



## SOLAR PRODUCTS CATALOG

**1500 V DC PRODUCTS**

**OVERVOLTAGE PROTECTION**

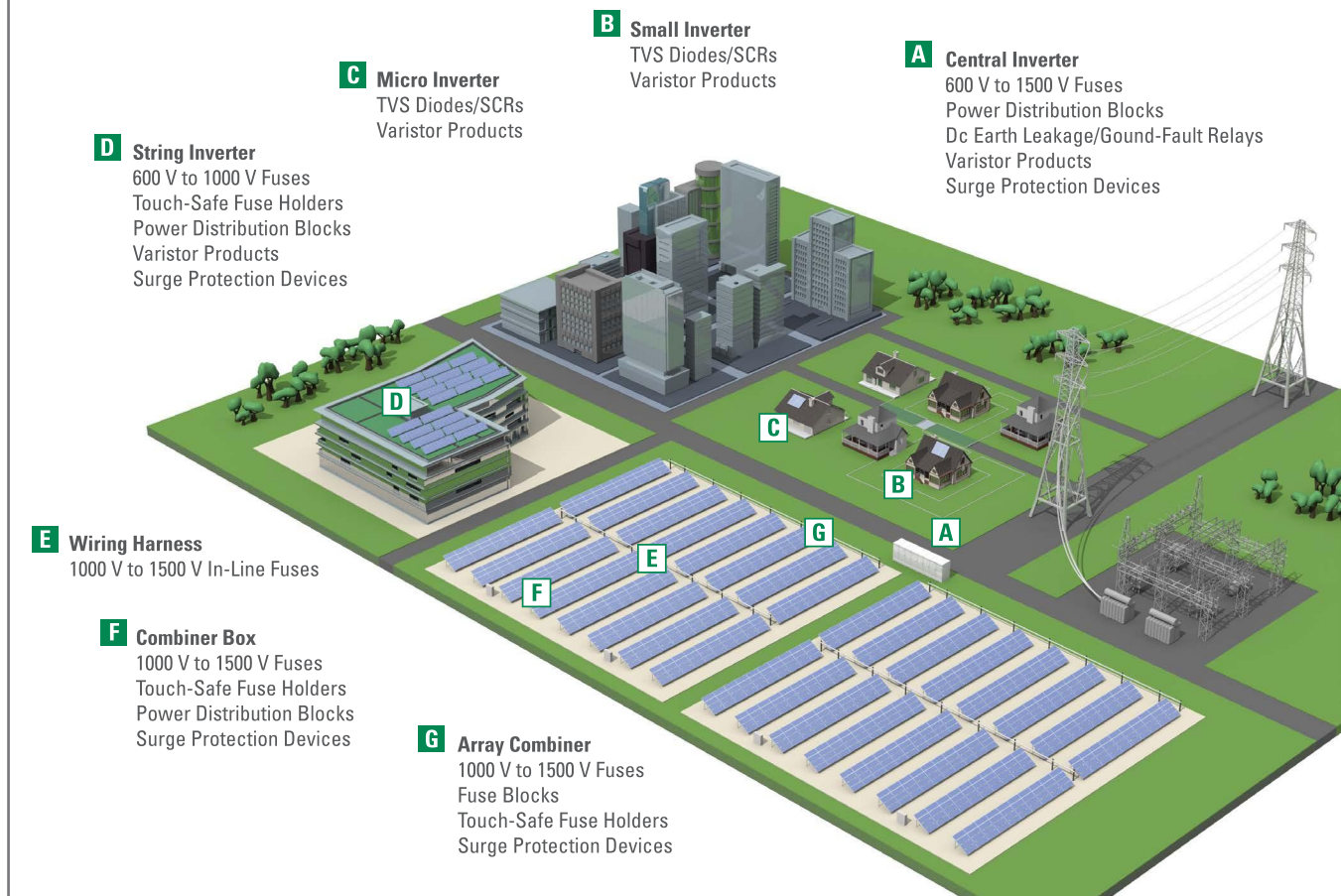
**IN-LINE FUSES**

**PROTECTION RELAYS**

**SURGE PROTECTION**

# Solar-Rated Products by Application

## Solar Applications



With over 25 million devices installed in photovoltaic power systems, Littelfuse understands the global challenges of the solar market. Littelfuse offers numerous circuit-protection products that are uniquely suited to protect the equipment and systems subject to the harsh environments of standard photovoltaic installations.



Look for this logo to indicate products that are used in solar applications. Visit our website [Littelfuse.com/Solar](https://www.littelfuse.com/Solar) for the latest updates on approvals, certifications, and new products.

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# Solar Products

## SPXV SERIES IN-LINE SOLAR FUSE

1500 V dc • 1–60 A

1



### Description

The Littelfuse SPXV solar string fuse has been specifically designed for the protection of photovoltaic (PV) systems.

It is available in multiple ampere ratings to match various requirements in a range of applications.

### Features/Benefits

- Offers higher amperage protection in less space for increased design flexibility
- Full range, fast-acting fuse helps eliminate common low-overload faults
- Up to 50,000 A interrupting rating

### Applications

- Inverters
- Combiner boxes

### Recommended Accessories

Fuse Holder: LFPXV Series 1500 V dc

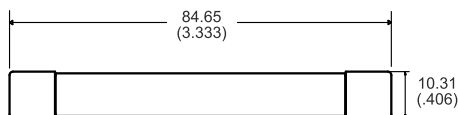
Fuse Clips: 125004/125005

### Web Resources

Download technical resources at: [Littelfuse.com/spxv](http://Littelfuse.com/spxv)

### SPXV-M Dimensions mm (in)

25 – 32 A

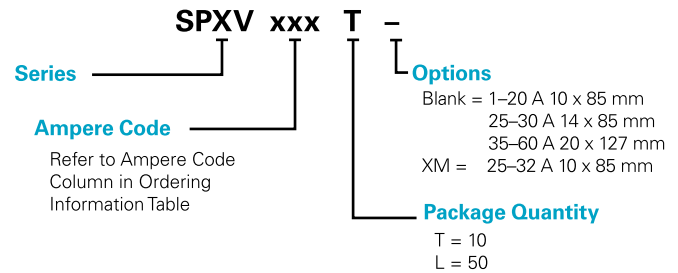


### Specifications

|                             |                                                                                                 |
|-----------------------------|-------------------------------------------------------------------------------------------------|
| <b>Voltage Rating</b>       | 1500 V dc                                                                                       |
| <b>Amperage Rating</b>      | 1, 2, 2.25, 2.5, 3, 3.5, 4, 5, 6, 8, 10, 12, 15, 16, 20, 25, 30, 32, 35, 40, 45, 50, 55, 60 A   |
| <b>Interrupting Rating</b>  | SPXV 1 A-30 A: 30 kA (50 kA Self-Certified)<br>SPXV 35 A-60 A: 50 kA<br>SPXV-M 25 A-32 A: 50 kA |
| <b>Time Constant</b>        | ≤ 1ms                                                                                           |
| <b>Material</b>             | Body: melamine<br>Caps: copper alloy (nickel plated)                                            |
| <b>Approvals</b>            | UL 248-19 Listed (File: E339112)                                                                |
| <b>Applicable Standards</b> | UL 248-1, 248-19<br>IEC 60269-6*                                                                |
| <b>Environmental</b>        | RoHS Compliant<br>REACH                                                                         |
| <b>Country of Origin</b>    | Mexico                                                                                          |

\*SPXV 25 and 30 amp fuses meet electrical performance only.

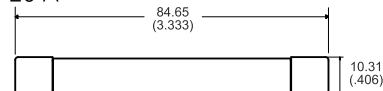
### Part Numbering System



| SERIES | AMPERAGE | PACKAGE QUANTITY | CATALOG NUMBER | ORDERING NUMBER |
|--------|----------|------------------|----------------|-----------------|
| SPXV   | 6        | 10               | SPXV006        | SPXV006.T       |
| SPXV   | 20       | 50               | SPXV020        | SPXV020.L       |
| SPXV   | 32       | 10               | SPXV032-M      | SPXV032.TXM     |
| SPXV   | 60       | 10               | SPXV060        | SPXV060.T       |

### SPXV Dimensions mm (in)

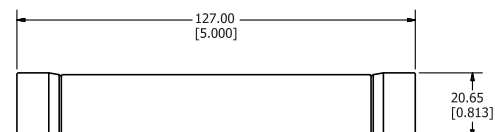
1 – 20 A



25 – 30 A



35–60 A





# Solar Products

## SPXI SERIES IN-LINE SOLAR FUSE

1500 V dc • 1–60 A



### Description

The Littelfuse SPXI solar fuse is specifically designed for the protection of photovoltaic (PV) systems. It integrates into an in-line assembly within a wire harness and can be electrically insulated by either overmolding or using heat-shrink.

Littelfuse offers multiple ampere ratings to match specific requirements in a variety of applications.

### Features/Benefits

- Offers higher amperage protection in less space for increased design flexibility
- One-piece cap design, without joints, offers easier wire crimping and more streamlined molding
- No fuse holder required helps save space, time, and money
- 50,000 A interrupting rating

### Applications

- Photovoltaic high-capacity homerun, trunk harness, and wire harness

### Recommended Crimping Tool

10-12 AWG: T&B Sta-Kon ERG4002

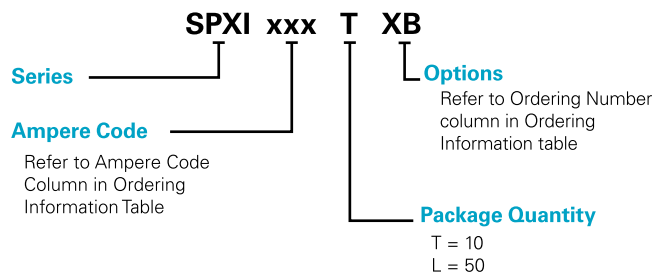
8 AWG: T&B Sta-Kon ERG4

6 AWG: Burndy MRC840AL

### Specifications

|                             |                                                                                                                    |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------|
| <b>Voltage Rating</b>       | 1500 V dc                                                                                                          |
| <b>Amperage Rating</b>      | 1, 2, 2.25, 2.5, 3.5, 4, 4.5, 5, 6, 8, 10, 12, 15, 16, 20, 25, 30, 32, 35, 40, 45, 50, 55, 60 A                    |
| <b>Interrupting Ratings</b> | SPXI 1-30 A and SPXI-B 1-20 A: 30 kA<br>SPXI 35-50 A and SPXI-B 35-60 A: 50 kA<br>SPXI-M and SPXI-BM 25-32A: 50 kA |
| <b>Time Constant</b>        | ≤ 1ms                                                                                                              |
| <b>Material</b>             | Body: melamine<br>Caps: copper alloy (nickel plated)                                                               |
| <b>Approvals</b>            | UL Recognized (File: E339112)                                                                                      |
| <b>Applicable Standards</b> | UL 248-1, 248-19<br>IEC 60269-6 (electrically only)                                                                |
| <b>Environmental</b>        | RoHS Compliant<br>REACH                                                                                            |
| <b>Country of Origin</b>    | Mexico                                                                                                             |
| <b>US Patent</b>            | 9,564,281                                                                                                          |

### Part Numbering System



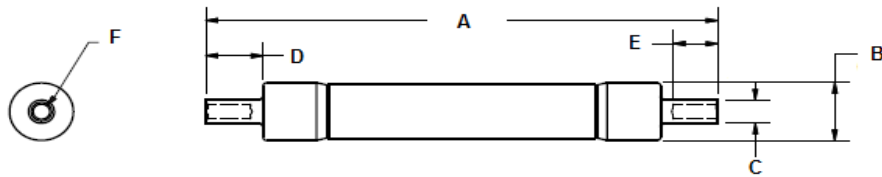
### Web Resources

Download additional technical information and view the complete solar portfolio: [Littelfuse.com/spxi](https://www.littelfuse.com/spxi)

# Solar Products

## SPXI SERIES IN-LINE SOLAR FUSE

### Dimensions



| SERIES  | AMPS   | DIMENSIONS IN MM (INCHES) |               |             |               |               |              | WIRE RANGE                          |
|---------|--------|---------------------------|---------------|-------------|---------------|---------------|--------------|-------------------------------------|
|         |        | A                         | B             | C           | D             | E             | F            |                                     |
| SPXI    | 2.5–4  | 81.41 (3.205)             | 10.31 (0.406) | 5.59 (0.22) | 12.26 (0.483) | 9.53 (0.375)  | 3.56 (0.14)  | 10-12 AWG<br>(6-4 mm <sup>2</sup> ) |
|         | 4.5–20 | 110.06 (4.333)            | 10.31 (0.406) | 5.59 (0.22) | 12.26 (0.483) | 9.53 (0.375)  | 3.56 (0.014) | 10-12 AWG<br>(6-4 mm <sup>2</sup> ) |
|         | 25–30  | 110.06 (4.333)            | 13.72 (0.54)  | 5.59 (0.22) | 12.26 (0.483) | 9.53 (0.375)  | 3.56 (0.014) | 10-12 AWG<br>(6-4 mm <sup>2</sup> ) |
|         | 35–50  | 158.04 (6.222)            | 20.65 (0.813) | 6.7 (0.264) | 14.25 (0.561) | 10.25 (0.404) | 4.7 (0.185)  | 8 AWG<br>(10mm <sup>2</sup> )       |
| SPXI-B  | 2.5–4  | 85.4 (3.362)              | 10.31 (0.406) | 6.7 (0.264) | 14.25 (0.561) | 10.25 (0.404) | 4.7 (0.185)  | 8 AWG<br>(10mm <sup>2</sup> )       |
|         | 4.5–20 | 114.05 (4.49)             | 10.31 (0.406) | 6.7 (0.264) | 14.25 (0.561) | 10.25 (0.404) | 4.7 (0.185)  | 8 AWG<br>(10mm <sup>2</sup> )       |
|         | 35–60  | 163.58 (6.44)             | 20.65 (0.813) | 8.5 (0.335) | 17.02 (0.67)  | 13.72 (0.54)  | 5.5 (0.217)  | 6 AWG                               |
| SPXI-M  | 25–32  | 110.06 (4.333)            | 10.31 (0.406) | 5.59 (0.22) | 12.26 (0.483) | 9.53 (0.375)  | 3.56 (0.014) | 10-12 AWG<br>(6-4 mm <sup>2</sup> ) |
| SPXI-BM | 25–32  | 114.05 (4.49)             | 10.31 (0.406) | 6.7 (0.264) | 14.25 (0.561) | 10.25 (0.404) | 4.7 (0.185)  | 8 AWG<br>(10mm <sup>2</sup> )       |

# Solar Products

## SPNH SERIES SOLAR FUSE

1500 V dc • 50-400 A • NH Style



### Description

The SPNH series has been designed to meet the emerging circuit protection needs for 1500 volt photovoltaic (PV) systems. These fuses provide full range protection for all potential overcurrent conditions that exist in PV applications. Suitable for PV inverter protection and array combiner applications.

### Features/Benefits

- Meets UL and IEC photovoltaic standards
- Compact NH XL Sizes
- Low watt Loss Design
- 1500 V dc rating for emerging market needs
- Designed to protect against a full range of overcurrents

### Applications

- Inverters
- Re-combiner boxes
- Array/re-combiner application
- PV inverter dc input protection

### Web Resources

Download technical documents: [Littelfuse.com/spnh](http://Littelfuse.com/spnh)

### Specifications

|                            |                                                         |
|----------------------------|---------------------------------------------------------|
| <b>Voltage Rating</b>      | 1500 V dc                                               |
| <b>Amperage Rating</b>     | 50, 63, 80, 100, 125, 160, 200, 250, 315, 350, 400      |
| <b>Interrupting Rating</b> | 30 kA                                                   |
| <b>Time Constant</b>       | ≤ 2 ms                                                  |
| <b>Material</b>            | Body: Ceramic<br>End Bells: Copper Alloy                |
| <b>Approvals</b>           | UL 248-19 Listed (File: E339112, Vol. 4)<br>IEC 60269-6 |
| <b>Environmental</b>       | RoHS Compliant                                          |

### Part Numbering System

|                         | SPNH                                                        | XXX | .X | X | DL |  |
|-------------------------|-------------------------------------------------------------|-----|----|---|----|--|
| <b>Series</b>           |                                                             |     |    |   |    |  |
| <b>Amp Code</b>         |                                                             |     |    |   |    |  |
|                         | Refer to Amp Code Column in Electrical Specifications Table |     |    |   |    |  |
| <b>Package Quantity</b> |                                                             |     |    |   |    |  |
|                         | X = 1                                                       |     |    |   |    |  |
| <b>Termination*</b>     |                                                             |     |    |   |    |  |
|                         | Blank = Solid Blade                                         |     |    |   |    |  |
|                         | DL = S Blade                                                |     |    |   |    |  |
|                         | DE = U blade                                                |     |    |   |    |  |
|                         | DLMS = S Blade w/ Microswitch tab                           |     |    |   |    |  |
|                         | DEMS = U Blade w/ Microswitch tab                           |     |    |   |    |  |
| <b>Case Size*</b>       |                                                             |     |    |   |    |  |
|                         | X = 1XL size                                                |     |    |   |    |  |
|                         | 2XL = 2XL size                                              |     |    |   |    |  |
|                         | 3L = 3L size                                                |     |    |   |    |  |

| SERIES | AMPERAGE | PACKAGE QUANTITY | CATALOG NUMBER | ORDERING NUMBER |
|--------|----------|------------------|----------------|-----------------|
| SPNH   | 50       | 1                | SPNH050        | SPNH050.X       |
| SPNH   | 200      | 1                | SPNH200        | SPNH200.X       |
| SPNH   | 400      | 1                | SPNH400        | SPNH400.XXDLMS  |

\*Solid blade option for 1XL case size does not require a case or termination designator for the part number.

### Recommended Accessories

#### 1XL Case Size

**Fuse Holder:** LFNH152001CST

**Fuse Terminal Covers:** LFNH15200FBC

#### 2XL Case Size

**Fuse Holder:** LFNH154001CST

**Fuse Terminal Covers:** LFNH15400FBC

#### 3L Case Size

**Fuse Holder:** LFNH156301CST

**Fuse Terminal Covers:** LFNH15630FBC

#### Microswitch

MSSPNH1500X



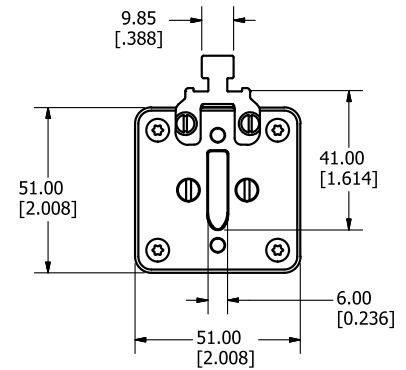
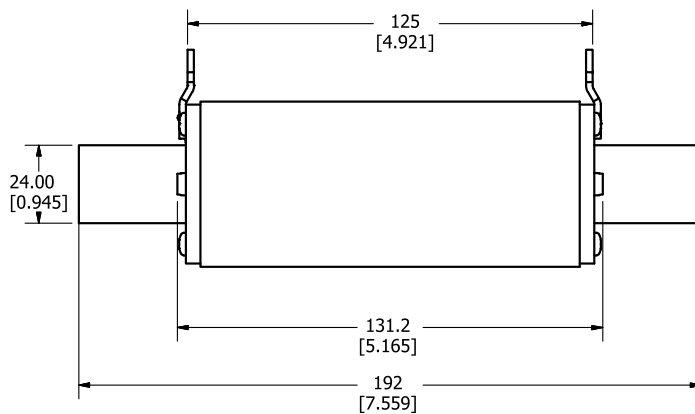
## Solar Products

### SPNH SERIES SOLAR FUSE

1

#### Dimensions Millimeters (in)

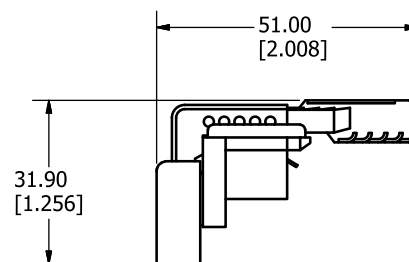
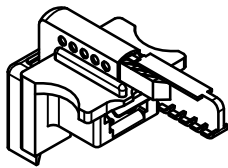
Size: 1 XL



#### Microswitch

### MSSPNH1500X

#### Dimensions Millimeters (in)





# Solar Products

## LFPXV TOUCH-SAFE FUSE HOLDERS

1500 V • 30 A



### Specifications

|                              |                                                  |
|------------------------------|--------------------------------------------------|
| <b>Voltage Ratings</b>       | 1500 V dc                                        |
| <b>Amperage Rating</b>       | 30 A UL, 32 A Littelfuse self-certified          |
| <b>SCCR Rating</b>           | 50 kA                                            |
| <b>Power Dissipation</b>     | 8W maximum                                       |
| <b>Fuse Type</b>             | 10 x 85 mm                                       |
| <b>Material</b>              | Thermoplastic                                    |
|                              | Fuse Clip: Silver-plated copper alloy            |
|                              | Screws: Zinc-plated steel                        |
| <b>Operating Temperature</b> | -55 °C to +125 °C                                |
| <b>Flammability Rating</b>   | UL94 V-0                                         |
| <b>Temperature Stability</b> | Body: 130 °C<br>Carrier: 140 °C                  |
| <b>Approvals</b>             | UL 4248-19 Listed (File: E345481)<br>IEC 60269-6 |
| <b>Environmental</b>         | RoHS compliant, Lead (Pb) free, REACH            |
| <b>Recommended DIN Rail</b>  | TH 35-7,5 per IEC 60715                          |

### Description

The Littelfuse LFPXV fuse holder is designed to hold 1500 V 10x85 mm fuses.

### Features/Benefits

- Finger-safe design offers personnel protection
- No fuse pullers or tools required for fuse removal
- 35 mm DIN-rail mountable
- Evaluated for use with copper alloy busbars
- Compact design

### Recommended Fuses

Littelfuse SPXV/SPXV-S Fuses

### Web Resources

Download the complete datasheet and other technical documents: [Littelfuse.com/LFPXV](https://www.littelfuse.com/LFPXV)

| MATERIAL AND TEMP RATING              | WIRE TYPE                             |
|---------------------------------------|---------------------------------------|
| 75 °C or 90 °C<br>CU Only<br>Stranded | UL Class B and Class C wire           |
|                                       | AlphaWire PV Series Photovoltaic Wire |
|                                       | IEC Class 5 Flexible Wire             |

| BUSBAR SPECIFICATIONS |                       |                       |                                |
|-----------------------|-----------------------|-----------------------|--------------------------------|
| TERMINAL              | THICKNESS             | WIDTH                 | TORQUE                         |
| Maximum               | 0.188 in<br>(4.78 mm) | 0.290 in<br>(7.37 mm) | 24-28 lb-in<br>(2.71-3.16 N-m) |
| Minimum               | 0.125 in<br>(3.18 mm) | 0.200 in<br>(5.08 mm) |                                |

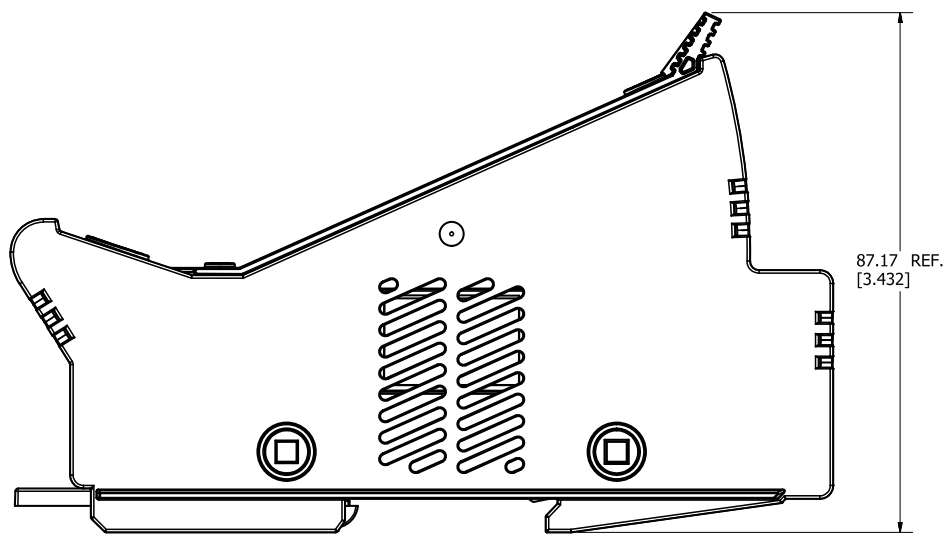
### Ordering Information

| SERIES | VOLTAGE<br>(V dc) | POLES | CATALOG<br>NUMBER | ORDERING<br>NUMBER | PACK<br>QTY | TERMINAL INFORMATION |                    |                                          |                                |
|--------|-------------------|-------|-------------------|--------------------|-------------|----------------------|--------------------|------------------------------------------|--------------------------------|
|        |                   |       |                   |                    |             | TERMINAL<br>TYPE     | NUMBER<br>OF WIRES | WIRE SIZE                                | TORQUE                         |
| LFPXV  | 1500              | 1     | LFPXV001          | LFPXV0001Z         | 20          | Box Lug              | 1                  | 4-14 AWG<br>(25-2.5 mm <sup>2</sup> )    | 24-28 lb-in<br>(2.71-3.16 N-m) |
|        |                   |       |                   |                    |             |                      | 1                  | 16-18 AWG<br>(1.5-0.75 mm <sup>2</sup> ) | 18-22 lb-in<br>(2.03-2.49 N-m) |
|        |                   |       |                   |                    |             |                      | 2*                 | 6-14 AWG<br>(16-2.5 mm <sup>2</sup> )    | 26-30 lb-in<br>(2.94-3.69 N-m) |
|        |                   |       |                   |                    |             |                      | 2*                 | 16-18 AWG<br>(1.5-0.75 mm <sup>2</sup> ) | 20-24 lb-in<br>(2.26-2.71 N-m) |

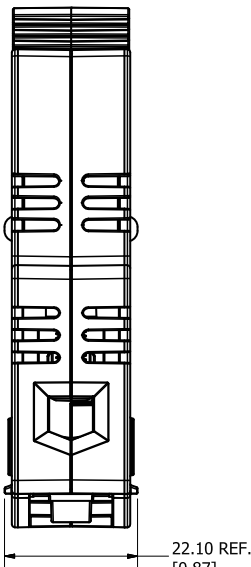
\*Must be the same cross-sectioned size

1

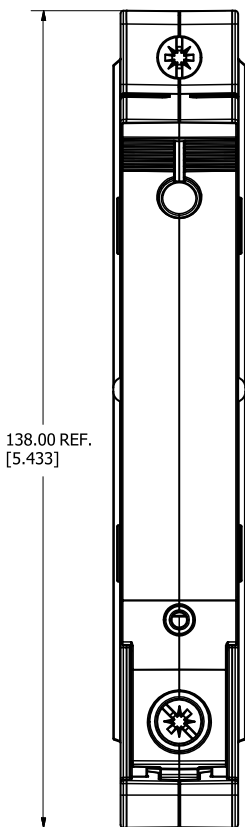
Dimensions Millimeters (in)



Side View



Top View



Front View

# Solar Products

## LFNH SERIES FUSE BLOCK



1



### Description

The LFNH series fuse block is specifically designed for the Littelfuse SPNH 1500 V solar fuse. It meets UL electrical requirements, is available in multiple case sizes and has an optional cover to enclose the lugs.

### Features/Benefits

- Narrow width increases space savings
- Range of amperages to match all SPNH fuse options

### Specifications

|                               |                                                                                                                                                                                            |
|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Voltage Rating</b>         | 1500 V dc                                                                                                                                                                                  |
| <b>Ampere Rating</b>          | 200, 400, 630 A                                                                                                                                                                            |
| <b>Interrupt Rating</b>       | 30 kA                                                                                                                                                                                      |
| <b>Termination Type</b>       | Stud Mount                                                                                                                                                                                 |
| <b>Base Temp Rating</b>       |                                                                                                                                                                                            |
| <b>Approvals</b>              | UL4248-1<br>UL4248-19<br>FILE: E345481 Vol. 2<br>RoHS Compliant<br>Fuse Clip: Silver-Plated Copper<br>Spring: Zinc-Plated Steel<br>Mounting Plate: Zinc-Plated Steel<br>Insulator: Ceramic |
| <b>Environmental Material</b> |                                                                                                                                                                                            |

### Recommended Fuses

SPNH Series

### Web Resources

For sample requests, downloadable CAD drawings, dimensions and other technical information:

[Littelfuse.com/LFNH](http://Littelfuse.com/LFNH)

For a comprehensive overview of solar market solutions, visit:

[Littelfuse.com/solar](http://Littelfuse.com/solar)

### Ordering Information

| AMPERAGE | ORDERING NUMBER | FUSE SIZE | RECOMMENDED TORQUE |                    | TERMINAL COVER ORDERING NUMBER* |
|----------|-----------------|-----------|--------------------|--------------------|---------------------------------|
|          |                 |           | TERMINAL           | BASE               |                                 |
| 200      | LFNH152001CST   | NH1XL     | 283 in-lb (32 N-m) | 132 in-lb (15 N-m) | LFNH15200FBC                    |
| 400      | LFNH154001CST   | NH2XL     | 283 in-lb (32 N-m) | 132 in-lb (15 N-m) | LFNH15400FBC                    |
| 630      | LFNH156301CST   | NH3L      | 283 in-lb (32 N-m) | 132 in-lb (15 N-m) | LFNH15630FBC                    |

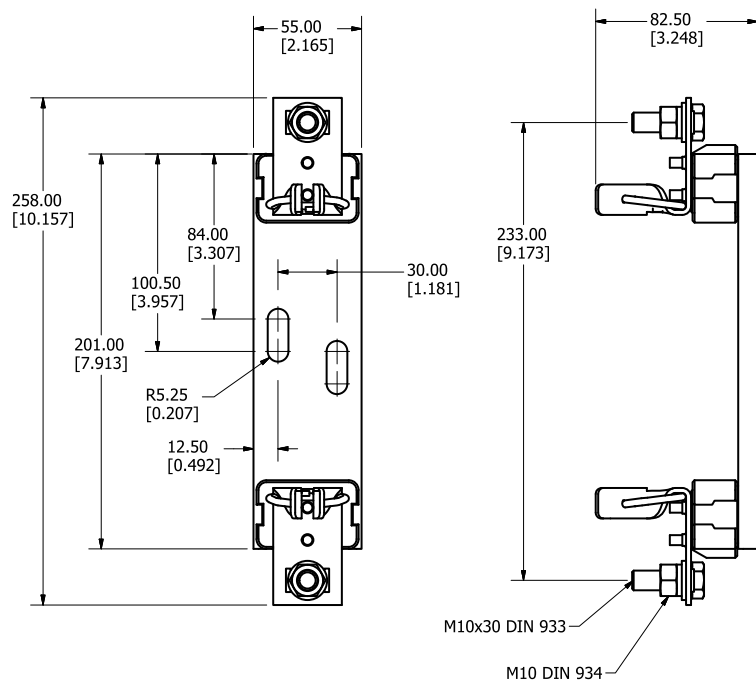
\*Terminal covers sold separately

# Solar Products

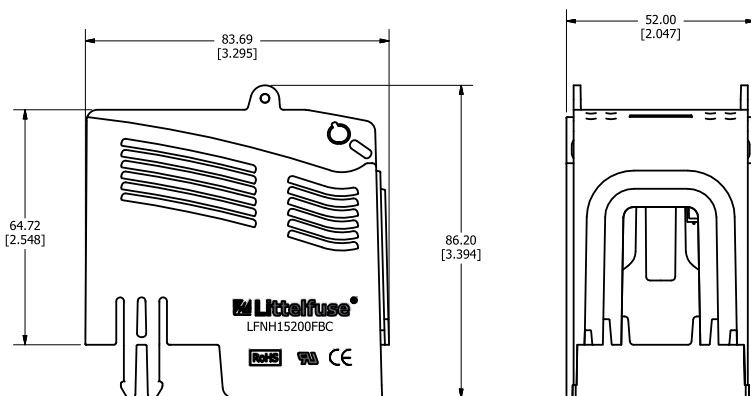
## LFNH SERIES FUSE BLOCK

### Dimensions Millimeters (in)

1



**Fuse Block**  
**LFNH152001CST**



**Fuse Terminal Cover**  
**LFNH15200FBC**

### Specifications

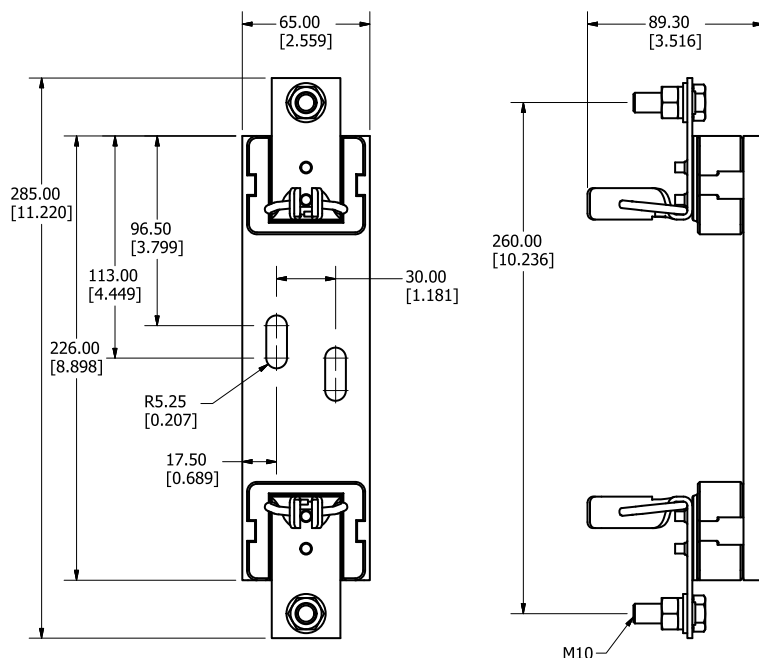
|                             |                |
|-----------------------------|----------------|
| <b>Voltage Rating:</b>      | 1500 V         |
| <b>Ampere Rating:</b>       | 200 amperes    |
| <b>Flammability Rating:</b> | UL 94 V-0      |
| <b>Material:</b>            | V0-rated Nylon |
| <b>Packaging:</b>           | Sold in pairs  |

# Solar Products

## LFNH SERIES FUSE BLOCK

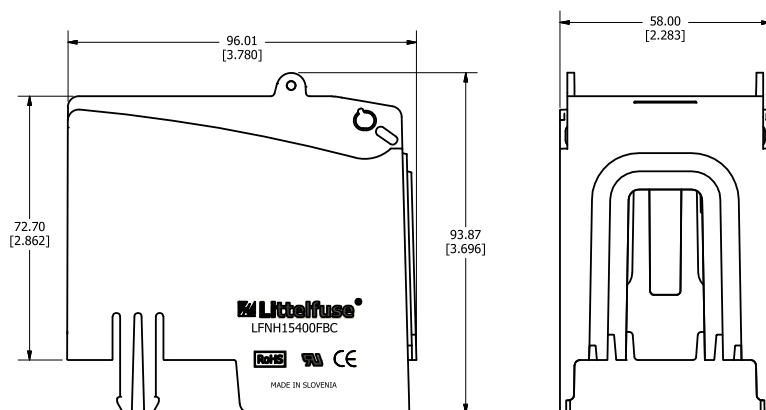
### Dimensions Millimeters (in)

1



### Fuse Block

#### LFNH154001CST



### Fuse Terminal Cover

#### LFNH15400FBC

### Specifications

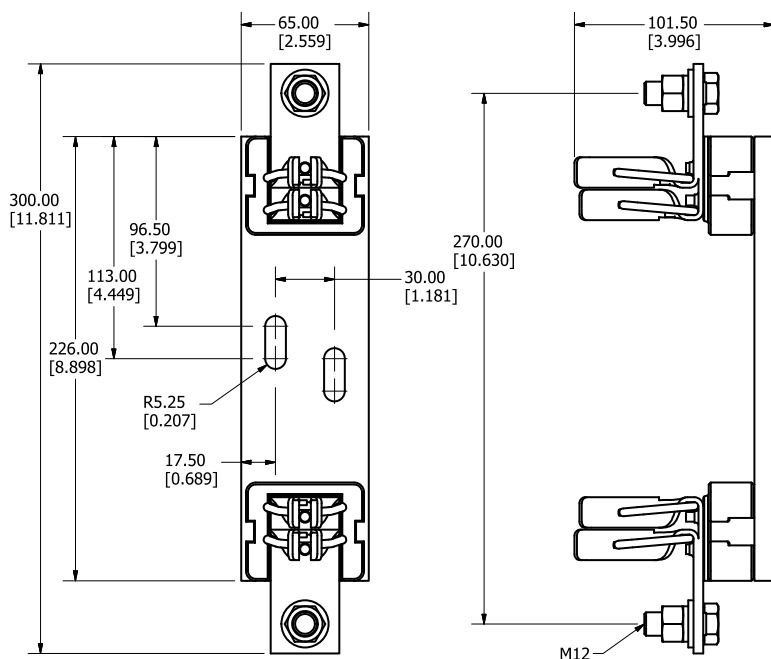
|                             |                |
|-----------------------------|----------------|
| <b>Voltage Rating:</b>      | 1500 V         |
| <b>Ampere Rating:</b>       | 400 amperes    |
| <b>Flammability Rating:</b> | UL 94 V-0      |
| <b>Material:</b>            | V0-rated Nylon |
| <b>Packaging:</b>           | Sold in pairs  |

# Solar Products

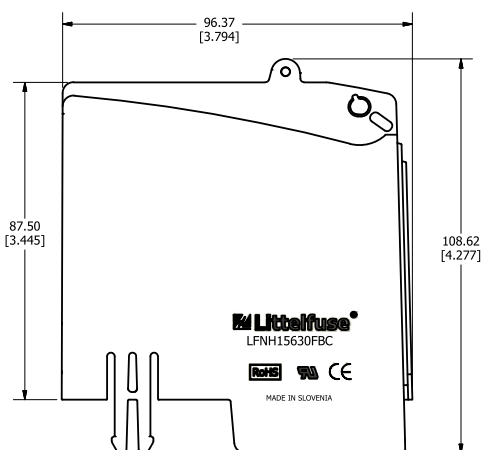
## LFNH SERIES FUSE BLOCK

1

### Dimensions Millimeters (in)



**Fuse Block**  
**LFNH156301CST**



**Fuse Terminal Cover**  
**LFNH15630FBC**

### Specifications

|                             |                |
|-----------------------------|----------------|
| <b>Voltage Rating:</b>      | 1500 V         |
| <b>Ampere Rating:</b>       | 630 amperes    |
| <b>Flammability Rating:</b> | UL 94 V-0      |
| <b>Material:</b>            | V0-rated Nylon |
| <b>Packaging:</b>           | Sold in pairs  |



# Solar Products

## SPFJ SERIES SOLAR FUSE

1000 V dc • 70–450 A



### Description

The SPFJ series is the smallest 1000 V dc 70-450 A photovoltaic (PV) fuse available in the market. The SPFJ series is manufactured in Class J case sizes that allows for both fuse holder and busbar mounting configuration. The SPFJ meets both UL and IEC requirements.

### Features/Benefits

- Meets UL and IEC photovoltaic standards
- Small footprint reduces panel size
- Flexibility of fuse holder or busbar mounting
- Higher amperage solar fuses in standard sizes
- UL Listed branch and feeder circuit rated
- Class J case sizes for the 125-450 A ratings

### Applications

- Inverters
- Re-combiner boxes

### Recommended Fuse Holder

LFJ1000 Solar Series

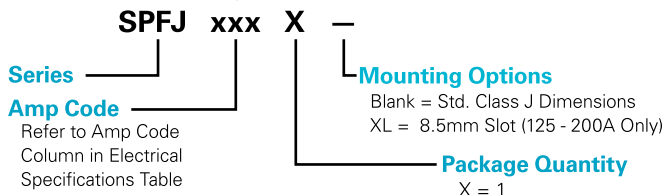
### Web Resources

Download technical documents: [Littelfuse.com/spfj](http://Littelfuse.com/spfj)

### Specifications

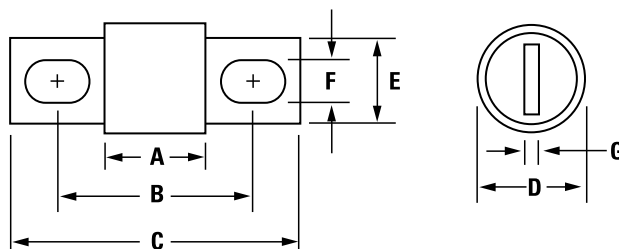
|                            |                                                                                                                                     |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| <b>Voltage Rating</b>      | 1000 V dc<br>600 V ac (125-450 A)                                                                                                   |
| <b>Amperage Rating</b>     | 70, 80, 90, 100, 125, 160, 200,<br>250, 300, 350, 400, 450                                                                          |
| <b>Interrupting Rating</b> | Ac: 200 kAIC (125-450 A)<br>Dc: 70-200 A: 20 kAIC<br>250-400 A: 10 kAIC<br>450 A: 20 kAIC                                           |
| <b>Time Constant</b>       | ≤ 1 ms                                                                                                                              |
| <b>Material</b>            | Body: Melamine<br>End Bells: Copper Alloy                                                                                           |
| <b>Approvals</b>           | UL 248-19 Listed (File: E339112)<br>UL 248-8, Class J (125-450 A)<br>cULus (125-450 A)<br>IEC 60269-6 (125-450 A)<br>RoHS Compliant |
| <b>Environmental</b>       | Mexico                                                                                                                              |

### Part Numbering System



| SERIES | AMPERAGE | PACKAGE QUANTITY | CATALOG NUMBER | ORDERING NUMBER |
|--------|----------|------------------|----------------|-----------------|
| SPFJ   | 70       | 1                | SPFJ070        | SPFJ070.X       |
| SPFJ   | 200      | 1                | SPFJ200        | SPFJ200.XXL     |

### Dimensions Inches (mm)



| AMPERAGE | DIMENSIONS IN INCHES (MM) |              |               |            |              |             |            |
|----------|---------------------------|--------------|---------------|------------|--------------|-------------|------------|
|          | A                         | B            | C             | D          | E            | F           | G          |
| 70-100   | 3.02 (76.5)               | 4.38 (111.3) | 5.75 (146.1)  | 1.5 (38.1) | 1.125 (28.3) | .335 (8.5)  | .189 (4.8) |
| 125-200  | 3.02 (76.5)               | 4.38 (111.3) | 5.75 (146.1)  | 1.5 (38.1) | 1.125 (28.3) | .281 (7.1)* | .189 (4.8) |
| 250-400  | 3.37 (85.7)               | 5.25 (133.4) | 7.125 (181.0) | 2.0 (50.8) | 1.63 (41.3)  | .406 (10.3) | .252 (6.4) |
| 450      | 3.75 (95.3)               | 5.98 (152.0) | 8.0 (203.2)   | 2.5 (63.5) | 2.0 (50.8)   | .531 (13.5) | .374 (9.5) |

\* SPFJ L option = 8.5 mm (UL 248-19 approval only)

# Solar Products

## SPF SERIES SOLAR FUSES

1000 V dc • 1–30 A



2



### Description

The SPF Solar Protection Fuse series has been specifically designed for the protection of photovoltaic (PV) systems. This family of midjet-style fuses (10 x 38 mm) can safely protect PV modules and conductors from reverse-overcurrent conditions.

As PV systems have grown in size, so have the corresponding voltage requirements. This increase in system voltage has typically been intended to minimize power loss associated with long conductor runs. Standard circuit protection devices are not designed to completely protect photovoltaic panels. However, the SPF series is UL Listed to safely interrupt faulted circuits up to this demanding voltage level.

Littelfuse offers 14 ampere ratings to match specific requirements in a variety of applications.

### Features/Benefits

- Meets UL and IEC photovoltaic standards
- UL 248-19 Listed 1000 V dc maximum
- 1-30 A ratings available
- 20,000 A Interrupting Rating - 1 A - 20 A
- 50,000 A Interrupting Rating - 25 A - 30 A
- Both PCB mount and dead-front holder options available

### Applications

- Inverters
- Combiner boxes
- Battery charge controllers

### Recommended Accessories

Fuse Holder: LPHV 1000 V dc POWR-Safe Series  
Fuse Clips: 125004/125005

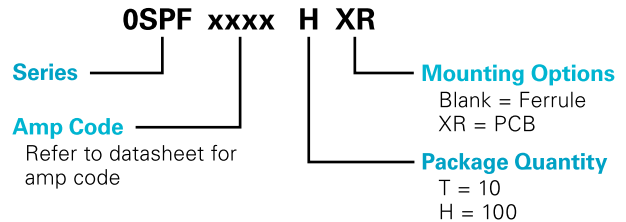
### Web Resources

Download technical documents: [littelfuse.com/spf](http://littelfuse.com/spf)

### Specifications

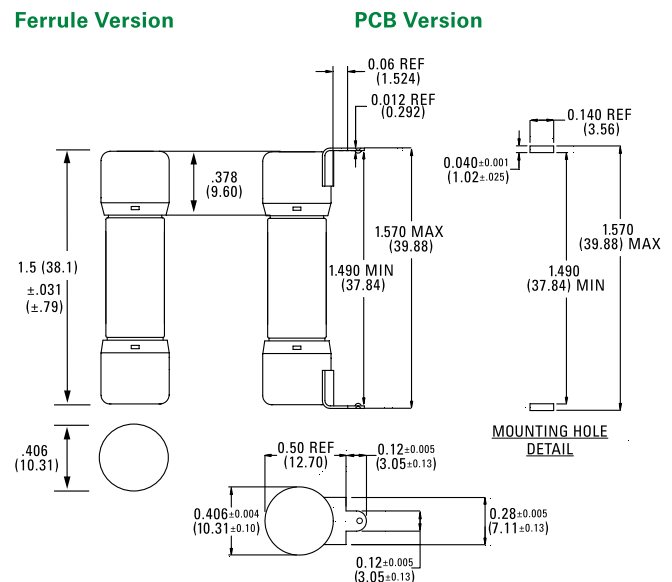
|                                 |                                                                                                |
|---------------------------------|------------------------------------------------------------------------------------------------|
| <b>Voltage Rating</b>           | 1000 V dc                                                                                      |
| <b>Ampere Rating</b>            | 1, 2, 3, 3.5, 4, 5, 6, 8, 10, 12, 15, 20, 25, 30                                               |
| <b>Max. Interrupting Rating</b> | 20 kA - 1 A - 20 A<br>50 kA - 25 A - 30 A                                                      |
| <b>Time Constant</b>            | ≤ 2 ms                                                                                         |
| <b>Material</b>                 | Body: Melamine<br>Caps: Copper Alloy                                                           |
| <b>Approvals</b>                | UL 248-19 Listed (File: E339112)<br>IEC 60269-6 (1-30 A)<br>CSA Certified (File: 029862_0_000) |
| <b>Environmental</b>            | RoHS Compliant                                                                                 |
| <b>Country of Origin</b>        | Mexico                                                                                         |

### Part Numbering System



| SERIES | AMPERAGE | PACKAGE QUANTITY | MOUNTING METHOD | CATALOG NUMBER | ORDERING NUMBER |
|--------|----------|------------------|-----------------|----------------|-----------------|
| SPF    | 2        | 10               | FERRULE         | SPF002         | 0SPF002.T       |
| SPF    | 3.5      | 10               | FERRULE         | SPF03.5        | 0SPF03.5T       |
| SPF    | 30       | 100              | PCB TABS        | SPF030R        | 0SPF030.HXR     |

### Dimensions Inches (mm)



## Solar Products

### SPFI SERIES IN-LINE SOLAR FUSE

1000 V dc • 2–30 A



2



### Description

The Littelfuse SPFI solar fuse is designed to integrate into an in-line assembly within a wire harness. The fuse provides photovoltaic (PV) protection that meets UL 248-19 for photovoltaic applications. The SPFI can be electrically insulated by either overmolding or using approved heat-shrink.

### Features/Benefits

- UL 248-19 Recognized
- Meets IEC 60269-6 electrical performance requirements
- 20,000 A Interrupting Rating
- No fuse holder required

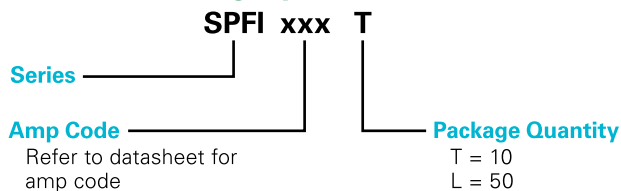
### Applications

- Photovoltaic wire harness

### Specifications

|                            |                                                      |
|----------------------------|------------------------------------------------------|
| <b>Voltage Rating</b>      | 1000 V dc                                            |
| <b>Amperage Rating</b>     | 2, 2.5, 3, 3.5, 4, 5, 6, 8, 10, 12, 15, 20, 25, 30 A |
| <b>Interrupting Rating</b> | 20 kA                                                |
| <b>Time Constant</b>       | ≤ 1 ms                                               |
| <b>Material</b>            | Body: Melamine<br>Caps: Copper Alloy (Nickel Plated) |
| <b>Approvals</b>           | UL 2579 Recognized (File: E339112)                   |
| <b>Environmental</b>       | RoHS Compliant<br>REACH                              |
| <b>Country of Origin</b>   | Mexico                                               |
| <b>US Patent</b>           | 9,564,281                                            |

### Part Numbering System



| SERIES | AMPERAGE | PACKAGE QUANTITY | CATALOG NUMBER | ORDERING NUMBER |
|--------|----------|------------------|----------------|-----------------|
| SPFI   | 2        | 10               | SPFI002        | SPFI002.T       |
| SPFI   | 3.5      | 10               | SPFI03.5       | SPFI03.5T       |
| SPFI   | 20       | 50               | SPFI020        | SPFI020.L       |

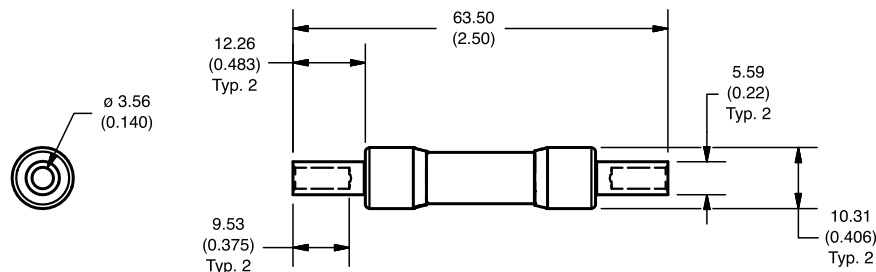
### Web Resources

Downloadable CAD drawings and other technical information:  
[littelfuse.com/spfi](http://littelfuse.com/spfi)

### Recommended Crimping Tool

T&B Sta-Kon ERG4002

### Dimensions mm (in)



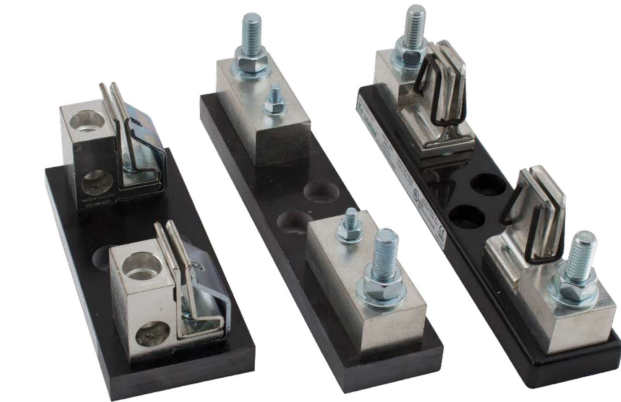
# Solar Products

## LFJ1000 SERIES SOLAR FUSE BLOCK

1000 V dc • Clip-to-Box • Stud-to-Stud • Clip-to-Stud



2



Clip-to-Box

Stud-to-Stud

Clip-to-Stud

### Description

The LFJ1000 series fuse block is specifically designed for the Littelfuse SPFJ 1000 V Solar Fuse. It meets UL electrical requirements, is available in multiple amperages, and comes in a variety of fuse mounting and termination configuration: fuse clip to box lug, fuse stud to wire stud and fuse clip to wire stud.

### Features/Benefits

- Narrow width increases space savings
- Range of amperages to match all SPFJ fuse options
- Box lug termination style accommodates a wide range of cable sizes
- Stud-mounted option increases convenience
- Approval for use with copper or aluminum lugs allowing for design flexibility

### Ordering Information

#### (Clip-to-Box Lug 1000 V)

| AMPERAGE | ORDERING NUMBER | INTERRUPT RATING | WIRE RANGE STANDARD (METRIC)                                | WIRE TYPE |                    | RECOMMENDED TORQUE   |
|----------|-----------------|------------------|-------------------------------------------------------------|-----------|--------------------|----------------------|
| 200      | LFJ102001C      | 20 kA            | 250 kcmil - #6 (127 mm <sup>2</sup> - 16 mm <sup>2</sup> )  | Cu/Al     | Solid/<br>Stranded | 275 in-lb (31.1 N-m) |
| 400      | LFJ104001C      | 10 kA            | 350 kcmil - 1/0 (177 mm <sup>2</sup> - 55 mm <sup>2</sup> ) |           |                    | 275 in-lb (31.1 N-m) |
| 450      | LFJ104501C      | 20 kA            | 500 kcmil - #4 (253 mm <sup>2</sup> - 25 mm <sup>2</sup> )  |           |                    | 375 in-lb (42.4 N-m) |

#### (Stud-to-Stud 1000 V)

| AMPERAGE | ORDERING NUMBER | INTERRUPT RATING | RECOMMENDED TORQUE   |                      | MAX. BUSBAR THICKNESS | RECOMMENDED BASE TORQUE |                            |
|----------|-----------------|------------------|----------------------|----------------------|-----------------------|-------------------------|----------------------------|
|          |                 |                  | FUSE                 | TERMINAL             |                       | BOLT SIZE               | TORQUE                     |
| 200      | LFJ102001STST   | 20 kA            | 65 in-lb (7.3 N-m)   | 200 in-lb (22.6 N-m) | .774" (19.66 mm)      | 1/4"<br>5/16"           | 30-40 in-lb<br>40-50 in-lb |
| 400      | LFJ104001STST   | 10 kA            | 170 in-lb (19.2 N-m) | 200 in-lb (22.6 N-m) | .555" (14.10 mm)      |                         |                            |
| 450      | LFJ104501STST   | 20 kA            | 300 in-lb (33.9 N-m) | 300 in-lb (33.9 N-m) | .570" (14.18 mm)      |                         |                            |

#### (Clip-to-Stud 1000 V)

| AMPERAGE | ORDERING NUMBER | INTERRUPT RATING | RECOMMENDED TORQUE   | MAX. BUSBAR THICKNESS | RECOMMENDED BASE TORQUE | TORQUE                     |
|----------|-----------------|------------------|----------------------|-----------------------|-------------------------|----------------------------|
|          |                 |                  | TERMINAL             |                       |                         |                            |
| 200      | LFJ102001CST    | 20 kA            | 200 in-lb (22.6 N-m) | .774" (19.66 mm)      | 1/4"<br>5/16"           | 30-40 in-lb<br>40-50 in-lb |
| 400      | LFJ104001CST    | 10 kA            | 200 in-lb (22.6 N-m) | .555" (14.10 mm)      |                         |                            |
| 450      | LFJ104501CST    | 20 kA            | 300 in-lb (33.9 N-m) | .570" (14.18 mm)      |                         |                            |

### Specifications

|                            |                                                             |
|----------------------------|-------------------------------------------------------------|
| <b>Voltage Rating</b>      | 1000 V dc                                                   |
| <b>Ampere Rating</b>       | 200, 400, 450 A                                             |
| <b>Flammability Rating</b> | UL 94 V-0                                                   |
| <b>Termination Type</b>    | Box Lug or Stud Mount                                       |
| <b>Base Temp Rating</b>    | 130 °C                                                      |
| <b>Approvals</b>           | UL 4248-18 Listed<br>File: E345481 Vol. 1<br>RoHS Compliant |
| <b>Environmental</b>       |                                                             |

### Recommended Fuses

SPFJ Solar Series

### Web Resources

Sample requests, downloadable CAD drawings, dimensions and other technical information:

[Littelfuse.com/LFJ1000](http://Littelfuse.com/LFJ1000)

For a comprehensive overview of solar market solutions visit:

[Littelfuse.com/solar](http://Littelfuse.com/solar)

# Solar Products

## LPHV POWR-SAFE FUSE HOLDERS

1000 V dc



### Description

The Littelfuse LPHV fuse holder is designed to house 1000 V fuses. It is not designed for load break but is ideal for isolating photovoltaic (PV) module strings for maintenance and meets UL requirements for 1000 V solar fuse protection.

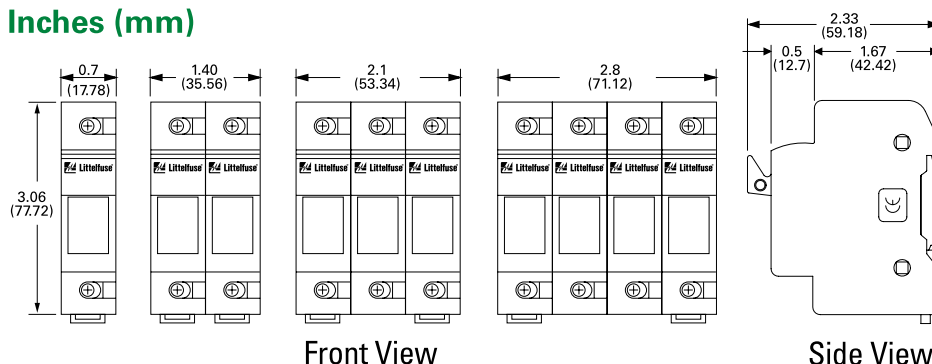
### Features/Benefits

- Touch-safe design offers protection when replacing fuses
- Compact design
- 35 mm DIN-rail mountable
- Available in 1-, 2-, 3- and 4-pole configurations
- No fuse pullers or tools required for fuse removal

### Ordering Information

| SERIES | POLES | CATALOG<br>NUMBER | ORDERING<br>NUMBER | TERMINAL<br>TYPE | WIRE<br>TYPE              |                       | WIRE<br>RANGE                                    | TERMINAL<br>TORQUE     | ROHS |
|--------|-------|-------------------|--------------------|------------------|---------------------------|-----------------------|--------------------------------------------------|------------------------|------|
| LPHV   | 1     | LPHV001           | LPHV0001Z          | Pressure Plate   | 75 °C or 90 °C<br>CU Only | Stranded /<br>[Solid] | #8-14 AWG (2-10 mm²) /<br>[#10-14 AWG (2-6 mm²)] | 17.7 in-lbs<br>(2 N-m) | •    |
| LPHV   | 2     | LPHV002           | LPHV0002Z          |                  |                           |                       |                                                  |                        | •    |
| LPHV   | 3     | LPHV003           | LPHV0003Z          |                  |                           |                       |                                                  |                        | •    |
| LPHV   | 4     | LPHV004           | LPHV0004Z          |                  |                           |                       |                                                  |                        | •    |

### Dimensions Inches (mm)



Front View

Side View

### Specifications

|                            |                                                 |
|----------------------------|-------------------------------------------------|
| <b>Voltage Rating</b>      | 1000 V dc                                       |
| <b>Amperage Rating</b>     | 30 A                                            |
| <b>SCCR Rating</b>         | 20 kA                                           |
| <b>Power Dissipation</b>   | 4 W Maximum                                     |
| <b>Fuse Type</b>           | 10 X 38 mm up to 1000 V dc                      |
| <b>Material</b>            | Thermoplastic                                   |
| <b>Flammability Rating</b> | UL 94 V-0                                       |
| <b>Approval</b>            | Self-certified 1000 V dc<br>IEC 60269-2, -4, -6 |
| <b>Environmental</b>       | RoHS compliant, Lead (Pb) Free                  |

### Multi-Pole Assembly Kit

Kits are used to create multi-pole holders from 1-pole LPHV fuse holders. Please contact factory for more information.

| ORDERING NUMBER | DESCRIPTION                           |
|-----------------|---------------------------------------|
| CYHP001         | 20 Connector Pincers & 10 Handle Pins |
| CYHP002         | Connector Pincer Only                 |
| CYHP003         | Handle Pin Only                       |

### Web Resources

Sample requests, downloadable CAD drawings and other technical information: [Littelfuse.com/lphv](http://Littelfuse.com/lphv)

More information about solar applications:  
[Littelfuse.com/solar](http://Littelfuse.com/solar)

### Recommended Fuses

10 x 38 mm 1000 V dc Fuses  
SPF 1000 V Series  
FLU 1000 V Series

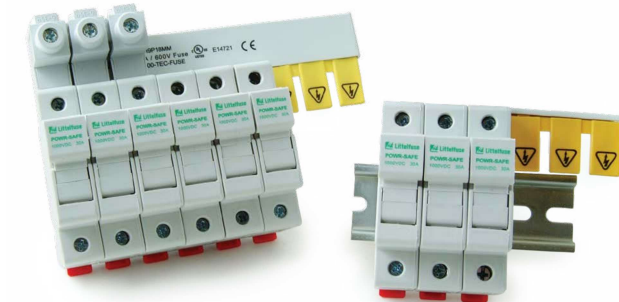
# Solar Products

## BUS BAR SYSTEM

### POWR-BAR Distribution



2



### Description

A key objective for panel designers is safe distribution of power to multiple fuse holders in a compact design. The Littelfuse UL 508 Listed bus bar system eliminates most wire terminations in a timesaving package. A power distribution block and associated conductors are no longer needed to feed multiple POWR-safe fuse holders.

### Features/Benefits

- Touch-safe design offers protection when replacing fuses
- Compact design
- 35mm DIN-rail mountable
- Available in one and three phase configurations
- Can be cut down to optimal size

### Recommended Fuse Holders

Littelfuse LFPSM / LFPSC / LPSM / LPSC (600 V)  
Littelfuse LPHV (1000 V)

### Web Resources

Download technical documents: [Littelfuse.com/busbar](http://Littelfuse.com/busbar)

### Specifications

**Voltage Ratings** 600 V ac/dc  
1000 V dc\*

#### Current Ratings

| CROSS SECTION (mm <sup>2</sup> ) | 18 mm <sup>2</sup> | 25 mm <sup>2</sup> |
|----------------------------------|--------------------|--------------------|
| END FED                          | 80 A               | 100 A              |
| CENTER FED                       | 160 A              | 200 A              |

**SCCR** 10 kA, 100 kA<sup>†</sup>  
**Conductor** Copper  
**Pitch** 17.8 mm  
**Approvals** UL 508 Listed (File E328654)  
**Environmental** RoHS Compliant  
 Lead (Pb) free

\*1 Phase 18 mm<sup>2</sup> rated 1000 V dc up to 160 A when center fed  
 1 Phase 25 mm<sup>2</sup> rated 1000 V dc up to 200 A when center fed  
<sup>†</sup>When protected directly upstream by Class J 175 amperes max (18 mm<sup>2</sup> bus bar) and Class J 200 amperes max (25 mm<sup>2</sup> bus bar).

### Ordering Information

| 1 PHASE, 18 mm <sup>2</sup> |       |             | 1 PHASE, 25 mm <sup>2</sup> |       |             |
|-----------------------------|-------|-------------|-----------------------------|-------|-------------|
| ORDERING NUMBER             | POLES | LENGTH (mm) | ORDERING NUMBER             | POLES | LENGTH (mm) |
| 1PH3P18mm                   | 3     | 50          | 1PH3P25mm                   | 3     | 50          |
| 1PH4P18mm                   | 4     | 79          | 1PH4P25mm                   | 4     | 79          |
| 1PH6P18mm                   | 6     | 104         | 1PH6P25mm                   | 6     | 104         |
| 1PH9P18mm                   | 9     | 155         | 1PH9P25mm                   | 9     | 155         |
| 1PH12P18mm                  | 12    | 208         | 1PH12P25mm                  | 12    | 208         |
| 1PH15P18mm                  | 15    | 270         | 1PH15P25mm                  | 15    | 270         |
| 1PH57P18mm                  | 57    | 1009        | 1PH57P25mm                  | 57    | 1009        |

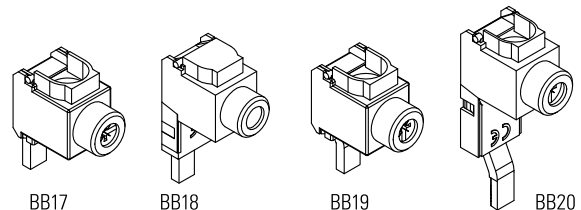
| 3 PHASE, 18 mm <sup>2</sup> |       |             | 3 PHASE, 25 mm <sup>2</sup> |       |             |
|-----------------------------|-------|-------------|-----------------------------|-------|-------------|
| ORDERING NUMBER             | POLES | LENGTH (mm) | ORDERING NUMBER             | POLES | LENGTH (mm) |
| 3PH6P18 mm                  | 6     | 104         | 3PH6P25 mm                  | 6     | 104         |
| 3PH9P18 mm                  | 6     | 158         | 3PH9P25 mm                  | 9     | 158         |
| 3PH12P18 mm                 | 12    | 214         | 3PH12P25 mm                 | 12    | 214         |
| 3PH15P18 mm                 | 15    | 266         | 3PH15P25 mm                 | 15    | 266         |
| 3PH57P18 mm                 | 57    | 1009        | 3PH57P25 mm                 | 57    | 1009        |

Endcaps are standard with all 3 phase configurations except 57-pole. Endcaps are not needed for the 1 phase configurations from the factory or if the copper bus is trimmed per the supplied instructions. Power feed lugs and protective covers are extra.

### Accessories

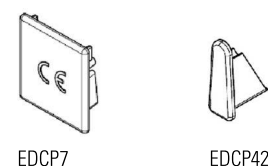
#### Power Feed Lug

| PART NUMBER | AMPERAGE RATING | VOLTAGE (ac/ dc) | WIRE RANGE    | WIRE TYPE | TORQUE   |
|-------------|-----------------|------------------|---------------|-----------|----------|
| BB17        | 115             | 1000             | #10 - 1/0 AWG | CU        | 50 lb-in |
| BB18        | 115             | 1000             | #10 - 1/0 AWG | CU        | 50 lb-in |
| BB19        | 115             | 1000             | #10 - 1/0 AWG | CU        | 50 lb-in |
| BB20        | 115             | 1000             | #10 - 1/0 AWG | CU        | 50 lb-in |



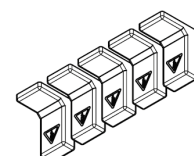
#### Endcaps

| PART NUMBER | PHASE  | QUANTITY |
|-------------|--------|----------|
| EDCP42      | Single | 50       |
| EDCP7       | Three  | 50       |



#### Pole Protective Covers

| PART NUMBER | QUANTITY |
|-------------|----------|
| CTPT5       | 5        |





# Solar Products

## LPSC / LPSM POWR-SAFE FUSE HOLDERS

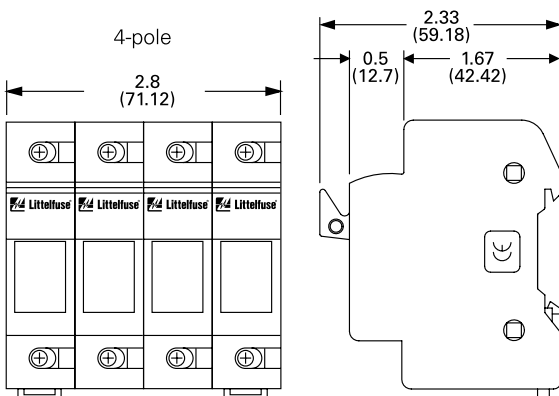
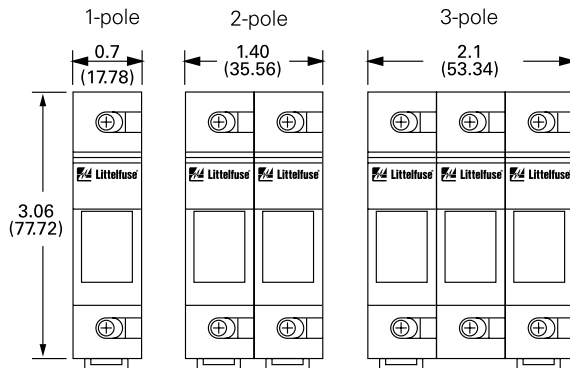
600 V



### Description

Littelfuse POWR-Safe dead front holders provide optimum protection to personnel for Class CC and midget-style fuses.

### Dimensions Inches (mm)



### Features/Benefits

- Indicating and non-indicating options available
- 1-, 2-, 3- and 4-pole configurations
- Easy installation and fuse removal with no additional pullers or tools required
- 35 mm DIN-rail mountable
- Ventilated design for cooler operation

### Specifications

|                            |                                                                                                              |
|----------------------------|--------------------------------------------------------------------------------------------------------------|
| <b>Voltage Rating</b>      | 600 V ac/dc                                                                                                  |
| <b>Ampere Rating</b>       | 30 A                                                                                                         |
| <b>Interrupting Rating</b> | 200 kA (Class CC)<br>100 kA (midget)                                                                         |
| <b>Terminal Type</b>       | Pressure plate                                                                                               |
| <b>Suggested Torque</b>    | 17.7 in-lbs                                                                                                  |
| <b>Wire Range</b>          | #8-#14 CU                                                                                                    |
| <b>Material</b>            | Thermoplastic                                                                                                |
| <b>Flammability Rating</b> | UL 94 V-0                                                                                                    |
| <b>Approvals</b>           | UL Listed (LPSC File: E14721)<br>UL Recognized (LPSM File: E14721)<br>CSA Certified (LPSC/LPSM File: LR7316) |
| <b>Environmental</b>       | RoHS compliant, Lead (Pb) Free                                                                               |

### Ordering Information

| INDICATING     |                 | NON-INDICATING |                 | FUSE TYPE | POLES |
|----------------|-----------------|----------------|-----------------|-----------|-------|
| CATALOG NUMBER | ORDERING NUMBER | CATALOG NUMBER | ORDERING NUMBER |           |       |
| LPSC001ID      | LPSC0001ZXID    | LPSC001        | LPSC0001Z       | Class CC  | 1     |
| LPSC002ID      | LPSC0002ZXID    | LPSC002        | LPSC0002Z       | Class CC  | 2     |
| LPSC003ID      | LPSC0003ZXID    | LPSC003        | LPSC0003Z       | Class CC  | 3     |
| LPSC004ID      | LPSC0004ZXID    | LPSC004        | LPSC0004Z       | Class CC  | 4     |
| LPSM001ID      | LPSM0001ZXID    | LPSM001        | LPSM0001Z       | Midget    | 1     |
| LPSM002ID      | LPSM0002ZXID    | LPSM002        | LPSM0002Z       | Midget    | 2     |
| LPSM003ID      | LPSM0003ZXID    | LPSM003        | LPSM0003Z       | Midget    | 3     |
| LPSM004ID      | LPSM0004ZXID    | LPSM004        | LPSM0004Z       | Midget    | 4     |

**Multi Pole Assembly Kit** Ordering No. CYHP0001Z-KIT  
(Kit contains 20 connector pincers & 10 handle pins)

### Web Resources

Download CAD drawings and other technical information:

[littelfuse.com/lpsc](http://littelfuse.com/lpsc)

[littelfuse.com/lpsm](http://littelfuse.com/lpsm)

### Recommended Fuses

Class CC

Midget-style (10 x 38 mm)

# Solar Products

## KLKD SERIES 10 X 38 FUSES

600 V ac/V dc • 1/10–30 A • Fast Acting



3

### Description

The KLKD fuse series is fast-acting with a high dc voltage rating. This family of midget-style fuses (10 x 38 mm) is used in solar combiner boxes and in circuits with dc fault currents up to 50,000 amperes. KLKD fuses are available in standard and board-mount configurations.

In addition, the KLKD series has been designed to meet both the UL and IEC photovoltaic (PV) fuse standards.

Littelfuse offers a wide range of ampere ratings to match specific requirements in a variety of applications.

### Features/Benefits

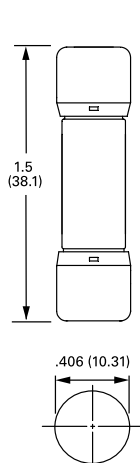
- Designed to UL and IEC photovoltaic specifications
- 1/10 - 30 A ratings available
- 50,000 A Interrupting Rating
- Available in ferrule or PCB mount options
- 1-5 A meets UL 1741 GFDI requirements

### Applications

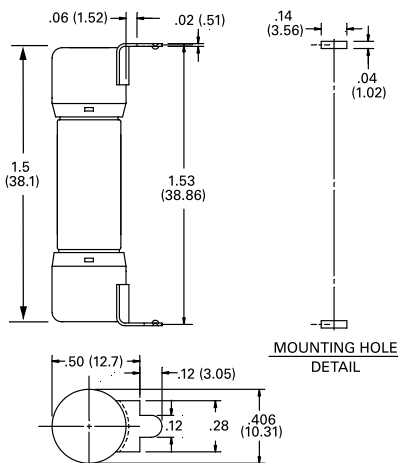
- Combiner boxes and inverters
- Power supplies
- Desktop meters

### Dimensions Inches (mm)

#### Ferrule Version



#### PCB 1-Tab



### Specifications

#### Voltage Rating

600 V ac/V dc

#### Amperage Rating

1/10, 1/8, 2/10, 1/4, 3/10, 1/2, 3/4, 1, 1 1/2, 2, 2 1/2, 3, 3 1/2, 4, 5, 6, 7, 8, 9, 10, 12, 15, 20, 25, 30

#### Interrupting Ratings

AC: 100 kA

200 kA Littelfuse self-certified

DC: 1/10-30: 10 kA (UL 2579)

1/10-30: 50 kA (UL 248-14)

#### Material

Body: Melamine / Caps: Copper Alloy

#### Operating Temperature

See rating curve

#### Approvals

UL 2579 Listed (File: E339112)

IEC 60269-6 (2-25 A)

VDE Certified (No. 40033094)

UL 248-14 Listed (File: E10480)

CSA Certified Ferrule only (File: LR29862)

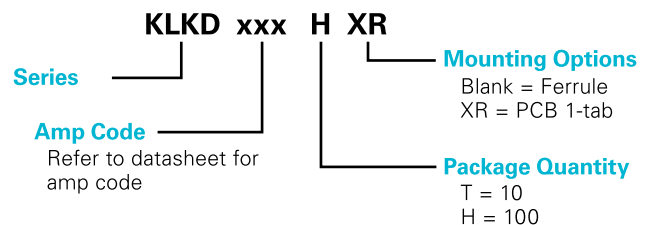
RoHS Compliant

Mexico

#### Environmental

#### Country of Origin

### Part Numbering System



| SERIES | AMPERAGE | PACKAGE QUANTITY | MOUNTING METHOD | CATALOG NUMBER | ORDERING NUMBER |
|--------|----------|------------------|-----------------|----------------|-----------------|
| KLKD   | 1/8      | 10               | FERRULE         | KLKD.125       | KLKD.125T       |
| KLKD   | 5        | 100              | FERRULE         | KLKD005        | KLKD005.H       |
| KLKD   | 15       | 10               | PCB 1-TAB       | KLKD015R       | KLKD015.TXR     |

### Recommended Fuse Holders

Littelfuse LPSM and LFPSM dead-front series

Littelfuse L60030M open-face series

### Web Resources

Download CAD drawings and other technical information:

[littelfuse.com/klkd](http://littelfuse.com/klkd)



# Solar Products

## POWR-BLOKS

Distribution Blocks • Splicer Blocks • Covers



### Description

POWR-BLOKS 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.

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.

### 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.

### Hinged Plastic Covers



### Connectors

Box lug connectors are designed for use with a single or multiple, solid or class B or C stranded conductor. For UL approved use of more than one conductor per connector opening, contact Littelfuse Technical Service. 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.

### Specifications

|                            |                                                                                                                                                                                                                    |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Voltage Rating</b>      | 600 V                                                                                                                                                                                                              |
| <b>Current Rating</b>      | Based on NEC Table 310.16, using 75 °C copper wire                                                                                                                                                                 |
| <b>SCCR</b>                | Consult factory                                                                                                                                                                                                    |
| <b>Material</b>            | Phenolic rated at 150 °C and Thermoplastic rated at 125 °C (LD1400 and LS1300 series only)                                                                                                                         |
| <b>Connector</b>           | Aluminum: Highly conductive aluminum, tin plated<br>Copper: Highly conductive copper, tin plated                                                                                                                   |
| <b>Flammability Rating</b> | UL 94 V-0                                                                                                                                                                                                          |
| <b>Approvals</b>           | UL Recognized - OLD/OLS Series (File: E171395)<br>LFD/LFS Series (File: E309688)<br>CSA Certified - OLD/OLS Series (File: LR700111)<br>LFD/LFS Series (File: 007316_0_000)<br>UL Listed - OLD57xxx (File: E482231) |
| <b>Environmental</b>       | RoHS compliant, Lead (Pb) free                                                                                                                                                                                     |

### Web Resources

For dimension, CAD and 3-D drawings, visit:  
[littelfuse.com/powrbloks](http://littelfuse.com/powrbloks)

### Clear Plastic Covers



# Solar Products

## IGBT MODULE, HALF-BRIDGE

600/1200 V • S Package • D Package • WB Package



### Description

Half-Bridge Circuit IGBT Modules offer the high efficiency and fast switching speeds of modern IGBT technology in a robust and flexible format. Used for power control applications, Littelfuse offers IGBT modules for flexible and efficient motor control and inverter applications.

### Features

- Ultra low loss
- High ruggedness
- High short-circuit capability
- Positive temperature coefficient
- With fast free-wheeling diodes

### Benefits

- High efficiency and switching speed
- High reliability in demanding applications
- Reduced protection needs
- Easily paralleled
- Integrated solution in compact module package

### Applications

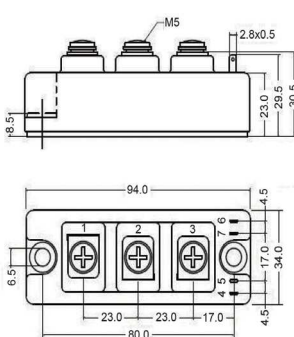
- AC motor control
- Inverter
- Motion/servo control
- Power supplies
- Photovoltaic/fuel cell

### Web Resources

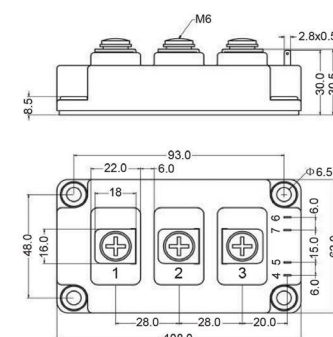
Download the complete datasheet and other technical information: [littelfuse.com](http://littelfuse.com)

### Dimensions Inches (mm)

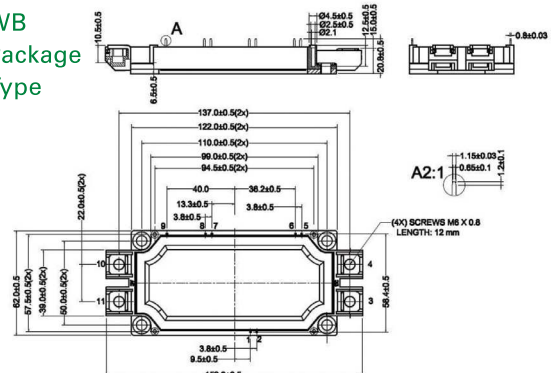
#### S Package Type



#### D Package Type



#### WB Package Type



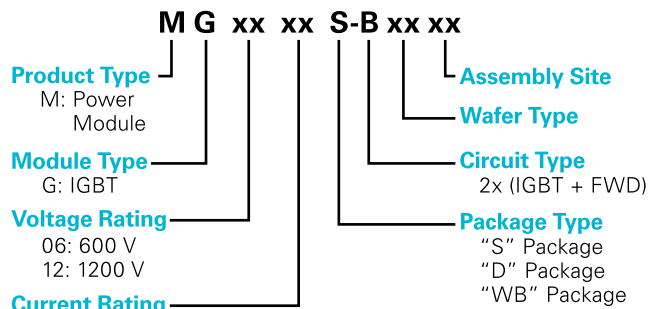
### Specifications

**Voltage Rating**  
**Amperage Rating**

600 / 1200 V  
S Package: 75, 100, 150, 200  
D Package: 100, 150, 200, 300, 400  
WB Package: 225, 300, 450, 600  
Half-Bridge  
UL Listed (File: E71639)  
RoHS Compliant

**Circuit Type**  
**Approvals**  
**Environmental**

### Part Numbering System



### Ordering Information

| ORDERING NUMBER | VOLT | AMPERAGE | PACKAGE TYPE | MOUNTING METHOD | M.O.Q. |
|-----------------|------|----------|--------------|-----------------|--------|
| MG1250S-BA1MM   | 1200 | 50       | S            | SCREW           | 100    |
| MG12100S-BN2MM  | 1200 | 100      | S            | SCREW           | 100    |
| MG12150S-BN2MM  | 1200 | 150      | S            | SCREW           | 100    |
| MG1275S-BA1MM   | 1200 | 75       | S            | SCREW           | 100    |
| MG06100S-BN4MM  | 600  | 100      | S            | SCREW           | 100    |
| MG06150S-BN4MM  | 600  | 150      | S            | SCREW           | 100    |
| MG06300D-BN4MM  | 600  | 300      | D            | SCREW           | 60     |
| MG06400D-BN4MM  | 600  | 400      | D            | SCREW           | 60     |
| MG12200D-BA1MM  | 1200 | 200      | D            | SCREW           | 60     |
| MG12300D-BA1MM  | 1200 | 300      | D            | SCREW           | 60     |
| MG12300D-BN3MM  | 1200 | 300      | D            | SCREW           | 60     |
| MG12400D-BN2MM  | 1200 | 400      | D            | SCREW           | 60     |
| MG06600WB-BN4MM | 600  | 600      | WB           | PRESS FIT       | 60     |
| MG12225WB-BN2MM | 1200 | 225      | WB           | PRESS FIT       | 60     |
| MG12300WB-BN2MM | 1200 | 300      | WB           | PRESS FIT       | 60     |
| MG12450WB-BN2MM | 1200 | 450      | WB           | PRESS FIT       | 60     |

# Solar Products

## TVS (TRANSIENT VOLTAGE SUPPRESSION) DIODES



RoHS HF

### What Are Voltage Transients?

Voltage transients are unwanted short duration surges of electrical energy. They may result from the sudden release of previously stored energy, and can come from internal and external sources. If the voltage magnitude of the transient is large enough, circuit component damage or malfunction of the circuit may result.

Transients can occur either repeatedly or as random impulses. Repeatable transients are frequently caused by the operation of other system components, such as motors, generators or the switching of reactive circuit components. Random transients, are often caused by lightning, electrostatic discharge (ESD), and other outdoor environment events.

| SOURCE                        | VOLTAGE | CURRENT | RISE-TIME  | DURATION |
|-------------------------------|---------|---------|------------|----------|
| Lightning                     | 25 kV   | 20 kA   | 10 $\mu$ s | 50 ms    |
| Load Switching                | 600 V   | 500 A   | 50 $\mu$ s | 500 ms   |
| Electromagnetic Pulse (EMP)   | 1 kV    | 300 kV  | 20 ns      | 1 ms     |
| Electrostatic Discharge (ESD) | 15 kV   | 30 A    | 1–5 ns     | 100 ns   |

### Transient Voltage Suppression Diodes

TVS Diodes are used to protect semiconductor components from high-voltage transients. Their p-n junctions have a larger cross-sectional area than those of a normal diode, allowing them to conduct large currents to ground without sustaining damage. Littelfuse supplies TVS Diodes with peak power ratings from 200 W to 30 kW, and reverse standoff voltages from 5 V to 512 V. For more information visit [Littelfuse.com/tvsdiodes](http://Littelfuse.com/tvsdiodes)

### TVS and Solar Inverter Protection

Integration of Transient Voltage Suppression (TVS) components within solar system designs help to prevent the damaging effects of transient events and assure compliance to safety and reliability standards. Solar power inverters are vulnerable to transient voltage effects and its direct connection to other system components allows transient voltage transfer. For example:

- Lightning-induced transient events may pass through the solar array and outdoor cabling to the inverter
- Transients originating from the outside utility power grid may pass through the main circuit panel and cabling to the inverter
- Startup of motorized equipment enables vulnerabilities produced by repeated load changes
- Electrostatic discharge events generated internally and externally to the system may pass between the inverter and sensitive electronic control equipment

It is important to build surge protection in the inverter and at other locations before damaging transients may reach sensitive equipment.

| SERIES NAME                                        | PHOTO | PACKAGE TYPE | REVERSE STANDOFF VOLTAGE (V <sub>R</sub> ) | PEAK PULSE POWER RANGE (P <sub>pp</sub> 10/1000 μs) | PEAK PULSE CURRENT (I <sub>pp</sub> 8/20 μs) | OPERATING TEMPERATURE                    | HF | ROHS |
|----------------------------------------------------|-------|--------------|--------------------------------------------|-----------------------------------------------------|----------------------------------------------|------------------------------------------|----|------|
| SURFACE MOUNT - STANDARD APPLICATION (200-5000 W)  |       |              |                                            |                                                     |                                              |                                          |    |      |
| SMF                                                |       | SOD-123      | 5.0-85                                     | 200 W                                               | —                                            | -67 °F to +302 °F<br>(-55 °C to +150 °C) | •  | •    |
| SMAJ                                               |       | DO-214AC     | 5.0-440                                    | 400 W                                               | —                                            |                                          | •  | •    |
| P4SMA                                              |       | DO-214AC     | 5.8-468                                    | 400 W                                               | —                                            |                                          | •  | •    |
| SMA6J                                              |       | DO-214AC     | 5.0-12                                     | 600 W                                               | —                                            |                                          | •  | •    |
| SMA6L                                              |       | DO-221AC     | 5.0-85                                     | 600 W                                               | —                                            |                                          | •  | •    |
| SACB                                               |       | DO-214AA     | 5.0-50                                     | 500 W                                               | —                                            |                                          | •  | •    |
| SMBJ                                               |       | DO-214AA     | 5.0-440                                    | 600 W                                               | —                                            |                                          | •  | •    |
| P6SMB                                              |       | DO-214AA     | 5.8-468                                    | 600 W                                               | —                                            |                                          | •  | •    |
| 1KSMB                                              |       | DO-214AA     | 5.8-153                                    | 1000 W                                              | —                                            |                                          | •  | •    |
| SMCJ                                               |       | DO-214AB     | 5.0-440                                    | 1500 W                                              | —                                            |                                          | •  | •    |
| 1.5SMC                                             |       | DO-214AB     | 5.8-468                                    | 1500 W                                              | —                                            |                                          | •  | •    |
| 4.0SDJ                                             |       | DO-214AB     | 24.0                                       | 4000W                                               | —                                            |                                          | •  | •    |
| SMDJ                                               |       | DO-214AB     | 5.0-220                                    | 3000 W                                              | —                                            |                                          | •  | •    |
| 5.0SMDJ                                            |       | DO-214AB     | 12-170                                     | 5000 W                                              | —                                            |                                          | •  | •    |
| AXIAL LEADED - STANDARD APPLICATION (400-5000 W)   |       |              |                                            |                                                     |                                              |                                          |    |      |
| P4KE                                               |       | DO-41        | 5.8-468                                    | 400 W                                               | —                                            | -67 °F to +347 °F<br>(-55 °C to +175 °C) | •  | •    |
| SA                                                 |       | DO-15        | 5.0-180                                    | 500 W                                               | —                                            |                                          | •  | •    |
| SAC                                                |       | DO-15        | 5.0-50                                     | 500 W                                               | —                                            |                                          | •  | •    |
| P6KE                                               |       | DO-15        | 5.8-512                                    | 600 W                                               | —                                            |                                          | •  | •    |
| 1.5KE                                              |       | DO-201       | 5.8-512                                    | 1500 W                                              | —                                            |                                          | •  | •    |
| LCE                                                |       | DO-201       | 6.5-90                                     | 1500 W                                              | —                                            |                                          | •  | •    |
| 3KP                                                |       | P600         | 5.0-220                                    | 3000 W                                              | —                                            |                                          | •  | •    |
| 5KP                                                |       | P600         | 5.0-250                                    | 5000 W                                              | —                                            |                                          | •  | •    |
| AXIAL LEADED - HIGH POWER (15000-30000 W; 1-15 kA) |       |              |                                            |                                                     |                                              |                                          |    |      |
| 15KPA                                              |       | P600         | 17-280                                     | 15000 W                                             | —                                            | -67 °F to +347 °F<br>(-55 °C to +175 °C) | •  | •    |
| 20KPA                                              |       | P600         | 20-300                                     | 20000 W                                             | —                                            |                                          | •  | •    |
| 30KPA                                              |       | P600         | 28-288                                     | 30000 W                                             | —                                            |                                          | •  | •    |
| AK1                                                |       | Radial Lead  | 76.0                                       | —                                                   | 1000 A                                       | -67 °F to +302 °F<br>(-55 °C to +150 °C) | •  | •    |
| AK3                                                |       | Radial Lead  | 15-430                                     | —                                                   | 3000 A                                       |                                          | •  | •    |
| AK6                                                |       | Radial Lead  | 30-430                                     | —                                                   | 6000 A                                       |                                          | •  | •    |
| AK10                                               |       | Radial Lead  | 15-530                                     | —                                                   | 10000 A                                      |                                          | •  | •    |
| AK15                                               |       | Radial Lead  | 58-76                                      | —                                                   | 15000 A                                      |                                          | •  | •    |
|                                                    |       |              |                                            |                                                     |                                              |                                          |    |      |

# Solar Products

## OVERVOLTAGE SUPPRESSION VARISTORS



### Protection Application and Needs

#### Description:

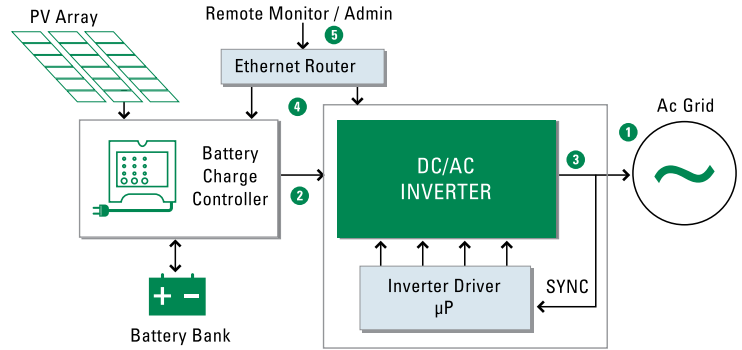
Microprocessor-controlled inverter with the ac output synchronized to the ac grid stores energy in utility company and maximizes photovoltaic (PV) array energy output.

#### Threats:

- Power surges on ac or dc input and ac output
- ESD threats through the communication network

#### Solutions:

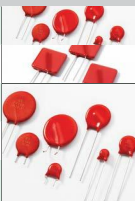
1. **Ac Input:** Fuse / MOV / GDT
2. **Dc Input:** Dc-rated fuse / Unidirectional TVS / MOV
3. **Ac Output:** Fuse / TVS / MOV
4. **Local Ethernet:** MLV / SPA
5. **Outside Ethernet:** SEP series SIDACTor® device



Example: Hybrid Solar Inverter Configuration

### Varistor Products

Varistors possess characteristics that divert transient currents away from sensitive components. Littelfuse offers two types: Miniature surface mount Multi-Layer Varistors (MLVs) for small electronics applications and Metal Oxide Varistors (MOVs) for higher energy applications. For more information visit [Littelfuse.com/varistor](http://Littelfuse.com/varistor)

| Series Name             | Photo                                                                               | Operating<br>V AC Range | Operating<br>V DC Range | Peak Current<br>Range <sup>1</sup> (A) | Peak Energy<br>Range (J) | Operating<br>Temperature | Mount/<br>Form Factor               | Disc Size           | Agency<br>Approvals |     |     |      |   | RoHS | HF |
|-------------------------|-------------------------------------------------------------------------------------|-------------------------|-------------------------|----------------------------------------|--------------------------|--------------------------|-------------------------------------|---------------------|---------------------|-----|-----|------|---|------|----|
|                         |                                                                                     |                         |                         |                                        |                          |                          |                                     |                     | UR                  | CSA | VDE | CECC |   |      |    |
| Surface Mount MLV / MOV |                                                                                     |                         |                         |                                        |                          |                          |                                     |                     |                     |     |     |      |   |      |    |
| ML                      |  | 2.7-107                 | 5.5-120                 | 4-500                                  | 0.02-2.5                 | -55 to +125 °C           | Surface Mount                       | Not Applicable      |                     |     |     |      | • | •    |    |
| CH                      |                                                                                     | 14-275                  | 18-369                  | 100-400                                | 1.0-8.0                  | -55 to +125 °C           | Surface Mount                       | Not Applicable      | •                   |     |     |      | • |      |    |
| SM7                     |                                                                                     | 115-510                 | 369-675                 | 1200                                   | 10-40                    | -55 to +85 °C            | Surface Mount                       | Not Applicable      | •                   |     |     |      | • | •    |    |
| SM20                    |                                                                                     | 20-320                  | 26                      | 2000-6500                              | 20-150                   |                          | Surface Mount                       | Not Applicable      | •                   |     |     |      | • | •    |    |
| Radial Leaded MOV       |                                                                                     |                         |                         |                                        |                          |                          |                                     |                     |                     |     |     |      |   |      |    |
| UltraMOV™               |  | 130-625                 | 170-825                 | 1750-10000                             | 12.5-720                 | -55 to +85 °C            | Radial Leaded                       | 7, 10, 14, 20 mm    | •                   | •   | •   | •    | • | •    |    |
| UltraMOV™ 25S           |                                                                                     | 115-750                 | 150-970                 | 22000                                  | 230-890                  |                          |                                     | 25 mm               | •                   | •   | •   | •    | • | •    |    |
| C-III                   |                                                                                     | 130-660                 | —                       | 3500-9000                              | 40-530                   |                          |                                     | 10, 14, 20 mm       | •                   | •   | •   | •    | • | •    |    |
| LA                      |                                                                                     | 130-1000                | 175-1200                | 1200-6500                              | 11-360                   |                          |                                     | 7, 10, 14, 20 mm    | •                   | •   | •   | •    | • | •    |    |
| ZA                      |                                                                                     | 4-460                   | 5.5-615                 | 50-6500                                | 0.1-52                   |                          |                                     | 5, 7, 10, 14, 20 mm | •                   |     | •   | •    | • | •    |    |
| Thermally Protected MOV |                                                                                     |                         |                         |                                        |                          |                          |                                     |                     |                     |     |     |      |   |      |    |
| SMOV™ 25S               |  | 115-750                 | 150-970                 | 20000                                  | 170-670                  | -45 to +75 °C            | Industrial Packaged<br>Radial Leads | 25 mm               | •                   |     |     |      | • |      |    |
| SMOV™ 34S               |                                                                                     | 115-750                 | 150-970                 | 40000                                  | 280-1200                 | -45 to +75 °C            | Industrial Packaged<br>Radial Leads | 34 mm               | •                   |     |     |      | • |      |    |
| TMOV® 25S               |  | 115-750                 | 150-970                 | 20000                                  | 170-670                  | -55 to +85 °C            | Radial Leaded                       | 25 mm               | •                   |     | •   | •    | • |      |    |
| TMOV® 34S               |                                                                                     | 115-750                 | 150-970                 | 40000                                  | 235-1050                 |                          |                                     | 34 mm               | •                   |     | •   | •    | • |      |    |
| TMOV®/iTMOV®            |                                                                                     | 115-750                 | 150-970                 | 6000-10000                             | 35-480                   |                          |                                     | 14, 20 mm           | •                   |     | •   | •    | • |      |    |

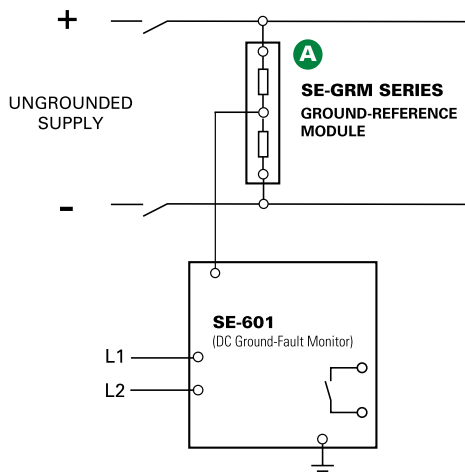
# Solar Products

## SE-601 SERIES (PGR-2601)

### Dc Ground-Fault Monitor



### Simplified Circuit Diagram



### Ordering Information

| ORDERING NUMBER | CONTROL POWER     |
|-----------------|-------------------|
| SE-601-OU       | 120/240 V ac/V dc |
| SE-601-OD       | 12/24 V dc        |
| SE-601-OT       | 48 V dc           |
| ACCESSORIES     | REQUIREMENT       |
| SE-GRM SERIES   | Required          |
| PGA-0500        | Optional          |
| PMA-55          | Optional          |
| PMA-60          | Optional          |

Note: For optional conformal coating please consult factory.

### Description

The SE-601 is a microprocessor-based ground-fault relay for ungrounded dc systems. It provides sensitive ground-fault protection without the problems associated with nuisance tripping. Ground-fault current is sensed using an SE-GRM Series Ground-Reference Module—a resistor network that limits ground-fault current to 25 mA. The SE-601 is used on ungrounded dc systems ranging from industrial 24 V dc control circuits to 1000 V dc solar and transportation systems.

### Features & Benefits

| FEATURES                                   | BENEFITS                                                                                                     |
|--------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| <b>Adjustable pickup (1-20 mA)</b>         | Ten settings provide a wide range of low-level protection                                                    |
| <b>Adjustable time delay (50 ms-2.5 s)</b> | Adjustable trip delay allows quick protection or delayed response                                            |
| <b>Output contacts</b>                     | Form A and Form B output contacts for operation of separate annunciation and trip circuits                   |
| <b>Analog output (0-5 V)</b>               | Provides means for connecting to a meter (PGA-0500) or a control system                                      |
| <b>Non-volatile trip memory</b>            | Retains trip state when de-energized to simplify troubleshooting                                             |
| <b>Selectable contact operating mode</b>   | Selectable fail-safe or non-fail-safe operating modes allow connection to shunt or undervoltage breaker coil |
| <b>Microprocessor-based</b>                | No calibration required saves on maintenance cost                                                            |

### Accessories



**SE-GRM Series Ground-Reference Module**  
Required accessory, used to connect the SE-601 dc Ground-Fault Monitor to the dc bus.



**PGA-0500 Analog % Current Meter**  
Optional panel-mounted analog meter displays ground-fault current as a percentage of 22 mA.

### Specifications

|                               |                                                                                 |
|-------------------------------|---------------------------------------------------------------------------------|
| <b>IEEE Device Numbers</b>    | Dc Overcurrent Relay (76G)                                                      |
| <b>Input Voltage</b>          | See ordering information                                                        |
| <b>Dimensions</b>             | <b>H</b> 75 mm (3.0"); <b>W</b> 55 mm (2.2");<br><b>D</b> 115 mm (4.5")         |
| <b>Trip Level Settings</b>    | 1-20 mA                                                                         |
| <b>Trip Time Settings</b>     | 0.05-2.5 s                                                                      |
| <b>Output Contacts</b>        | Isolated Form A and Form B                                                      |
| <b>Contact Operating Mode</b> | Selectable fail-safe or non-fail-safe                                           |
| <b>Test Button</b>            | Local                                                                           |
| <b>Reset Button</b>           | Local and remote                                                                |
| <b>Analog Output</b>          | 0-5 V                                                                           |
| <b>Conformally Coated</b>     | Consult factory                                                                 |
| <b>Approvals</b>              | CSA certified, UL Listed (E340889),<br>CE (European Union), C-Tick (Australian) |
| <b>Warranty</b>               | 5 years                                                                         |
| <b>Mounting</b>               | DIN, surface (standard)<br>Panel (with PMA-55 or PMA-60 adapter)                |



# Solar Products

## EL731 SERIES

### Ac/Dc Sensitive Earth-Leakage Relay

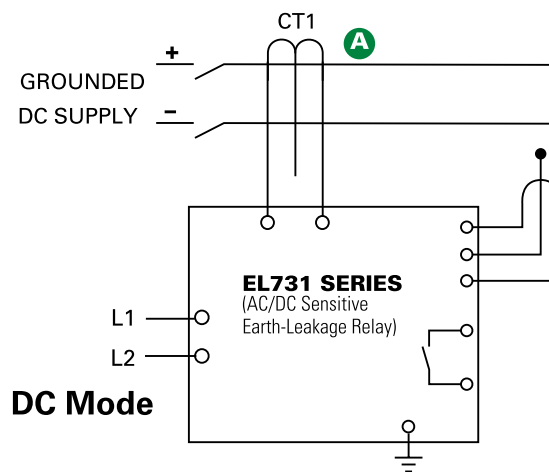
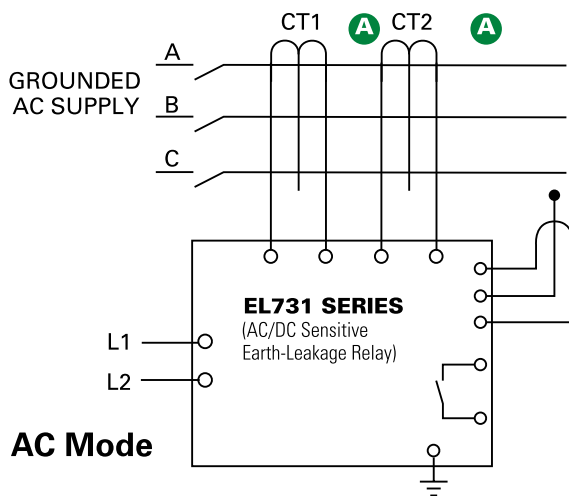


#### Description



The EL731 is a microprocessor-based ac/dc Sensitive Earth-Leakage Relay that offers complete coverage for all frequencies from 0 to 6,000 Hz. Two CTs are required for the entire frequency range, or one CT can be used for only low- or high-frequency detection. An RTD/PTC sensor input allows over-temperature protection for a motor or drive. The EL731 offers metering, password-protected alarm and trip settings and optional network communications. It is primarily used to add low-level ground-fault protection to variable-speed drives, and to dc circuits.

#### Simplified Circuit Diagram



#### Ordering Information

| ORDERING NUMBER | CONTROL POWER     | COMMUNICATIONS |
|-----------------|-------------------|----------------|
| EL731-00-X0     | 120/240 V ac/V dc | None           |
| EL731-01-X0     | 120/240 V ac/V dc | DeviceNet*     |
| EL731-02-X0     | 120/240 V ac/V dc | Profibus*      |
| EL731-03-X0     | 120/240 V ac/V dc | EtherNet/IP*   |
| EL731-04-X0     | 120/240 V ac/V dc | Modbus* TCP    |
| EL731-10-X0     | 48 V dc & 24 V ac | None           |
| EL731-11-X0     | 48 V dc & 24 V ac | DeviceNet      |
| EL731-12-X0     | 48 V dc & 24 V ac | Profibus       |
| EL731-13-X0     | 48 V dc & 24 V ac | EtherNet/IP    |
| EL731-14-X0     | 48 V dc & 24 V ac | Modbus TCP     |
| EL731-20-X0     | 24 V dc           | None           |
| EL731-21-X0     | 24 V dc           | DeviceNet      |
| EL731-22-X0     | 24 V dc           | Profibus       |
| EL731-23-X0     | 24 V dc           | EtherNet/IP    |
| EL731-24-X0     | 24 V dc           | Modbus TCP     |

Note: When building a part number, replace the "X" with "1" for AS/NZS 2081:2011 Compliant product, "0" otherwise.

\*DeviceNet, Profibus, EtherNet/IP and Modbus TCP are trademarks of their respective owners.

#### Accessories



##### EFCT Series Earth-Fault Current Transformer

Required zero-sequence current transformer specifically designed for low-level detection.



##### AC700-CUA Series Communication Adapter

Optional network-interface and firmware-upgrade communications adapters field-install in EL731.



##### AC700-SMK DIN-rail & Surface-mount Adapter

EL731 plugs into adapter for back-plane mounting.

| ACCESSORIES                                                       | REQUIREMENT  |
|-------------------------------------------------------------------|--------------|
| EFCT Series CT                                                    | One Required |
| AC700-CUA Series Com. Unit                                        | Optional     |
| AC700-SMK Surface-Mount Kit                                       | Optional     |
| AC700-CVR-00 Watertight Cover (IP66) for Panel-Mount Applications | Optional     |
| PGA-0520 Analog Meter                                             | Optional     |

# Solar Products

## SPD2 PV SERIES

Class 2 (IEC)/Type 2 (EN)/Type 1CA (UL)  
Pluggable Multi-Pole Surge Protective Device  
for PV Systems

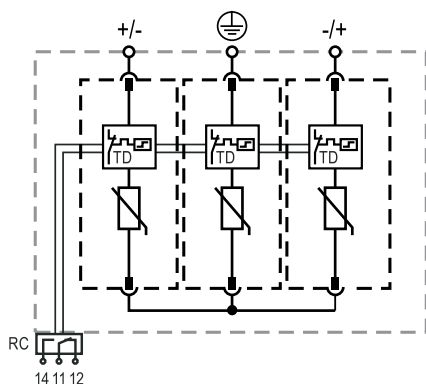


### Description

Surge protective devices (SPDs) provide equipment protection from transient overvoltage events lasting micro-seconds. By limiting the overvoltage to the equipment during these events, costly damage and downtime can be mitigated.

The surge protective devices for solar string box and inverter applications are available in 1100 and 1500 V dc in the 3+0 configuration.

### Internal Configuration



#### Legend

- Protective Earth
- RC Optional Remote Contact
- TD Thermal Disconnection

### Features & Benefits

| FEATURES                                                                        | BENEFITS                                                                                                                                                                  |
|---------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Capability to clamp and withstand high-energy transients</b>                 | Ensures low-residual voltage during high-energy surge events and higher nominal discharge current to prevent disruption, downtime, and degradation or damage to equipment |
| <b>No additional overcurrent protection devices required in UL applications</b> | Reduces the number of components and costs required for protection                                                                                                        |
| <b>Compact footprint</b>                                                        | Increases panel design flexibility                                                                                                                                        |
| <b>Visual life indicator</b>                                                    | Quick visual determines module replacement status to avoid loss of protection                                                                                             |
| <b>Pluggable modules</b>                                                        | Fast and simple to replace, minimizing maintenance and downtime. No tools required                                                                                        |
| <b>Thermal protection</b>                                                       | Eliminates catastrophic failure                                                                                                                                           |
| <b>IP20 protection rating</b>                                                   | Finger-safe design increases worker protection                                                                                                                            |

### Module & Base Ordering Information

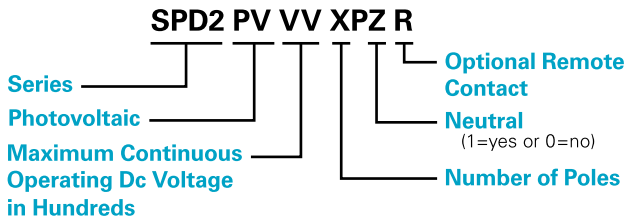
| Ordering Number                  | IEC Electrical                                        |                                                    |                                                        |                                         |                                    |                                            | UL Electrical                              |                                 |                                                    |                                     | Single Unit Weight |
|----------------------------------|-------------------------------------------------------|----------------------------------------------------|--------------------------------------------------------|-----------------------------------------|------------------------------------|--------------------------------------------|--------------------------------------------|---------------------------------|----------------------------------------------------|-------------------------------------|--------------------|
|                                  | Maximum Continuous Operating Dc Voltage ( $U_{CPV}$ ) | Nominal Discharge Current (8/20 $\mu$ s) ( $I_n$ ) | Maximum Discharge Current (8/20 $\mu$ s) ( $I_{max}$ ) | Total Discharge Current ( $I_{Total}$ ) | Voltage Protection Level ( $U_p$ ) | Short-Circuit Current Rating ( $I_{SCP}$ ) | Maximum Permitted Dc Voltage ( $U_{pdc}$ ) | Voltage Protection Rating (VPR) | Nominal Discharge Current (8/20 $\mu$ s) ( $I_n$ ) | Short-Circuit Current Rating (SCCR) |                    |
| SPD2-PV11-3PO<br>SPD2-PV11-3PO-R | 1100 V                                                | 20 kA                                              | 40 kA                                                  | 50 kA                                   | 4200 V                             | 9 kA                                       | 1100 V                                     | 3000 V                          | 20 kA                                              | 50 kA                               | 333 g (0.734 lb)   |
| SPD2-PV15-3PO<br>SPD2-PV15-3PO-R | 1500 V                                                | 15 kA                                              | 40 kA                                                  | 40 kA                                   | 4800 V                             | 9 kA                                       | 1500 V                                     | 4000 V                          | 20 kA                                              | 65 kA                               | 363 g (0.800 lb)   |



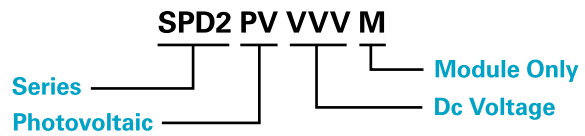
# Solar Products

## SPD2 PV SERIES

### Module & Base Part Numbering System



### Module Only Part Numbering System



### Replacement Module Ordering Information

| Ordering Number | IEC Electrical                                        |                                                    |                                                        |                                         |                                    |                                             | UL Electrical                              |                                 |                                                    |                                     | Single Unit Weight |
|-----------------|-------------------------------------------------------|----------------------------------------------------|--------------------------------------------------------|-----------------------------------------|------------------------------------|---------------------------------------------|--------------------------------------------|---------------------------------|----------------------------------------------------|-------------------------------------|--------------------|
|                 | Maximum Continuous Operating Dc Voltage ( $U_{CPV}$ ) | Nominal Discharge Current (8/20 $\mu$ s) ( $I_n$ ) | Maximum Discharge Current (8/20 $\mu$ s) ( $I_{max}$ ) | Total Discharge Current ( $I_{Total}$ ) | Voltage Protection Level ( $U_p$ ) | Short-Circuit Current Rating ( $I_{SCPV}$ ) | Maximum Permitted Dc Voltage ( $U_{pdc}$ ) | Voltage Protection Rating (VPR) | Nominal Discharge Current (8/20 $\mu$ s) ( $I_n$ ) | Short-Circuit Current Rating (SCCR) |                    |
| SPD2-PV550-M    | 1100 V                                                | 20 kA                                              | 40 kA                                                  | 50 kA                                   | 4200 V                             | 9 kA                                        | 1100 V                                     | 3000 V                          | 20 kA                                              | 50 kA                               | 61 g (0.134 lb)    |
| SPD2-PV750-M    | 1500 V                                                | 15 kA                                              | 40 kA                                                  | 40 kA                                   | 4800 V                             | 9 kA                                        | 1500 V                                     | 4000 V                          | 20 kA                                              | 65 kA                               | 71 g (0.157 lb)    |

### Specifications

|                                                                                  |                                                                                        |
|----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|
| <b>Mode of Protection</b>                                                        | (+) - PE, (-) - PE, (+) - (-)                                                          |
| <b>Nominal Discharge Current (8/20 <math>\mu</math>s) (<math>I_n</math>)</b>     | 20 kA                                                                                  |
| <b>Maximum Discharge Current (8/20 <math>\mu</math>s) (<math>I_{max}</math>)</b> | Up to 40 kA                                                                            |
| <b>Protective Elements</b>                                                       | High Energy MOV                                                                        |
| <b>Response Time (<math>t_A</math>)</b>                                          | < 25 ns                                                                                |
| <b>Number of Ports</b>                                                           | 1                                                                                      |
| <b>Mechanical &amp; Environmental</b>                                            |                                                                                        |
| <b>Operating Temperature Range (<math>T_a</math>)</b>                            | -40 °C to +80 °C (-40 °F to +185 °F)                                                   |
| <b>Permissible Operating Humidity (RH)</b>                                       | 5% to 95%                                                                              |
| <b>Altitude (max)</b>                                                            | 4,000 m (13,123 ft)                                                                    |
| <b>Terminal Screw Torque (<math>M_{max}</math>)</b>                              | 4.5 Nm (39.9 lbf-in)                                                                   |
| <b>Conductor Cross Section (max)</b>                                             | 35 mm <sup>2</sup> (2 AWG) (Solid, Stranded)/<br>25 mm <sup>2</sup> (4 AWG) (Flexible) |
| <b>Mounting</b>                                                                  | 35 mm DIN Rail, EN60715                                                                |
| <b>Degree of Protection</b>                                                      | IP20 (built-in)                                                                        |
| <b>Housing Material</b>                                                          | Thermoplastic: Extinguishing Degree<br>UL 94 V-0                                       |
| <b>Thermal Protection</b>                                                        | Yes                                                                                    |

#### Operating State/Fault Indication

Green Flag/No Green Flag

#### Remote Contact Switching Capacity

Ac: 250 V/1 A, 125 V/1 A;  
Dc: 48 V/0.5 A, 24 V/0.5 A, 12 V/0.5 A

#### Remote Contact Conductor Cross Section (max) Standards Passed

1.5 mm<sup>2</sup> (16 AWG) (Solid)  
EN 50539-11:2013+A1:2014  
UL 1449 4th Edition; E320116

#### Product Dimensions

##### 3TE Module and Base

**H** 90.7 mm (3.57"); **W** 53.8 mm (2.11");  
**D** 66.1 mm (2.60")

##### 1TE Replacement Module

**H** 45.0 mm (1.77"); **W** 18.0 mm (0.71");  
**D** 57.2 mm (2.25")

#### Package Dimensions

##### 3TE Module and Base

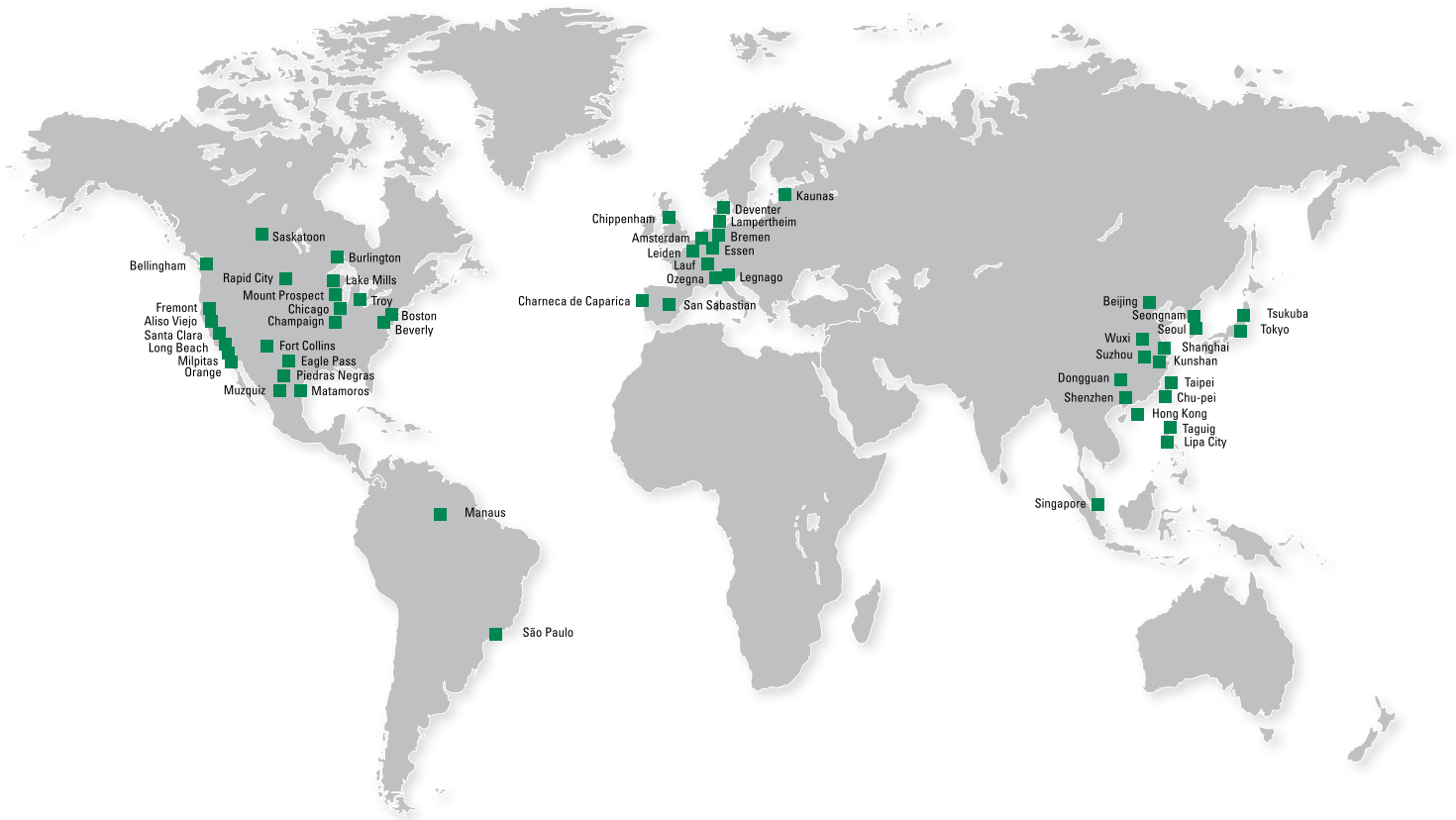
**H** 102.0 mm (4.01"); **W** 64.0 mm (2.52");  
**D** 110.0 mm (4.33")

##### 1TE Replacement Module

**H** 102.0 mm (4.01"); **W** 28.0 mm (1.10");  
**D** 110.0 mm (4.33")

Warranty – Visit [www.littelfuse.com/warranty](http://www.littelfuse.com/warranty) for details.

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## Surge Protection Devices Catalog (PF612)

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