Base Fuse Holder and Grounding Receptacle                                              | 4" Octagon Box      |
|          | LSRY                | One Edison-Base Fuse Holder and Grounding Receptacle                                              | 4" Square Box       |
| 3        | LSSU                | One Edison-Base Fuse Holder and Single Pole Switch                                                | 2¼" Handy Box       |
|          | LSSW                | One Edison-Base Fuse Holder and Single Pole Switch                                                | 2¾" Switch Box      |
|          | LSSX                | One Edison-Base Fuse Holder and Single Pole Switch                                                | 4" Octagon Box      |
|          | LSSY                | One Edison-Base Fuse Holder and Single Pole Switch                                                | 4" Square Box       |
| 4        | LSOY-B              | Two Edison-Base Fuse Holders                                                                      | 4" Square Box       |
| 5        | LSSY-L              | One Edison-Base Fuse Holder<br>One Single Pole Switch and Pilot Light                             | 4" Square Box       |
| 6        | LSSY-RL             | One Edison-Base Fuse Holder<br>One Grounding Receptacle<br>One Single Pole Switch and Pilot Light | 4" Square Box       |
| 7        | LSCY                | Two Edison-Base Fuse Holders and Two Single Pole Switches                                         | 4" Square Box       |
| 8        | LSKA                | Two Edison-Base Fuse Holders<br>One 250V Grounding Receptacle                                     | 4 11/16" Square Box |
| 9        | LSTY                | Two Edison-Base Fuse Holders and One 2-Pole Switch                                                | 4" Square Box       |



## Box Cover Units



## Misc. Products

### Electronic Fuse Display • Spare Fuse Cabinet



#### Spare Fuse Cabinet

Sturdy steel cabinet holds spare fuses. Cabinet can be locked to prevent unauthorized access and is weather stripped to reduce the accumulation of dust, dirt and moisture. Convenient inventory card located inside door. Measures 30"H x 24"W x 12"D. Keyhole mounting holes 16" on center for easy installation.

#### Ordering Information

**Spare Fuse Cabinet:** Part No. LSFC  
**Spare Keys:** Part No. LKEY001



#### Electronic Fuse Display

The sturdy wall-mountable or free-standing modular rack system prominently displays the most popular Littelfuse glass and automotive fuses. Additional sections can be quickly snapped on to provide a larger product selection. Each rack features a cross reference and full color identification guide to help customers locate the proper replacement fuse.

- Holds 720 (144 5-packs) of the most popular glass, ceramic, and automotive fuses.
- Designed to save space—measures 14"H x 9"W x 4"D.
- Suitable for wall or counter mounting.
- Includes cross reference, product identification guide, and back-up card for easy reordering.
- Expandable with modular section that can hold 240 fuses (48 5-packs) per section.

#### Ordering Information

**Fully stocked display:** Littelfuse part number: 094324PG  
 Littelfuse system number: 00940324ZXP  
**Empty display rack:** Littelfuse part number: FDR001PG  
 Littelfuse system number: 0FDR0001ZXP  
**Additional sections:** Littelfuse part number: MRS001PG  
 Littelfuse system number: 0MRS0001ZXP

Fully stocked rack includes the following parts:

| 3AG (Glass)<br>Fast Acting Fuses |          | 3AG (Glass)<br>Slo-Blo® Fuses |          | 3AB (Ceramic)<br>Normal-Blo Fuses |          | 3AB (Ceramic)<br>Slo-Blo® Fuses |          |
|----------------------------------|----------|-------------------------------|----------|-----------------------------------|----------|---------------------------------|----------|
| Quantity                         | Part No. | Quantity                      | Part No. | Quantity                          | Part No. | Quantity                        | Part No. |
| 25                               | 312 ½A   | 25                            | 313 ½A   | 25                                | 314 15A  | 25                              | 326 8A   |
| 50                               | 312 1A   | 25                            | 313 ¾A   | 25                                | 314 20A  | 20                              | 326 10A  |
| 25                               | 312 1½A  | 25                            | 313 1A   | 25                                | 314 30A  |                                 |          |
| 75                               | 312 2A   | 25                            | 313 1½A  |                                   |          |                                 |          |
| 25                               | 312 2½A  | 50                            | 313 2A   |                                   |          |                                 |          |
| 75                               | 312 3A   | 25                            | 313 2½A  |                                   |          |                                 |          |
| 25                               | 312 4A   | 25                            | 313 3A   |                                   |          |                                 |          |
| 25                               | 312 5A   | 25                            | 313 4A   |                                   |          |                                 |          |
| 25                               | 312 10A  | 25                            | 313 5A   |                                   |          |                                 |          |

## International Products



|                                            |                |
|--------------------------------------------|----------------|
| <i>LgD Series Global Pro™ Fuses</i>        | <b>162</b>     |
| <i>LPSG Series Global Pro™ Fuseholders</i> | <b>163</b>     |
| <i>NH Fuse Links</i>                       | <b>164-165</b> |
| <i>Diazed/Neozed Fuses</i>                 | <b>166-167</b> |
| <i>Cylindrical Fuses</i>                   | <b>168</b>     |
| <i>British Dimension HRCII-C Fuses</i>     | <b>169</b>     |

## LgD Series Global Pro™ Fuses

600 Volts AC • Time-Delay • 1 – 100 Amperes



Littelfuse Global Pro is the world's only fuse system designed for use anywhere, in any equipment, in virtually any country. Global Pro simplifies circuit protection by incorporating North American electrical requirements into fuse styles found in the rest of the world. Reduced size, touch-safe design, and international acceptance make the Global Pro system the easy circuit protection choice for engineers and equipment designers everywhere.

Global Pro fuses provide quick and positive visual identification of blown fuses by using a pop-up indicator design that protrudes from the top of the fuse, immediately alerting maintenance personnel that it needs to be replaced. The pop-up indicator is designed to activate a microswitch built into every Global Pro fuseholders that can activate stack-lights or to integrate into PLC networks and provide equipment operators with a remote method of determining when the fuse needs to be replaced.

The Global Pro system is designed to save valuable space in a crowded panel while providing designers with the flexibility of a universally accepted design for easy replacement. These fuses are far more compact and have greater power handling capability than conventional products. Global Pro fuses are up to 75% smaller than Class RK5 fuses and up to 50% smaller than Class J fuses while providing the time-delay characteristics that are necessary for motor circuit protection.

### Applications

- Motor control centers
- Motor branch circuits
- Primary and secondary protection for transformers
- Equipment designed for export

### Features And Benefits

The Global Pro fuse is physically compatible with IEC style fuseholders allowing it to be used in virtually any market. The IEC dimensions of the Global Pro fuseholder allow easy adaptation of exported equipment by simply replacing the fuse with one that meets local standards.

- Extremely compact size
- Pop-up pin indication
- Meets performance requirements of UL Class J fuses
- Global acceptance
- UL approval
- Universal voltages
- Touch-safe components
- Integrated lockout/tagout device for compliance
- Design versatility for OEMs
- Designed to IEC standards

### Size Chart

| Part Number | Amperage | English          | Metric      |
|-------------|----------|------------------|-------------|
| LgD 0–30A   | 0–30A    | 9/16" x 2"       | 14mm x 51mm |
| LgD 35–60A  | 35–60A   | 13/16" x 2 1/4"  | 22mm x 58mm |
| LgD 70–100A | 70–100A  | 1 1/16" x 2 3/8" | 27mm x 60mm |

### Specifications

**Voltage Ratings:** AC: 600 Volts (UL)  
690 Volts (IEC)  
DC: 300 Volts

**Interrupting Rating:** AC: 200,000 amperes rms symmetrical  
DC: 20,000 amperes rms symmetrical

**Ampere Range:** 1 – 100\* amperes

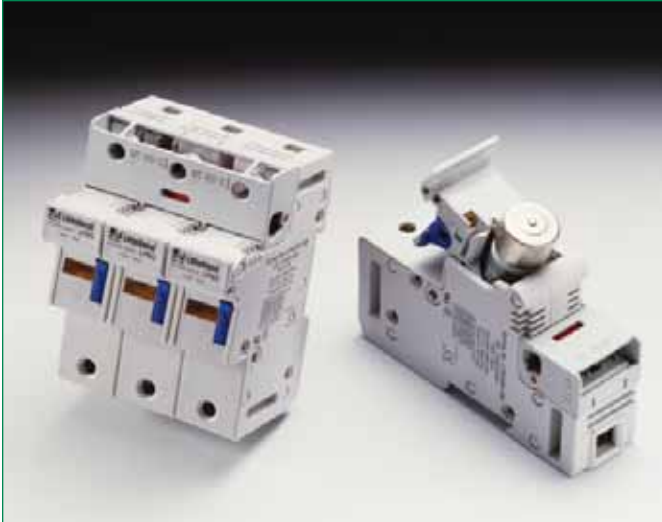
**Approvals:** UL Listed Special Purpose 1–30 amps (File No. E71611)  
UL Recognized 35–60 amps (File No. E71611)  
CSA Certified 1–60 amps (File No. LR29862)

### Ampere ratings

|   |    |    |    |    |     |      |
|---|----|----|----|----|-----|------|
| 1 | 5  | 12 | 25 | 40 | 60  | 90*  |
| 2 | 7  | 15 | 30 | 45 | 70* | 100* |
| 3 | 10 | 20 | 35 | 50 | 80* |      |

\*Contact factory for ratings above 60A  
Example part number (series & amperage): LgD 60

## LPSG Series Global Pro™ Fuseholders



Littelfuse Global Pro is the world's only fuse system designed for use anywhere, in any equipment, in virtually any country. Global Pro simplifies circuit protection by incorporating North American electrical requirements into fuse styles found in the rest of the world. Reduced size, touch-safe design, and international acceptance make the Global Pro system the easy circuit protection choice for engineers and equipment designers everywhere.

Every Global Pro fuseholder includes a microswitch that is activated by a blown fuse. This allows the Global Pro system to be integrated into PLC networks and provide equipment operators with a remote method of determining when the fuse needs to be replaced. Global Pro holders also feature a blown fuse indicator light to help maintenance personnel quickly locate the proper circuit.

The Global Pro system is designed to save valuable space in a crowded panel, while providing designers with the flexibility of a universally accepted design for easy replacement. These fuses are far more compact and have greater power handling capability than conventional products. Global Pro fuses are up to 75% smaller than Class RK5 fuses and up to 50% smaller than Class J fuses while providing the time-delay characteristics that are necessary for motor circuit protection.

### Applications

- Motor control centers
- Motor branch circuits
- Primary and secondary protection for transformers
- Equipment designed for export

### Features And Benefits

The Global Pro Fuseholder also accepts IEC dimension cartridge style fuses, allowing equipment to be easily adapted for export markets by simply replacing the fuse with one that meets local standards.

- Extremely compact size
- Blown fuse indicator
- Integrated lockout/tagout tab
- Din-Rail mountable (35mm DIN-Rail)
- Integrated microswitch with N.O. and N.C. contacts
- Global compatibility – Accepts Global Pro fuses and European IEC dimension cartridge style fuses
- UL and IEC approval
- Touch-safe design with integrated lockout/tagout device for compliance
- Design versatility for OEMs

### Ordering Information

| Catalog No. | Amp Rating | Poles |
|-------------|------------|-------|
| LPSG30-1MI  | 30A        | 1     |
| LPSG30-2MI  | 30A        | 2     |
| LPSG30-3MI  | 30A        | 3     |
| LPSG60-1MI  | 60A        | 1     |
| LPSG60-2MI  | 60A        | 2     |
| LPSG60-3MI  | 60A        | 3     |
| LPSG100-1MI | 100A       | 1     |
| LPSG100-2MI | 100A       | 2     |
| LPSG100-3MI | 100A       | 3     |

### Specifications

|                             |                                       |
|-----------------------------|---------------------------------------|
| <b>Voltage Ratings:</b>     | 600 Volts (UL)<br>690 Volts (IEC)     |
| <b>Interrupting Rating:</b> | AC: 200kA rms symmetrical<br>DC: 20kA |
| <b>Ampere Range:</b>        | 30, 60, and 100* amperes              |
| <b>Terminal Type:</b>       | Pressure Plate                        |
| <b>Wire Range:</b>          | #2 – #14 CU                           |
| <b>Material:</b>            | Thermo-plastic                        |

|                   |                                                                          |
|-------------------|--------------------------------------------------------------------------|
| <b>Approvals:</b> | UL Recognized<br>CSA Certified<br>*Contact factory for ratings above 60A |
|-------------------|--------------------------------------------------------------------------|

Contact factory for dimensions.

## NH Fuse Links

500 Volts • 2 – 630 Amperes



Littelfuse European style NH fuse links are designed for the protection of conductors and motors. The gL-gG characteristic fuse links are generally used to protect cables and installation lines from overloads and short-circuits. The aM characteristic fuse links are used for the short-circuit protection of motors and switchgear. They are available in NH00C to NH3 sizes up to 630 amperes.

### Specifications

**Standards:** DIN 43.620, IEC 269-2-1  
**Approvals:** VDE  
**Example part number:** NH1CG25 (size, characteristic and amperage)

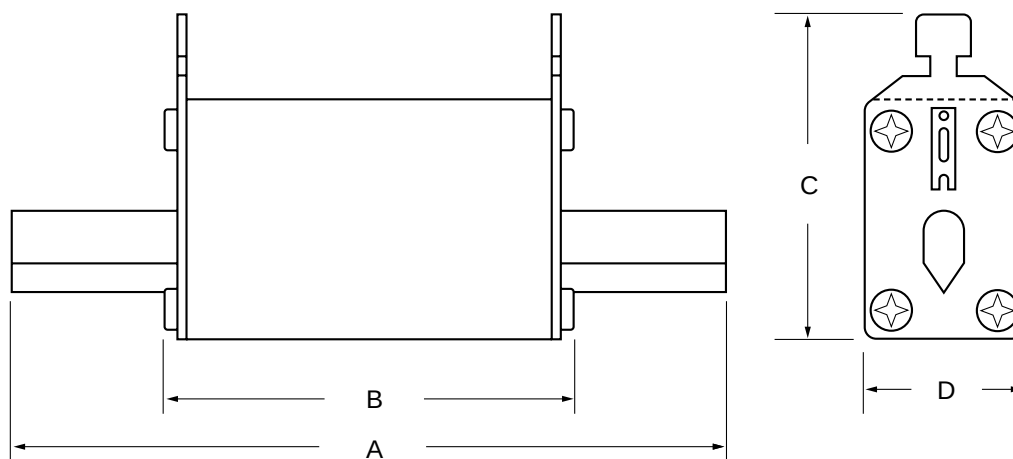
| Size | Current Range   | Voltage (AC/DC) | Interrupting Rating | Nominal Frequency | Selectivity |
|------|-----------------|-----------------|---------------------|-------------------|-------------|
| 00C  | 2A up to 100A   | 500V/440V       | 120kA/25kA          | 45 - 62 Hz        | 1:1 25      |
| 00   | 2A up to 160A   | 500V/440V       | 120kA/25kA          | 45 - 62 Hz        | 1:1 25      |
| 0    | 6A up to 160A   | 500V/440V       | 120kA/25kA          | 45 - 62 Hz        | 1:1 25      |
| 1C   | 25A up to 160A  | 500V/440V       | 120kA/25kA          | 45 - 62 Hz        | 1:1 25      |
| 1    | 63A up to 250A  | 500V/440V       | 120kA/25kA          | 45 - 62 Hz        | 1:1 25      |
| 2C   | 40A up to 250A  | 500V/440V       | 120kA/25kA          | 45 - 62 Hz        | 1:1 25      |
| 2    | 125A up to 400A | 500V/440V       | 120kA/25kA          | 45 - 62 Hz        | 1:1 25      |
| 3C   | 315A up to 400A | 500V/440V       | 120kA/25kA          | 45 - 62 Hz        | 1:1 25      |
| 3    | 315A up to 630A | 500V/440V       | 120kA/25kA          | 45 - 62 Hz        | 1:1 25      |

All NH fuse links incorporate a blown fuse indicator.

| Amperage | gL-gG 500V |         |          |          |          | aM 500V  |         |         |         |
|----------|------------|---------|----------|----------|----------|----------|---------|---------|---------|
|          | NH00C/NH00 | NH0     | NH1C/NH1 | NH2C/NH2 | NH3C/NH3 | NH00M    | NH1     | NH2     | NH3     |
| 2        | NH00CG2    | —       | —        | —        | —        | NH00M2   | —       | —       | —       |
| 4        | NH00CG4    | —       | —        | —        | —        | NH00M4   | —       | —       | —       |
| 6        | NH00CG6    | NH0G6   | —        | —        | —        | NH00M6   | —       | —       | —       |
| 10       | NH00CG10   | NH0G10  | —        | —        | —        | NH00M10  | —       | —       | —       |
| 16       | NH00CG16   | NH0G16  | —        | —        | —        | NH00M16  | —       | —       | —       |
| 20       | NH00CG20   | NH0G20  | —        | —        | —        | NH00M20  | —       | —       | —       |
| 25       | NH00CG25   | NH0G25  | NH1CG25  | —        | —        | NH00M25  | —       | —       | —       |
| 32       | NH00CG32   | NH0G32  | NH1CG32  | —        | —        | NH00M32  | —       | —       | —       |
| 35       | NH00CG35   | NH0G35  | NH1CG35  | —        | —        | NH00M35  | —       | —       | —       |
| 40       | NH00CG40   | NH0G40  | NH1CG40  | NH2CG40  | —        | NH00M40  | —       | —       | —       |
| 50       | NH00CG50   | NH0G50  | NH1CG50  | NH2CG50  | —        | NH00M50  | —       | —       | —       |
| 63       | NH00CG63   | NH0G63  | NH1CG63  | NH2CG63  | —        | NH00M63  | NH1M63  | —       | —       |
| 80       | NH00CG80   | NH0G80  | NH1CG80  | NH2CG80  | —        | NH00M80  | NH1M80  | —       | —       |
| 100      | NH00CG100  | NH0G100 | NH1CG100 | NH2CG100 | —        | NH00M100 | NH1M100 | —       | —       |
| 125      | NH00G125   | NH0G125 | NH1CG125 | NH2CG125 | —        | NH00M125 | NH1M125 | NH2M125 | —       |
| 160      | NH00G160   | NH0G160 | NH1CG160 | NH2CG160 | —        | NH00M160 | NH1M160 | NH2M160 | —       |
| 200      | —          | —       | NH1G200  | NH2CG200 | —        | —        | NH1M200 | NH2M200 | —       |
| 224      | —          | —       | NH1G224  | NH2CG224 | —        | —        | NH1M224 | NH2M224 | —       |
| 250      | —          | —       | NH1G250  | NH2CG250 | —        | —        | NH1M250 | NH2M250 | —       |
| 300      | —          | —       | —        | NH2G300  | —        | —        | —       | NH2M300 | —       |
| 315      | —          | —       | —        | NH2G315  | NH3CG315 | —        | —       | NH2M315 | NH3M315 |
| 355      | —          | —       | —        | NH2G355  | NH3CG355 | —        | —       | NH2M355 | NH3M355 |
| 400      | —          | —       | —        | NH2G400  | NH3CG400 | —        | —       | NH2M400 | NH3M400 |
| 425      | —          | —       | —        | —        | NH3G425  | —        | —       | —       | —       |
| 500      | —          | —       | —        | —        | NH3G500  | —        | —       | —       | NH3M500 |
| 630      | —          | —       | —        | —        | NH3G630  | —        | —       | —       | NH3M630 |

## NH Fuse Links

### NH Fuse Link Dimensions



| Size | Current Range | Dimensions (mm) |       |       |       |
|------|---------------|-----------------|-------|-------|-------|
|      |               | A               | B     | C     | D     |
| 00C  | 2-100A        | 78.00           | 54.00 | 51.30 | 20.00 |
| 00   | 2-160A        | 78.00           | 54.00 | 56.40 | 30.00 |
| 0    | 6-160A        | 123.95          | 70.11 | 53.34 | 30.00 |
| 1C   | 25-160A       | 135.00          | 75.00 | 56.40 | 30.00 |
| 1    | 63-250A       | 135.00          | 75.00 | 64.30 | 40.00 |
| 2C   | 40-250A       | 150.00          | 75.00 | 64.26 | 40.00 |
| 2    | 125-400A      | 150.00          | 75.00 | 74.20 | 50.00 |
| 3C   | 315-400A      | 150.00          | 75.00 | 74.20 | 50.00 |
| 3    | 315-630A      | 150.00          | 75.00 | 87.37 | 71.88 |

## NH Bases / Disconnects

### Fuse Bases

| Part No. | Size | Rating    | Connection |
|----------|------|-----------|------------|
| NHB00B   | 00   | 690V/160A | Bolt       |
| NHB00C   | 00   | 690V/160A | V-Clamp    |
| NHB1B    | 1    | 690V/250A | Bolt       |
| NHB2B    | 2    | 690V/400A | Bolt       |
| NHB3B    | 3    | 690V/630A | Bolt       |

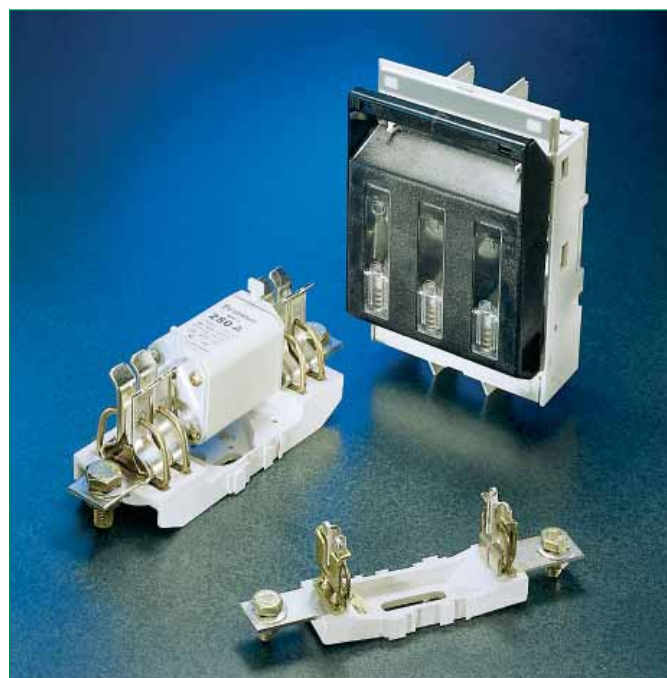
All fuse bases are single pole and gangable.

### Fuse Disconnects

| Part No. | Size | Rating    | Connection |
|----------|------|-----------|------------|
| NHFSC00B | C00  | 690V/100A | Bolt       |
| NHFS0B   | 0    | 690V/160A | Bolt       |
| NHFS1B   | 1    | 690V/250A | Bolt       |
| NHFS2B   | 2    | 690V/400A | Bolt       |
| NHFS3B   | 3    | 690V/630A | Bolt       |

All disconnects are 3 pole.

Contact factory for dimensional information.



## Diazed/Neozed Fuses

380-500 Volts AC • 2– 63 Amperes



Littelfuse fast acting (gL-gG) fuses are used for the protection of cables against short-circuits. Time-lag (aM) fuses are used for protection of motors. Ratings are available in standard Diazed and compact Neozed styles.

### Specifications

**Standards:** DIN 49.522-DIN 49.525, IEC 269-3

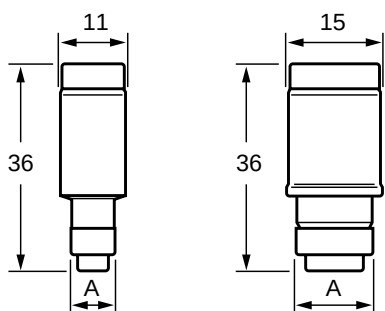
**Approvals:** VDE

Example part number: DZ27F4

| Base Size | Type | Current Range | Voltage AC/DC | Interrupting Rating |
|-----------|------|---------------|---------------|---------------------|
| 14        | D01  | 2-16A         | 380V/250V     | 50kA                |
| 18        | D02  | 20-63A        | 380V/250V     | 50kA                |
| 16        | DI   | 2-25A         | 500V          | 80kA                |
| 27        | DII  | 2-25A         | 500V          | 80kA                |
| 33        | DIII | 35-63A        | 500V          | 80kA                |

All Diazed and Neozed fuses incorporate a blown fuse indicator.

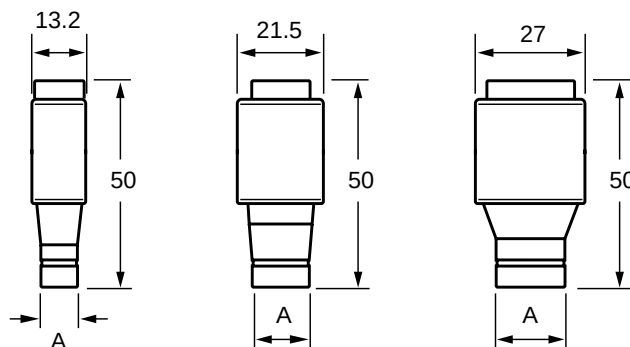
### Neozed Fuses



D01

D02

### Diazed Fuses



DI

DII

DIII

All dimensions are in "mm"

| Amperage       | Color  | Diazed Fuses |         |         |         |         |         |        | Neozed Fuses |          |        |
|----------------|--------|--------------|---------|---------|---------|---------|---------|--------|--------------|----------|--------|
|                |        | gL-gG        |         |         | aM      |         |         | DIM.   | gL-gG        |          | DIM.   |
|                |        | DI           | DII     | DIII    | DI      | DII     | DIII    | A (mm) | D01          | D02      | A (mm) |
| 2              | Pink   | DZ16F2       | DZ27F2  | —       | DZ16T2  | DZ27T2  | —       | 6      | D0Z14G2      | —        | 7.3    |
| 4              | Brown  | DZ16F4       | DZ27F4  | —       | DZ16T4  | DZ27T4  | —       | 6      | D0Z14G4      | —        | 7.3    |
| 6              | Green  | DZ16F6       | DZ27F6  | —       | DZ16T6  | DZ27T6  | —       | 6      | D0Z14G6      | —        | 7.3    |
| 10             | Red    | DZ16F10      | DZ27F10 | —       | DZ16T10 | DZ27T10 | —       | 8      | D0Z14G10     | —        | 8.5    |
| 16             | Grey   | DZ16F16      | DZ27F16 | —       | DZ16T16 | DZ27T16 | —       | 10     | D0Z14G16     | —        | 9.7    |
| 20             | Blue   | DZ16F20      | DZ27F20 | —       | DZ16T20 | DZ27T20 | —       | 12     | —            | D0Z18G20 | 10.9   |
| 25             | Yellow | DZ16F25      | DZ27F25 | —       | DZ16T25 | DZ27T25 | —       | 14     | —            | D0Z18G25 | 12.1   |
| 35             | Black  | —            | —       | DZ33F35 | —       | —       | DZ33T35 | 16     | —            | D0Z18G35 | 13.3   |
| 50             | White  | —            | —       | DZ33F50 | —       | —       | DZ33T50 | 18     | —            | D0Z18G50 | 14.5   |
| 63             | Copper | —            | —       | DZ33F63 | —       | —       | DZ33T63 | 20     | —            | D0Z18G63 | 15.9   |
| Base Size (mm) |        | 16           | 27      | 33      | 16      | 27      | 33      | —      | 14           | 18       | —      |

## Diazed/Neozed Fuses

Fuse bases, carriers, and gauge rings are available for Diazed (DZ) and Neozed (D0Z) type fuses. Fuse holders are comprised of a fuse base and carrier. Optional gauge rings act as a rejection feature and are used to prevent over-sizing of fuses. All bases and carriers are single pole units. Contact factory for additional information.

### Fuse Bases

| Part No. | Fuse Type | Base Size (mm) | Mounting Type |
|----------|-----------|----------------|---------------|
| DZB27S   | DZ        | 27             | Screw         |
| DZB27DR  | DZ        | 27             | Din Rail      |
| DZB33S   | DZ        | 33             | Screw         |
| DZB33DR  | DZ        | 33             | Din Rail      |
| D0ZB14S  | D0Z       | 14             | Screw         |
| D0ZB14DR | D0Z       | 14             | Din Rail      |
| D0ZB18S  | D0Z       | 18             | Screw         |
| D0ZB18DR | D0Z       | 18             | Din Rail      |



### Fuse Carriers

| Part No. | Fuse Type | Base Size (mm) |
|----------|-----------|----------------|
| DZC27    | DZ        | 27             |
| DZC33    | DZ        | 33             |
| D0ZC14   | D0Z       | 14             |
| D0ZC18   | D0Z       | 18             |

### Gauge Rings

| Amp Rating | Color  | DZ     | DZ     | D0Z     | D0Z     |
|------------|--------|--------|--------|---------|---------|
| 2          | Pink   | DZ27PK | —      | D0Z14PK | D0Z18PK |
| 4          | Brown  | DZ27BR | —      | D0Z14BR | D0Z18BR |
| 6          | Green  | DZ27GN | —      | D0Z14GN | D0Z18GN |
| 10         | Red    | DZ27RD | —      | D0Z14RD | D0Z18RD |
| 16         | Grey   | DZ27GY | —      | —       | D0Z18GY |
| 20         | Blue   | DZ27BE | —      | —       | D0Z18BE |
| 25         | Yellow | DZ27YW | —      | —       | D0Z18YW |
| 35         | Black  | —      | DZ33BK | —       | D0Z18BK |
| 50         | White  | —      | DZ33WE | —       | D0Z18WE |
| 63         | Copper | —      | DZ33CR | —       | —       |

Contact factory for dimensional information.



## Cylindrical Fuses

500 Volts • 0.5 – 100 Amperes

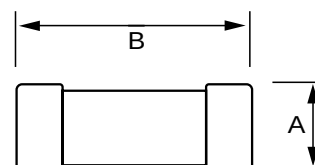


Littelfuse fast acting (gL-gG) fuses are used for the protection of cables against short-circuits. Time-lag (aM) fuses are used for protection of motors.

### Specifications

**Standards:** IEC 269-2-1  
**Example part number:** CY22X58G50

| Size       | Current Range | Voltage AC | Interrupting Rating |
|------------|---------------|------------|---------------------|
| 10 x 38 mm | 0.5-32A       | 500V       | 120kA               |
| 14 x 51 mm | 2-50A         | 500V       | 80kA                |
| 22 x 58 mm | 16-100A       | 500V       | 80kA                |



| Amperage           |   | gL-gG      |            |             | aM         |            |             |
|--------------------|---|------------|------------|-------------|------------|------------|-------------|
|                    |   | 10X38      | 14X51      | 22X58       | 10X38      | 14X51      | 22X58       |
| 0.5                |   | CY10X38G.5 | —          | —           | CY10X38M.5 | —          | —           |
| 1                  |   | CY10X38G1  | —          | —           | CY10X38M1  | —          | —           |
| 2                  |   | CY10X38G2  | CY14X51G2  | —           | CY10X38M2  | CY14X51M2  | —           |
| 4                  |   | CY10X38G4  | CY14X51G4  | —           | CY10X38M4  | CY14X51M4  | —           |
| 6                  |   | CY10X38G6  | CY14X51G6  | —           | CY10X38M6  | CY14X51M6  | —           |
| 8                  |   | CY10X38G8  | CY14X51G8  | —           | CY10X38M8  | CY14X51M8  | —           |
| 10                 |   | CY10X38G10 | CY14X51G10 | —           | CY10X38M10 | CY14X51M10 | —           |
| 12                 |   | CY10X38G12 | CY14X51G12 | —           | CY10X38M12 | CY14X51M12 | —           |
| 16                 |   | CY10X38G16 | CY14X51G16 | CY22X58G16  | CY10X38M16 | CY14X51M16 | CY22X58M16  |
| 20                 |   | CY10X38G20 | CY14X51G20 | CY22X58G20  | CY10X38M20 | CY14X51M20 | CY22X58M20  |
| 25                 |   | CY10X38G25 | CY14X51G25 | CY22X58G25  | CY10X38M25 | CY14X51M25 | CY22X58M25  |
| 32                 |   | CY10X38G32 | CY14X51G32 | CY22X58G32  | CY10X38M32 | CY14X51M32 | CY22X58M32  |
| 40                 |   | —          | CY14X51G40 | CY22X58G40  | —          | CY14X51M40 | CY22X58M40  |
| 50                 |   | —          | CY14X51G50 | CY22X58G50  | —          | CY14X51M50 | CY22X58M50  |
| 63                 |   | —          | —          | CY22X58G63  | —          | —          | CY22X58M63  |
| 80                 |   | —          | —          | CY22X58G80  | —          | —          | CY22X58M80  |
| 100                |   | —          | —          | CY22X58G100 | —          | —          | CY22X58M100 |
| Dimensions<br>(mm) | A | 10         | 14         | 22          | 10         | 14         | 22          |
|                    | B | 38         | 51         | 58          | 38         | 51         | 58          |

### Fuseholders

| Part No.    | Size  | # of Poles | Amp Rating | Voltage | Terminal Type  |
|-------------|-------|------------|------------|---------|----------------|
| CYH10381    | 10X38 | 1          | 32A        | 690V    | Pressure Plate |
| CYH10382    | 10X38 | 2          | 32A        | 690V    | Pressure Plate |
| CYH10383    | 10X38 | 3          | 32A        | 690V    | Pressure Plate |
| CYH10381ID* | 10X38 | 1          | 32A        | 690V    | Pressure Plate |
| CYH14511    | 14X51 | 1          | 50A        | 690V    | Pressure Plate |
| CYH14512    | 14X51 | 2          | 50A        | 690V    | Pressure Plate |
| CYH14513    | 14X51 | 3          | 50A        | 690V    | Pressure Plate |
| CYH22581    | 22X58 | 1          | 125A       | 690V    | Pressure Plate |
| CYH22582    | 22X58 | 2          | 125A       | 690V    | Pressure Plate |
| CYH22583    | 22X58 | 3          | 125A       | 690V    | Pressure Plate |

\* Indicating

NOTE: All fuseholders are DIN-Rail mountable.  
 Contact factory for dimensional information.

### Multi-pole Assembly Kit



Assembly kit is designed for use with CYH1038 and LPSC/LPSM fuse holders. Kit contains 20 connector pincers and 10 handle pins.

Part No: CYHP001

## British Dimension HRCII-C Fuses

600 Volts AC • 2– 600 Amperes



HRCII-C fuses are stud-mounted fuses designed to British standard dimensions. They are generally used for motor short-circuit protection in dead-front holders, and are normally required to be used in conjunction with a motor running overload device.

### Specifications

|                             |                                                                         |
|-----------------------------|-------------------------------------------------------------------------|
| <b>Voltage Rating:</b>      | 600 Volts AC, 250 Volts DC                                              |
| <b>Interrupting Rating:</b> | 200,000 amperes rms symmetrical AC<br>80,000 amperes rms symmetrical DC |
| <b>Ampere Range:</b>        | 2– 600 amperes                                                          |
| <b>Approvals:</b>           | CSA Certified to Standard C22.2 No. 106-M90<br>(File No. LR90341)       |

### Ampere ratings

|            |     |     |     |     |     |
|------------|-----|-----|-----|-----|-----|
| <b>2CO</b> | 2   | 10  | 25  | 50  | 80  |
|            | 4   | 15  | 30  | 60  | 100 |
|            | 6   | 20  | 40  |     |     |
| <b>2CC</b> | 125 | 200 | 300 | 400 | 500 |
|            | 150 | 250 | 350 | 450 | 600 |
| <b>2CM</b> | 80  | 125 | 200 | 300 | 400 |
|            | 100 | 150 | 250 | 350 |     |

Example part number (series & amperage): 2CM 150

### Recommended Fuse Blocks

|                  |   |                    |
|------------------|---|--------------------|
| DF30 (F, B, FB)  | — | Fits 2 – 30 amps   |
| DF60 (F, B, FB)  | — | Fits 40 – 60 amps  |
| DF100 (F, B, FB) | — | Fits 80 – 100 amps |

For additional information on HRCII-C fuse holders, contact factory.

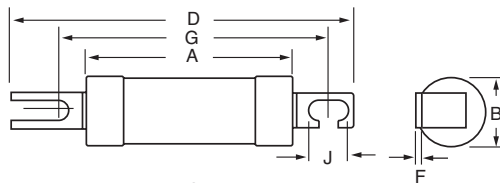


FIG. 1

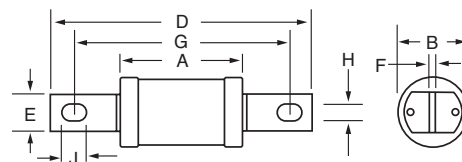


FIG. 2

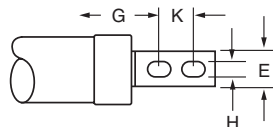


FIG. 3

| Cat. No.    | Old LF Part No. | Refer To Fig. No. | Dimensions in mm (inches in parentheses) |           |   |            |           |            |            |            |            |          |
|-------------|-----------------|-------------------|------------------------------------------|-----------|---|------------|-----------|------------|------------|------------|------------|----------|
|             |                 |                   | A                                        | B         | C | D          | E         | F          | G          | H          | J          | K        |
| 2CO 2-30    | FII             | 1                 | 56 (2.2)                                 | 21 (0.83) | — | 85 (3.3)   | 9 (0.35)  | 1 (0.04)   | 73 (2.87)  | 5.5 (0.21) | 7.5 (0.29) | —        |
| 2CO 40-60   | FII             | 1                 | 57 (2.24)                                | 26 (1.02) | — | 88 (3.45)  | 13 (0.51) | 1.6 (0.06) | 73 (2.87)  | 5.5 (0.21) | 7.5 (0.29) | —        |
| 2CO 80-100  | FII             | 1                 | 68 (2.88)                                | 36 (1.42) | — | 110 (4.33) | 19 (0.75) | 2.4 (0.09) | 94 (3.7)   | 8.7 (0.34) | —          | —        |
| 2CC 125-200 | FIIC            | 2                 | 76 (3)                                   | 41 (1.61) | — | 137 (5.39) | 19 (0.75) | 3.6 (0.14) | 111 (4.37) | 8.7 (0.34) | 16 (0.63)  | —        |
| 2CC 250-400 | FIIC            | 3                 | 81 (3.19)                                | 58 (2.28) | — | 210 (8.27) | 26 (1.02) | 6.5 (0.26) | 133 (5.24) | 10.3 (0.4) | 16 (0.63)  | 25.4 (1) |
| 2CC 450-600 | FIIC            | 3                 | 83 (3.27)                                | 74 (2.91) | — | 210 (8.27) | 26 (1.02) | 6.5 (0.25) | 133 (5.24) | 10.3 (0.4) | 16 (0.63)  | 25.4 (1) |
| 2CM 80-100  | FIIM            | 2                 | 66 (2.6)                                 | 31 (1.22) | — | 135 (5.31) | 19 (0.75) | 3.6 (0.14) | 111 (4.37) | 8.7 (0.34) | 16 (0.63)  | —        |
| 2CM 125-200 | FIIM            | 1                 | 77 (3.03)                                | 41 (1.81) | — | 110 (4.33) | 19 (0.75) | 2.4 (0.09) | 94 (3.7)   | 8.7 (0.34) | 10.3 (0.4) | —        |
| 2CM 250-400 | FIIM            | 2                 | 81 (3.19)                                | 58 (2.25) | — | 136 (5.35) | 26 (1.02) | 5.2 (0.2)  | 111 (4.37) | 8.7 (0.34) | 16 (0.63)  | —        |

\*Hole diameter to accept insulated stud (types C and D) mm min

## Suppression Products



*Overvoltage Suppression Products: Introduction* **171-172**

*Industrial Varistor Products* **173**

*Surge Suppression Fuses* **174**

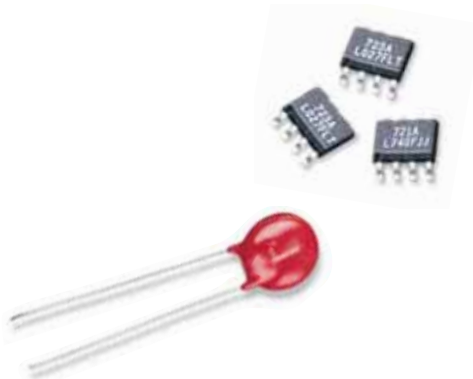
## Overvoltage Suppression Products

### Introduction

Overvoltage conditions are rapidly becoming an increasing concern in the electrical industry. Component miniaturization has resulted in increased sensitivity to many devices as the trend towards downsizing equipment and components continues. The majority of these devices are unable to handle high currents that result from Electrostatic Discharge (ESD) and other voltage transients.

### Did you know?

- 75% of field equipment failure is caused by Electrical Over-Stress (EOS)
- Semiconductor devices are becoming increasingly intolerant to voltage transients
- A lightning strike several miles away can induce transients in your equipment
- Power distribution transformers susceptibility impacts clean power condition



### Typical Overvoltage Applications

Industrial, High Energy AC Products  
(Solenoids, Motor Drives, Robotics, etc.)  
Telecommunications Products  
TVSS Products (UPS, AC Panels, Power Supplies,  
Circuit Breakers, etc.)  
Portable Electronic Equipment  
Automotive Electronics

### What Are Transients?

Voltage Transients are defined as short duration surges of electrical energy. Transients result from the sudden release of previously stored energy. In terms of electrical and electronic circuits, this energy can be released through intentional, controlled switching action, or induced into a circuit from external sources. If the voltage magnitude of the transient is large enough, circuit component damage or malfunction of the circuit may result.

Transients occur in either repeatable fashion or as random impulses. Repeatable transients are frequently caused by the operation of motors, generators, or the switching of reactive circuit components. Random transients, on the other hand, are often caused by lightning and ESD. Lightning and ESD generally occur unpredictably, and may require elaborate monitoring to be accurately measured.

### Transient Sources and Magnitude

|           | Voltage | Current | Rise-Time | Duration |
|-----------|---------|---------|-----------|----------|
| Lighting  | 25kV    | 20kA    | 10µs      | 1ms      |
| Switching | 600V    | 500A    | 50µs      | 500ms    |
| EMP       | 1kV     | 10A     | 20ns      | 1ms      |
| SSD       | 15kV    | 30A     | 1-5ns     | 100ns    |

## Overvoltage Suppression Products

### Introduction

#### Transient Voltage Scenarios

The switching of inductive loads generates high energy transients which increase in magnitude with increasingly heavy loads. When the inductive load is switched off, the collapsing magnetic field is converted into electrical energy which takes the form of a double exponential transient. Depending on the source, these transients can be as large as hundreds of volts and hundreds of amps with duration times of 400 milliseconds.

Typical sources of inductive transients are:

- Generator
- Motor
- Relay
- Transformer

These examples are extremely common in electrical and electronic systems. Because the sizes of the loads vary according to the application, the wave shape, duration, peak current, and peak voltage are all variables which exist in real world transients. Once these variables can be approximated, a suitable suppressor technology can be selected.

#### ESD (Electrostatic Discharge)

Electrostatic discharge is characterized by very fast rise times and very high peak voltages and currents. This energy is the result of an imbalance of positive and negative charges between objects.

#### Lightning Induced Transients

Even though a direct strike is clearly destructive, transients induced by lightning are not the result of a direct strike. When a lightning strike occurs, the event creates a magnetic field which can induce transients of large magnitude in nearby electrical cables.

#### Technological Solutions for Transient Threats

Because of the various types of transients and applications, it is necessary to employ protection devices with different characteristics in different applications. Littelfuse offers the broadest range of circuit protection technologies. Our overvoltage protection portfolio includes:

##### MOVs

*Metal Oxide Varistors (MOV)*

*Ceramic Technology*

Available in screw terminal, radial, square and axial leaded connections. Offers medium to very high energy ratings for a wide range of applications.

##### Surface Mount MOV

*Metal Oxide Varistor (MOV)*

*Ceramic Technology*

Available in a wide range of voltage ratings. Offers low to medium energy ratings for a variety of applications and is available with screw terminal, radial, square and axial leaded connections.

##### MLV

*Multilayer Metal Oxide Varistor*

*Ceramic Technology*

Available in a wide range of surface mount packages. Offers a lower voltage range and enhanced performance and filtering characteristics for applications requiring protection from low to medium energy transients.

##### PulseGuard® Suppressor

*Voltage Variable Polymer Technology*

Available in surface mount and 'D-Sub connector' format packages. Specifically designed for high data-rate applications requiring ESD protection and the lowest possible capacitance.

##### TVS Diode Arrays

*Silicon Avalanche Diode Technology*

Available in surface mount multi-pin packages or CSP (chip scale package) arrays. Designed for applications requiring multiline ESD protection and the lowest possible clamp voltage.

##### Discrete TVS Diode

*Silicon Avalanche Diode Technology*

Available in surface mount and axial leaded packages. Offers protection from medium to very high energy transients and can be used in wide range of applications.

##### SIDACTOR® Thyristor

*Thyristor Breakover Technology*

Available in surface mount, axial leaded and TO-220 through hole package options. Offers protection from medium to high energy transients, SIDACTOR thyristors are specifically designed for transient suppression in telecom and data transmission systems.

##### Gas Plasma Protector/Gas Discharge Tube

*Gas Plasma Technology*

Available in surface mount, axial leaded, radial leaded and special packages. The Littelfuse Gas Plasma technology offers high surge ratings and very low capacitance for use in telecommunication and broadband systems.

## Overvoltage Suppression Products

### Industrial Varistor Products

|                           | <b>TMOV™ /iTMOV™<br/>Varistor Series</b>                                          | <b>UltraMov™<br/>Varistor Series</b>                                              | <b>C-III Series</b>                                                                | <b>LA Series</b>                                                                    | <b>ZA Series</b>                                                                    |
|---------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                           |  |  |   |  |  |
| <b>Operating Voltage:</b> | 115-420 VAC<br>170-420 VDC                                                        | 130-625 VAC<br>170-825 VDC                                                        | 130-320 VAC                                                                        | 130-1000 VAC<br>175-1200 VDC                                                        | 4-460 VAC<br>5.5-615 VDC                                                            |
| <b>Peak Current:</b>      | 6,000-10,000A                                                                     | 1,750-10,000A                                                                     | 6,000-9,000A                                                                       | 1,200-6,500A                                                                        | 50-6,500A                                                                           |
| <b>Peak Energy:</b>       | 50-320                                                                            | 50-273J                                                                           | 45-220J                                                                            | 11-360J                                                                             | 0.1-52J                                                                             |
| <b>Mount/Form Factor:</b> | Radial Leaded                                                                     | Radial Leaded                                                                     | Radial Leaded                                                                      | Radial Leaded                                                                       | Radial Leaded                                                                       |
| <b>Disc Size:</b>         | 14, 20mm                                                                          | 7, 10, 14, 20mm                                                                   | 14, 20mm                                                                           | 7, 10, 14, 20mm                                                                     | 5, 7, 10, 14, 20mm                                                                  |
| <b>Indicating:</b>        | iTMOV Varistor Only                                                               | N/A                                                                               | N/A                                                                                | N/A                                                                                 | N/A                                                                                 |
|                           |  |  |  |  |  |

|                           | <b>MA Series</b>                                                                    | <b>RA Series</b>                                                                    | <b>CH Series</b>                                                                     | <b>CA Series</b>                                                                      | <b>NA Series</b>                                                                      |
|---------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|                           |                                                                                     |    |     |                                                                                       |                                                                                       |
| <b>Operating Voltage:</b> | 9-264 VAC<br>13-365 VDC                                                             | 4-275 VAC<br>5.5-369 VDC                                                            | 14-275 VAC<br>18-369 VDC                                                             | 250-2800 VAC<br>330-3500 VDC                                                          | 250-750 VAC<br>330-970 VDC                                                            |
| <b>Peak Current:</b>      | 40-100A                                                                             | 150-6,500A                                                                          | 250-500A                                                                             | 20,000-70,000A                                                                        | 40,000A                                                                               |
| <b>Peak Energy:</b>       | 0.06-1.7J                                                                           | 0.4-140J                                                                            | 1-23J                                                                                | 200-10,000J                                                                           | 370-1,050J                                                                            |
| <b>Mount/Form Factor:</b> | Axial Leaded                                                                        | Packaged                                                                            | Surface Mount                                                                        | Bare Disc                                                                             | Bare Disc                                                                             |
| <b>Disc Size:</b>         | 3mm                                                                                 | 8, 6, 22mm                                                                          | N/A                                                                                  | 32, 40, 60mm                                                                          | 34mm                                                                                  |
|                           |  |  |  |  |  |

|                           | <b>PA Series</b>                                                                    | <b>HB34 Series</b>                                                                  | <b>HA Series</b>                                                                     | <b>DA/DB Series</b>                                                                   | <b>BB/BA Series</b>                                                                   |
|---------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|                           |  |  |   |  |  |
| <b>Operating Voltage:</b> | 130-660 VAC<br>175-850 VDC                                                          | 130-750 VAC<br>175-970 VDC                                                          | 130-750 VAC<br>175-970 VDC                                                           | 130-970 VAC<br>175-970 VDC                                                            | 130-2800 VAC<br>175-3500 VDC                                                          |
| <b>Peak Current:</b>      | 6,500A                                                                              | 40,000A                                                                             | 25,000-40,000A                                                                       | 40,000A                                                                               | 50,000-70,000A                                                                        |
| <b>Peak Energy:</b>       | 70-250J                                                                             | 270-1,050J                                                                          | 200-1,050J                                                                           | 270-1,050J                                                                            | 450-10,000J                                                                           |
| <b>Mount/Form Factor:</b> | Packaged                                                                            | Industrial Packaged                                                                 | Packaged                                                                             | Industrial Packaged                                                                   | Packaged                                                                              |
| <b>Disc Size:</b>         | 20mm                                                                                | 34mm                                                                                | 32, 40mm                                                                             | 40mm                                                                                  | 60mm                                                                                  |
|                           |  |  |  |  |  |

Contact factory for additional information.

## Overvoltage Suppression Products

### Surge Suppression Fuses



The Littelfuse Varistor Protection (LVSP) Fuses are intended for the protection of TVSS products. The LVSP series has been designed to survive the 8x20 $\mu$ s lightning surges described in various standards (UL1449, IEC61000-4-5 & IEEE C62.41) without opening. This allows the TVSS to perform the necessary suppression. The LVSP is not rated for continuous current and the ratings are specific 8x20 $\mu$ s surge capability. The LVSP series can be used to facilitate TVSS module compliance to UL 1449 in permanently connected applications (abnormal overvoltage, unlimited current conditions).

### Features

- Very current-limiting under AC short-circuit conditions.
- Available in multiple mounting configurations (cartridge, bolt-in, PC board mount).
- Provides short-circuit protection in TVSS systems and complements the Littelfuse line of overvoltage products (HA, HB34, TMOV™ and iTMOV™ varistors as well as the AK-10 series TVS diodes).

### Applications

- TVSS products
- Surge arrestors

| Catalog No. | 8x20 $\mu$ s Surge Rating | Nominal Melting I <sup>2</sup> t (A <sup>2</sup> s) | Nominal Clearing I <sup>2</sup> t (A <sup>2</sup> s) | I <sub>peak</sub> @100kA 60Hz (A) |
|-------------|---------------------------|-----------------------------------------------------|------------------------------------------------------|-----------------------------------|
| LVSP 5      | 5,000                     | 359                                                 | 981                                                  | 3,700                             |
| LVSP 10     | 10,000                    | 1,300                                               | 3,210                                                | 5,823                             |
| LVSP 15     | 15,000                    | 3,267                                               | 6,235                                                | 7,765                             |
| LVSP 20     | 20,000                    | 4,940                                               | 11,710                                               | 8,135                             |
| LVSP 30     | 30,000                    | 11,950                                              | 35,325                                               | 12,478                            |
| LVSP 40     | 40,000                    | 20,550                                              | 61,700                                               | 15,250                            |
| LVSP 60     | 60,000                    | 39,240                                              | 145,555                                              | 19,604                            |
| LVSP 80     | 80,000                    | 75,000                                              | 254,000                                              | 24,600                            |
| LVSP 100    | 100,000                   | Contact Factory                                     |                                                      |                                   |

### Specifications

**Voltage Rating:** 600 VAC  
**Interrupting Rating:** 200,000 amps  
**Ratings:** 5 – 100kA 8x20 $\mu$ s surge withstand  
**Approvals:** UL Recognized under the components program.  
 (File No. E71611)

### Recommended Fuse Blocks

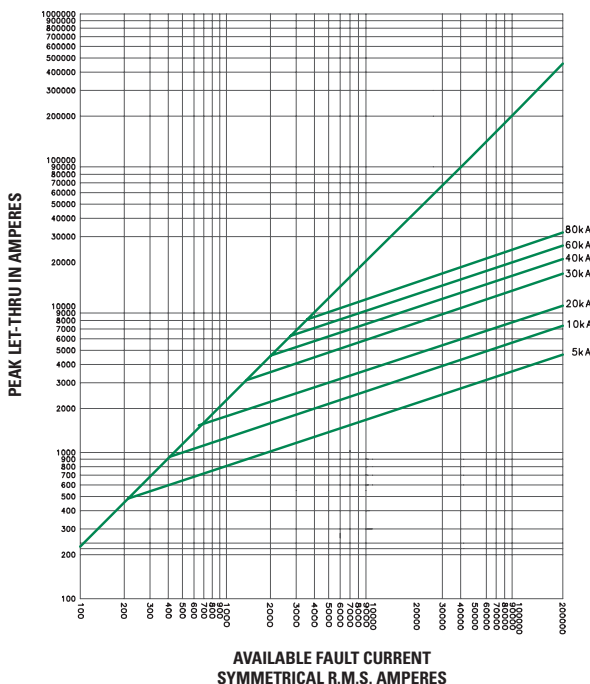
L60030M and LPSM series – LVSP (5-20)-2  
 LJ60030 and LPSJ30 series – LVSP (30-80)-2

### Mounting Options

| Surge Rating | Catalog Number |           |            |
|--------------|----------------|-----------|------------|
|              | Cartridge      | Leaded    | Bolt-In    |
| 5            | LVSP 5-2       | LVSP 5-R  | —          |
| 10           | LVSP 10-2      | LVSP 10-R | —          |
| 15           | LVSP 15-2      | LVSP 15-R | —          |
| 20           | LVSP 20-2      | LVSP 20-R | —          |
| 30           | LVSP 30-2      | —         | LVSP 30    |
| 40           | LVSP 40-2      | —         | LVSP 40    |
| 60           | LVSP 60-2      | —         | LVSP 60    |
| 80           | LVSP 80-2      | —         | LVSP 80    |
| 100          | —              | —         | LVSP 100-L |

*Note: Contact factory for dimensions and availability of specific mounting configurations.*

LVSP



## Fuseology



|                                  |                |
|----------------------------------|----------------|
| <i>Terms and Definitions</i>     | <b>177-181</b> |
| <i>Electrical Safety Guide</i>   | <b>182-183</b> |
| <i>Fuse Application Guide</i>    | <b>184-203</b> |
| <i>Motor Protection Tables</i>   | <b>204-206</b> |
| <i>Condensed Cross Reference</i> | <b>207</b>     |
| <i>Alphanumeric Index</i>        | <b>208</b>     |

## Fuseology

### Introduction

Fuseology provides the information needed to choose the correct types of Littelfuse POWR-GARD™ fuses for most applications. Definition of Terms is followed by Overcurrent Protection Fundamentals. If there are any questions or if additional data is needed for a specific use, call the Littelfuse Technical Support and Engineering Service Group at **1-800-TEC-FUSE (1-800-832-3873)** or visit us online at [www.littelfuse.com/technicalcenter](http://www.littelfuse.com/technicalcenter).

**Call 1-800-TEC-FUSE for  
Technical Support and  
Engineering Services or visit  
[www.littelfuse.com/technicalcenter](http://www.littelfuse.com/technicalcenter)**

|                                                                                |                |
|--------------------------------------------------------------------------------|----------------|
| <b>Definitions</b>                                                             | <b>177-181</b> |
| <b>Electrical Safety</b>                                                       | <b>182-183</b> |
| <b>Overcurrent Protection Fundamentals<br/>(Fuses and How They Work) Index</b> | <b>184</b>     |
| <i>Why Overcurrent Protection</i>                                              | 184            |
| <i>What is Quality Overcurrent Protection</i>                                  | 184            |
| <i>Overcurrent Types and Effects</i>                                           | 184            |
| <i>Fuse Characteristics (600 volts and below)</i>                              | 185            |
| <i>Time-Current Characteristics</i>                                            | 186-187        |
| <i>Peak Let-through Charts</i>                                                 | 187-189        |
| <i>Fuse Ampere Ratings</i>                                                     | 189            |
| <i>Fuse Dimensions</i>                                                         | 189            |
| <i>Fuse Coordination (Developing a Selective System)</i>                       | 190-191        |
| <i>Component Short-circuit Protecting Ability</i>                              | 190            |
| <b>UL/CSA Fuse Classes and Their Applications</b>                              | <b>192-193</b> |
| <b>Fuses for Specific Applications<br/>(600 Volts and Below) Index</b>         | <b>194</b>     |
| <i>Protecting Service Entrance and Feeder Conductors</i>                       | 194            |
| <i>Main Services and Feeders</i>                                               | 194            |
| <i>Motor Protection</i>                                                        | 194-198        |
| <i>Motor Overload Protection (running overcurrent)</i>                         | 195-197        |
| <i>Motor Feeder (100% Motor Load) Protection over 600A</i>                     | 197            |
| <i>Motor Branch Circuit Protection over 600A</i>                               | 197            |
| <i>Motor Controller (Starter) Protection over 600A</i>                         | 197            |
| <i>Control Transformer Protection</i>                                          | 197-198        |
| <i>Primary Fusing With Secondary Fusing</i>                                    | 198            |
| <i>Secondary Fusing of Transformers</i>                                        | 198            |
| <i>Lighting Fixture Protection</i>                                             | 198            |
| <i>Street Lighting &amp; Other Weatherproof Overcurrent Protection</i>         | 198            |
| <i>Cable Short-circuit Protection (Cable Limiter Application)</i>              | 199            |
| <i>Semiconductor and Solid-state Device Protection</i>                         | 199            |
| <i>Effect of Ambient Temperature on Fuses</i>                                  | 199            |
| <b>Medium Voltage Protection (2400 volts to 38.0 kV)</b>                       | <b>200-203</b> |
| <b>Motor Protection Tables</b>                                                 | <b>204-206</b> |

## Fuse Application Guide

### Definitions

#### Definition of Terms Frequently Used When Selecting Overcurrent Protection

##### **AIC or A.I.C.**

See Interrupting Capacity.

##### **AIR or A.I.R.**

See Interrupting Rating.

##### **Ambient Temperature**

The air temperature surrounding a device. For fuses or circuit breakers in an enclosure, the air temperature within the enclosure.

##### **Ampacity**

The current in amperes that a conductor can carry continuously under the conditions of use without exceeding its temperature rating. It is sometimes informally applied to switches or other devices. These are more properly referred to by their ampere rating.

##### **Ampere Rating**

The current rating, in amperes, that is marked on fuses, circuit breakers, or other equipment.

##### **Ampere-Squared-Seconds ( $I^2t$ )**

A means of describing the thermal energy generated by current flow. When a fuse is interrupting a current within its current-limiting range, the term is usually expressed as melting, arcing, or total clearing  $I^2t$ .

**Melting  $I^2t$**  is the heat energy passed by a fuse after an overcurrent occurs and until the fuse link melts. It equals the rms current squared multiplied by melting time in seconds. For times less than 0.004 seconds, melting  $I^2t$  approaches a constant value for a given fuse.

**Arcing  $I^2t$**  is the heat energy passed by a fuse during its arcing time. It is equal to the rms arcing current squared (see below), multiplied by arcing time.

**Clearing  $I^2t$**  (also Total Clearing  $I^2t$ ) is the ampere-squared seconds ( $I^2t$ ) through an overcurrent device from the inception of the overcurrent until the current is completely interrupted. Clearing  $I^2t$  is the sum of the Melting  $I^2t$  and the Arcing  $I^2t$ .

##### **Arc-Flash**

The sudden release of heat energy and intense light at the point of an arc. Can be considered a short-circuit through the air, usually created by accidental contact between live conductors.

##### **Arcing Current (See Figure 1)**

The current that flows through the fuse after the fuse link has melted and until the circuit is interrupted.

##### **Arcing $Pt$**

See Ampere-Squared-Seconds ( $I^2t$ ).

##### **Arcing Fault**

A short-circuit that arcs at the point of fault. The arc impedance (resistance) tends to reduce the short-circuit current. Arcing faults may turn into bolted faults by welding of the faulted components. Arcing faults may be phase-to-phase or phase-to-ground.

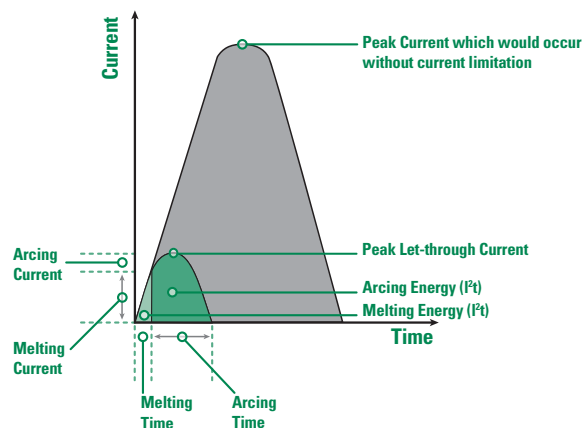


Figure 1

Showing arcing and melting currents and arcing, melting and clearing times.

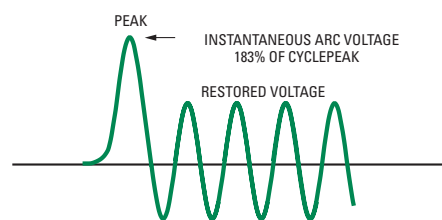


Figure 2

##### **Arcing Time (See Figure 1)**

The time between the melting of a fuse link, or parting of circuit breaker contacts, until the overcurrent is interrupted.

##### **Arc Voltage (See Figure 2)**

Arc voltage is a transient voltage that occurs across an overcurrent protection device during the arcing time. It is usually expressed as peak instantaneous voltage ( $V_{peak}$  or  $E_{peak}$ ), rarely as rms voltage.

##### **Asymmetrical Current**

See Symmetrical Current.

##### **Available Short-Circuit Current (also Available or Prospective Fault Current)**

The maximum rms Symmetrical Current that would flow at a given point in a system under bolted-fault conditions. Short-circuit current is maximum during the first half-cycle after the fault occurs. See definitions of Bolted Fault and Symmetrical Current.

##### **Blade Fuse**

See Knife Blade Fuse.

##### **Body**

The part of a fuse enclosing the fuse elements and supporting the contacts. Body is also referred to as cartridge, tube, or case.

## Fuse Application Guide

### Definitions

#### Bolted Fault

A short-circuit that has no electrical resistance at the point of the fault. It results from a firm mechanical connection between two conductors, or a conductor and ground. Bolted faults are characterized by a lack of arcing. Examples of bolted faults are a heavy wrench lying across two bare bus bars, or a crossed-phase condition due to incorrect wiring.

#### Cartridge Fuse

A fuse that contains a current-responsive element inside a tubular fuse body with cylindrical ferrules (endcaps).

#### Case Size (also Cartridge Size)

The maximum allowable ampere rating of a cartridge fuse having defined dimensions and shape. For example, case sizes for UL Listed Class H, K, J, RK1, and RK5 are 30, 60, 100, 200, 400, and 600 amperes. The physical dimensions vary with fuse class, voltage, and ampere rating. UL Standards establish the dimensions for each UL Fuse Class. This catalog's product section contains case size dimensions for all Littelfuse POWR-GARD™ fuses.

#### Clearing $I^2t$

See Ampere-Square-Seconds ( $I^2t$ ).

#### Clearing Time (see Figure 1)

The time between the initiation of an overcurrent condition to the point at which the overcurrent is interrupted. Clearing Time is the sum of Melting Time and Arcing Time.

#### Contacts (Fuse)

The external metal parts of the fuse used to complete the circuit. These consist of ferrules, caps, blades or terminals, as shown in this catalog.

#### Coordination or Coordinated System

See Selective Coordination.

#### Continuous Load

An electrical load where the maximum current is expected to continue for 3 hours or more.

#### Current-limiting Fuse (See Figure 3)

A fuse which, when interrupting currents within its current-limiting range, reduces the current in the faulted circuit to a magnitude substantially less than that obtainable in the same circuit if the device was replaced with a solid conductor having comparable impedance. To be labeled "current-

limiting," a fuse must mate with a fuseblock or fuseholder that has either a rejection feature or dimensions that will reject non-current-limiting fuses.

#### Current-limiting Range

For an individual overcurrent protective device, the current-limiting range begins at the lowest value of rms symmetrical current at which the device becomes current-limiting (the threshold current) and extends to the maximum interrupting capacity of the device. See definitions of Threshold Current and Interrupting Capacity.

#### Current Rating

See Ampere Rating.

#### Dual-element Fuse

A fuse with internal construction consisting of a separate time-delay overload element(s) that interrupts overcurrents up to approximately 500%-600% of its nominal rating, plus separate fuse links that quickly open higher value currents. All dual-element fuses have time delay, but, since there are other methods of achieving time delay, not all time-delay fuses have dual-element construction. See Time-Delay Fuse.

#### Element

A fuse's internal current-carrying parts that melt and interrupt the current when subjected to an overcurrent of sufficient duration or value. Also called fuse link.

#### Fast-Acting Fuse

May also be termed Normal-opening fuse.

A fuse that has no intentional, built-in, time delay. Actual opening time is determined by the fuse class, the overcurrent, and other conditions. Fast-acting is indicated on the fuse label by "Fast-Acting", "F-A", "F", or other suitable marking.

#### Fault

Same as Short-Circuit and used interchangeably.

#### Fault Current

Same as Short-Circuit current.

#### Filler

A material, such as granular quartz, used to fill a section or sections of a fuse and aid in arc quenching.

#### Fuse

An overcurrent protective device consisting of one or more current-carrying elements enclosed in a body fitted with contacts, so that the fuse may be readily inserted into or removed from an electrical circuit. The elements are heated by the current passing through them, thus interrupting current flow by melting during specified overcurrent conditions.

#### Ground Fault

A short-circuit caused by insulation breakdown between a phase conductor and a grounded object or conductor.

#### $I^2t$

See Ampere-Squared-Seconds ( $I^2t$ ).

#### IEC Type 2 Protection

Fused protection for control components that prevents damage to these

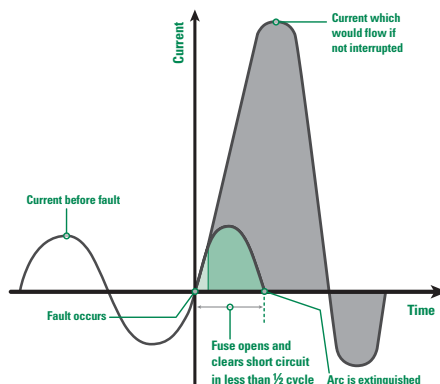


Figure 3

## Fuse Application Guide

### Definitions

components under short-circuit conditions. A more complete discussion of this subject is included in the Motor and Motor Circuit Protection Section. See definition of No Damage.

#### **Instantaneous Peak Current ( $I_p$ or $I_{peak}$ )**

The maximum instantaneous current value developed during the first half-cycle (180 electrical degrees) after fault inception. The peak current determines magnetic stress within the circuit. See Symmetrical Current.

#### **Interrupting Capacity (AIC)**

The highest available symmetrical rms alternating current (for DC fuses the highest direct current) at which the protective device has been tested, and which it has interrupted safely under standardized test conditions. The device must interrupt all available overcurrents up to its interrupting capacity. Also commonly called interrupting rating. See Interrupting Rating below.

#### **Interrupting Rating (IR, I.R., AIR or A.I.R.)**

The highest RMS symmetrical current, at specified test conditions, which the device is rated to interrupt. The difference between interrupting capacity and interrupting rating is in the test circuits used to establish the ratings.

#### **Inverse-time Characteristics**

A term describing protective devices whose opening time decreases with increasing current.

#### **IR or I.R. (also AIR or A.I.R.)**

See Interrupting Rating above.

#### **Kiloamperes (kA)**

1,000 amperes.

#### **Knife Blade Fuse**

Cylindrical or square body fuses with flat blade terminals extending from the fuse body. Knife blades may be designed for insertion into mating fuse clips, and/or to be bolted in place. Knife blade terminals may include a rejection feature that mates with a similar feature on a fuse block of the same class.

#### **Melting Current (see Figure 1)**

The current that flows through the fuse from the initiation of an overcurrent condition to the instant arcing begins inside the fuse.

#### **Melting $Pt$**

See Ampere-Squared-Seconds ( $I^2t$ ).

#### **Melting Time (see Figure 1)**

The time span from the initiation of an overcurrent condition to the instant arcing begins inside the fuse.

#### **NEC**

In general, the National Electrical Code® (NEC®). Specifically, as referenced herein, NEC refers to NFPA Standard 70, National Electrical Code®, National Fire Protection Association, Quincy, MA 02269.

Sections of the NEC reprinted herein, and/or quotations therefrom, are done so with permission. The quoted and reprinted sections are not the official position of the National Fire Protection Association, which is represented only by the Standard in its entirety. Readers are cautioned that not all authorities have adopted the most recent edition of the NEC; many are still using earlier editions.

#### **No Damage**

A term describing the requirement that a system component be in essentially the same condition after the occurrence of a short-circuit as prior to the short-circuit.

#### **Non-renewable Fuse**

A fuse that must be replaced after it has opened due to an overcurrent. It cannot be restored to service.

#### **Normal-opening Fuse**

See Fast-Acting Fuse.

#### **One-time Fuse**

Technically, any non-renewable fuse. However, the term usually refers to UL Class H fuses and to fast acting Class K5 fuses. Such fuses are not current-limiting and do not have a rejection feature. One-time fuses are also referred to as "Code" fuses.

#### **Overcurrent**

Any current larger than the equipment, conductor, or devices are rated to carry under specified conditions.

#### **Overload**

An overcurrent that is confined to the normal current path (e.g., not a short-circuit), which if allowed to persist, will cause damage to equipment and/or wiring.

Additional information regarding fuse applications for overload protection can be found later in this Fuseology section.

#### **Peak Let-through Current (See Figure 4)**

The maximum instantaneous current that passes through an overcurrent protective device during its total clearing time when the available current is within its current-limiting range.

#### **Power Factor (X/R)**

As used in overcurrent protection, power factor is the relationship between the inductive reactance (X) and the resistance (R) in the system during a fault. Under normal conditions a system may be operating at a 0.85 power factor (85%). When a fault occurs, much of the system resistance is shorted out and the power factor may drop to 25% or less. This may cause the current to become asymmetrical. See definition of Symmetrical Current. The UL test circuits used to test fuses

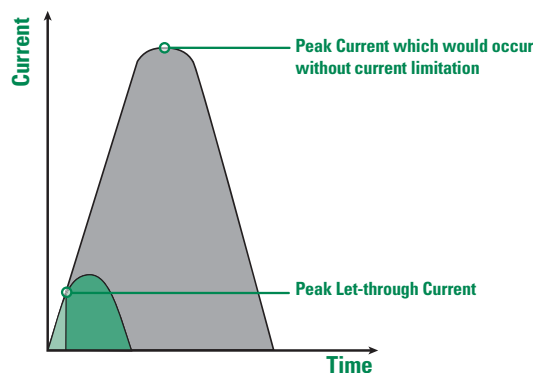


Figure 4

## Fuse Application Guide

### Definitions

with interrupting ratings exceeding 10,000 amperes are required to have a power factor of 20% or less. Since the power factor of test circuits tends to vary during test procedures, actual test circuits are usually set to a 15% power factor. The resulting asymmetrical current has an rms value of 1.33 times the available symmetrical rms. The instantaneous peak current of the first peak after the fault is 2.309 times the available symmetrical rms.

### Prospective Current

See Available Short-Circuit Current.

### Rating

A designated limit of operating characteristics based on definite conditions such as current rating, voltage rating and interrupting rating.

### Rectifier Fuse

See Semiconductor Fuse.

### Rejection Feature

The physical characteristics of a fuse block or fuseholder that prevents the insertion of a fuse unless it has mating characteristics. This may be done through the use of slots, grooves, projections, or the actual physical dimensions of the fuse. This feature prevents the substitution of fuses of a Class or size other than the Class and size intended.

### Renewable Element (also Renewable Link)

A renewable fuse current-carrying part that is replaced to restore the fuse to a functional condition after the link opens due to an overcurrent condition.

### Renewable Fuse

A fuse that may be readily restored to service by replacing the renewable element after operation.

### Selective Coordination (See Figure 5)

In a selectively coordinated system, only the protective device immediately on the line side of an overcurrent opens. Upstream protective devices remain closed. All other equipment remains in

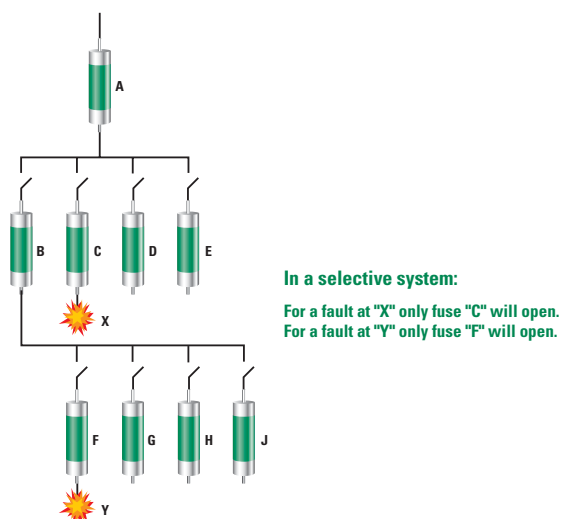


Figure 5

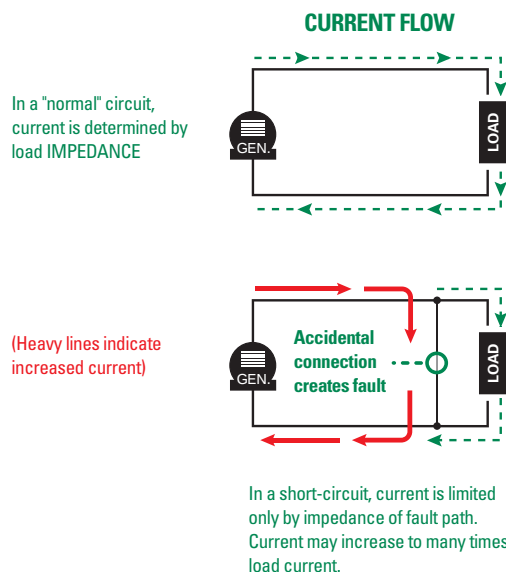


Figure 6

service, which simplifies the identification and location of overloaded equipment or short-circuits. For additional information, refer to the Fuse Coordination pages of this Fuseology section.

### Semiconductor Fuse

A fuse specifically designed to protect semiconductors such as silicon rectifiers, silicon-controlled rectifiers, thyristors, transistors, and similar components. For additional information, refer to the Semiconductor Section of this catalog.

### Short-Circuit (See Figure 6)

A current flowing outside its normal path. It is caused by a breakdown of insulation or by faulty equipment connections. In a short-circuit, current bypasses the normal load. Current is determined by the system impedance (AC resistance) rather than the load impedance. Short-circuit currents may vary from fractions of an ampere to 200,000 amperes or more.

### Short-Circuit Rating

The maximum RMS symmetrical short-circuit current at which a given piece of equipment has been tested under specified conditions, and which, at the end of the test is in essentially the same condition as prior to the test. Short-circuit ratings (also called withstand ratings) apply to equipment that will be subjected to fault currents, but which are not required to interrupt them. This includes switches, busway (bus duct), switchgear and switchboard structures, motor control centers and transformers.

Most short-circuit ratings are based on tests which last three complete electrical cycles (0.05 seconds). However, if the equipment is protected during the test by fuses, or by a circuit breaker with instantaneous trips, the test duration is the time required for the overcurrent protective device to open the circuit.

When so protected during testing, the equipment instructions and labels must indicate that the equipment shall be protected by a given fuse class and rating or by a specific make, type, and rating of circuit breaker.

## Fuse Application Guide

### Definitions

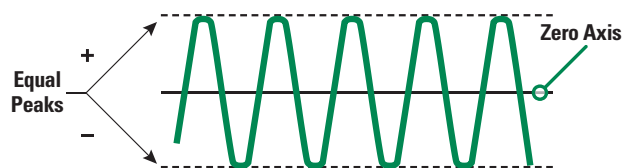


**Figure 7**  
Symmetrical Current

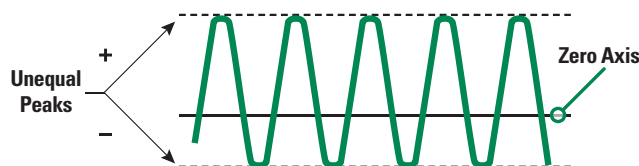


**Figure 8**  
Asymmetrical Current

Circuit breakers equipped with short-delay trip elements instead of instantaneous trip elements have withstand (short-circuit) ratings in addition to their interrupting rating. The breaker must be able to withstand the available fault current during the time that opening is delayed.

#### Symmetrical Current

The terms “Symmetrical Current” and “Asymmetrical Current” describe an AC wave symmetry around the zero axis. The current is symmetrical when the peak currents above and below the zero axis are equal in value, as shown in **Figure 7**. If the peak currents are not equal, as shown in **Figure 8**, the current is asymmetrical.

The degree of asymmetry during a fault is determined by the change in power factor (X/R) and the point in the voltage wave when the fault occurs. See definition of Power Factor. In general, lower short-circuit power factors increase the degree of asymmetry.

#### Threshold Current

The minimum current for a given fuse size and type at which the fuse becomes current-limiting. It is the lowest value of available rms symmetrical current that will cause the device to begin opening within the first 1/4 cycle (90 electrical degrees) and completely clear the circuit within 1/2 cycle (180 electrical degrees). The approximate threshold current can be determined from the fuse’s peak let-through charts.

See **Figure 9**.

#### Threshold Ratio

The threshold current divided by the ampere rating of a specific type or class overcurrent device. A fuse with a threshold ratio of 15 becomes current-limiting at 15 times its current rating.

#### Time-Delay Fuse

Fuses that have an intentional, built-in delay in opening. When compared to fast-opening fuses, time-delay fuses have an increased opening time for overcurrents between approximately 200% and 600% of the fuse’s current rating. Time-delay is indicated on the fuse label by “Time-Delay”, “T-D”, “D”, or other suitable marking. Time-delay in the

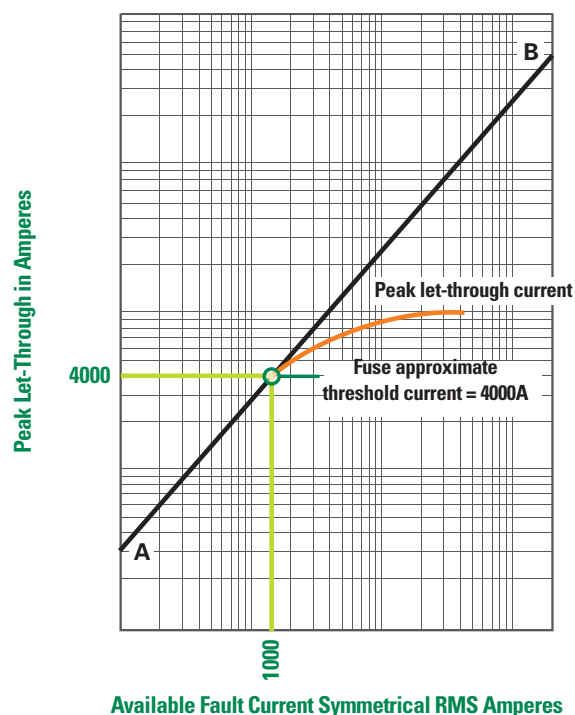


**Figure 9**

overload range (200%-600% of the fuse rating) permits the fuse to withstand system switching surges, motor starting currents, and other harmless temporary overcurrents.

UL Standards require time-delay Class H, K, RK1, RK5, and J fuses to hold 500% of their normal current rating for a minimum of 10 seconds. They must also pass the same opening time tests (135% and 200% of current rating) as fast acting fuses.

Time-delay Class CC, CD, G, Plug, and Miscellaneous fuses have different requirements. See the corresponding descriptions given in the Product Information Section.

For the UL Standard, Class L fuses have no standard time-delay. The time-delay varies from type to type for a given manufacturer, as well as from manufacturer to manufacturer. For reference, Littelfuse KLPC series POWR-PRO® fuses do hold 500% of rated current for a minimum of ten seconds.

#### Voltage Rating

The maximum rms AC voltage and/or the maximum DC voltage at which the fuse is designed to operate. For example, fuses rated 600 volts and below may be applied at any voltage less than their rating. There is no rule for applying AC fuses in DC circuits such as applying the fuse at half its AC voltage rating. **Fuses used on DC circuits must have DC ratings.**

#### Withstand Rating

See Short-Circuit.

## Electrical Safety Guide

Electrical safety is an important issue for employers and employees alike. Unfortunately there are still about 30,000 electrical accidents occurring each year, each of them potentially costing up to \$15 million, and the number is increasing.

OSHA requires all employers to perform a hazard assessment of their facilities and train their employees to become qualified to perform a specific task. Being aware, following safety regulations, codes and standards, and using protective devices will minimize hazards and help establish safer work practices.

### FACTS

- **There are approximately 30,000 electrical shock accidents every year.**
- **Over 3600 disabling electrical contact injuries occur annually.**
- **Over 2000 workers are sent to burn centers each year with severe Arc-Flash burns.**
- **Over 1000 electrical workers die each year from workplace accidents.**
- **60% of workplace accident deaths are caused by burn injuries.**
- **Electrocutions are the 4th leading cause of traumatic occupational fatalities.**
- **Estimates show that 10 Arc-Flash incidents occur every day in the U.S.**
- **97% of all electricians have been shocked or injured on the job.**
- **Medical costs per person can exceed \$4 million for severe electrical burns.**
- **Total costs per electrical incident can exceed \$15 million.**
- **In the year 2002, work injuries cost Americans \$146.6 billion.**

#### OSHA Standard 29 CFR Part 1910 Subpart S (electrical)

generally addresses safety standards, work practices, and maintenance requirements.

#### NFPA 70E Standard for Electrical Safety in the Workplace

concentrates on safety requirements to protect employees. OSHA commonly is referred to as the "Shall" and NFPA 70E as the "How" with regards to electrical safety.

#### Both OSHA and NFPA 70E reinforce the need for Electrical Hazard Analysis.

The analysis should address all potential electrical hazards including shock, Arc-Flash, Arc-Blast, and burns. NFPA 70E Article 110.8(B)(1) specifically requires Electrical Hazard Analysis within all areas of the electrical system that operate at 50 volts or greater. The results of the Electrical Hazard Analysis will determine the work practices, protection boundaries, personal protective equipment to be used, and other procedures to protect employees from an Arc-Flash or contact with live conductors.

#### Implementing and following a well designed Electrical Safety Program will protect employees and employers against:

- Injury to personnel
- Increased insurance and workman compensation
- Lost or unusable materials
- Unplanned equipment repair or replacement
- OSHA citations and fines
- Multi-million dollar lawsuits
- Possible bankruptcy

***Electrical Safety is not an option; it is absolutely necessary for both workers and employers.***

## Electrical Safety Guide

The following is a brief overview of requirements for working on electrical equipment.

**NOTE:** Only the complete standards constitute the law or regulation and all parts must be followed where applicable.



### Understand and follow NFPA and OSHA guidelines

Allow only "Qualified" individuals to perform work. Qualified workers must be knowledgeable on the equipment and the hazards that exist and receive documented training. For more information refer to OSHA 1910.332 and NFPA 70E Article 110.6(D)(1).

Establish a "Safe Work Condition" and work on system components de-energized whenever possible. Consult NFPA 70E Article 120.1 for establishing an Electrically Safe Work Condition.



### Develop an Electrical Safety Program

Determine available fault currents and hazard risks at points where there is the potential for contact with an energized part. In many cases, this requires a complete Hazard Risk Assessment. As a result, the entire electrical system is analyzed and the one-line diagram for the facility is reviewed and updated. The outcome is used to determine the Hazard Risk Category (0 to 4), required level of PPE, Protection Boundaries and equipment that requires warning labels. Refer to OSHA 1910.132(d) and NFPA 70E Article 110.8(B)(1) for more information on Electrical Hazard Analysis.



### Establish an Electrical Safety Program.

It should control and re-engineer the processes in the workplace to insure Electrical Safety including: hazard assessments, labeling of equipment, training programs, energized work permits and using current-limiting devices to minimize hazards. Refer to NFPA 70E Article 110.7 for more information on establishing an Electrical Safety Program. Develop formal training for equipment operators, service technicians and any other employees that might come in contact with the identified hazard. "Qualify" them for hazard preparations and contingencies (preparations prior to servicing electrical systems or coming within boundaries of electrical hazards). For more information refer to OSHA 1910.332 and NFPA 70E Article 110.6.



### Communicate the hazards to employees

Train your employees.

Label equipment and service entrances of the "Hazards Assessed." Refer to NEC Article 110.16 for Warning Label Requirements.

Create a safety culture and support safety processes and awareness such as: Deenergize and Verify, "Test Before Touch", Lockout/Tagout, the proper use of PPE and insulated tools, providing barriers to warn and restrict access to unqualified personnel, etc.



### Select the safest circuit protection devices to minimize electrical hazards

| <b>WARNING</b>                                                                                                                                                               |                                                                                                                                                                                                       |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Arc-Flash and Shock Hazard</b>                                                                                                                                            |                                                                                                                                                                                                       |
| Appropriate PPE Required                                                                                                                                                     |                                                                                                                                                                                                       |
| Flash Protection Boundary                                                                                                                                                    | <u>32 inches</u>                                                                                                                                                                                      |
| Hazard Risk Category                                                                                                                                                         | <u>1</u>                                                                                                                                                                                              |
| Incident Energy at 18" (cal/cm <sup>2</sup> )                                                                                                                                | <u>2.77 cal/cm<sup>2</sup></u>                                                                                                                                                                        |
| Available Fault Current                                                                                                                                                      | <u>35 kA</u>                                                                                                                                                                                          |
| System Voltage                                                                                                                                                               | <u>480 VAC</u>                                                                                                                                                                                        |
| <b>REQUIRED PPE</b>                                                                                                                                                          |                                                                                                                                                                                                       |
| <input type="checkbox"/> Hard Hat<br><input type="checkbox"/> Safety Glasses<br><input type="checkbox"/> Safety Goggles<br><input type="checkbox"/> Face Shield              | <input type="checkbox"/> Flash Hood<br><input type="checkbox"/> Ear Protection<br><input type="checkbox"/> T-shirt<br><input type="checkbox"/> Long Sleeve Shirt<br><input type="checkbox"/> FR Shirt |
| <input type="checkbox"/> Voltage Rated Gloves<br><input type="checkbox"/> Leather Gloves<br><input type="checkbox"/> Cotton Underwear<br><input type="checkbox"/> Long Pants | <input type="checkbox"/> FR Pants<br><input type="checkbox"/> FR coverall<br><input type="checkbox"/> Flash Suit<br><input type="checkbox"/> Leather Shoes                                            |
| <b>SHOCK HAZARD APPROACH BOUNDARIES</b>                                                                                                                                      |                                                                                                                                                                                                       |
| Limited                                                                                                                                                                      | <u>42 inches</u>                                                                                                                                                                                      |
| Restricted                                                                                                                                                                   | <u>12 inches</u>                                                                                                                                                                                      |
| Prohibited                                                                                                                                                                   | <u>1 inch</u>                                                                                                                                                                                         |
| Equipment ID: Bus: SERVICE4                                                                                                                                                  | Date: 05/12/05                                                                                                                                                                                        |
|  <b>800-TEC-FUSE</b><br>POWR-GARD™ Products www.littelfuse.com                           |                                                                                                                                                                                                       |

## Fuse Application Guide

### Overcurrent Protection Fundamentals

#### Overcurrent Protection Fundamentals (Fuses and How They Work)

##### Introduction

An important part of developing quality overcurrent protection is an understanding of system needs and overcurrent protective device fundamentals. This section discusses these topics with special attention to the application of fuses. If you have additional questions, call our Technical Support and Engineering Services Group at 1-800-TEC-FUSE (1-800-832-3873). Definitions of terms used in this section are located in the preceding section.

| INDEX                                             | Page    |
|---------------------------------------------------|---------|
| <b>Why Overcurrent Protection?</b>                | 184     |
| <b>What is Quality Overcurrent Protection?</b>    | 184     |
| <b>Overcurrents, Types and Effects</b>            | 184     |
| <b>Overloads</b>                                  | 184     |
| <b>Short-Circuits</b>                             | 185     |
| <b>Fuse Characteristics</b> (600 volts and below) | 185     |
| <b>Voltage Rating</b>                             | 185     |
| <b>Interrupting Rating</b>                        | 185-186 |
| 300,000 AIC Fuses                                 | 186     |
| <b>Time Current Characteristics</b>               | 186     |
| <b>Overloads</b>                                  | 186     |
| Fast-Acting Fuses                                 | 186     |
| Time-Delay (Dual-Element) Fuses                   | 186     |
| Very Fast-Acting Fuses                            | 187     |
| <b>Short Circuits</b>                             | 187     |
| Current-Limiting Fuses                            | 187     |
| Fast-Acting Fuses                                 | 187     |
| Dual-Element (Time-Delay) Fuses                   | 187     |
| Very Fast-Acting Fuses                            | 187     |
| <b>Time-current Curves</b>                        | 187     |
| <b>Peak Let-through Charts</b>                    | 187     |
| <b>Using the Peak Let-through Charts</b>          |         |
| ("up-over-and-down")                              | 188-189 |
| <b>Fuse Ampere (current) Ratings</b>              | 189     |
| <b>Fuse Dimensions</b>                            | 189     |
| <b>Fuse Coordination, Selective Systems</b>       | 190-191 |
| <b>Component Short-circuit Protecting Ability</b> | 190     |
| <b>UL/CSA Fuse Classes and Their Applications</b> | 192-193 |

##### Why Overcurrent Protection?

All electrical systems eventually experience overcurrents. Unless removed in time, even moderate overcurrents quickly overheat system components, damaging insulation, conductors, and equipment. Large overcurrents may melt conductors and vaporize insulation. Very high currents produce magnetic forces that bend and twist bus bars. They can pull cables from their terminals and crack insulators and spacers.

Too frequently, fires, explosions, poisonous fumes and panic accompany uncontrolled overcurrents. They not only damage electrical systems and equipment, but may cause injury or death to personnel.

To reduce these hazards, the National Electrical Code® (NEC®), OSHA regulations, and other applicable design and installation standards require overcurrent protection that will disconnect overloaded or faulted equipment.

Industry and governmental organizations have developed performance

standards for overcurrent devices and testing procedures that show compliance with the standards and with the NEC. These organizations include: the American National Standards Institute (ANSI), National Electrical Manufacturers Association (NEMA), and the National Fire Protection Association (NFPA) working with Nationally Recognized Testing Laboratories (NRTL) such as Underwriters Laboratories (UL).

Electrical systems must meet applicable code requirements including those for overcurrent protection before electric utilities can provide electric power to a facility.

##### What is Quality Overcurrent Protection?

A system with quality overcurrent protection has the following characteristics:

1. Meets all legal requirements, such as NEC, OSHA, local codes, etc.
2. Provides maximum safety for personnel, exceeding minimum code requirements as necessary.
3. Minimizes overcurrent damage to property, equipment, and electrical systems.
4. Provides coordinated protection. Only the protective device immediately on the line side of an overcurrent opens to protect the system.
5. Is cost effective. Provides reserve interrupting capacity for future growth. Not subject to obsolescence. Requires minimum maintenance that can be done by regular maintenance personnel using readily available tools and equipment.

##### Overcurrent Types and Effects

An overcurrent is any current that exceeds the ampere rating of conductors, equipment, or devices under conditions of use. The term "overcurrent" includes both overloads and short-circuits.

##### Overloads

An overload is an overcurrent that is confined to normal current paths. There is no insulation breakdown.

**Sustained** overloads are commonly caused by installing excessive equipment such as additional lighting fixtures. They are also caused by overloading mechanical equipment and by equipment breakdown such as failed bearings. If not disconnected within established time limits, sustained overloads eventually overheat circuit components causing thermal damage to insulation and other system components.

Overcurrent protective devices must disconnect circuits and equipment experiencing continuous or sustained overloads before overheating occurs. Even moderate insulation overheating seriously reduces its life. For example, motors overloaded by only 15% may have less than 50% insulation life.

**Temporary** overloads occur frequently. They may be caused by temporary equipment overloads such as a machine tool taking too deep of a cut, or may result from starting inductive loads, such as motors. Since temporary overloads are, by definition, harmless, overcurrent protective devices should not open the circuit.

Fuses selected must have sufficient time-delay to allow motors to start

## Fuse Application Guide

### Overcurrent Protection Fundamentals

and temporary overloads to subside. However, should the overcurrent continue, fuses must open before system components are damaged. Littelfuse POWR-PRO® and POWR-GARD™ time-delay fuses are designed to meet these needs. They hold 500% current for a minimum of ten seconds, yet open quickly on higher values of current. Even though government mandated high efficiency motors and NEMA design E motors have much higher locked rotor currents, POWR-PRO time-delay fuses such as the FLSR\_ID, LLSRK\_ID, or IDSR series have sufficient time-delay to permit motors to start when the fuses are properly selected in accordance with the NEC.

#### Short-Circuits

##### Types of Short-Circuits

Short-circuits are divided into bolted faults, arcing faults and ground faults. Each are defined in the Definition section.

##### Causes of Short-Circuits

A short-circuit is current flowing outside of its normal path. It is caused by an insulation breakdown or faulty connection. During a circuit's normal operation, the connected load determines current. During a short-circuit, the current bypasses load and the current takes a "shorter path," hence: short-circuit. Since there is no load impedance, only the total distribution system's impedance from the utility's generators to the fault will limit current flow. **See Figure 6.**

Many electrical systems have single-phase impedance of 0.005 ohms or less. Applying Ohm's Law ( $I = E/Z$  for AC systems), a 480 volt single-phase circuit with a ten ohm load impedance would draw 48 amperes ( $480/10 = 48$ ). If, when the load is shorted, the same circuit has a 0.005 ohm system impedance, the available fault current would be 96,000 amperes ( $480/0.005 = 96,000$ ). Short-circuits are currents out of their normal path and regardless of their value, they must be removed quickly.

##### Effects of Short-Circuit Currents

If not removed quickly, the large currents associated with short-circuits may have three profound effects on an electrical system: heating, magnetic stress, and arcing.

**Heating.** Current passing through an electrical system heats every part of it. When overcurrents are large enough, heating is practically instantaneous. The energy in such overcurrents is measured in ampere-squared seconds ( $I^2t$ ). An overcurrent of 10,000 amperes that lasts for 0.01 seconds has an  $I^2t$  of 1,000,000. If the current could be reduced to 1,000 amperes for the same period of time,  $I^2t$  would be reduced to 10,000 — only one percent of the original value. If the current in a conductor increases 10 times, the  $I^2t$  increases 100 times. A current of only 7,500 amperes can melt a #8 AWG copper wire in 0.1 second. Within eight milliseconds (0.008 seconds or one-half cycle), a current of 6,500 amperes can raise the temperature of #12 AWG THHN thermoplastic insulated copper wire from its operating temperature of 75°C to its maximum short-circuit temperature of 150°C.

Currents larger than this may immediately vaporize organic insulations. Arcs at the point of fault or from mechanical switching such as automatic transfer switches or circuit breakers may ignite the vapors causing violent explosions and electrical flash.

**Magnetic stress.** Magnetic stress (or force) is a function of the peak

current squared. Fault currents of 100,000 amperes can exert forces of more than 7,000 lb. per foot of bus bar. These stresses may injure insulation, pull conductors from terminals, and stress equipment terminals sufficiently to cause damage.

**Arcing.** Arcing at the point of fault melts and vaporizes the conductors and components involved in the fault. The arcs often burn through raceways and equipment enclosures showering the area with molten metal that quickly starts fires and/or injures personnel in the area. Additional short-circuits are often created when vaporized material is deposited on insulators and other surfaces. Sustained arcing-faults vaporize organic insulation. These vapors may explode or burn.

#### Fuse characteristics (600 volts and below)

Since overcurrent protection is crucial to reliable electrical system operation and safety, overcurrent device selection and application should be carefully considered. When selecting fuses, the following parameters need to be evaluated:

#### Voltage Rating

Fuse voltage ratings must equal or exceed the circuit voltage where the fuses will be installed, and fuses used in DC circuits must be rated for DC. Exceeding the voltage ratings or using an AC only fuse in a DC circuit could result in violent destruction of the fuse. Standard 600 volt and below fuses may be applied at any voltage less than their rating. For example, a 600 volt fuse may be used in a 277 volt or even a 32 volt system.

**NOTE:** This does not apply to semiconductor fuses and medium voltage fuses. See the semiconductor and medium voltage fuse application data later in this section for voltage limitations of these fuses.

UL Listed low-voltage power fuses are available with AC voltage ratings of 125, 250, 300, 480, and 600 volts, and DC voltage ratings of 60, 125, 160, 250, 300, 400, 500, and 600 volts. Fuses may be rated for AC only or DC only, or they may have both an AC and a DC voltage rating. Supplementary fuses have voltage ratings from 32 to 1,000 volts AC and/or DC.

300 volt Class T fuses (Littelfuse JLLN series) may only be used for single-phase to neutral loads where the voltage does not exceed 300 volts to ground. They may not be used in three-phase, four wire, 480/277 volt, wye systems or in 480 volt corner-grounded delta systems.

#### Interrupting Rating

A fuse's interrupting rating is the highest available symmetrical rms alternating current that the fuse is required to safely interrupt at rated voltage under standardized test conditions without being damaged. A fuse must interrupt all overcurrents up to its interrupting rating. Fuses are available with interrupting ratings of 10,000A, 50,000A, 100,000A, 200,000A, and 300,000A.

NEC Article 110.9 requires all equipment intended to break current at fault levels to have an interrupting rating sufficient for system voltage and current available at the equipment's line terminals. Refer to **Figure 10**. Select fuses with interrupting ratings which equal or exceed the available fault current.

Standardizing on fuses with at least a 200,000 ampere interrupting capacity (AIR) ensures that all fuses have an adequate interrupting

## Fuse Application Guide

### Overcurrent Protection Fundamentals

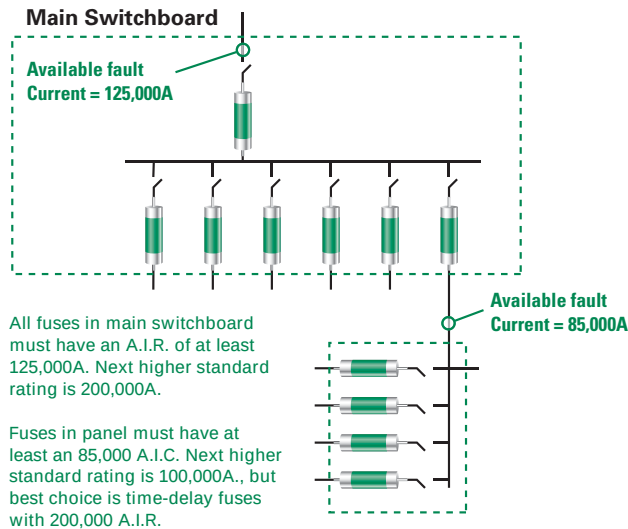


Figure 10

rating, and provides reserve interrupting capacity for future increases in available fault current.

#### 300,000 AIC Fuses

Littelfuse POWR-PRO® fuse series have a Littelfuse Self-Certified interrupting rating of 300,000 amperes rms symmetrical. The 300,000 ampere testing was performed in a Nationally Recognized Testing Laboratory, and the tests were UL witnessed. UL has ruled that fuses with a UL interrupting rating greater than 200,000 amperes must be marked as "Special Purpose Fuse" and may not be labeled as UL Listed Class RK5, RK1, L, etc.

Littelfuse feels that the "Special Purpose Fuse" classification adds confusion to specification writing for both fuses and switches and complicates fuse procurement. Since only a very small number of installations have a real need for fuses with interrupting ratings in excess of 200,000 amperes, Littelfuse will continue to UL List their fuses by UL standard fuse classes that have interrupting ratings up to 200,000 amperes. Littelfuse fuses which have passed the 300,000 ampere tests are marked on the label: "300kA (Self certified by Littelfuse)". UL listing cards showing 300,000 AIC and the special purpose classification are available on request. Refer to the product section of this catalog for information on specific fuse classes.

#### Time Current Characteristics

Time current characteristics determine how fast a fuse responds to overcurrents. All fuses have inverse time characteristics; that is, the fuse opening time decreases as the value of overcurrent increases. When properly rated in accordance with NEC requirements, fuses provide both overload and short-circuit protection to system conductors and components. However, in some instances such as when fuses are used to backup circuit breakers or to provide motor branch circuit short-circuit and ground fault protection, fuses provide only short-circuit protection. A fuse's response to overcurrents is divided into overloads and short-circuits.

#### Overloads

While fuses must disconnect overloaded conductors and equipment before the conductors and components are seriously overheated, they should not disconnect harmless temporary overloads. To provide overload protection for system conductors, UL has established maximum fuse opening times at 135% and 200% of a fuse's current rating. All UL Listed fuses for application in accordance with the National Electrical Code® (NEC®) must meet these limits whether they are fast-acting or time-delay fuses.

#### Fast-Acting (Normal-Opening) Fuses

Fast-acting fuses (sometimes called "Normal-opening fuses") have no intentional time-delay. Typical opening times at 500% of the fuse ampere rating range from 0.05 to approximately 2 seconds. Fast-Acting fuses are suitable for non-inductive loads, such as incandescent lighting and general-purpose feeders, or branch circuits with little or no motor load. When protecting motors and other inductive loads, fast-acting fuses must be rated at 200-300% of load currents to prevent nuisance opening on in-rush currents. Fuses with such increased ratings no longer furnish adequate protection from overloads. They provide only short-circuit protection. Overload relays or other overload protection must be provided to protect conductors and equipment from overload conditions.

#### Time-Delay (Dual Element) Fuses

UL Classes CC, CD, G, H, L, RK5 and RK1 fuses, plus some of the UL Listed Miscellaneous fuses, may have time-delay. If so, they are identified on the fuse label with "Time-Delay", "T-D", "D", or some other suitable marking. Minimum time-delay varies with the fuse class, and to some degree with the fuse ampere rating. UL standards for POWR-GARD™ Fuses Products series IDSR, FLNR\_ID, and FLSR\_ID (UL Class RK5), LLNRK, LLSRK, LLSRK\_ID (UL Class RK1), and JTD, JTD\_ID (UL Class J) fuses require them to carry 500% rated current for a minimum of 10 seconds. Standards for CCMR and KLDR (UL Class CC and CD) and SLC (UL Class G) require them to carry 200% rated current for a minimum of 12 seconds.

Although there is no UL Classification for time-delay Class L fuses, they may be marked "Time-Delay." The amount of time-delay is determined by the manufacturer. POWR-PRO® KLPC series and POWR-GARD KLLU series fuses will hold 500% current for 10 seconds or more.

In addition to providing time-delay for surges and short time overloads, time-delay fuses meet all UL requirements for sustained overload protection. On higher values of current, time-delay fuses are current-limiting meaning they remove large overcurrents in less than one-half cycle (0.008 seconds). Time-delay fuses provide the best overall protection for both motor and general purpose circuits, and eliminate nuisance fuse opening and most downtime.

Compared to fast-acting fuses, time-delay fuses can be selected with ratings much closer to a circuit's operating current. For example, on most motor circuits, RK5 and RK1 fuses can be rated at 125-150% of a motor's full load current (FLA). This provides superior overload and short-circuit protection, and often permits using smaller, less expensive switches. Time-delay fuses have gradually replaced most one-time and renewable fuses. Today, more than 50% of all fuses sold by electrical distributors are time-delay fuses such as Littelfuse POWR-PRO LLSRK\_ID series fuses.

## Fuse Application Guide

### Overcurrent Protection Fundamentals

#### Very Fast-Acting Fuses

The principle use of very fast acting fuses is to protect solid-state electronic components, such as semiconductors. Their special characteristics, including quick overload response, very low  $I^2t$ ,  $I_{peak}$  and peak transient voltages provide protection for components that cannot withstand line surges, low value overloads, or short-circuit currents.

#### Short-Circuits

A fuse's short-circuit response is its opening time on higher-value currents. For power fuses, that is generally over 500 – 600% of the fuse's rating. As stated earlier, all fuses have inverse time characteristics: the higher the current, the faster the opening time. Since short-circuits should be removed quickly, inverse time is especially important for short-circuit protection.

#### Current-limiting Fuses

Current-limiting fuses must have the following characteristics:

1. Limit peak currents to values less than those which would occur if the fuses were replaced with solid conductors of the same impedance. This reduced peak current is referred to as a fuse's "Peak Let-through Current."
2. When the fault current exceeds the fuse threshold current, the fuse must open the circuit in less than 180 electrical degrees ( $1/2$  cycle) after the start of the fault.
3. Matching fuse holders and/or fuse blocks must reject non-current-limiting fuses and accept only current-limiting fuses of the stated UL Class.

#### Fast-Acting (Normal Opening) Fuses

All fast-acting fuses provide fast short-circuit response within their interrupting rating. Some are current-limiting, such as Class T and J. Others are non-current-limiting, such as Class H.

#### Dual Element (Time-delay) Fuses

Littelfuse time-delay IDSR, FLNR\_ID/FLSR\_ID Class RK5, and LLNRK/LLSRK\_ID Class RK1 series fuses have true dual-element construction. Time-delay elements are used for overload protection, and separate fast acting fuse links are used to provide current-limiting short-circuit protection.

#### Very Fast-Acting Fuses

Very fast-acting fuses are designed for very fast response to overloads and short-circuits. They are very current-limiting.

#### Understanding Time-current Curves

Time-current curves for Littelfuse POWR-GARD™ fuses are shown in each product section. They show the average melting times for that fuse series at any current. In order to make the curves more readable, they are presented on log-log paper. The overcurrent values appear at the bottom, and increase from left to right. Average melting times appear on the left-hand side of the curve and increase from bottom to top. The amperage ratings of the individual fuses for a given series are listed at the top and increase from left to right. **Figure 11** shows the average melting time curves for a typical time-delay fuse series.

**Figure 12** compares the average melting times for 100 and 600 amp ratings of three fuse types: Littelfuse POWR-GARD dual-element, time-delay LLSRK series RK1 fuses; Littelfuse normal opening NLS series fuses and Littelfuse very fast acting L60S series semiconductor fuses.

**Table 1** compares the opening times for these fuses.

#### Peak Let-through Charts

Fuses that are current-limiting open severe short-circuits within the first half-cycle (180 electrical degrees) after the fault occurs. They also reduce the peak current of the available fault current to a value less than would occur without the fuse. This is shown in **Figure 13**.

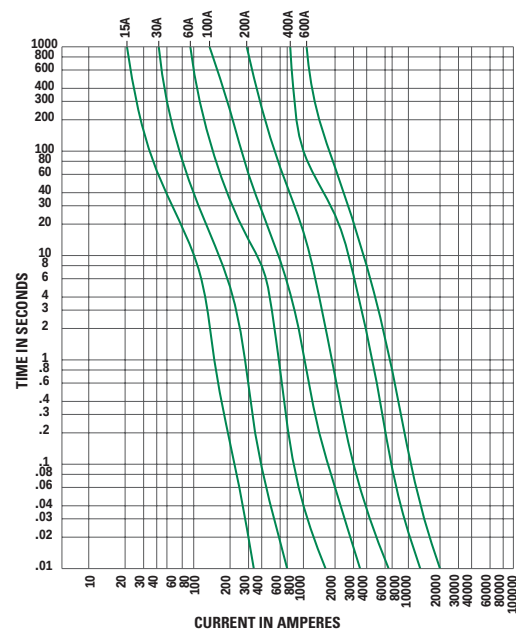


Figure 11

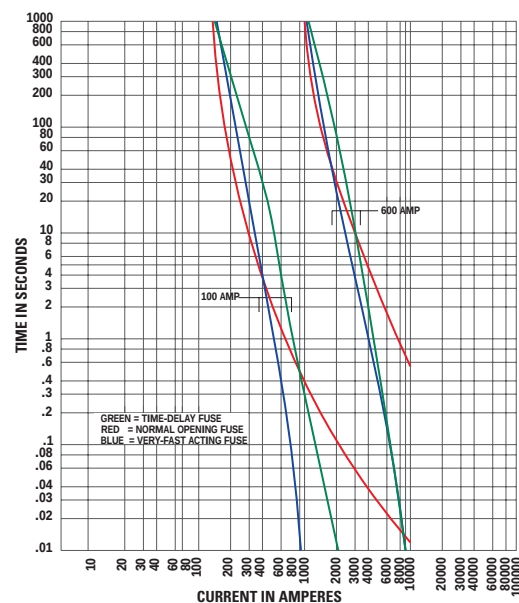


Figure 12

## Fuse Application Guide

### Overcurrent Protection Fundamentals

**Table 1**

**Comparative Opening Times for Time-Delay, Fast-Acting, and Very Fast-Acting Fuses**

| Ampere Rating | Fuse Type        | Opening Time in Seconds |             |              |
|---------------|------------------|-------------------------|-------------|--------------|
|               |                  | 500% Rating             | 800% Rating | 1200% Rating |
| 100           | Time-Delay       | 12 secs.                | 0.9 secs.   | 0.14 secs.   |
|               | Normal Opening   | 2 secs.                 | 0.7 secs.   | 0.3 secs.    |
|               | Very Fast-Acting | 1.3 secs.               | 0.02 secs.  | >0.01 secs.  |
| 600           | Time-Delay       | 14 secs.                | 0.7 secs.   | 0.045 secs.  |
|               | Normal Opening   | 10 secs.                | 3 secs.     | 1.1 secs.    |
|               | Very Fast-Acting | 2 secs.                 | 0.05 secs.  | >0.01 secs.  |

A fuse current-limiting effects are shown graphically on Peak Let-through charts such as the one in **Figure 14**. The values across the chart's bottom represent the available (also referred to as potential or prospective) rms symmetrical fault current. The values on the chart's left side represent the instantaneous available peak current and the peak let-through current for various fuse ratings.

As an example, enter the chart on the bottom at 100,000 rms symmetrical amperes and read upwards to line A-B. From this point, read horizontally to the left and read an instantaneous peak current of 230,000 amperes. In a circuit with a 15% short-circuit power factor, the instantaneous peak of the available current approximates 2.3 times the rms symmetrical value. Line A-B on the chart has a 2.3:1 slope.

The curves that branch off line A-B show the current-limiting effects of different fuse ampere ratings. Enter the chart in **Figure 14** on the bottom at 100,000 rms symmetrical amperes and read upwards to the intersection of the 200 ampere fuse curve. Read horizontally to the left from this point and read approximately 20,000 amperes. The 200 ampere fuse has reduced the peak current during the fault from 230,000 amperes to 20,000 amperes. 20,000 amperes is less than one-tenth of the available current. Magnetic force created by current flow is a function of the peak current squared. If the peak let-through current of a current-limiting fuse is one-tenth of the available peak, the magnetic force is reduced to less than  $1/100$  of what would occur without the fuse.

#### Using the Peak Let-through Charts ("Up-Over-and-Down")

Peak Let-through Charts for Littelfuse POWR-GARD™ fuses are shown in each product section of this catalog. These charts are useful in determining whether a given fuse can protect a specific piece of equipment.

For example, with an available fault-current of 100,000 rms symmetrical amperes, determine whether 600 amp 250 volt time-delay Class RK1 fuses can protect equipment with a 22,000 amp short-circuit rating. Refer to **Figure 15**.

Locate 100,000A available fault-current on the bottom of the chart (Point A) and follow this value upwards to the intersection with the 600A fuse curve (Point B). Follow this point horizontally to the left to intersect with Line A-B (Point C). Read down to the bottom of the chart (Point D) and read approximately 18,000 amps.

The POWR-PRO® LLNRK 600 ampere RK1 current-limiting fuses have reduced the 100,000 amperes available current to an apparent or equivalent 18,000 amps. When protected by 600 amp LLNRK RK1 fuses, equipment with short-circuit ratings of 22,000 amps may be safely con-

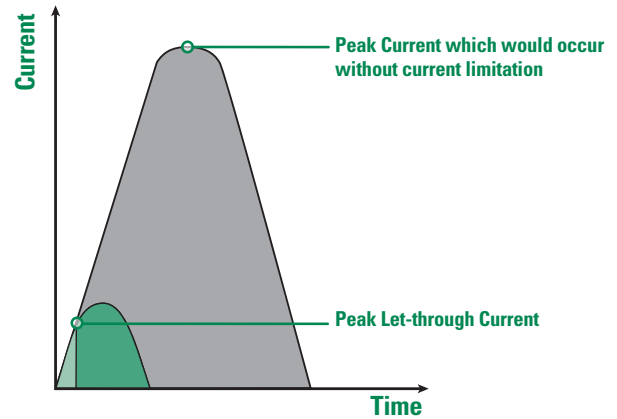


**Figure 13**  
Current limiting effect of fuses

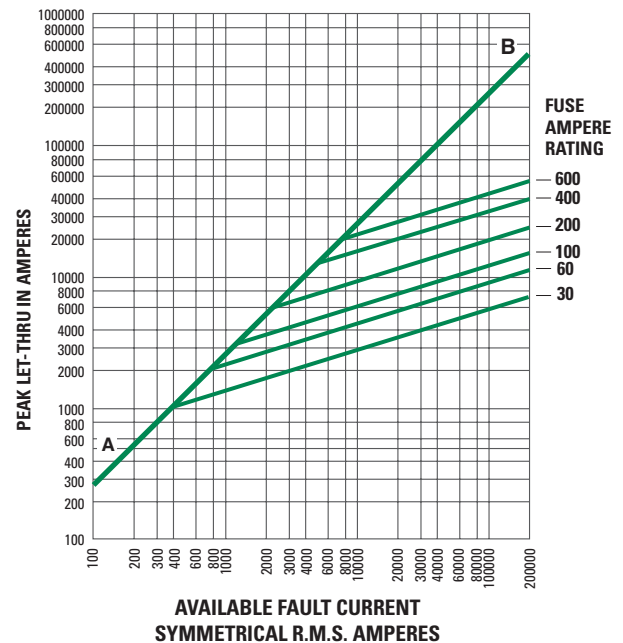


**Figure 14**  
Peak Let-through Charts

nected to a system having 100,000 available rms symmetrical amperes.

This method, sometimes referred to as the "Up-Over-and-Down" method, may be used to:

1. Provide back-up short-circuit protection to large air power circuit breakers.
2. Enable non-interrupting equipment such as bus duct to be installed in systems with available short-circuit currents greater than their short-circuit (withstand) ratings.

## Fuse Application Guide

### Overcurrent Protection Fundamentals

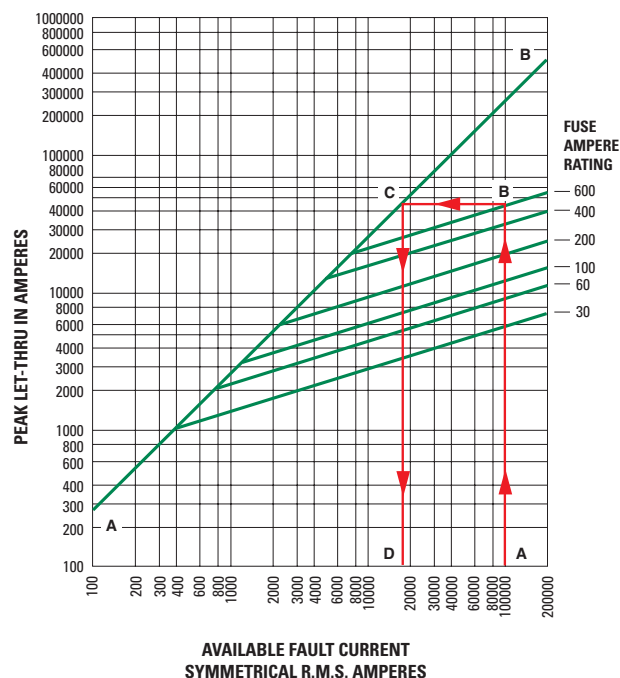


**Figure 15**  
Peak Let-through Chart for POWR-PRO®  
LLNRK Class RK1 Dual-Element Fuses.  
Using the Up-Over-and-Down Method.

This method **may not** be used to select fuses for backup protection of molded case or intermediate frame circuit breakers. National Electrical Code® (NEC®) Article 240.86 states:

“Where a circuit breaker is used on a circuit having an available fault current higher than its marked interrupting rating by being connected on the load side of an acceptable overcurrent protective device having the higher rating, 240.86(A) and (B) shall apply.

(A) Marking. The additional series combination interrupting rating shall be marked on the end use equipment, such as switchboards and panelboards.”

NEC Article 110.22 states:

“Where circuit breakers or fuses are applied in compliance with the series combination ratings marked on the equipment by the manufacturer, the equipment enclosure(s) shall be legibly marked in the field to indicate the equipment has been applied with a series combination rating. The marking shall be readily visible and state the following:

CAUTION - SERIES COMBINATION SYSTEM RATED \_\_\_\_\_  
\_\_\_\_\_ AMPERES. IDENTIFIED REPLACEMENT COMPONENTS  
REQUIRED.

UL Listed fuse-to-circuit breaker series ratings are now available from most national loadcenter and panelboard manufacturers. The Listings are shown in their product digests and catalogs. Many local builders have also obtained fuse-to-circuit breaker series ratings. For additional information on this subject contact the Littelfuse Technical Support and

Engineering Services Group at 1-800-TEC-FUSE (1-800-832-3873).

#### Ampere (Current) Rating

A fuse ampere rating is the AC or DC current that the fuse can continuously carry under specified conditions. Fuses selected for a circuit must have ampere ratings that meet NEC requirements. These NEC requirements establish maximum ratings and, in some cases, minimum ratings. NEC Articles 240 and 430 contain specific requirements.

#### Fuse Dimensions

There is a trend toward miniaturization in almost everything, and electrical equipment is no exception. While saving space may be an important factor when selecting the proper fuses, other considerations should not be overlooked. Some of these are:

- Does the smallest fuse have the most desirable characteristics for the application?
- Does the equipment in which the fuse will be installed provide adequate space for maintenance?
- Do smaller fuses coordinate well with the system's other overcurrent protection?

### General Fusing Recommendations

#### Fuse Ratings from 1/10 through 600 amperes

When available fault currents are less than 100,000 amperes and when equipment does not require the more current-limiting characteristics of RK1 fuses, POWR-PRO FLSR\_ID series Indicating Class RK5 current-limiting fuses provide superior time-delay and cycling characteristics along with all the benefits of an indicating fuse at lower cost than RK1 fuses. FLSR\_ID series fuses tell you when they have protected your circuit and need to be replaced. If available fault currents exceed 100,000 amperes, equipment may need the additional current-limitation capabilities of the POWR-PRO LLNRK/LLSRK/LLSRK\_ID series Class RK1 fuses.

Fast-acting JLLN/JLLS series Class T fuses possess space-saving features that make them especially suitable for protection of molded case circuit breakers, meter banks, and similar limited-space applications.

Time-delay JTD\_ID/JTD series Class J fuses are used in OEM motor control center applications as well as other MRO motor and transformer applications requiring space-saving IEC Type 2 protection.

Class CC and Class CD series fuses are used in control circuits and control panels where space is at a premium. Choose Littelfuse POWR-PRO CCMR series fuses for protection of small motors. They are now available with ampere ratings up to 60 amperes. Choose Littelfuse KLDR series fuses for the protection of control power transformers and similar devices.

Should you have any questions concerning product applications, call our Technical Support Group at 800 TEC FUSE.

#### Fuses with ampere ratings from 601 through 6,000 amperes

For superior protection of most general-purpose and motor circuits, we recommend POWR-PRO KLPC series Class L fuses.

## Fuse Application Guide

### Overcurrent Protection Fundamentals

#### Coordinated (Selective) Systems

A “coordinated” or “selective” system is a system whose overcurrent protective devices have been carefully chosen and their time-current characteristics coordinated. Only the overcurrent device immediately on the line side of an overcurrent will open for any overload or short-circuit condition.

See definition of Selective Coordination in Definitions, and refer to **Figure 5** for a graphical example.

When a system is not coordinated, a fault at X might cause Fuse B to open. This increases the amount of equipment out of service, and makes it more difficult to locate the problem, thereby increasing downtime.

Since the advent of electrical and electronic equipment, businesses have become entirely dependent on the continuous availability of electric energy. Loss of power halts all production. Customer service is interrupted; order processing ceases; yet expenses continue.

Even many UPS systems become unintentionally non-selective, causing power loss to computers and other critical equipment. Non-selectivity may defeat otherwise well-engineered UPS systems.

In a selective system, none of this occurs. Overloads and faults are disconnected by the overcurrent protective device immediately on the line side of the problem. Minimum equipment is removed from service, the faulted or overloaded circuit is easy to locate, and minimum time is required to restore full service.

For these and many other reasons, selectivity is the standard by which many systems are judged.

#### Fuse Selectivity

Refer to **Figure 11** which shows typical average melting time curves for one class of fuses. Note that the curves are roughly parallel, and that for a given overcurrent the smaller fuse ratings respond quicker than the larger ratings. The heat energy required to open a fuse is divided into melting  $I^2t$  and arcing  $I^2t$  (see definition of Ampere-Squared-Seconds). The sum of these is the total clearing  $I^2t$ .

For a system to be coordinated, the smaller fuse total clearing  $I^2t$  must be less than the larger fuse melting  $I^2t$ . Put another way, if the downstream (branch) fuse opens the circuit before the overcurrent affects the upstream (feeder) fuse element, the system will be selective. This can be determined from curves showing melting and total clearing  $I^2t$ , or from minimum melting and maximum clearing time-current curves.

The simplest method of coordinating low voltage power fuses is by use of a Coordination Table such as the one shown in **Table 2**. This table is only applicable for the Littelfuse POWR-PRO® and POWR-GARD™ fuse series listed. Tables such as this one greatly reduce design time. For example, the coordination table shows that POWR-PRO KLPC Class L fuses coordinate at a two-to-one ratio with other Class L fuses, and with POWR-PRO LLNRK/LLSRK/LLSRK\_ID series Class RK1 and POWR-PRO JTD/JTD\_ID series Class J fuses.

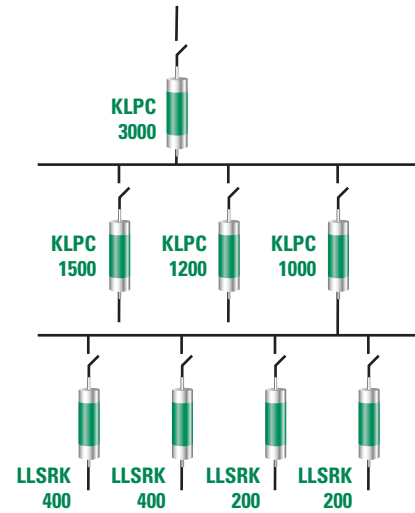


**Figure 16**  
**A Coordinated (selective) Fused System**

In the system shown in **Figure 16**, the 3000 amp Class L main fuses are at least twice the ratings of the 1500, 1200, and 1000 amp Class L feeder fuses, therefore they will coordinate. The Coordination Table also shows that the LLSRK series time-delay RK1 feeder and branch circuit fuses coordinate at a two-to-one ratio with the Class L feeder fuses, so the entire system in **Figure 16** would be 100% coordinated.

#### Circuit Breaker Coordination

Because of the many types of circuit breakers and circuit breaker trip units, developing a coordinated circuit breaker system or coordinating circuit breakers with fuses is beyond the scope of this Guide. If you have questions concerning these subjects contact the Littelfuse Technical Support Group. For more information on fuses and circuit breakers request Littelfuse Tech Topics Volume 2 – Fuses Vs. Breakers (PF327).

#### Component Short-Circuit Protecting Ability

NEC requires equipment protection to be coordinated with overcurrent protective devices and available fault current to prevent extensive damage to equipment. See **Figure 17**. Essentially, this means that electrical equipment must be capable of withstanding heavy overcurrents without damage or that they are protected by overcurrent protective devices that will limit damage.

When a severe fault occurs in an unprotected circuit, current immediately increases to a very high value. This is the available or prospective fault current. Some fuses respond so quickly to the increasing current that they interrupt current within the first half-cycle; before the current reaches its first peak. See **Figure 13**. Such fuses are termed “current-limiting fuses.” Current-limiting fuses stop damaging current faster than any other protective device. Current-limiting fuses greatly reduce or totally prevent component damage from high fault currents. This helps meet the NEC® Article 110.10 requirements shown in **Figure 17**.

## Fuse Application Guide

### Overcurrent Protection Fundamentals

**Table 2**  
**Fuse Coordination Table**

#### Selecting the Correct Fuse Ampere Ratio to Maintain Selectively Coordinated Systems

Ratios are expressed as Line-Side Fuse to Load-Side Fuse

| Line-Side Fuses |          |                        | Load-Side Fuses                        |          |                |            |                      |                                        |           |         |        |
|-----------------|----------|------------------------|----------------------------------------|----------|----------------|------------|----------------------|----------------------------------------|-----------|---------|--------|
| Ampere Range    | UL Class | Littelfuse Catalog No. | Time-Delay Fuses                       |          |                |            |                      | Fast-Acting Fuses                      |           |         |        |
|                 |          |                        | Ampere Range, UL Class and Catalog No. |          |                |            |                      | Ampere Range, UL Class and Catalog No. |           |         |        |
|                 |          |                        | 601-6000                               | 601-4000 | 30-600         | 30-600     | 30-600               | 30-600                                 | 30-600    | 30-1200 | 30-600 |
|                 |          |                        | L                                      | L        | RK1            | J          | RK5                  | RK1                                    | T         | J       | G      |
|                 |          |                        | KLPC LDC                               | KLLU     | LLNRK LLSRK_ID | JTD_ID JTD | FLNR_ID FLSR_ID IDSR | KLNR KLSR                              | JLLN JLLS | JLS     | SLC    |
| 601-6000        | L        | KLPC                   | 2:1                                    | 2:1      | 2:1            | 2:1        | 4:1                  | 2:1                                    | 2:1       | 2:1     | N/A    |
| 601-4000        | L        | KLLU                   | 2:1                                    | 2:1      | 2:1            | 2:1        | 4:1                  | 2:1                                    | 2:1       | 2:1     | N/A    |
| 601-2000        | L        | LDC                    | 2:1                                    | 2:1      | 2:1            | 2:1        | 4:1                  | 2:1                                    | 2:1       | 2:1     | N/A    |
| 30-600          | RK1      | LLNRK                  | N/A                                    | N/A      | 2:1            | 2:1        | 8:1                  | 3:1                                    | 3:1       | 3:1     | 4:1    |
| 30-600          | RK1      | LLSRK_ID               | N/A                                    | N/A      | 2:1            | 2:1        | 8:1                  | 3:1                                    | 3:1       | 3:1     | 4:1    |
| 30-600          | J        | JTD_ID                 | N/A                                    | N/A      | 2:1            | 2:1        | 8:1                  | 3:1                                    | 3:1       | 3:1     | 4:1    |
| 30-600          | RK5      | IDSR                   | N/A                                    | N/A      | 1.5:1          | 1.5:1      | 2:1                  | 1.5:1                                  | 1.5:1     | 1.5:1   | 1.5:1  |
| 30-600          | RK5      | FLNR_ID                | N/A                                    | N/A      | 1.5:1          | 1.5:1      | 2:1                  | 1.5:1                                  | 1.5:1     | 1.5:1   | 1.5:1  |
| 30-600          | RK5      | FLSR_ID                | N/A                                    | N/A      | 1.5:1          | 1.5:1      | 2:1                  | 1.5:1                                  | 1.5:1     | 1.5:1   | 1.5:1  |
| 30-600          | RK1      | KLNR                   | N/A                                    | N/A      | 3:1            | 3:1        | 8:1                  | 3:1                                    | 3:1       | 3:1     | 4:1    |
| 30-600          | RK1      | KLSR                   | N/A                                    | N/A      | 3:1            | 3:1        | 8:1                  | 3:1                                    | 3:1       | 3:1     | 4:1    |
| 30-1200         | T        | JLLN                   | N/A                                    | N/A      | 3:1            | 3:1        | 8:1                  | 3:1                                    | 3:1       | 3:1     | 4:1    |
| 30-1200         | T        | JLLS                   | N/A                                    | N/A      | 3:1            | 3:1        | 8:1                  | 3:1                                    | 3:1       | 3:1     | 4:1    |
| 30-600          | J        | JLS                    | N/A                                    | N/A      | 3:1            | 3:1        | 8:1                  | 3:1                                    | 3:1       | 3:1     | 4:1    |
| 1-60            | G        | SLC                    | N/A                                    | N/A      | 3:1            | 3:1        | 4:1                  | 2:1                                    | 2:1       | 2:1     | 2:1    |

#### NATIONAL ELECTRICAL CODE®

#### ARTICLE 110 – REQUIREMENTS FOR ELECTRICAL INSTALLATIONS

##### A. General

##### 110-3. Examination, Identification, Installation, and Use of Equipment.

(A) Examination. In judging equipment, considerations such as the following shall be evaluated:

(5) Heating effects under normal conditions of use and also under abnormal conditions likely to arise in service.

(6) Arcing effects.

(B) Installation and Use. Listed or labeled equipment shall be used or installed in accordance with any instructions included in the listing or labeling.

**110.9 Interrupting Rating.** Equipment intended to interrupt current at fault levels shall have an interrupting rating sufficient for the nominal circuit voltage and the current that is available at the line terminals of the equipment.

Equipment intended to interrupt current at other than fault levels shall have an interrupting rating at nominal circuit voltage sufficient for the current that must be interrupted.

**110.10 Circuit Impedance and Other Characteristics.** The overcurrent protective devices, the total impedance, the component short-circuit current ratings, and other characteristics of the circuit to be protected shall be selected and coordinated to permit the circuit-protective devices used to clear a fault to do so without extensive damage to the electrical components of the circuit. This fault shall be assumed to be either between two or more of the circuit conductors or between any circuit conductor and the grounding conductor or enclosing metal raceway. Listed products applied in accordance with their listing shall be considered to meet the requirements of this section.

#### ARTICLE 240 – OVERCURRENT PROTECTION

**240.1 Scope.** Parts I through VII of this article provide the general requirements for overcurrent protection and overcurrent protective devices not more than 600 volts, nominal. Part VIII covers overcurrent protection for those portions of supervised industrial installations operating at voltages of not more than 600 volts, nominal. Part IX covers overcurrent protection over 600 volts, nominal.

(FPN): Overcurrent protection for conductors and equipment is provided to open the circuit if the current reaches a value that will cause an excessive or dangerous temperature in conductors or conductor insulation. See also Sections 110.9 for requirements for interrupting ratings and 110.10 for requirements for protection against fault currents.

(Reproduced by permission of NFPA)

**Figure 17**

**National Electrical Code Requires Effective Overcurrent Protection**

## Fuse Application Guide

### UL/CSA Fuse Charts

#### Fuses for Supplementary Overcurrent Protection

**Standards:** UL Standard 248-14 (formerly 198F); CSA Standard C22.2, No. 59-1. Three Classifications covered:

**Note:** Fuses may be rated for AC and/or DC when suitable for such use.

##### (1) Micro fuses

Voltage ratings: UL, 125 volts; CSA, 0-250 volts  
Current ratings: UL, 0-10 amps; CSA, 0-60 amps  
Interrupting rating: 50 amps rms symmetrical

##### (2) Miniature fuses (CSA classifies these as Supplemental Fuses)

Voltage ratings: UL, 125 or 250 volts; CSA, 0-600 volts  
Current ratings: UL, 0-30 amps; CSA, 0-60 amps  
Interrupting rating: 10,000 amps rms symmetrical

##### (3) Miscellaneous Cartridge fuses (CSA classifies these as Supplemental Fuses)

Voltage ratings: UL, 125 to 600 volts; CSA, 0-600 volts  
Current ratings: UL, 0-30 amps; CSA, 0-60 amps  
Interrupting ratings: 10,000, 50,000, or 100,000 amps rms symmetrical

Time delay (Optional); Minimum delay at 200% fuse rating:

5 seconds for fuses rated 3 amps or less  
12 seconds for fuses rated more than 3 amps

**LF Series:** BLF, BLN, BLS, FLA, FLM, FLQ, KLC, KLKD (600 Volts DC)

NOTE: Littelfuse electronic fuses are also covered by these standards; see electronic section of this catalog, or request Electronic Designer's Guide (Publication No. EC101) for complete listing.

#### Special Purpose Fuses

There are no UL Standards covering this category of fuses. These fuses have special characteristics designed to protect special types of electrical or electronic equipment such as diodes, SCR, transistors, thyristors, capacitors, integrally fused circuit breakers, parallel cable runs, etc. Fuses may be UL Recognized for use as a component in UL Listed equipment. UL Recognized fuses are tested for characteristics such as published interrupting capacity. They are also covered by UL re-examination service.

Non-renewable

**Voltage ratings:** to 1000 volts AC and/or DC

**Ampere ratings:** to 6000 amperes

**Interrupting ratings:** to 200,000 amperes

Dimensions vary widely depending on application, voltage and current ratings.

Many of these fuses are extremely current limiting. When considering application of these fuses, or if you have special requirements, contact Littelfuse Technical Support Group for assistance.

**LF Series:** KLC, LA15QS, LA30QS, LA50QS, LA60QS, LA60X, LA70QS, LA100P, LA120X, LA070URD, LA130URD, L15S, L25S, L50S, L60S, L70S, JLLS 900 amp through 1200 amp

### Fuses for overcurrent and short-circuit protection of power and lighting feeders and/or branch circuits

#### Current Limiting

#### Non-Current Limiting

##### Plug Fuses

**Standards:** UL Standard 248-11 (formerly 198F), CSA Standard C22.2, No. 59.1

**Voltage ratings:** 125 volts AC only

**Current ratings:** 0-30 amps

**Interrupting ratings:** 10,000 amps rms symmetrical. Interrupting rating need not be marked on fuse.

Two types: Edison-base and Type S

**Edison-base:** Base is same as standard light bulb. All amp ratings interchangeable. NEC permits Edison-base plug fuses to be used only as replacements for existing fuses, and only when there is no evidence of tampering or overfusing.

**Type S:** Not interchangeable with Edison-base fuses unless non-removable type S fuse adapter is installed in Edison-base fuse socket.

To prevent overfusing, adapters have three ampere ratings: 10-15, 16-20, and 21-30 amps.

Time delay: Fuses may be time delay, if so, they are required to hold 200% of rating for 12 seconds minimum.

Time delay plug fuses are marked T, TD, or Time Delay

NOTE: Plug fuses may be used where there is not more than 125 volts between conductors or more than 150 volts from any conductor to ground. This permits their use in 120/240 volts grounded, single-phase circuits.

**LF Series:** Edison-base: T00, TLO  
Type S: S00, SLO  
Type S Adapters: SA0

##### CLASS H

**Standards:** UL Standard 248-6 (formerly 198B), CSA Standard C22.2, No. 59.1

Also known as NEMA Class H, and sometimes referred to as "NEC" or "Code" fuses

**Voltage ratings:** 250 and 600 volts, AC

**Current ratings:** 0-600 amps

**Interrupting ratings:** 10,000 amps rms symmetrical

Two types: one-time and renewable

Physically interchangeable with UL Classes K1 & K5;

Fits UL Class H fuseholders which will also accept K1, K5, RK5, and RK1 fuses.

Manufacturers are upgrading Class H One-time fuses to Class K5 per UL Standard 198D, See Class K fuses.

##### ONE-TIME FUSES (NON-RENEWABLE)

Time delay: Optional  
Time-delay fuses must hold 500% current rating for a minimum of ten seconds

**LF Series:** NLKP

##### RENEWABLE FUSES

Only Class H fuses may be renewable. While time delay is optional, no renewable fuses meet requirements for time delay. Some renewable fuses have a moderate amount of time delay, referred to as "time lag" to differentiate from true time delay.

**LF Series:** RLN, RLS  
**Replaceable links Series:** LKN, LKS

# Fuse Application Guide

## UL/CSA Fuse Charts

### CURRENT LIMITING FUSE LABELING

Fuses which meet the requirements for current limiting fuses are required to be labeled "Current Limiting". Fuse labels must include: UL/CSA fuse class, Manufacturer's name or trademark, Current Rating, AC and/or DC voltage rating, and AC and/or DC interrupting rating. The words "Time Delay" or equivalent may also be included on the label when the fuse complies with time delay requirements of its class.

### CLASS G

**Standards:** UL Standard 248-5 (formerly 198C),  
CSA Standard C22.2, No. 106, classified as HRC1 Misc.

**Voltage rating:** 480 volts, AC

**Current ratings:** 0-60 amps

**Interrupting rating:** 100,000 amps rms symmetrical

Not interchangeable with any other UL fuse class.

Time delay optional: Minimum of 12 seconds at 200% current rating.

**LF Series:** SLC

### CLASS J

**Standards:** UL Standard 248-8 (formerly 198C),  
CSA Standard C22.2, No. 106, classified as HRCI-J

**Voltage rating:** 600 volts, AC

**Current ratings:** 0-600 amps

**Interrupting rating:** 200,000 amps rms symmetrical

Not interchangeable with any other UL fuse class

Time delay optional: Minimum of 10 seconds at 500% current rating.

**LF Series:** Time-Delay: JTD\_ID, JTD  
Fast-Acting: JLS

### CLASS L

**Standards:** UL Standard 248-10 (formerly 198C),  
CSA Standard C22.2, No. 106, classified as HRCI-L

**Voltage rating:** 600 volts, AC and/or DC

**Current ratings:** 601-6000 amps

KLPC also available 200-600A; LDC also available 150-600A

**Interrupting rating:** AC: 200,000 amps rms symmetrical  
DC: 50,000, 100,000, or 200,000 amps

Not interchangeable with any other UL fuse class

Time delay: Class L fuses may be marked "Time-Delay" although UL does not investigate time-delay characteristics of Class L fuses.

KLPC & KLLU: 10 seconds at 500% current rating.

LDC: 4 seconds at 500% current rating

**LF Series:** KLPC, KLLU, LDC

### CLASS R

**Standards:** UL Standard 248-12 (formerly 198E),  
CSA Standard C22.2, No. 106, classified as HRCI-R

**Voltage ratings:** 250 and 600 volts, AC; 125 and 300 volts DC

**Current ratings:** 0-600 amps

**Interrupting rating:** 200,000 amps rms symmetrical

**Two classes:** RK1 & RK5

Non-renewable

Time delay is optional for Class R fuses.

Fuses marked "Time Delay", "D", "TD", or similar indications of time delay are required to hold 500% current rating for a minimum of ten seconds.

Same Dimensions as UL Class H fuses, terminals modified to provide rejection feature.

Fits UL Class R fuseholders which reject non Class R fuses.

Physically interchangeable with UL Class H, NEMA Class H, and UL Classes K1 & K5 when equipment has Class H fuseholders.

### CLASS T

**Standards:** UL Standard 248-15 (formerly 198H),  
CSA Standard C22.2, No. 106, classified as HRCI-T

**Voltage ratings:** 300 and 600 volts AC, 125 and 300 volts DC

**Current ratings:** 0-1200 amps

**Interrupting rating:** 900 to 1200 amps UL Recognized for 600V version  
200,000 amps rms symmetrical

Non-renewable

Fast-Acting fuses. High degree of current limitation

Very small fuses; space-saving and non-interchangeable with any other fuse class.

**LF Series:** JLLN/JLLS

### CLASS CC/CD

**Standards:** UL Standard 248-4 (formerly 198C),  
CSA Standard C22.2, No. 106, classified as HRCI Misc.

**Voltage rating:** 600 volts, AC

**Current ratings:** UL Class CC: 0-30 amps  
UL Class CD: 35-60 amps

**Interrupting ratings:** 200,000 amps rms symmetrical

Non-renewable

**Fuseholders:** Fit UL Class CC and CD fuseholders which reject non Class CC fuses.

Time delay optional: Minimum of 12 seconds at 200% current rating.

**LF Series:** KLKR (Fast-Acting)  
KLDR (Time-Delay for Transformers)  
CCMR (Time-Delay for Motors)

### CLASS K

**Standards:** UL Standard 248-9 (formerly 198D), No CSA Standard

**Voltage ratings:** 250 and 600 volts, AC

**Current ratings:** 0-600 amps

**Interrupting ratings:** Three permitted:  
50,000, 100,000, and 200,000 amps rms sym

Non-renewable

Time delay is optional for Class K fuses.

Fuses marked "Time Delay", "D" or "TD" are required to hold 500% current rating for a minimum of ten seconds.

Same Dimensions and Physically Interchangeable with UL Class H fuses

Fits UL Class H fuseholders

Class K fuses are not permitted to be labeled Current Limiting because there is no rejection feature as required by NEC Article 240-60(B).

### CLASS K1

Same prescribed degree of current limitation as RK1 fuses when tested at 50,000 or 100,000 amps rms symmetrical.

**LF Series:**  
**Time Delay – Use** LLNRK/LLSRK  
**Fast-Acting – Use** KLNR/KLSR

### CLASS K5

Same prescribed degree of current limitation as RK5 fuses when tested at 50,000 or 100,000 amps rms symmetrical.

**LF Series:** NLN/NLS

### CLASS RK1

High degree of current limitation.

Provides IEC Type 2 (no damage) protection for motor starters and control components

Time Delay optional LLSRK\_ID Series provides visual indication of blown fuse

**LF Series:** Time Delay: LLNRK, LLSRK, LLSRK\_ID  
Fast-Acting: KLNR, KLSR

### CLASS RK5

Moderate degree of current limitation, adequate for most applications.

Time Delay optional

FLNR\_ID, FLRSR\_ID and IDSR series provides visual indication of blown fuse.

**LF Series:** FLNR\_ID, FLRSR\_ID and IDSR

## Fuse Application Guide

### Applying Fuses for Specific Applications

#### Fuses for Specific Applications (600 volts and Below)

| INDEX                                                                | Page           |
|----------------------------------------------------------------------|----------------|
| <b>Protecting Service Entrance and Feeder Conductors</b> .....       | <b>194</b>     |
| <b>Motor Protection</b> .....                                        | <b>194-198</b> |
| Motor Overload Protection (running overcurrent) .....                | <b>195-196</b> |
| Motor Feeder (100% motor Load) over 600A .....                       | <b>197</b>     |
| Motor Branch Circuit Protection over 600A .....                      | <b>197</b>     |
| Motor Controller (Starter) Protection over 600A .....                | <b>197</b>     |
| Control Circuit Protection .....                                     | <b>197</b>     |
| Control Transformer Protection .....                                 | <b>197-198</b> |
| <b>Protecting Branch Circuits</b> .....                              | <b>198</b>     |
| <b>Transformer Protection</b> .....                                  | <b>198</b>     |
| Primary Fusing only .....                                            | <b>198</b>     |
| Primary Fusing With Secondary Fusing .....                           | <b>198</b>     |
| Secondary Fusing of Transformers .....                               | <b>198</b>     |
| <b>Fusing Capacitors</b> .....                                       | <b>198</b>     |
| <b>Lighting Fixture Protection</b> .....                             | <b>198</b>     |
| Street Lighting and Other Weatherproof .....                         | <b>198</b>     |
| ..... Overcurrent Protection .....                                   | <b>198</b>     |
| <b>Cable Short-Circuit Protection</b> (Cable Limiter Application) .. | <b>199</b>     |
| <b>Semiconductor and Solid-state Device Protection</b> .....         | <b>199</b>     |
| <b>Medium Voltage Protection</b> .....                               | <b>200-203</b> |

#### Protecting Service Entrance and Feeder Conductors

##### 601 through 6000 amperes

Select POWR-PRO® KLPC series Class L fuses for AC circuits from 601 through 6000 amperes. The construction and operating characteristics of KLPC series fuses meet the toughest project specifications for Class L fuses:

- They provide maximum time-delay and current-limitation.
- They have a 300,000 amp interrupting rating.
- They have an “O-ring” seal to improve short-circuit performance.
- The fuse links are 99% pure silver.

If the system has DC circuits, another choice is the POWR-PRO LDC series Class L fuses for AC and DC circuits available from 601 through 2000 amperes. LDC series fuses are the only Class L fuses which are UL Listed at both 600 Volts AC and DC. When facilities have a mix of large AC and DC circuits, standardizing on LDC series for all Class L fuses should be considered. This reduces inventory and eliminates the possibility that an AC-only fuse will be used in a DC circuit.

When conductors are selected in accordance with the NEC®, recommended fuse ratings for mains and feeders with combined motor and non-motor loads are:

- 150% of the largest motor full load current plus,
- 100% of all other motors full load currents plus,
- 125% of the continuous<sup>1</sup> non-motor load plus,
- 100% of non-continuous, non-motor load.

If the largest motor has a long acceleration time requiring branch circuit protection to be increased to 175-225% of FLA, it may be necessary to increase main and feeder fuse ratings to 175-225% of the largest motor FLA plus the other current values as indicated above. However, if conductor ampacity has been increased to provide spare capacity for future loads, fuse ratings may be increased to the ampacity of the conductors.

When standard fuse ratings do not match conductor ampacities, the next larger standard fuse ratings may be used only if they are rated less than 800 amperes. If fuse ratings are over 800 amperes, the next smaller ratings must be used. In addition to all standard ampere ratings, KLPC and LDC series fuses have many additional ampere ratings. The additional ratings permit minimum downsizing of fuses, saving valuable conductor ampacity.

##### Main Services and Feeders 600 amps and less

Several fuse series may be used for main services and feeders under 600 amperes. Choices should be made on the needs of the particular facility. Some of the needs to be considered are discussed below, with recommendations for fuses that meet those needs.

The vast majority of electrical systems, especially those 600 amps and smaller, have available short-circuit currents less than 100,000 amperes. Class RK5 fuses have provided excellent protection for such circuits for many years. When fault currents exceed 100,000 amperes at the service entrance, a study should be made to determine if the additional current limitation provided by Class RK1 or Class J fuses is required.

POWR-PRO Class RK5, 600 Volt FLSR\_ID series Indicator® fuses provide superior time-delay plus substantially better current limitation than required by UL Class RK5 standards. In addition, the patented indicating window on the fuse immediately shows which fuses are blown. This can significantly reduce downtime.

POWR-PRO Class RK1, 250/600 Volt LLNRK/LLSRK/LLSRK\_ID series time-delay fuses are the fuse of choice for circuits where fault currents exceed 100,000 amperes. The LLSRK advanced design reduces short-circuit damage to full-size NEMA and sensitive IEC motor controllers, and is capable of providing Type 2 “No Damage” protection to NEMA size motor starters. Together with the KLPC series fuses, the LLNRK/LLSRK series form the foundation of the POWR-PRO Fuse system of overcurrent protection. And, the patented indicating window on the LLSRK\_ID series provides the same benefits of blown fuse indication for the user.

POWR-PRO Class J 600 Volt JTD\_ID series time-delay fuses provide the amount of time-delay necessary for most applications and are substantially smaller than RK5 or RK1 fuses with current-limitation equal to the RK1 fuse. JTD\_ID series fuses provide IEC Type 2 “No Damage” protection to both NEMA and IEC control components and motor controllers. When time-delay is required and space is the determining factor, JTD\_ID time-delay Class J fuses provide the answer.

<sup>1</sup> See Definitions for “Continuous Load.”

## Fuse Application Guide

### Applying Fuses for Specific Applications

When conductors are selected in accordance with the NEC®, recommended fuse ratings for mains and feeders rated 1 to 600A with combined motor and non-motor loads are:

- 150% of the largest motor full load current plus,
- 100% of all other motors full load currents plus,
- 125% of the continuous<sup>1</sup> non-motor load plus,
- 100% of non-continuous, non-motor load.

### Motor Protection

The importance of effective motor and motor circuit protection cannot be over emphasized. Motors are consistently the largest single cause of industrial and commercial fires.

In today's highly automated commercial and industrial facilities, the failure of even one relatively minor motor may shut down an entire installation.

#### Motor Characteristics

Motors discussed herein are standard characteristic AC induction motors, which cover about 80-85% of all motors. Special purpose motors are beyond the scope of this publication. Specific application information and protection requirements for these special purpose motors should be obtained from the motor manufacturers.

#### Horsepower Ratings

A motor's assigned horsepower rating indicates the work that it can do under standard test conditions. It is the maximum horsepower load the motor can drive over a long period without exceeding its rated temperature rise. However, a motor can develop far more horsepower than its rating, and if the overload does not last long enough to overheat the motor, no damage occurs.

A motor tries to rotate any load attached to it. If the load is too large, the motor will not be able to rotate and will overheat and fail within a very short period. However, if the motor is able to start and run with an overload, excess heat will be generated. If the motor is not stopped or the overload removed, the excess heat will gradually deteriorate the insulation, and the motor will prematurely fail.

#### Motor RPM

The motor nameplate shows the rated speed of the motor in revolutions per minute (RPM) with rated full load attached. The no-load speed of the motor is somewhat higher. The no-load (synchronous) speed of a motor is a function of its design and the number of poles (windings).

**Table 3** shows the relationship between the number of poles, no-load speed, and full load speed shown on the motor nameplate.

**Table 3**

**Synchronous (No Load) Speed of Induction Motors vs Full Load Speed**

| Number of Poles | Synchronous (No Load) Speed (RPM) | Typical Full Load Speed Range (RPM) |
|-----------------|-----------------------------------|-------------------------------------|
| 2               | 3600                              | 3450 – 3500                         |
| 4               | 1800                              | 1710 – 1760                         |
| 8               | 900                               | 855 – 880                           |
| 12              | 600                               | 520 – 610                           |

All non-synchronous induction motors begin to slow down as the load increases. This is commonly referred to as "slip." As load increases, the motor current and slip increase.

#### Motor Running Current

**Full Load Amperes (FLA or F.L.A.):** A motor's rated full load amps (full load current) is the motor's running current when connected to a load equal to its horsepower rating. If load exceeds the horsepower rating, current will exceed the FLA and the motor may overheat. The vast majority of motors are only partially loaded. As load decreases, motor current decreases.

**Partially Loaded Motors:** If a motor is not connected to any external load, it still requires a certain amount of current to turn the rotor. This is defined as the "no-load amps" or "no-load current." No-load current is a constant for any given motor and does not change with load. However, no-load current varies widely for different motor designs and horsepower ratings.

A motor's actual running current is the sum of no-load current and load current. For all practical purposes, load current increases directly as the load increases. If a motor is loaded to only 50% of rated horsepower, then the actual load current will be approximately 50% of the full potential load current.

If a given motor's no-load current is 30% of FLA, load current is 70% FLA ( $100\% - 30\% = 70\%$ ). At 50% rated load, the load current would be about 35% FLA (one-half of 70%). Added to no-load current of 30%, motor running current at 50% load will be about 65% FLA ( $30 + 35 = 65\%$ ). If the same motor were 75% loaded, the motor running current would be about 83% FLA ( $0.70 \times 0.75 + 0.30 = 0.83$ ).

**Motor starting currents:** When a motor is first energized, a great deal of energy (torque) is required to overcome the inertia of the motor and the load. Once the load is moving, it requires much less energy to keep it moving.

At the instant a motor is energized, motor current peaks at about 12-15 times the nameplate FLA. This is the current required to magnetize the motor windings. Within  $\frac{1}{2}$  to  $\frac{3}{4}$  cycles (0.008-0.0125 seconds) the full magnetic field is developed, and current decreases from 12 to 15 times FLA to roughly 4.5 to 8 times FLA. This is called the motor starting current, and is also the current the motor will draw if it stops while energized. This is why it is also referred to as the locked-rotor amps (LRA).

The exact value of LRA is determined by motor design, and is shown on the motor nameplate by the NEMA design letter. Motors designed to start only low inertia loads have the lowest starting current. Motors with the same horsepower ratings but designed to start very high inertia loads such as large flywheels, hammer mills, etc., will have much higher starting currents. **Table 4** shows the starting current for various designs.

As the motor speed increases from zero, current remains high until the motor reaches about 85-90% full speed. Current then begins to decrease, and when the motor reaches full speed for the attached load, current decreases to normal running current.

## Fuse Application Guide

### Applying Fuses for Specific Applications

**Table 4**

**Starting Current (Amperes) for Various Types of Motor Designs**

| NEMA Code Letter | Locked Rotor KVA Per Hrspwr. | Maximum Locked Rotor Amps for NEMA Code Letter Motors |       |             |      |      |      |
|------------------|------------------------------|-------------------------------------------------------|-------|-------------|------|------|------|
|                  |                              | Single Phase                                          |       | Three Phase |      |      |      |
|                  |                              | 115V                                                  | 230V  | 200V        | 230V | 460V | 575V |
| A                | 3.14                         | 27.3                                                  | 13.7  | 9.1         | 7.9  | 4.0  | 3.1  |
| B                | 3.54                         | 30.8                                                  | 15.4  | 10.2        | 8.9  | 4.5  | 3.5  |
| C                | 3.99                         | 34.7                                                  | 17.4  | 11.5        | 10.0 | 5.0  | 4.0  |
| D                | 4.49                         | 39.1                                                  | 19.5  | 13.0        | 11.3 | 5.7  | 4.5  |
| E                | 4.99                         | 43.4                                                  | 21.7  | 14.4        | 12.5 | 6.3  | 5.0  |
| F                | 5.59                         | 48.6                                                  | 24.3  | 16.2        | 14.0 | 7.0  | 5.6  |
| G                | 6.29                         | 54.7                                                  | 27.4  | 18.2        | 15.8 | 7.9  | 6.3  |
| H                | 7.09                         | 61.7                                                  | 30.8  | 20.5        | 17.8 | 8.9  | 7.1  |
| J                | 7.99                         | 69.5                                                  | 34.8  | 23.1        | 20.1 | 10.1 | 8.0  |
| K                | 8.99                         | 78.2                                                  | 39.1  | 26.0        | 22.6 | 11.3 | 9.0  |
| L                | 9.99                         | 86.9                                                  | 43.5  | 28.9        | 25.1 | 12.6 | 10.0 |
| M                | 11.19                        | 97.4                                                  | 48.7  | 32.3        | 28.1 | 14.1 | 11.2 |
| N                | 12.49                        | 108.7                                                 | 54.3  | 36.1        | 31.3 | 15.7 | 12.5 |
| P                | 13.99                        | 121.7                                                 | 60.9  | 40.4        | 35.1 | 17.6 | 14.0 |
| R                | 15.99                        | 139.1                                                 | 69.6  | 46.2        | 40.1 | 20.1 | 16.0 |
| S                | 17.99                        | 156.5                                                 | 78.3  | 52.0        | 45.2 | 22.7 | 18.0 |
| T                | 19.99                        | 173.9                                                 | 87.0  | 57.8        | 50.2 | 25.2 | 20.0 |
| U                | 22.39                        | 194.8                                                 | 97.4  | 64.7        | 56.2 | 28.2 | 22.4 |
| V                | 24.00                        | 208.8                                                 | 104.4 | 69.4        | 60.2 | 30.2 | 24.0 |

#### Single-phasing of three-phase motors

Three phase motors are designed to operate with three balanced phases. When one phase is missing, severe damage may occur if the motor is not rapidly de-energized. This may be due to an open wire in a motor junction box, an open motor winding, a blown fuse, a burned contact in a motor controller, a defective circuit breaker, or other conditions. What happens when single-phasing occurs depends on the nature of the circuit. There are several possibilities which must be examined to fully understand the problem:

#### When there is only one motor on a circuit which is single-phased

If the motor is not running at the time, and then tries to start while single-phased, it will not have sufficient available energy to overcome starting inertia, and will stay in a locked rotor condition. The motor will draw full locked rotor current, and most overcurrent protection devices will open the circuit quick enough to prevent serious motor damage.

If the motor is running at the time it is single-phased, current in the remaining legs theoretically increases to 1.73 times the current being drawn when the single-phasing occurs. Single-phased motors, however, do not have the capability of developing full horsepower and torque, so the motors may begin to slow down (increased slip) depending on the amount of load. The motor is designed to operate at full speed, so the current increases as the slip increases.

A motor that is more than 80% fully loaded at the time of single-phasing will slow down quite rapidly and stop. Current increases to locked rotor values, and the running overcurrent protection will de-energize the circuit in sufficient time to protect the motor from significant damage.

A motor that is loaded to less than 50-60% load will not slow down significantly while the current increases to 173% of the current being drawn just prior to single-phasing. Since this is less than FLA, ordinary running overcurrent protection will not sense this as an abnormal condition and the motor will continue to run. When it stops, it will obviously not restart again until the source of the single-phasing is eliminated. Fortunately, the extra heat generated under these single-phase conditions can usually be dissipated by the motor. Little damage is done, unless the single-phasing continues for an extended period of time. For added protection to large, expensive motors, (especially those over 600 volts), consideration should be given to installation of single-phase detection or voltage imbalance relays.

It is the group of motors loaded from 55-60% through 80% that present the greatest challenge. When these motors are single-phased, they slow down but continue to rotate. Current in the energized legs increases to approximately 200-220% of current being drawn at the time the motor was single-phased. This is a combination of the increase due to single-phasing (173%) plus that due to slow down (slip increase).

Since this may vary from slightly less than FLA, up to as much as 200% FLA, standard overcurrent protection may not provide adequate protection when sized in accordance with rated full load amps of the motor.

The voltage imbalance in the circuit may also result in extra heat. This additional heat produces damage in excess of that produced by current alone.

The best way of reducing this type of damage is to measure the actual current drawn by the motor under normal conditions, determine if there may be temporary overloads that need to be considered, and size overcurrent protection just large enough to permit the motor to run under normal conditions.

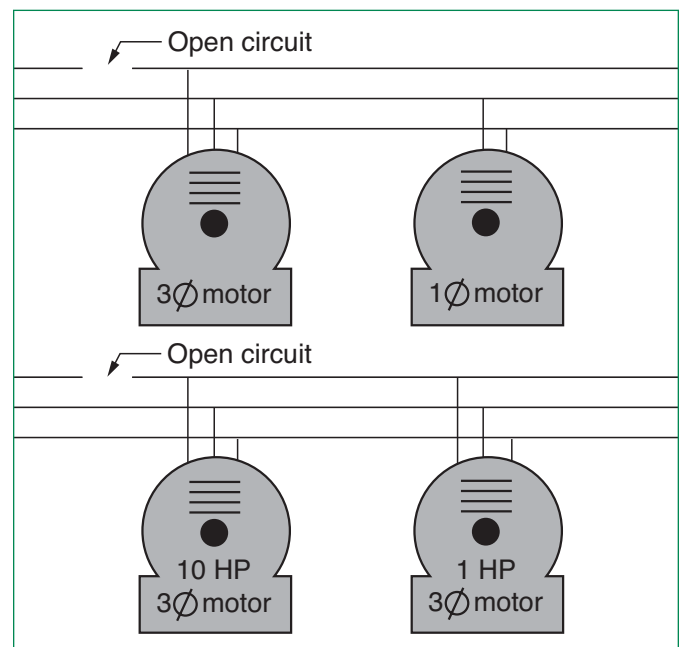


**Figure 18**

## Fuse Application Guide

### Applying Fuses for Specific Applications

#### **Several motors single-phased on one circuit**

When there is more than one motor on a circuit that is single-phased, the effects on motor current depend on the relative size of the motors, and whether they are all three-phase, or whether there is a mix of three-phase and single-phase motors.

**Figure 18** presents two such cases. In the circuit with a three-phase and a single-phase motor, the three-phase motor was loaded to 70% of full load. The feeder was then single-phased as shown. The currents in the three-phase motor increased to 52%, 120%, and 36% of full load current in the three phases. At 120% current, it is questionable whether standard running overcurrent protection sized at 115% of rated FLA could provide protection from damage due to overload and voltage imbalance.

When the circuit with the ten horsepower and one horsepower three-phase motors was single-phased, the smaller motor did little to affect the currents in the larger motor, but the one horsepower motor was in serious trouble. One of the currents was 140% of normal, while the other two currents were only slightly above the standard rating of running overcurrent protection.

When the ampere rating of a motor's running overcurrent protection is based on the motor's actual running current, adequate protection may be provided for such conditions. However, as is usually the case, if the ampere rating of a motor's running overcurrent protection is based on nameplate FLA and the motor is only partially loaded, the protective devices (overload relays and fuses) may not open in time to protect the motor because the current will not increase enough to operate the relays.

For these reasons, and many others, it is strongly recommended that Littelfuse POWR-GARD™ dual-element fuses be properly sized per the recommended guidelines.

#### **Protection required by motors**

Since mains and feeders usually serve a mix of inductive and resistive loads, time-delay fuses provide significant advantages. Even when there is no motor load, time-delay fuses reduce other nuisance outages caused by temporary overloads or switching surges. Available short-circuit current is generally highest at the main service disconnect so that adequate interrupting capacity and maximum current limitation are also desirable.

#### **Motor Branch Circuits**

Most motor circuits contain motor controllers (starters) which start and stop the motor, overload relays to provide motor running protection, and in some cases other relays to provide other types of protection.

Time-delay fuses should be considered a must for motor branch circuits. Motor starting currents and the possibility of temporary overloads and/or voltage surges would require oversizing of *non-time delay* fuses — often as much as 300%. In such cases, only short-circuit protection is provided, and because of the oversizing necessary, larger switches and enclosures are required. This is true of MCCs as well. Properly selected, time-delay fuses also provide back-up protection to the motor controllers for such conditions as single-phasing and contact welding.

Recommended ratings of RK1 and RK5 time-delay fuses for motor branch circuits containing motor controllers with overload relays are as follows:

For general purpose motors with 1.15 service factor or 40°C rise, the fuses may generally be rated at 125% of motor's FLA. When fuse ratings do not match the motor's FLA, use the next larger standard fuse rating, but do not exceed the NEC® limitation of 175% of motor's FLA as given in NEC Tables 430.248 through 430.250. Following these guidelines will provide optimum protection to the circuit.

High efficiency motors and NEMA Design E motors have much higher efficiencies, and also require higher locked rotor currents in relation to FLA. They will require careful selection of both fuses and overload relays. In these circuits, we recommend sizing fuses at 150% of FLA, or the next smaller rating.

These recommendations will cover about 90% of all motor applications. For those motors with especially severe starting duty and long acceleration times, Table 430.52 of the NEC permits time-delay fuses to be sized up to 175% of motor FLA.

If 175% of FLA will not permit the motor to start, fuse rating may be increased to a maximum of 225% of motor FLA.

Pages 204 – 206 contain Motor Protection Tables that simplify the selection of Littelfuse RK5, RK1, J and CC fuses for motor running protection and motor branch short-circuit and ground fault protection.

#### **Motor Feeders Over 600A With 100% Motor Load**

Recommended fuses are POWR-PRO® KLPC series.

Recommended fuse ratings when conductors are selected in accordance with the NEC are 150% of largest motor's full load current plus the full load current of the other motors. If required rating does not correspond with a KLPC ampere rating, use the next larger rating.

#### **Fuses for Mains and Feeders With No Motor Loads**

Minimum fuse rating is 125% of the continuous load plus 100% of the non-continuous load.

#### **Fusing Motor Control Centers (MCCs)**

The same general considerations apply to protecting MCCs as they do to mains and feeders. Use time-delay current-limiting fuses as described above to provide protection to the entire MCC including buses and internal construction.

Feeders serving MCC are sized the same as general-purpose mains and feeders since many MCC have both motor and non-motor loads. Non-motor loads may include fused switches that serve dry-type power transformers used for lighting panels or feeders to distribution panels. MCC ampere ratings based on the MCC main buses usually exceed the load connected to the MCC. Therefore, fuses feeding the MCC or located in a main switch in the MCC may be rated to protect the MCC buses, as long as they meet the minimum size as determined above.

#### **Fusing Control Transformers**

With one exception, control transformers are protected the same as regular transformers as discussed below. Control transformers with primary current less than 2 amperes and which are part of a Listed motor controller may have primary fusing not greater than 500% of rated primary current.

## Fuse Application Guide

### Applying Fuses for Specific Applications

#### Protecting Branch Circuits

Multi-outlet branch circuits must be protected in accordance with the ampere rating of the overcurrent protective device. Ratings shall be 15, 20, 30, 40, and 50 amperes, although non-lighting loads in industrial facilities with adequate maintenance may have branch circuits larger than 50 amperes.

Special purpose branch circuits must have adequate capacity for the load to be served. Refer to NEC® Article 210.2 for a listing of Articles and Sections covering requirements for specific equipment not covered in this section.

#### Transformer Protection

##### Transformers over 600 volts

The basic rule for transformers rated over 600 volts requires them to have primary and secondary protection in accordance with **Table 5**.

##### Transformers rated 600 volts and less

UL Industrial Control Standards (No. 508) and Motor Control Center Standards (No. 845) specify control power transformer protection corresponding to NEC 430.72(C). In addition, UL requires the primary of control power transformers used in controllers having short-circuit ratings in excess of 10,000 amperes to be protected by UL Class CC, J, R, or T fuses. For maximum fuse ratings permitted by the NEC, refer to **Table 6** for sizing of primary fusing and **Table 7** for sizing of secondary fusing.

#### Fusing Capacitors

Capacitors installed on the load side of motor running overcurrent protection are required to have individual protection. All other capacitors are required to have an individual fuse in each ungrounded conductor. NEC Article 460.8(B) requires that the fuse rating be as small as possible. Use POWR-PRO® dual-element time-delay fuses rated at 150% to 175% of capacitor rated current.

#### Lighting Fixture Ballasts

Ballasts for all types of discharge lighting should be protected with individual fuses. Even the newer electronic ballasts with internal fusing benefit from fusing of the fixture. Individual fusing helps prevent loss of an entire lighting circuit when one ballast or fixture fails. This prevents loss of production. When only one fixture is removed from service, the user can now identify the fixture in trouble and eliminate the need to test all the fixtures to locate the problem. UL Listed Class P ballasts are only tested at 200 amps fault current, and the test circuit has a fuse ahead of the ballast. With available currents continuing to increase, individual fixture fusing reduces the possibility of the ballast failing in such a way that the fixture is damaged. Since ballast designs and characteristics vary so much, recommendations for ballast fusing should be obtained directly from the ballast manufacturer.

##### Fusing of Outdoor Lighting Standards

Whether the lighting fixtures are being used for highway lighting, street lighting, or for parking lots, each fixture should be fused using a Littelfuse Class CC or midget fuse installed in a LEB or LEC weather proof fuseholder. These fuseholders were designed to fit in the base

**Table 5**

**Fuses for Transformers over 600 volts**

| Transformer Rated Impedance        | Maximum Fuse Rating in Percent of Transformer Rated Current |                                 |                                             |                                           |
|------------------------------------|-------------------------------------------------------------|---------------------------------|---------------------------------------------|-------------------------------------------|
|                                    | Primary Fuse Rating Over 600 Volts                          | Secondary Fuse Rating           |                                             |                                           |
|                                    |                                                             | Over 600 volts in all locations | 600 volts or less in unsupervised locations | 600 volts or less in supervised locations |
| Not more than 6%                   | 300%                                                        | 250%                            | 125%                                        | 250%                                      |
| More than 6% and not more than 10% | 300%                                                        | 225%                            | 125%                                        | 250%                                      |

#### Notes to Table 5

1. Littelfuse IDSR, LLNRK/LLSRK/LLSRK\_ID, FLNR\_ID/FLSR\_ID, and JTD\_ID series time-delay fuses may be rated at 125% of transformer secondary current.
2. Where the required fuse rating does not correspond to a standard fuse rating, the next higher standard rating is permitted.
3. An individual primary fuse is not required if the primary circuit fuse is not greater than 300% of transformer primary current.

**Table 6**

**Maximum Acceptable Rating of Primary Overcurrent Device**

| Rated Primary Current Amperes | Maximum Rating of Overcurrent Protective Device % of Transformer Primary Current Rating |                                                      |
|-------------------------------|-----------------------------------------------------------------------------------------|------------------------------------------------------|
|                               | No secondary fusing provided                                                            | Secondary fusing provided in accordance with Table 7 |
| Less than 2                   | 300 <sup>1</sup>                                                                        | 250 <sup>1</sup>                                     |
| 2 to less than 9              | 167                                                                                     | 250                                                  |
| 9 or more                     | 125 <sup>2</sup>                                                                        | 250                                                  |

**Table 7**

**Maximum Acceptable Rating of Secondary Overcurrent Device**

| Rated Secondary Current Amperes | Maximum Rating of Overcurrent Protective Device % of Transformer Secondary Current Rating |
|---------------------------------|-------------------------------------------------------------------------------------------|
| less than 9                     | 167                                                                                       |
| 9 or more                       | 125 <sup>2</sup>                                                                          |

#### Notes to Tables 6 & 7

1. 500% for Motor Circuit Control Power Transformers.
  2. If 125% does not correspond to a standard fuse rating, the next higher standard rating may be used.
- Reference NEC 430.72 (c) Exception No. 2: 450.3 (b) 1 and 2 UL 508 32.7: 845 11.16 and 11.17.

of lighting standards. They withstand wet and corrosive conditions, including those caused by snow-melting chemicals. Fusing each fixture eliminates having to test the entire circuit for the faulted fixture when only one fails. In industrial plants where outdoor lighting provides safety and security, this is particularly important.

## Fuse Application Guide

### Applying Fuses for Specific Applications

#### Cable Short-Circuit Protection (application of cable limiters)

Cable limiters are fusible devices that provide very fast short-circuit protection, primarily to faulted cables, but also to other conductors such as busway. Cable limiters do not have an ampere rating, and cannot be used to provide overload protection. Cable limiters are selected by cable size; for example, a 500 kcmil cable requires a 500 kcmil cable limiter. Their main use is to isolate faulted cables in circuits containing three or more parallel conductors per phase and may be installed on the line side of the main service to provide short-circuit protection to the service conductors. This is especially important when service conductors are tapped from large low voltage networks or from large low impedance transformers.

The principle involved is illustrated in **Figures 19 and 20**. The first example has two cables per phase, as shown in **Figure 19**. When a fault occurs in either cable as illustrated by the "X", most of the fault current will flow directly to the fault through limiter L-1. L-1 will open, and all the fault current will back feed the fault via limiters L-3, L-4, and L-2. Since all of the limiters have the same rating, they will all open resulting in the entire circuit being shut down.

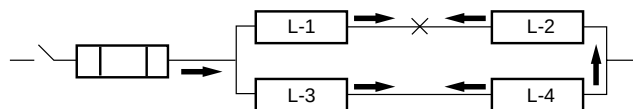


**Figure 19**

**One Line Diagram of Circuit with Two Conductors Per Phase**

However, when a fault occurs and there are three or more cables per phase, this problem can be avoided. This scenario is illustrated in **Figure 20**. When a fault occurs at point "X", current will flow directly to the fault opening limiter L-1. The fault current will back feed the fault, but when there are three or more conductors in parallel, it divides between the remaining cables. When there are three conductors in parallel as shown in **Figure 20**, one half of the fault current will flow through limiters L-3 and L-4, and one-half will flow through limiters L-5 and L-6. All of the fault current will flow through limiter L-2 causing it to open before the other limiters. As a result, only the one cable is removed from service.

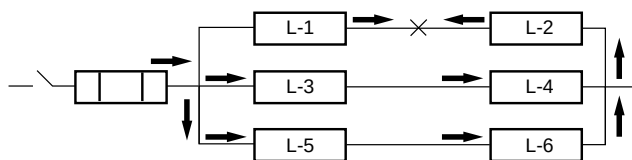


**Figure 20**

**One Line Diagram of Circuit with Three or More Conductors Per Phase**

By isolating faulted cables quickly, cable limiters prevent damage to conductor insulation caused by the heating effects of large fault currents. For example, if the cable run shown in **Figure 20** passed through pull boxes or manholes, and one section of the cable faulted, only the faulted section would require replacement instead of one or more entire lengths.

Cable limiters have terminals which permit them to be installed in a variety of equipment. The most common configuration is the offset blade on one end and the crimp terminal on the other end. This permits the limiter to replace a cable terminal (lug).

#### Applications

Service entrance conductors.

Between transformer or network bus and busway terminal boxes.

Large feeders with three or more conductors per phase.

#### Features/Benefits

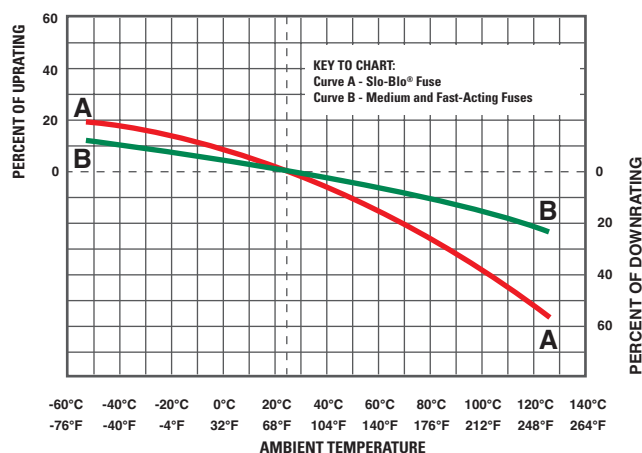
- Fast-acting current-limiting characteristics provide protection to conductor insulation and reduce damage when faults occur.
- Properly applied cable limiters may permit the use of equipment with reduced withstand ratings.
- Wide variety of terminations and cable ratings permit use in almost every situation.

#### Semiconductors and Solid-State Device Protection

Semiconductors generally are very sensitive to low value overloads and to short-circuit currents. As a result, they require fuses referred to as "very fast-acting" fuses. Littelfuse Semiconductor fuses are designed specifically to protect power electronics equipment. For application information refer to Littelfuse Semiconductor Application Guide PF336 or the Semiconductor fuse section of this catalog.

#### Effect Of Ambient Temperature On Fuses

The current carrying capacity of fuses is 110% of the fuse rating when installed in a standard UL test circuit and tested in open air at 25°C ambient. This allows for derating to 100% of rating in an enclosure at 40°C ambient. At higher ambient temperatures, the continuous current carrying capacity will be decreased as shown in the chart below. This closely follows the derating tables for all electrical equipment, and can help reduce equipment burnout due to high ambient conditions. Littelfuse SLO-BLO® or Time-Delay fuses derate quicker in higher ambient conditions, so they in effect, act as "self-protecting" devices and maintain their integrity until opening.



**Fuse Derating Curve**

## Fuse Application Guide

### Applying Fuses for Specific Applications/Applying Medium Voltage Fuses

## Medium Voltage (MV) Fuse Application (2,400 - 38,000 Volts AC)

Medium voltage fuses are applied quite differently than fuses rated 600 volts and less. The biggest difference is: medium voltage fuses are not intended to provide overload protection. They should only be applied where they will not be required to open small overcurrents. Another major difference is the wide range of system voltages which results in a correspondingly large number of fuse voltage ratings.

Descriptions and ratings of Littelfuse medium voltage fuses are located in the medium voltage fuse section of this catalog, which also contains some application data. The following is a more detailed discussion of factors which must be considered.

Littelfuse medium voltage fuses are silver-sand, non-expulsion, current-limiting type. When properly applied, they are designed to carry their nominal current rating continuously without "fatigue failure." This means that the fuse will not age, become brittle, or deteriorate under the most severe duty cycling.

There are two basic types of current-limiting, medium voltage fuses: general purpose and back-up. General purpose fuses have the ability to interrupt both large and small short-circuits down to currents which would cause the fuse to open within one hour. General purpose fuses are used to provide short-circuit protection for transformers, switchgear, and similar equipment.

Back-up fuses are designed to only protect against high fault currents and must be used in series with equipment which provides the circuit's required overload and low value short-circuit protection.

Medium Voltage "E" rated fuses are general purpose fuses. Their mounting dimensions permit them to be installed in a wide variety of medium voltage switches, in pad-mounted transformers, and other similar locations. "R" rated MV fuses are specifically designed to provide short-circuit protection for medium voltage motor controllers and associated equipment.

### Selecting Medium Voltage Fuses

Four factors must be considered when applying MV fuses: voltage rating, interrupting rating, current rating, and coordination with other overcurrent protective devices.

#### Voltage Rating

In common with fuses rated 600 volts and less, MV fuses minimum voltage ratings must be equal to or greater than the maximum recovery voltage which the fuse will experience under the worst possible conditions. Normally, this requires the fuse voltage rating to be greater than the system's maximum line-to-line voltage. However, when fusing single-phase loads which are connected from line-to-neutral on an effectively grounded four wire wye system, a fuse maximum design voltage only needs to be greater than the system's maximum line-to-neutral voltage. When fuses are selected on this basis, it must be impossible for the fuse to experience line-to-line voltage. Therefore, if more than one phase is extended beyond the fuse location, it is best to use fuses with a voltage rating greater than the maximum line-to-line voltage.

While not required for low voltage fuses, MV fuses maximum voltage rating must also be considered. For a fuse to be current-limiting, it must interrupt the circuit withing 180 electrical degrees (one-half cycle) after the fault occurs. It does this by producing an arc voltage across the fuse which is greater than the system voltage. This forces current to zero before the available short-circuit current reaches its first peak.

Arc voltages are created in the fuse by the melting of the fuse links. This produces a number of high resistance arcs (gaps) in series, and there is a voltage drop across each gap. When the total voltage drop exceeds system voltage, current flow stops. As this occurs, a transient voltage spike is generated in the system, (**see Figure 21**). Care must be taken to see that this voltage is not greater than the system's basic insulation level (BIL). If the fuse maximum design voltage rating does not exceed 140% of the electrical system's voltage, arc (transient) voltage will not usually be a problem.

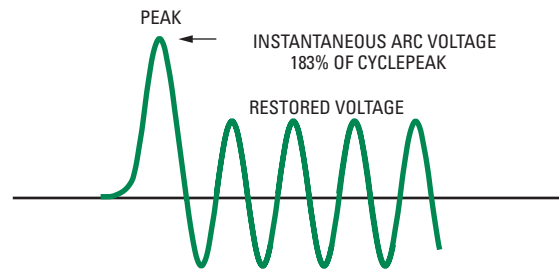


**Figure 21**

However, higher voltage fuses may be used if certain conditions are met. When tested at nominal voltage rating and rated interrupting current, Littelfuse MV fuses are designed so that the peak arc voltage does not exceed three times the fuse nominal voltage. If the electrical system being protected has a basic insulation level (BIL) greater than three times the fuse maximum design voltage, the higher voltage fuses may be used. See the following example:

Given: System nominal voltage = 4,800 volts  
System BIL = 50 kV

Can a POWR-GARD™ 15NLE-80E fuse, rated 14,400 volts nominal and 15,500 volts max. be used in this system?

Maximum peak voltage produced by this fuse =  
 $3 \times 14,400 = 43,200$  volts.

43,200 volts is less than the BIL of 50 kV, so the 15NLE-80E fuse may be used.

#### Medium Voltage Fuses Used With Lightning Arresters

When MV fuses are in the same circuit with lightning arresters, some precautions must be taken to insure that the transient voltage spike, which occurs when the fuse is interrupting a fault, does not cause lightning arresters to spark over. When checking the BIL of the system,

## Fuse Application Guide

### Applying Medium Voltage Fuses

#### Medium Voltage Fuses Used With Lightning Arresters

(continued from previous page)

lightning arresters are the first things that should be investigated. The lightning arrester spark-over voltage must be higher than the transient voltages which can be produced by the MV fuses. If arc voltages produced by the fuses cause lightning arresters to spark over, a relatively high current will be shunted into the arresters. However, they are not designed to interrupt such currents.

If the fuses have a voltage rating higher than the arrester and are installed on the arrester's load side, the arrester may spark over when the fuse is interrupting a large fault. If the system has only distribution class arresters, there will seldom be a problem because distribution class arresters have sufficient impedance to prevent large amounts of current from passing through them. However, intermediate, line, and station type arresters have low impedance, and if they spark over, sufficient current may flow in an arrester to damage it severely. Intermediate, line, and station type arresters should not be applied on the line side or in parallel with current-limiting MV fuses unless the arresters' spark over voltages are greater than the arc voltages the fuses can produce. If the lightning arresters and the fuses have the same voltage rating, arc voltages will be within desired limits, and the problem is eliminated.

Another approach is to locate the fuses on the line side of the arresters. However, in many cases this is impossible. Utilities prefer to locate fuses on the load side of lightning arresters to prevent lightning from damaging the fuses. In still other cases, fuses may be mounted on the primary transformer bushings or within pad-mounted transformer enclosures so that lightning arresters will be on the line side of the fuses.

Machine protection lightning arresters, such as those used to protect large motors and motor control, have very low spark over values and may be easily damaged if they are located on the fuses line side. However, arresters should always be mounted directly on the machine terminals placing them on the load side of the fuses.

#### Interrupting Ratings

Maximum rms symmetrical AC component and maximum asymmetrical current interrupting ratings for Littelfuse MV power fuses are shown in the medium voltage fuse section of this catalog. MV fuses are tested with a short-circuit X/R ratio of 25:1 which produces an rms asymmetrical multiplier of 1.6 times the symmetrical component  $1/2$  cycle after the fault occurs. It also produces an instantaneous asymmetrical peak current 2.66 times the rms symmetrical component. The interrupting ratings indicate the maximum symmetrical and asymmetrical fault current permitted at the point where the fuse is installed.

#### Short-circuit kVA Ratings

It is common to state the short-circuit ratings of MV breakers and other equipment such as switchgear in terms of short-circuit kVA. It must be remembered that MV power fuses are not constant kVA devices. For example, if the voltage is half of the fuse rating, the interrupting capacity does not double. MV fuse interrupting ratings are given in symmetrical and asymmetrical amperes. These values must not be exceeded at any voltage.

When the short-circuit kVA is known, the rms symmetrical AC component may be determined from the formula:

$$I_{sc} = \frac{kVA \times 1000}{1.732 \times E}$$

$I_{sc}$  = RMS symmetrical short-circuit current

kVA = Three phase short-circuit kVA

E = System line-to-line voltage

#### Effect of Frequency and Altitude

Interrupting ratings of MV fuses shown in the Product section are valid for 50 and 60 Hertz systems. For 25 Hertz systems, multiply the interrupting ratings shown by a factor of 0.74.

The continuous current ratings and interrupting ratings of MV fuses shown in the Product section are valid up to 3,000 feet. Since the density of air and its dielectric strength decreases as altitude increases, continuous current ratings and interrupting ratings are affected at altitudes exceeding 3,000 feet. **Table 8** provides altitude correction factors.

**Table 8**

**Altitude Correction Factors per ANSI C37.40-2.3**

| Altitude Above Sea Level |        | Continuous Current Multiplier | Interrupting Rating Multiplier |
|--------------------------|--------|-------------------------------|--------------------------------|
| Feet                     | Meters |                               |                                |
| 4000                     | 1200   | .99                           | .98                            |
| 6000                     | 1800   | .98                           | .92                            |
| 8000                     | 2400   | .97                           | .86                            |
| 10000                    | 3000   | .96                           | .80                            |
| 12000                    | 3600   | .95                           | .75                            |
| 14000                    | 4300   | .93                           | .70                            |
| 16000                    | 4900   | .92                           | .65                            |
| 18000                    | 5500   | .91                           | .61                            |
| 20000                    | 6100   | .90                           | .56                            |

#### Continuous Current Ratings

Available current ratings of "E-rated" and "R-rated" MV fuses are shown in the MV fuse section of this catalog. The current ratings for MV fuses carry a different meaning than ratings for 600 volt and below fuses. MV fuses are not intended to provide protection against overloads or other overcurrents less than two times their continuous current rating. If MV fuses are exposed to currents only slightly over their continuous current rating, a large amount of heat is generated within the fuse. The heat may cause the fuse tube to char and weaken, and the time-current characteristics may be changed. If circuits can produce sustained currents that are 100% to 200% of MV fuses current ratings, other overcurrent devices must be in series with the fuses to provide overload protection.

MV fuses are designed to carry their rated current without exceeding the temperature rise permitted by NEMA and ANSI standards. The "E" and "R" ratings help define the operating characteristics of the fuses:

NEMA Standards for "E-rated" MV power fuses require that fuses rated 100E or less open within 300 seconds (5 minutes) when subjected to an rms current of 200-240% of the fuse's continuous current rating. Fuses with an "E" rating larger than 100E must open within 600 seconds (10 minutes) when subjected to an RMS current of 220-264% of the fuse continuous current rating.

## Fuse Application Guide

### Applying Medium Voltage Fuses

NEMA Standards for “R-rated” MV power fuses require that they open within 15-35 seconds when subjected to an rms current 100 times the “R” rating.

These values establish one point on the fuses time-current curves and help define the characteristics of E- and R-rated fuses. Since all E and R-rated fuses must meet these requirements, the time-current characteristics of E-rated and R-rated fuses of different manufacturers will have a certain similarity, although they are not necessarily identical.

A long-standing rule of thumb for applying MV fuses states that the minimum fuse rating should be at least 1.4 times the circuit’s full load current. This generally insures that MV fuses will not be required to open overloads. If the nature of the load is such that load currents will never exceed the rating of the fuse, MV fuses may be rated as close as 1.1 times full load current.

### Motor Protection

To properly select MV fuses for motor protection, several factors should be considered. R Rated fuses are only intended for short-circuit protection and should be applied in conjunction with motor overload relays. An R Rated fuse does not have an ampere rating and the “R” rating refers to the opening time of the fuse. R Rated fuses are designed to safely interrupt any current between their minimum and maximum interrupting rating. When applying R Rated fuses, it is recommended to follow the fuse sizing guidelines established by the motor starter manufacturer.

When engineering a system, time-current characteristic curves of the fuse and overload relay should be compared to insure the overload relay opens before the fuse during overload conditions. The following table is provided as a guideline for sizing R Rated fuses.

**R-Rated Fuse Sizing Table**

| For Motors with an Acceleration of 10 Seconds |              | For Motors with an Acceleration of 3 Seconds |              |
|-----------------------------------------------|--------------|----------------------------------------------|--------------|
| Max. Motor FLA                                | R Rated Fuse | Max. Motor FLA                               | R Rated Fuse |
| 28A                                           | 2R           | 32A                                          | 2R           |
| 40A                                           | 3R           | 45A                                          | 3R           |
| 55A                                           | 4R           | 65A                                          | 4R           |
| 80A                                           | 6R           | 95A                                          | 6R           |
| 125A                                          | 9R           | 140A                                         | 9R           |
| 165A                                          | 12R          | 190A                                         | 12R          |
| 250A                                          | 18R          | 280A                                         | 18R          |
| 330A                                          | 24R          | 360A                                         | 24R          |
| 500A                                          | 36R          | 550A                                         | 36R          |

### Transformer Protection

A principle use of MV fuses is to provide primary short-circuit protection for transformers. When selecting MV fuses to protect transformers, the following factors must be considered in descending order of importance:

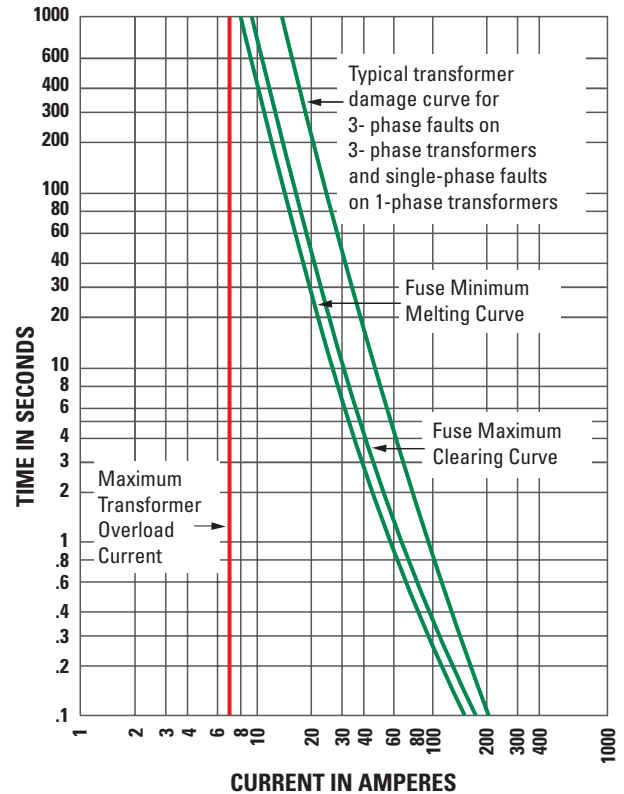


**Figure 22**

1. As explained above, the fuses voltage and interrupting ratings must equal or exceed system requirements at the point where fuses will be applied.
2. The fuse continuous current rating must be large enough to withstand transformer magnetizing (in-rush) current. (Minimum Fuse Rating).
3. The fuse continuous current rating must be able to withstand transformer overloading and emergency operation, and meet NEC requirements. (Maximum Fuse Rating).
4. Fuses must protect the system on the line side of the fuse from the effects of short circuits on the load side of the fuses. (Utility System Coordination).
5. Fuses must coordinate with the transformer secondary protection where and whenever possible. (Facility System Coordination).
6. Fuses must protect transformer against secondary bolted faults.
7. Where and whenever possible, fuses should protect the transformer against higher impedance secondary faults.

Transformer magnetizing or inrush current depends on several factors such as transformer design, residual flux in the core at the instant the transformer is energized, the point on the voltage wave at which the switch is closed, and the characteristics of the electrical system powering the transformer. Power transformers in-rush current approximates 12 times the transformer full load current, and distribution transformers 25 to 40 times full load current. The current generally lasts less than  $\frac{1}{10}$  second.

## Fuse Application Guide

### Applying Medium Voltage Fuses

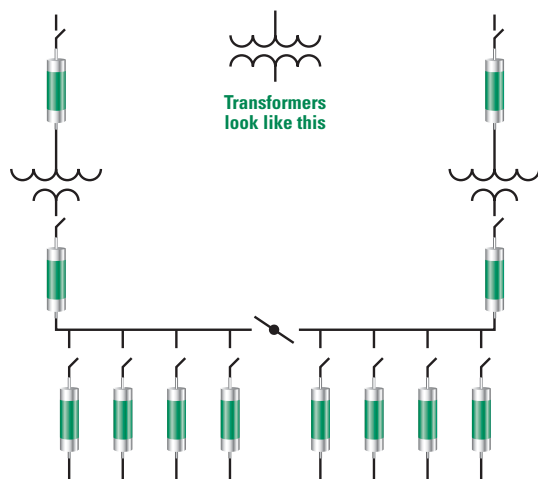


**Figure 23**

To determine the minimum size fuse which will hold the in-rush current, obtain the in-rush current from the transformer manufacturer and mark the current on the fuses minimum melting time-current curves at 0.10 second as shown in **Figure 22**. The minimum fuse rating is the fuse whose minimum melting curve is just to the right and above the transformer inrush point.

When the in-rush current is not greater than 12 times transformer full load current, MV fuses with current ratings that equal or exceed a transformer's self-cooled, full load current will usually meet this

requirement. However, transformers are generally operated at close to full load current on a continuous basis, and are overloaded under emergency conditions. A typical example is a double-ended loadcenter operated with a normally open bus tie. See **Figure 23**. Each transformer is rated to carry 150% of the load on its half of the loadcenter. With loss of service to one transformer, the main switch for that line is opened, and the bus tie switch is closed shifting all load to the remaining transformer. The system is operated overloaded until the other line is back in service. If the outage will continue for a long period of time, manual load shedding can be used to control transformer overloading.

Other similar operating schemes also result in transformer overloading. As a result, MV fuses usually have continuous current ratings larger than required to withstand transformer in-rush current.

NEC® Article 450 covers transformer installations and establishes the maximum ratings of transformer overcurrent protective devices. Regarding medium voltage fuses, Article 450.3 states in part:

Overcurrent Protection of transformers shall comply with NEC Article 450.3(A) – Transformers Over 600 Volts, Nominal, and shall be provided in accordance with **Table 9**.

*NOTE: In this section, the word transformer shall mean a transformer or polyphase bank of two or more single-phase transformers operating as a single unit.*

**Table 9**  
(Based on NEC Table 450.3(A) – Maximum Rating or Setting of Overcurrent Protection for Transformers Over 600 Volts (as a Percentage of Transformer-Rated Current))

| Location Limitations                   | Transformer Rated Impedance                                              | Primary Protection Over 600 Volts |             | Secondary Protection (See Note 2) |              |                   |
|----------------------------------------|--------------------------------------------------------------------------|-----------------------------------|-------------|-----------------------------------|--------------|-------------------|
|                                        |                                                                          | Circuit Breaker (see Note 4)      | Fuse Rating | Over 600 Volts                    |              | 600 Volts or Less |
| Any Location                           | Not more than 6% (see Note 1)                                            | 600%                              | 300%        | 300%                              | 250%         | 125%              |
|                                        | More than 6% but not more than 10% (see Note 1)                          | 400%                              | 300%        | 250%                              | 225%         | 125%              |
| Supervised Locations Only (see Note 3) | Any (see Note 1)                                                         | 300%                              | 250%        | Not Required                      | Not Required | Not Required      |
|                                        | Not more than 6% (see Note 5 for Secondary Protection)                   | 600%                              | 300%        | 300%                              | 250%         | 250%              |
|                                        | More than 6% but not more than 10% (see Note 5 for Secondary Protection) | 400%                              | 300%        | 250%                              | 225%         | 250%              |

Note 1 – If the required fuse rating or breaker setting does not correspond to standard ratings/settings, the next higher rating/setting may be used.

Note 2 – If secondary overcurrent protection is required, no more than six breakers or sets of fuses may be grouped in any one location. When multiple overcurrent devices are used, the sum of all device ratings shall not exceed the allowed value of any single device. If both breakers and fuses are used, the total of device ratings shall not exceed that if using only fuses.

Note 3 – A “supervised location” is one where maintenance and supervision conditions ensure that only qualified persons are allowed to monitor and perform installation service on the transformer.

Note 4 – Electronically actuated fuses set to open at a specific current shall be set and calibrated in accordance with the corresponding settings of the circuit breakers involved.

Note 5 – Separate secondary protection is not necessary if the transformer is equipped with a coordinated thermal overload protection provided by the manufacturer.

## Motor Protection Tables

**Selection of Class RK5 (FLNR\_ID/FLSR\_ID & IDSR Series) or POWR-PRO® Class RK1 (LLNRK/LLSRK/LLSRK\_ID Series) Fuses Based on Motor Full Load Amps**

### Using AC Motor Protection Tables to Select Fuse Ratings

Time-delay RK1 and RK5 fuse ratings selected in accordance with the following recommendations also meet NEC® requirements for Motor Branch circuit and Short-Circuit Protection.

### Selecting Fuses for Motor Running Protection Based on Motor Horsepower

Motor horsepower and motor Full Load Amperes (FLA) shown are taken from NEC Tables 430.248 through 430.250 covering standard speed AC motors with normal torque characteristics. Fuse ratings for motors with special characteristics may need to vary from given values.

If motor running protection will be provided by the fuses, select fuse ratings for correct type of motor from Motor Protection Table Columns headed, "Without Overload Relays."

If overload relays will provide principal motor running protection, select fuse ratings for correct type of motor from Motor Protection Table Columns headed, "Back-up Running Protection" or "With Overload Relays." Fuse ratings selected from these columns coordinate with most UL Class 10 and 20 overload relays which covers over 90% of motor applications.

### Selecting Fuses for Motor Running Protection Based on Motor Actual Full Load Currents

Better protection is achieved when fuse ratings are based on motor actual FLA obtained from motor nameplates. Locate motor nameplate FLA in the column appropriate for the type of motor and type of protection required. Then select the corresponding ampere rating from the first column of that line.

| Time Delay UL<br>Class RK1 or<br>RK5 Fuse<br>Ampere Rating | Motor Running Protection<br>(Used Without Properly Sized Overload<br>Relays) Motor Full-Load Amps |                                                                                       | Back-up Motor Running Protection<br>(Used With Properly Sized Overload<br>Relays) Motor Full-Load Amps |                                                                                      |
|------------------------------------------------------------|---------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
|                                                            | Motor Service<br>Factor of 1.15 or<br>Greater or With<br>Temp. Rise Not<br>over 40°C.             | Motor Service<br>Factor Less Than<br>1.15 or with Temp.<br>Rise Greater<br>Than 40°C. | Motor Service<br>Factor of 1.15 or<br>Greater or With<br>Temp. Rise Not<br>Over 40°C.                  | Motor Service<br>Factor Less Than<br>1.15 or with Temp.<br>Rise Greater<br>Than 40°C |
| 1/10                                                       | 0.08-0.09                                                                                         | 0.09-0.10                                                                             | 0-0.08                                                                                                 | 0-0.09                                                                               |
| 1/8                                                        | 0.10-0.11                                                                                         | 0.11-0.125                                                                            | 0.09-0.10                                                                                              | 0.10-0.11                                                                            |
| 15/100                                                     | 0.12-0.15                                                                                         | 0.14-0.15                                                                             | 0.11-0.12                                                                                              | 0.12-0.13                                                                            |
| 3/10                                                       | 0.16-0.19                                                                                         | 0.18-0.20                                                                             | 0.13-0.16                                                                                              | 0.14-0.17                                                                            |
| 1/4                                                        | 0.20-0.23                                                                                         | 0.22-0.25                                                                             | 0.17-0.20                                                                                              | 0.18-0.22                                                                            |
| 3/10                                                       | 0.24-0.30                                                                                         | 0.27-0.30                                                                             | 0.21-0.24                                                                                              | 0.23-0.26                                                                            |
| 4/10                                                       | 0.32-0.39                                                                                         | 0.35-0.40                                                                             | 0.25-0.32                                                                                              | 0.27-0.35                                                                            |
| 1/2                                                        | 0.40-0.47                                                                                         | 0.44-0.50                                                                             | 0.33-0.40                                                                                              | 0.36-0.43                                                                            |
| 5/10                                                       | 0.48-0.60                                                                                         | 0.53-0.60                                                                             | 0.41-0.48                                                                                              | 0.44-0.52                                                                            |
| 5/10                                                       | 0.64-0.79                                                                                         | 0.70-0.80                                                                             | 0.49-0.64                                                                                              | 0.53-0.70                                                                            |
| 1                                                          | 0.80-0.89                                                                                         | 0.87-0.97                                                                             | 0.65-0.80                                                                                              | 0.71-0.87                                                                            |
| 1 1/8                                                      | 0.90-0.99                                                                                         | 0.98-1.08                                                                             | 0.81-0.90                                                                                              | 0.88-0.98                                                                            |
| 1 1/4                                                      | 1.00-1.11                                                                                         | 1.09-1.21                                                                             | 0.91-1.00                                                                                              | 0.99-1.09                                                                            |
| 1 4/10                                                     | 1.12-1.19                                                                                         | 1.22-1.30                                                                             | 1.01-1.12                                                                                              | 1.10-1.22                                                                            |
| 1 1/2                                                      | 1.20-1.27                                                                                         | 1.31-1.39                                                                             | 1.13-1.20                                                                                              | 1.23-1.30                                                                            |
| 1 5/10                                                     | 1.28-1.43                                                                                         | 1.40-1.56                                                                             | 1.21-1.28                                                                                              | 1.31-1.39                                                                            |
| 1 9/10                                                     | 1.44-1.59                                                                                         | 1.57-1.73                                                                             | 1.29-1.44                                                                                              | 1.40-1.57                                                                            |
| 2                                                          | 1.60-1.79                                                                                         | 1.74-1.95                                                                             | 1.45-1.60                                                                                              | 1.58-1.74                                                                            |
| 2 1/4                                                      | 1.80-1.99                                                                                         | 1.96-2.17                                                                             | 1.61-1.80                                                                                              | 1.75-1.96                                                                            |
| 2 1/2                                                      | 2.00-2.23                                                                                         | 2.18-2.43                                                                             | 1.81-2.00                                                                                              | 1.97-2.17                                                                            |
| 2 5/10                                                     | 2.24-2.39                                                                                         | 2.44-2.60                                                                             | 2.01-2.24                                                                                              | 2.18-2.43                                                                            |
| 3                                                          | 2.40-2.55                                                                                         | 2.61-2.78                                                                             | 2.25-2.40                                                                                              | 2.44-2.60                                                                            |
| 3 1/10                                                     | 2.56-2.79                                                                                         | 2.79-3.04                                                                             | 2.41-2.56                                                                                              | 2.61-2.78                                                                            |
| 3 1/2                                                      | 2.80-3.19                                                                                         | 3.05-3.47                                                                             | 2.57-2.80                                                                                              | 2.79-3.04                                                                            |
| 4                                                          | 3.20-3.59                                                                                         | 3.48-3.91                                                                             | 2.81-3.20                                                                                              | 3.05-3.48                                                                            |
| 4 1/2                                                      | 3.60-3.99                                                                                         | 3.92-4.34                                                                             | 3.21-3.60                                                                                              | 3.49-3.91                                                                            |
| 5                                                          | 4.00-4.47                                                                                         | 4.35-4.86                                                                             | 3.61-4.00                                                                                              | 3.92-4.35                                                                            |
| 5 1/10                                                     | 4.48-4.79                                                                                         | 4.87-5.21                                                                             | 4.01-4.48                                                                                              | 4.36-4.87                                                                            |
| 6                                                          | 4.80-4.99                                                                                         | 5.22-5.43                                                                             | 4.49-4.80                                                                                              | 4.88-5.22                                                                            |
| 6 1/4                                                      | 5.00-5.59                                                                                         | 5.44-6.08                                                                             | 4.81-5.00                                                                                              | 5.23-5.43                                                                            |
| 7                                                          | 5.60-5.99                                                                                         | 6.09-6.52                                                                             | 5.01-5.60                                                                                              | 5.44-6.09                                                                            |
| 7 1/2                                                      | 6.00-6.39                                                                                         | 6.53-6.95                                                                             | 5.61-6.00                                                                                              | 6.10-6.52                                                                            |
| 8                                                          | 6.40-7.19                                                                                         | 6.96-7.82                                                                             | 6.01-6.40                                                                                              | 6.53-6.96                                                                            |
| 9                                                          | 7.20-7.99                                                                                         | 7.83-8.69                                                                             | 6.41-7.20                                                                                              | 6.97-7.83                                                                            |
| 10                                                         | 8.00-9.59                                                                                         | 8.70-10.00                                                                            | 7.21-8.00                                                                                              | 7.84-8.70                                                                            |
| 12                                                         | 9.60-11.99                                                                                        | 10.44-12.00                                                                           | 8.01-9.60                                                                                              | 8.71-10.43                                                                           |
| 15                                                         | 12.00-13.99                                                                                       | 13.05-15.00                                                                           | 9.61-12.00                                                                                             | 10.44-13.04                                                                          |
| 17 1/2                                                     | 14.00-15.99                                                                                       | 15.22-17.39                                                                           | 12.01-14.00                                                                                            | 13.05- 15.21                                                                         |
| 20                                                         | 16.00-19.99                                                                                       | 17.40-20.00                                                                           | 14.01-16.00                                                                                            | 15.22-17.39                                                                          |
| 25                                                         | 20.00-23.99                                                                                       | 21.74-25.00                                                                           | 16.01-20.00                                                                                            | 17.40-21.74                                                                          |
| 30                                                         | 24.00-27.99                                                                                       | 26.09-30.00                                                                           | 20.01-24.00                                                                                            | 21.75-26.09                                                                          |
| 35                                                         | 28.00-31.99                                                                                       | 30.44-34.78                                                                           | 24.01-28.00                                                                                            | 26.10-30.43                                                                          |
| 40                                                         | 32.00-35.99                                                                                       | 34.79-39.12                                                                           | 28.01-32.00                                                                                            | 30.44-37.78                                                                          |
| 45                                                         | 36.00-39.99                                                                                       | 39.13-43.47                                                                           | 32.01-36.00                                                                                            | 37.79-39.13                                                                          |
| 50                                                         | 40.00-47.99                                                                                       | 43.48-50.00                                                                           | 36.01-40.00                                                                                            | 39.14-43.48                                                                          |
| 60                                                         | 48.00-55.99                                                                                       | 52.17-60.00                                                                           | 40.01-48.00                                                                                            | 43.49-52.17                                                                          |
| 70                                                         | 56.00-59.99                                                                                       | 60.87-65.21                                                                           | 48.01-56.00                                                                                            | 52.18-60.87                                                                          |
| 75                                                         | 60.00-63.99                                                                                       | 65.22-69.56                                                                           | 56.01-60.00                                                                                            | 60.88-65.22                                                                          |
| 80                                                         | 64.00-71.99                                                                                       | 69.57-78.25                                                                           | 60.01-64.00                                                                                            | 65.23-69.57                                                                          |
| 90                                                         | 72.00-79.99                                                                                       | 78.26-86.95                                                                           | 64.01-72.00                                                                                            | 69.58-78.26                                                                          |
| 100                                                        | 80.00-87.99                                                                                       | 86.96-95.64                                                                           | 72.01-80.00                                                                                            | 78.27-86.96                                                                          |
| 110                                                        | 88.00-99.99                                                                                       | 95.65-108.69                                                                          | 80.01-88.00                                                                                            | 86.97-95.65                                                                          |
| 125                                                        | 100.00-119.99                                                                                     | 108.70-125.00                                                                         | 88.01-100.00                                                                                           | 95.66-108.70                                                                         |
| 150                                                        | 120.00-139.99                                                                                     | 131.30-150.00                                                                         | 100.01-120.00                                                                                          | 108.71-130.43                                                                        |
| 175                                                        | 140.00-159.99                                                                                     | 152.17-173.90                                                                         | 120.01-140.00                                                                                          | 130.44-152.17                                                                        |
| 200                                                        | 160.00-179.99                                                                                     | 173.91-195.64                                                                         | 140.01-160.00                                                                                          | 152.18-173.91                                                                        |
| 225                                                        | 180.00-199.99                                                                                     | 195.65-217.38                                                                         | 160.01-180.00                                                                                          | 173.92-195.62                                                                        |
| 250                                                        | 200.00-239.99                                                                                     | 217.39-250.00                                                                         | 180.01-200.00                                                                                          | 195.63-217.39                                                                        |
| 300                                                        | 240.00-279.99                                                                                     | 260.87-300.00                                                                         | 200.01-240.00                                                                                          | 217.40-260.87                                                                        |
| 350                                                        | 280.00-319.99                                                                                     | 304.35-347.82                                                                         | 240.01-280.00                                                                                          | 260.88-304.35                                                                        |
| 400                                                        | 320.00-359.99                                                                                     | 347.83-391.29                                                                         | 280.01-320.00                                                                                          | 304.36-347.83                                                                        |
| 450                                                        | 360.00-399.99                                                                                     | 391.30-434.77                                                                         | 320.01-360.00                                                                                          | 347.84-391.30                                                                        |
| 500                                                        | 400.00-479.99                                                                                     | 434.78-500.00                                                                         | 360.01-400.00                                                                                          | 391.31-434.78                                                                        |
| 600                                                        | 480.00-600.00                                                                                     | 521.74-600.00                                                                         | 400.01-480.00                                                                                          | 434.79-521.74                                                                        |

## Motor Protection Tables

Selection of Class RK5 (FLNR\_ID/FLSR\_ID & IDSR Series) or POWR-PRO® Class RK1 (LLNRK/LLSRK/LLSRK\_ID Series) Fuses Based on Motor Horsepower

| Motor HP                               | Full Load Amps | Without Overload Relays                      |                                                   | With Overload Relays                         |                                                   | Switch or Fuse Clip Rating |
|----------------------------------------|----------------|----------------------------------------------|---------------------------------------------------|----------------------------------------------|---------------------------------------------------|----------------------------|
|                                        |                | S.F. = 1.15 Or More, Temp Rise Not Over 40°C | S.F. = Less Than 1.15 Or Temp Rise More Than 40°C | S.F. = 1.15 Or More, Temp Rise Not Over 40°C | S.F. = Less Than 1.15 Or Temp Rise More Than 40°C |                            |
| 120 VOLT 1-PHASE MOTORS (120V CIRCUIT) |                |                                              |                                                   |                                              |                                                   |                            |
| 1/8                                    | 4.4            | 5                                            | 5                                                 | 5 <sup>5/10</sup>                            | 5 <sup>5/10</sup>                                 | 30                         |
| 1/4                                    | 5.8            | 7                                            | 6 <sup>1/4</sup>                                  | 7 <sup>1/2</sup>                             | 7                                                 | 30                         |
| 1/2                                    | 7.2            | 9                                            | 8                                                 | 9                                            | 9                                                 | 30                         |
| 3/4                                    | 9.8            | 12                                           | 10                                                | 15                                           | 12                                                | 30                         |
| 1                                      | 13.8           | 15                                           | 15                                                | 17 <sup>1/2</sup>                            | 17 <sup>1/2</sup>                                 | 30                         |
| 1 1/2                                  | 16             | 20                                           | 17 <sup>1/2</sup>                                 | 20                                           | 20                                                | 30                         |
| 2                                      | 20             | 25                                           | 20                                                | 25                                           | 25                                                | 30                         |
| 2 1/2                                  | 24             | 30                                           | 25                                                | 30                                           | 30                                                | 30                         |
| 230 VOLT 1-PHASE MOTORS (240V CIRCUIT) |                |                                              |                                                   |                                              |                                                   |                            |
| 1/8                                    | 2.2            | 2 <sup>1/2</sup>                             | 2 <sup>1/2</sup>                                  | 2 <sup>5/10</sup>                            | 2 <sup>5/10</sup>                                 | 30                         |
| 1/4                                    | 2.9            | 3 <sup>1/2</sup>                             | 3 <sup>5/10</sup>                                 | 4                                            | 3 <sup>1/2</sup>                                  | 30                         |
| 1/2                                    | 3.6            | 4 <sup>1/2</sup>                             | 4                                                 | 4 <sup>1/2</sup>                             | 4 <sup>1/2</sup>                                  | 30                         |
| 3/4                                    | 4.9            | 5 <sup>5/10</sup>                            | 5 <sup>5/10</sup>                                 | 6 <sup>1/4</sup>                             | 6                                                 | 30                         |
| 1                                      | 6.9            | 8                                            | 7 <sup>1/2</sup>                                  | 9                                            | 8                                                 | 30                         |
| 1 1/2                                  | 8              | 10                                           | 9                                                 | 10                                           | 10                                                | 30                         |
| 2                                      | 10             | 12                                           | 10                                                | 15                                           | 12                                                | 30                         |
| 2 1/2                                  | 12             | 15                                           | 12                                                | 15                                           | 15                                                | 30                         |
| 3                                      | 17             | 20                                           | 17 <sup>1/2</sup>                                 | 25                                           | 20                                                | 30                         |
| 5                                      | 28             | 35                                           | 30*                                               | 35                                           | 35                                                | 60                         |
| 7 1/2                                  | 40             | 50                                           | 45                                                | 50                                           | 50                                                | 60                         |
| 10                                     | 50             | 60                                           | 50                                                | 70                                           | 60                                                | 60                         |
| 200 VOLT 3-PHASE MOTORS (208V CIRCUIT) |                |                                              |                                                   |                                              |                                                   |                            |
| 1/8                                    | 2.5            | 3                                            | 2 <sup>5/10</sup>                                 | 3 <sup>1/10</sup>                            | 3                                                 | 30                         |
| 1/4                                    | 3.7            | 4 <sup>1/2</sup>                             | 4                                                 | 5                                            | 4 <sup>1/2</sup>                                  | 30                         |
| 1                                      | 4.8            | 6                                            | 5 <sup>5/10</sup>                                 | 6 <sup>1/4</sup>                             | 6                                                 | 30                         |
| 1 1/2                                  | 6.9            | 8                                            | 7 <sup>1/2</sup>                                  | 7 <sup>1/2</sup>                             | 8                                                 | 30                         |
| 2                                      | 7.8            | 9                                            | 8                                                 | 10                                           | 9                                                 | 30                         |
| 3                                      | 11             | 12                                           | 12                                                | 15                                           | 15                                                | 30                         |
| 5                                      | 17.5           | 20                                           | 20                                                | 25                                           | 25                                                | 30                         |
| 7 1/2                                  | 25.3           | 30*                                          | 25*                                               | 35                                           | 30*                                               | 60                         |
| 10                                     | 32.2           | 40                                           | 35                                                | 45                                           | 40                                                | 60                         |
| 15                                     | 48.3           | 60                                           | 50                                                | 70†                                          | 60                                                | 60                         |
| 20                                     | 62.1           | 75                                           | 70                                                | 80                                           | 75                                                | 100                        |
| 25                                     | 78.2           | 90                                           | 80                                                | 100                                          | 90                                                | 100                        |
| 30                                     | 92             | 110                                          | 100*                                              | 125                                          | 110                                               | 200                        |
| 40                                     | 120            | 150                                          | 125                                               | 150                                          | 150                                               | 200                        |
| 50                                     | 150            | 175                                          | 150                                               | 200                                          | 175                                               | 200                        |
| 60                                     | 177            | 200*                                         | 200*                                              | 225                                          | 225                                               | 400                        |
| 75                                     | 221            | 250                                          | 250                                               | 300                                          | 300                                               | 400                        |
| 100                                    | 285            | 350                                          | 300                                               | 400                                          | 350                                               | 400                        |
| 125                                    | 359            | 400*                                         | 400*                                              | 450                                          | 450                                               | 600                        |
| 150                                    | 414            | 500                                          | 450                                               | 600                                          | 500                                               | 600                        |
| 230 VOLT 3-PHASE MOTORS (240V CIRCUIT) |                |                                              |                                                   |                                              |                                                   |                            |
| 1/8                                    | 2.2            | 2 <sup>5/10</sup>                            | 2 <sup>1/2</sup>                                  | 2 <sup>5/10</sup>                            | 2 <sup>5/10</sup>                                 | 30                         |
| 1/4                                    | 3.2            | 4                                            | 3 <sup>1/2</sup>                                  | 4                                            | 4                                                 | 30                         |
| 1                                      | 4.2            | 5                                            | 4 <sup>1/2</sup>                                  | 5 <sup>5/10</sup>                            | 5                                                 | 30                         |
| 1 1/2                                  | 6.0            | 7 <sup>1/2</sup>                             | 6 <sup>1/4</sup>                                  | 7 <sup>1/2</sup>                             | 7 <sup>1/2</sup>                                  | 30                         |
| 2                                      | 6.8            | 8                                            | 7 <sup>1/2</sup>                                  | 9                                            | 8                                                 | 30                         |
| 3                                      | 9.6            | 12                                           | 10                                                | 12                                           | 12                                                | 30                         |
| 5                                      | 15.2           | 17 <sup>1/2</sup>                            | 17 <sup>1/2</sup>                                 | 20                                           | 17 <sup>1/2</sup>                                 | 30                         |
| 7 1/2                                  | 22             | 25                                           | 25                                                | 30                                           | 30                                                | 30                         |
| 10                                     | 28             | 35                                           | 30*                                               | 35                                           | 35                                                | 60                         |
| 15                                     | 42             | 50                                           | 45                                                | 60                                           | 50                                                | 60                         |
| 20                                     | 54             | 60*                                          | 60*                                               | 70                                           | 70                                                | 100                        |
| 25                                     | 68             | 80                                           | 75                                                | 90                                           | 80                                                | 100                        |
| 30                                     | 80             | 100                                          | 90                                                | 100                                          | 100                                               | 100                        |
| 40                                     | 104            | 125                                          | 110                                               | 150                                          | 125                                               | 200                        |
| 50                                     | 130            | 150                                          | 150                                               | 175                                          | 150                                               | 200                        |
| 60                                     | 154            | 175                                          | 175                                               | 200                                          | 200                                               | 200                        |
| 75                                     | 192            | 225                                          | 200*                                              | 250                                          | 225                                               | 400                        |
| 100                                    | 248            | 300                                          | 250                                               | 350                                          | 300                                               | 400                        |
| 125                                    | 312            | 350                                          | 350                                               | 400                                          | 400                                               | 400                        |
| 150                                    | 360            | 450                                          | 400*                                              | 450                                          | 450                                               | 600                        |
| 200                                    | 480            | 600                                          | 500                                               | 600                                          | 600                                               | 600                        |

| Motor HP                               | Full Load Amps | Without Overload Relays                      |                                                   | With Overload Relays                         |                                                   | Switch or Fuse Clip Rating |
|----------------------------------------|----------------|----------------------------------------------|---------------------------------------------------|----------------------------------------------|---------------------------------------------------|----------------------------|
|                                        |                | S.F. = 1.15 Or More, Temp Rise Not Over 40°C | S.F. = Less Than 1.15 Or Temp Rise More Than 40°C | S.F. = 1.15 Or More, Temp Rise Not Over 40°C | S.F. = Less Than 1.15 Or Temp Rise More Than 40°C |                            |
| 460 VOLT 3-PHASE MOTORS (480V CIRCUIT) |                |                                              |                                                   |                                              |                                                   |                            |
| ½                                      | 1.1            | 1⅒                                           | 1¼                                                | 1⅒                                           | 1⅒                                                | 30                         |
| ¾                                      | 1.6            | 2                                            | 1⅒                                                | 2                                            | 2                                                 | 30                         |
| 1                                      | 2.1            | 2½                                           | 2¼                                                | 2⅒                                           | 2½                                                | 30                         |
| 1½                                     | 3.0            | 3½                                           | 3⅒                                                | 4                                            | 3½                                                | 30                         |
| 2                                      | 3.4            | 4                                            | 3½                                                | 4½                                           | 4                                                 | 30                         |
| 3                                      | 4.8            | 5⅒                                           | 5                                                 | 6                                            | 5⅒                                                | 30                         |
| 5                                      | 7.6            | 9                                            | 8                                                 | 10                                           | 9                                                 | 30                         |
| 7½                                     | 11             | 12                                           | 12                                                | 15                                           | 15                                                | 30                         |
| 10                                     | 14             | 17½                                          | 15                                                | 17½                                          | 17½                                               | 30                         |
| 15                                     | 21             | 25                                           | 20                                                | 30                                           | 25                                                | 30                         |
| 20                                     | 27             | 30*                                          | 30*                                               | 35                                           | 35                                                | 60                         |
| 25                                     | 34             | 40                                           | 35                                                | 45                                           | 40                                                | 60                         |
| 30                                     | 40             | 50                                           | 45                                                | 50                                           | 50                                                | 60                         |
| 40                                     | 54             | 60*                                          | 60*                                               | 70                                           | 60*                                               | 100                        |
| 50                                     | 65             | 80                                           | 70                                                | 90                                           | 75                                                | 100                        |
| 60                                     | 77             | 90                                           | 80                                                | 100                                          | 90                                                | 100                        |
| 75                                     | 96             | 110                                          | 110                                               | 125                                          | 125                                               | 200                        |
| 100                                    | 124            | 150                                          | 125                                               | 175                                          | 150                                               | 200                        |
| 125                                    | 156            | 175                                          | 175                                               | 200                                          | 200                                               | 200                        |
| 150                                    | 180            | 225                                          | 200*                                              | 225                                          | 225                                               | 400                        |
| 200                                    | 240            | 300                                          | 250                                               | 300                                          | 300                                               | 400                        |
| 575 VOLT 3-PHASE MOTORS (600V CIRCUIT) |                |                                              |                                                   |                                              |                                                   |                            |
| ½                                      | 0.9            | 1⅛                                           | 1                                                 | 1⅛                                           | 1⅛                                                | 30                         |
| ¾                                      | 1.3            | 1⅒                                           | 1⅒                                                | 1⅒                                           | 1⅒                                                | 30                         |
| 1                                      | 1.7            | 2                                            | 1⅒                                                | 2¼                                           | 2                                                 | 30                         |
| 1½                                     | 2.4            | 3                                            | 2½                                                | 3                                            | 3                                                 | 30                         |
| 2                                      | 2.7            | 3⅒                                           | 2⅒                                                | 3½                                           | 3⅒                                                | 30                         |
| 3                                      | 3.9            | 4½                                           | 4                                                 | 5                                            | 4½                                                | 30                         |
| 5                                      | 6.1            | 7½                                           | 7                                                 | 8                                            | 7½                                                | 30                         |
| 7½                                     | 9              | 10                                           | 10                                                | 12                                           | 12                                                | 30                         |
| 10                                     | 11             | 12                                           | 12                                                | 15                                           | 15                                                | 30                         |
| 15                                     | 17             | 20                                           | 17½                                               | 25                                           | 20                                                | 30                         |
| 20                                     | 22             | 25                                           | 25                                                | 30                                           | 30                                                | 30                         |
| 25                                     | 27             | 30*                                          | 30*                                               | 35                                           | 35                                                | 60                         |
| 30                                     | 32             | 40                                           | 35                                                | 40                                           | 40                                                | 60                         |
| 40                                     | 41             | 50                                           | 45                                                | 60                                           | 50                                                | 60                         |
| 50                                     | 52             | 60                                           | 60                                                | 70†                                          | 60                                                | 60                         |
| 60                                     | 62             | 75                                           | 70                                                | 80                                           | 75                                                | 100                        |
| 75                                     | 77             | 90                                           | 80                                                | 100                                          | 90                                                | 100                        |
| 100                                    | 99             | 110                                          | 110                                               | 125                                          | 125                                               | 200                        |
| 125                                    | 125            | 150                                          | 125                                               | 175                                          | 150                                               | 200                        |
| 150                                    | 144            | 175                                          | 150                                               | 200                                          | 175                                               | 200                        |
| 200                                    | 192            | 225                                          | 200*                                              | 250                                          | 225                                               | 400                        |

### NOTES

S.F. = Motor Service Factor

\* Fuse Reducers Required

† 100 Amp Switch Required

## Motor Protection Tables

### Selection of POWR-PRO® Class J (JTD\_ID/JTD Series) Fuses Based on Motor Full Load Amps

| Motor F.L.A. | JTD_ID/JTD<br>Ampere Rating | Motor F.L.A. | JTD_ID/JTD<br>Ampere Rating | Motor F.L.A. | JTD_ID/JTD<br>Ampere Rating |
|--------------|-----------------------------|--------------|-----------------------------|--------------|-----------------------------|
| 0.00 – 0.60  | $\frac{5}{10}$              | 12.1 – 14.5  | 17 $\frac{1}{2}$            | 76.1 – 84.0  | 110                         |
| 0.61 – 0.80  | 1                           | 14.6 – 17.0  | 20                          | 84.1 – 90.0  | 125                         |
| 0.81 – 1.00  | 1 $\frac{1}{4}$             | 17.1 – 21.0  | 25                          | 90.1 – 102   | 150                         |
| 1.01 – 1.20  | 1 $\frac{1}{2}$             | 21.1 – 25.0  | 30                          | 103 – 125    | 175                         |
| 1.21 – 1.65  | 2                           | 25.1 – 28.5  | 35                          | 126 – 144    | 200                         |
| 1.66 – 2.00  | 2 $\frac{1}{2}$             | 28.6 – 34.0  | 40                          | 145 – 162    | 225                         |
| 2.01 – 2.40  | 3                           | 34.1 – 37.0  | 45                          | 163 – 180    | 250                         |
| 2.41 – 3.30  | 4                           | 37.1 – 41.0  | 50                          | 181 – 204    | 300                         |
| 3.31 – 4.10  | 5                           | 41.1 – 48.0  | 60                          | 205 – 240    | 350                         |
| 4.11 – 4.90  | 6                           | 48.1 – 52.0  | 70                          | 241 – 288    | 400                         |
| 4.91 – 6.40  | 8                           | 52.1 – 59.0  | 80                          | 289 – 312    | 450                         |
| 6.41 – 8.00  | 10                          | 59.1 – 66.0  | 90                          | 313 – 360    | 500                         |
| 8.01 – 9.80  | 12                          | 66.1 – 76.0  | 100                         | 361 – 432    | 600                         |
| 9.81 – 12.0  | 15                          |              |                             |              |                             |

NOTE: For severe motor starting conditions, fuses may be sized up to 225% motor F.L.A. (See NEC Article 430.52 for Exceptions)

### Selection of CCMR Time-Delay Fuses Based on Motor Full Load Amps

| Motor Full Load Current (F.L.A.)                             |                |                                                              |                |                                                              |                | CCMR<br>Ampere Rating |
|--------------------------------------------------------------|----------------|--------------------------------------------------------------|----------------|--------------------------------------------------------------|----------------|-----------------------|
| For Motors With An Acceleration<br>Time Of 2 Seconds Or Less |                | For Motors With An Acceleration<br>Time Of 5 Seconds Or Less |                | For Motors With An Acceleration<br>Time Of 8 Seconds Or Less |                |                       |
| Min. F.L.A. (1)                                              | Max F.L.A. (3) | Min. F.L.A. (1)                                              | Max F.L.A. (3) | Min F.L.A. (2)                                               | Max F.L.A. (3) |                       |
| 0.2                                                          | 0.2            | 0.2                                                          | 0.2            | 0.2                                                          | 0.2            | 3/10                  |
| 0.3                                                          | 0.4            | 0.3                                                          | 0.4            | 0.3                                                          | 0.3            | 1/2                   |
| 0.4                                                          | 0.6            | 0.4                                                          | 0.5            | 0.4                                                          | 0.5            | 5/10                  |
| 0.5                                                          | 0.7            | 0.5                                                          | 0.6            | 0.5                                                          | 0.6            | 1                     |
| 0.6                                                          | 1.0            | 0.6                                                          | 0.9            | 0.6                                                          | 0.8            | 1 1/4                 |
| 0.8                                                          | 1.1            | 0.8                                                          | 1.0            | 0.7                                                          | 0.9            | 1 1/2                 |
| 0.9                                                          | 1.3            | 0.9                                                          | 1.1            | 0.8                                                          | 1.0            | 1 5/10                |
| 1.1                                                          | 1.4            | 1.1                                                          | 1.2            | 0.9                                                          | 1.1            | 2                     |
| 1.2                                                          | 2.1            | 1.2                                                          | 2.1            | 1.2                                                          | 1.8            | 2 1/2                 |
| 1.5                                                          | 2.6            | 1.5                                                          | 2.6            | 1.4                                                          | 2.3            | 3                     |
| 1.8                                                          | 3.0            | 1.8                                                          | 3.0            | 1.6                                                          | 2.6            | 3 1/2                 |
| 2.1                                                          | 3.4            | 2.1                                                          | 3.2            | 1.8                                                          | 2.8            | 4                     |
| 2.3                                                          | 3.9            | 2.3                                                          | 3.3            | 2.0                                                          | 2.8            | 4 1/2                 |
| 2.6                                                          | 4.3            | 2.6                                                          | 3.4            | 2.3                                                          | 2.8            | 5                     |
| 2.9                                                          | 4.8            | 2.9                                                          | 3.7            | 2.5                                                          | 3.1            | 5 5/10                |
| 3.3                                                          | 5.2            | 3.3                                                          | 4.0            | 2.7                                                          | 3.4            | 6                     |
| 3.5                                                          | 5.4            | 3.5                                                          | 4.1            | 2.8                                                          | 3.5            | 6 1/4                 |
| 3.6                                                          | 5.7            | 3.6                                                          | 4.2            | 3.2                                                          | 3.7            | 7                     |
| 4.1                                                          | 5.8            | 4.1                                                          | 4.3            | 3.4                                                          | 3.8            | 7 1/2                 |
| 4.3                                                          | 6.2            | 4.3                                                          | 4.6            | 3.6                                                          | 4.2            | 8                     |
| 4.6                                                          | 6.9            | 4.6                                                          | 5.2            | 4.0                                                          | 4.5            | 9                     |
| 5.2                                                          | 7.7            | 5.2                                                          | 5.8            | 4.5                                                          | 4.9            | 10                    |
| 5.8                                                          | 8.9            | 5.8                                                          | 6.6            | 5.4                                                          | 5.5            | 12                    |
| 6.9                                                          | 10.0           | 6.9                                                          | 7.7            | 6.7                                                          | 6.7            | 15                    |
| 8.9                                                          | 13.5           | 8.9                                                          | 10.0           | 6.8                                                          | 9.0            | 20                    |
| 11.5                                                         | 15.8           | 11.2 (2)                                                     | 11.8           | 9.0                                                          | 11.0           | 25                    |
| 14.3                                                         | 17.8           | 13.4 (2)                                                     | 13.4           | 10.0                                                         | 15.0           | 30                    |
| 20.7                                                         | 23.3           | 16.1                                                         | 17.9           | 15.6                                                         | 15.9           | 35                    |
| 23.7                                                         | 26.7           | 18.4                                                         | 20.5           | 17.8                                                         | 18.2           | 40                    |
| 26.6                                                         | 30.0           | 20.7                                                         | 23.1           | 20.0                                                         | 20.4           | 45                    |
| 30.0                                                         | 33.3           | 23.0                                                         | 25.6           | 22.3                                                         | 22.7           | 50                    |
| 35.5                                                         | 40.0           | 27.6                                                         | 30.1           | 26.7                                                         | 27.3           | 60                    |

- 1 Based on NEC requirement limiting the rating of time-delay fuses to 175% of motor F.L.A., or next higher rating.
- 2 Based on NEC exception permitting fuse rating to be increased, but not to exceed, 225% motor F.L.A., however per NEC Article 430.52 Class CC (0-30) fuses can now be sized up to 300% of motor F.L.A.
- 3 Based on Littelfuse CCMR time-delay characteristics.

NOTE: These values were calculated for motors with Locked Rotor Current (LRA), not exceeding the following values:

| Motor F.L.A. | *LRA |
|--------------|------|
| 0.00 – 1.00  | 850% |
| 1.01 – 2.00  | 750% |
| 2.01 – 10.0  | 650% |
| 10.1 – 17.8  | 600% |

\*If motor LRA varies from these values, contact Littelfuse.

## Condensed Cross Reference

### Power/Electronic Fuses

This cross reference covers most popular fuses for which there is a similar Littelfuse standard item. Furnished for your convenience, it is meant to serve as a guide only for product selection. We suggest you check all applicable specifications before making substitutions. For special applications, consult the factory.

For more complete information, and for fuse block and medium voltage fuse cross referencing, send for Cross Reference Booklet EC501 or call 1-800-TEC-FUSE (1-800-832-3873).

| Competition       | Littelfuse       | Competition  | Littelfuse       | Competition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Littelfuse   | Competition  | Littelfuse       |
|-------------------|------------------|--------------|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|--------------|------------------|
| 10KOTN            | NLN              | CLL          | KLLU or KLPC     | JHC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | JTD_ID       | NCLR         | KLNR             |
| 10KOTS            | NLS              | CLU          | KLLU or KLPC     | JJN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | JLLN         | NON          | NLN              |
| 50KOTN            | NLN              | CM           | BLF              | JJS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | JLLS         | NOS          | NLS              |
| 50KOTS            | NLS              | CMF          | BLN              | JKS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | JLS          | NRN          | NLN              |
| A                 | 251              | CNM          | FLM              | KAA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | L15S         | NRN (15-60A) | NLKP             |
| A013F             | L15S             | CNQ          | FLQ              | KAB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | L25S         | NRS          | NLS              |
| A015F             | L15S             | CRN-R        | FLNR_ID (note 3) | KAC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | KLC          | OT           | NLN              |
| A015R             | L15S             | CRS-R        | FLSR_ID          | KBH                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | L50S         | OTM          | BLF or BLN       |
| A025F             | L25S             | CSF13X       | L15S             | KLM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | KLKD         | OTN          | NLN              |
| A050F             | L50S             | CSF25X       | L25S (AC only)   | KLMR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | CCMR         | OTS          | NLS              |
| A060F             | L60S             | CSF50P       | L50S             | KLU                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | KLLU or KLPC | REN          | RLN              |
| A060URL           | KLK              | CSF60C       | KLC (AC only)    | KN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | KLNR         | RES          | RLS              |
| A070F             | L70S             | CSF60X       | L60S (AC only)   | KON                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | NLN          | RF           | RLN              |
| A13X              | L15S             | CSF70P       | L70S             | KOS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | NLS          | RFA          | L15S             |
| A25X              | L25S (AC only)   | CTN-R        | KLNR             | KRPC (SP)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | KLPC         | RFC          | KLC              |
| A2D-R             | LLNRK            | CTS-R        | KLRSR            | KRPC-L                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | KLPC         | RFL (750V)   | L70S (700V)      |
| A2K-R             | KLNR             | EBS          | BLS              | KS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | KLRSR        | RFN (Ferraz) | RLN              |
| A3T               | JLLN             | ECNR         | FLNR_ID (note 3) | KTG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | KLK          | RFS (Ferraz) | RLS              |
| A4BQ              | KLPC             | ECSR         | FLSR_ID          | KTGR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | KLKR         | RFV          | L50S             |
| A4BT              | KLLU or KLPC     | ELN          | LKN              | KTNR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | KLNR         | RHN          | KLNR             |
| A4BY              | KLPC or KLLU     | ELS          | LKS              | KTSR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | KLRSR        | RHS          | KLRSR            |
| A4J               | JLS              | ERN          | RLN              | KTU                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | KLPC         | RLN (Ferraz) | LKN              |
| A50P (type 1 & 4) | L50S             | ERS          | RLS              | L                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | KLLU or KLPC | RLS (Ferraz) | LKS              |
| A60X              | L60S             | FNA          | FLA              | LCL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | KLPC or KLLU | S            | S00              |
| A6D-R             | LLSRK_ID         | FNB          | 235              | LCU                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | KLPC or KLLU | SA           | SA0              |
| A6K-R             | KLRSR            | FNM          | FLM              | LENRK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | LLNRK        | SC           | SLC              |
| A6T               | JLLS             | FNQ          | FLQ              | LESRK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | LLSRK_ID     | SCLR         | KLRSR            |
| A70P              | L70S             | FNQ-R        | KLDR             | LKN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | LKN          | SEC          | SLC              |
| ACK               | CCK              | FRN-R        | FLNR_ID (note 3) | LKS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | LKS          | SF13X        | L15S             |
| AG                | SLC              | FRS-R        | FLSR_ID          | LKU                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | KLLU         | SF25X        | L25S             |
| AGA               | AGA              | FWA (note 2) | L15S             | LONRK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | LLNRK        | SF50P        | L50S             |
| AGC               | 312              | FWH (note 2) | L50S             | LOSRK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | LLSRK_ID     | SF60X        | L60S             |
| AGU (1-30A)       | BLN              | FWP (note 1) | L70S             | LPCC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | CCMR         | SF70P        | L70S             |
| AGW               | AGW              | FWX (note 1) | L25S             | LPJ (SP)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | JTD_ID       | SFE          | SFE              |
| AJT               | JTD_ID           | GDA          | 216              | LPNRK (SP)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | LLNRK        | SL           | SLO              |
| ANL               | CNL              | GDB          | 217              | LPSRK (SP)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | LLSRK_ID     | T            | T00              |
| ANN               | CNN              | GDC          | 218              | MCL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | KLK          | TJN          | JLLN             |
| ATC               | ATO (257)        | GDG          | 313              | MDA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 326          | TJS          | JLLS             |
| AT-DE             | FLNR_ID (note 3) | GEB          | LEB              | MDL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 313          | TL           | TLO              |
| ATDR              | CCMR             | GEBN         | LET              | MDQ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 313          | TR           | FLNR_ID (note 3) |
| ATM               | KLK              | GFA          | 251              | MDV                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 315          | TRM          | FLM              |
| ATMR              | KLKR             | GFN          | FLA              | MDX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 313          | TRN-R        | FLNR_ID (note 3) |
| ATQ               | FLQ              | GGC          | 312              | MEN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | FLM          | TRS          | FLSR_ID          |
| ATQR              | KLDR             | GGM          | 235              | MEQ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | FLQ          | TRS-R        | FLSR_ID          |
| AX                | 481              | GLR          | LGR              | MID                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | FLA          | XL25X        | L25S             |
| AXRAD             | 252              | GMT          | 481              | MOF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | BLN          | XL50F        | L50S (note 1)    |
| BAF               | BLF              | HCLR         | KLKR             | MOL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | BLF          | XL70F        | L70S (note 1)    |
| BAN               | BLN              | HCTR         | KLDR             | MTH                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 312          |              |                  |
| BBS               | BLS              | HEB          | LEB              | 1) Check specific mounting dimensions before substituting.<br>2) Check fuse characteristics and mounting dimensions for specific application before substituting.<br>3) For 1/10 - 30 amperes, order non-indicating FLNR series fuses.<br>Remember a fuse may be used in circuits where the fuse's voltage rating is equal to or greater than the circuit voltage, unless otherwise stated on the fuse. For example, the FLSR_ID indicating fuse has a voltage rating of 75-600 volts. This fuse can be used on 600 volts, 480 volts, 250 volts, 125 volts, or 75 volts. Never use a fuse in a circuit having higher rated voltage than the fuse. |              |              |                  |
| CGL (2-100A)      | 2C0              | HET          | LET              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |              |              |                  |
| CGL (125-600A)    | 2CC              | HLR          | LHR              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |              |              |                  |
| CJ                | JLS              | J            | JLS              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |              |              |                  |
| CJS               | JLS              | JDL          | JTD_ID           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |              |              |                  |
| CLF               | KLPC or KLLU     | JFL          | JLS              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |              |              |                  |

## Alphanumeric Index of Catalog Numbers

| Catalog Number      | Page Number        | Catalog Number  | Page Number  | Catalog Number      | Page Number | Catalog Number | Page Number |
|---------------------|--------------------|-----------------|--------------|---------------------|-------------|----------------|-------------|
| Arc-Flash           | 177                | KLKR series     | 45-47        | LPMP series         | 154-155     | SLC series     | 44          |
| ATO series          | 60                 | KLLU series     | 26-28        | LPS1                | 152-153     | SLO series     | 48          |
| BLF series          | 51                 | KLNR series     | 34-35        | LPS2                | 152-153     | S00 series     | 48          |
| BLN series          | 51                 | KLPC series     | 8-10         | LPS3                | 152-153     | SPL001         | 127         |
| BLS series          | 52                 | KLQ series      | 53           | LPS4                | 152-153     | Splicer Blocks | 137-144     |
| Box Cover Units     | 158-159            | KLSR series     | 34-35        | LPS6                | 152-153     | Suppression    | 170-174     |
| CablePro®           | 62                 | L15S series     | 85-86        | LPSC series         | 128         | Telecom Fuses  | 76-80       |
| CBO series          | 107                | L17T series     | 77           | LPSG series         | 163         | TLN series     | 78          |
| CCK series          | 107                | L25S series     | 85-86        | LPSJ series         | 129         | TLO series     | 48          |
| CCL series          | 107                | L30030G series  | 124          | LPSM series         | 128         | TLS series     | 79          |
| CCMR series         | 20-21, 45-47       | L50S series     | 85-86        | LR250 series        | 112-116     | TMOV           | 173         |
| Class CC            | 20-21, 45-47       | L60030C series  | 125-126      | LR600 series        | 112-116     | TOO series     | 48          |
| Class CD            | 20-21, 45-47       | L60030M series  | 125-126      | LRU series          | 157         | US3J series    | 129         |
| Class G             | 44                 | L60060C series  | 125-126      | LS series           | 137-144     | US6J series    | 129         |
| Class H             | 38                 | L60S series     | 85, 87       | LSCR series         | 134         | WPB series     | 147         |
| Class J             | 17-19, 39-40       | L70S series     | 85, 87       | LSCY                | 158-159     | 094324PG       | 160         |
| Class K5            | 36-37              | LA15QS          | 88-89        | LSFC                | 160         | 215 series     | 57          |
| Class L             | 8-10, 23-24, 26-28 | LA30QS          | 90-91        | LSKA                | 158-159     | 216 series     | 57          |
|                     |                    | LA50QS          | 92-93        | LSOU                | 158-159     | 217 series     | 57          |
| Class RK1           | 11-16, 34-35       | LA60QS          | 94           | LSOW                | 158-159     | 218 series     | 57          |
| Class RK5           | 22, 29-33          | LA60X           | 95           | LSOX                | 158-159     | 224 series     | 58          |
| Class T             | 41-43              | LA70QS          | 96-98        | LSOY                | 158-159     | 225 series     | 58          |
| CNL series          | 107                | LA100P          | 99-100       | LSOY-B              | 158-159     | 229 series     | 56          |
| CNN series          | 107                | LA120X          | 101          | LSRU                | 158-159     | 230 series     | 56          |
| CYHP001             | 128, 168           | LA070URD        | 102-104      | LSRW                | 158-159     | 235 series     | 58          |
| Cylindrical Fuses   | 168                | LA130URD        | 102, 105-106 | LSRX                | 158-159     | 239 series     | 58          |
| Diazed Fuses        | 166-167            | LCC series      | 131          | LSRY                | 158-159     | 251 series     | 59          |
| Definitions         | 177-181            | LD series       | 137-144      | LSSU                | 158-159     | 252 series     | 59          |
| Distribution Blocks | 137-144            | LDC series      | 23-24        | LSSW                | 158-159     | 257 series     | see ATO     |
| Electrical Safety   | 182-183            | LEB series      | 145-150      | LSSX                | 158-159     | 272 series     | 59          |
| Electronic Fuses    | 55-59              | LEC series      | 145-150      | LSSY-L              | 158-159     | 273 series     | 59          |
| E-Rated Fuses       | 69-74              | LET series      | 145-150      | LSSY-RL             | 158-159     | 278 series     | 59          |
| European Fuses      | 161-169            | LEX series      | 145-150      | LSTY                | 158-159     | 279 series     | 59          |
| FBDIN1              | 127                | LEY series      | 145-150      | LT300 series        | 120-123     | 297 series     | see MIN     |
| FDR001PG            | 160                | LFCL series     | 108          | LT600 series        | 120-123     | 299 series     | see MAX     |
| FLA series          | 52                 | LFDS series     | 156          | LTFD series         | 81-82       | 2CC series     | 169         |
| FLM series          | 50                 | LFFB001         | 133          | LVSP series         | 174         | 2CM series     | 169         |
| FLNR series         | 33                 | LFFS030CC       | 156          | MAX series          | 60          | 2CO series     | 169         |
| FLNR_ID series      | 29-32              | LG300 series    | 124          | Medium Voltage      | 63-75       | 312 series     | 55          |
| FLQ series          | 51                 | LgD series      | 5, 162       | MEGA series         | 61          | 313 series     | 55          |
| FLSR series         | 33                 | LGR series      | 109          | MFP                 | 131         | 313_ID series  | 56          |
| FLSR_ID series      | 29-32              | Live Parts      | 75           | MIDI series         | 61          | 314 series     | 55          |
| FLU series          | 53                 | LH250 series    | 112-116      | MIN series          | 60          | 315 series     | 55          |
| Fuse Blocks         | 126                | LH250-PC series | 130          | MOV                 | 173         | 318 series     | 55          |
| Fuseology           | 172-206            | LH600 series    | 112-116      | MROplus             | 6           | 324 series     | 55          |
| Fuse Reducers       | 157                | LH600-PC series | 130          | Neozed Fuses        | 166-167     | 325 series     | 55          |
| GFP                 | 131                | LHFB            | 133          | NH Fuse Links       | 164-165     | 326 series     | 55          |
| IDSR series         | 22                 | LHR series      | 108          | NLKP series         | 36-37       | 334 series     | 56          |
| ILS series          | 135-136            | LJ600 series    | 117-119      | NLN series          | 36-37       | 473 series     | 59          |
| Inline Fuseholders  | 145-150            | LJ600-PC series | 130          | NLS series          | 36-37       | 481 series     | 80          |
| JCASE series        | 62                 | LKN series      | 38           | Overvoltage         | 170-174     | 496 series     | 62          |
| JLLN series         | 41-43              | LKS series      | 38           | Plug Fuses          | 48          | 498 series     | 61          |
| JLLS series         | 41-43              | LLNRK series    | 14-16        | PT Fuses            | 74          | 571 series     | 132         |
| JLS series          | 39-40              | LLSRK series    | 14-16        | RLN series          | 38          | 572 series     | 132         |
| JTD_ID series       | 17-19              | LLSRK_ID series | 11-13        | RLS series          | 38          | 70 series      | 80          |
| KLC series          | 85, 87             | LMF series      | 109          | R-Rated Fuses       | 65-68       | 700 series     | 75          |
| KLDR series         | 45-47              | LNNB            | 53           | SAO series          | 48          |                |             |
| KLK series          | 50                 | LPFP            | 131          | Semiconductor Fuses | 83-106      |                |             |
| KLKD series         | 50                 | LPBC series     | 138          | SFE series          | 60          |                |             |

## Littelfuse® POWR-GARD™ Products

Littelfuse provides our customers with a comprehensive range of electrical products used to protect:

- Industrial motors and drives
- Pumps and compressors
- Power distribution circuits and wiring devices
- Medium voltage power distribution grids
- Lighting circuits

## Littelfuse® POWR-GARD™ Services Designed to Add Value

At Littelfuse we are committed to partnering with our customers. That means not only providing the right circuit protection solution, but also offering services that will continually add value to your initiatives:



**MROplus™: (Material Reduction Opportunity plus, the industry's best indicating fuse line)**

Improve performance while lowering operational costs – for free.

When you use our MROplus program, our technical service professionals will run a free comprehensive fuse analysis, evaluating your current purchases and complete fuse inventory, including identification of duplicate and obsolete fuses. After the analysis you will receive a detailed report with streamlining recommendations, annual cost savings estimates and ways to improve safety and decrease downtime.



### Techline

**800-TEC-FUSE (800-832-3873)**

Our technical hotline is available 8:00a.m. – 4:30p.m. CST. The Littelfuse technical specialists are there to answer questions, assist in cross-references and provide application expertise.



### Littelfuse Safety Program

Did you know that 97% of all electricians have been shocked or injured on the job? To help you increase safety in your facility Littelfuse offers the following:

- Current-Limiting Fuses and Accessories
- Electrical Safety Literature and Arc-Flash Calculators
- Electrical Safety Video
- Training Seminars and Presentations
- MROplus Fuse Inventory Analysis
- Technical Support and Engineering Services

Littelfuse safety experts are here to help you stay safe on the job. We can assist you in developing an Electrical Safety Program in your own facility.

### 24-Hour Emergency Fuse Service

**847-824-1188**

Our Emergency Fuse Service is available 24 hours a day, seven days a week—even on holidays. Just call our emergency fuse service number and one of our trained service agents will be happy to help you.

When looking for the right solutions, companies around the world count on the expertise of Littelfuse – the global leader in circuit protection.



## World Headquarters

Littelfuse, Inc.  
800 E. Northwest Highway  
Des Plaines, IL 60016 USA  
[www.littelfuse.com](http://www.littelfuse.com)

## International Sales, Distribution and Engineering Facilities:

### North America

- Des Plaines, Illinois USA  
and Irving, Texas USA  
Technical Assistance  
Phone: 800 TEC FUSE  
847 824 1188  
Fax: 217 268 5094

### Europe

- Dünsen, Germany  
Phone: +49 4244 8190  
Fax: +49 4244 819 139
- Eltville, Germany  
Phone: +49 6129 460  
Fax: +49 6129 46222
- Kaposvár, Hungary  
Phone: +36 8250 8335  
Fax: +36 8241 7529
- Munich, Germany  
Phone: +49 8955 27660  
Fax: +49 8955 276 699
- Utrecht, The Netherlands  
Phone: +31 30 299 9900  
Fax: +31 30 299 9800
- Swindon, United Kingdom  
Phone: +44 179 372 0400  
Fax: +44 179 372 0401

### Asia/Pacific

- Hong Kong, China  
Phone: +852 2810 5099  
Fax: +852 2810 5500
- Beijing, China  
Phone: +86 10 8454 9408  
Fax: +86 10 8454 9409
- Shanghai, China  
Phone: +86 21 5383 8016  
Fax: +86 21 5383 7476
- Shenzhen, China  
Phone: +86 755 8207 0760  
Fax: +86 755 8207 0759
- Singapore  
Phone: +65 6885 9111  
Fax: +65 6885 9113
- Shin-Yokohama, Japan  
Phone: +81 45 478 1088  
Fax: +81 45 478 1089
- Seoul, Korea  
Phone: +82 2 6000 8600  
Fax: +82 2 6000 8655
- Taipei, Taiwan  
Phone: +886 2 8751 1234  
Fax: +886 2 8751 1177

### Central and South America

- São Paulo, Brasil  
Phone: +55 113 835 3780  
Fax: +55 113 645 0612

## Research and Manufacturing Facilities:

- Arcola, Illinois USA
- Des Plaines, Illinois USA
- Dongguan, China
- Dundalk, Ireland
- Dünsen, Germany
- Eltville, Germany
- Grenchen, Switzerland
- Irving, Texas USA
- Lipa City, Philippines
- Matamoros, Mexico
- Piedras Negras, Mexico
- Siemianowice Slaskie, Poland
- Suzhou, China
- Swindon, United Kingdom
- Uebigau, Germany
- Witten, Germany

## Other Catalogs Available

- Electronic Designer's Guide
- Teccor® Power Thyristor Databook
- Automotive OEM Catalog
- Automotive Aftermarket Catalog