



Expertise Applied | Answers Delivered



# SOLAR PRODUCTS CATALOG



**1500 V DC PRODUCTS**

**OVERVOLTAGE PROTECTION**

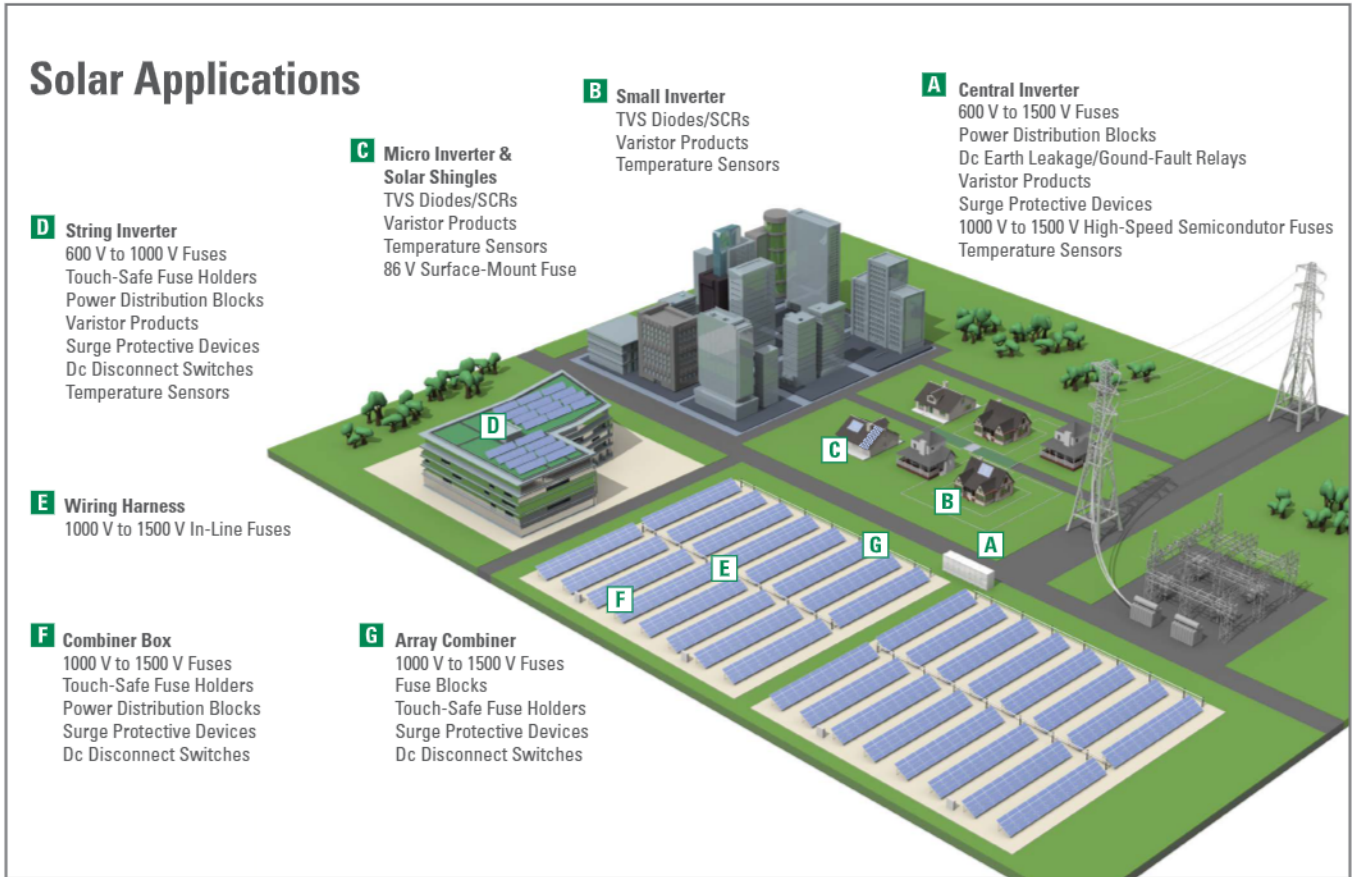
**IN-LINE FUSES**

**PROTECTION RELAYS**

**SURGE PROTECTION**

**SWITCH PRODUCTS**

# Solar-Rated Products by Application



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](http://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

REACH    

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

#### 1–32 Amperes

**Fuse Holder:** LFPXV001

**Fuse Clips:** 125004/125005

#### 35–60 Amperes

**Fuse Block and Cover:** LFXV15060-BC

### Web Resources

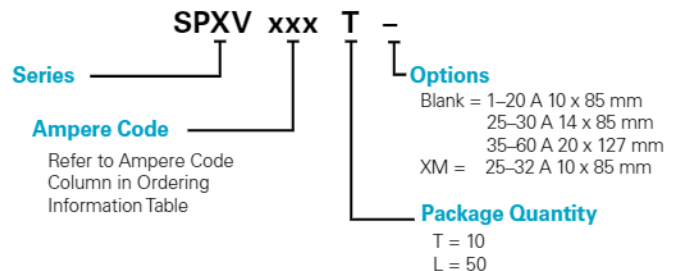
Download technical resources at: [Littelfuse.com/spxv](http://Littelfuse.com/spxv)

### Specifications

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

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

### Part Numbering System

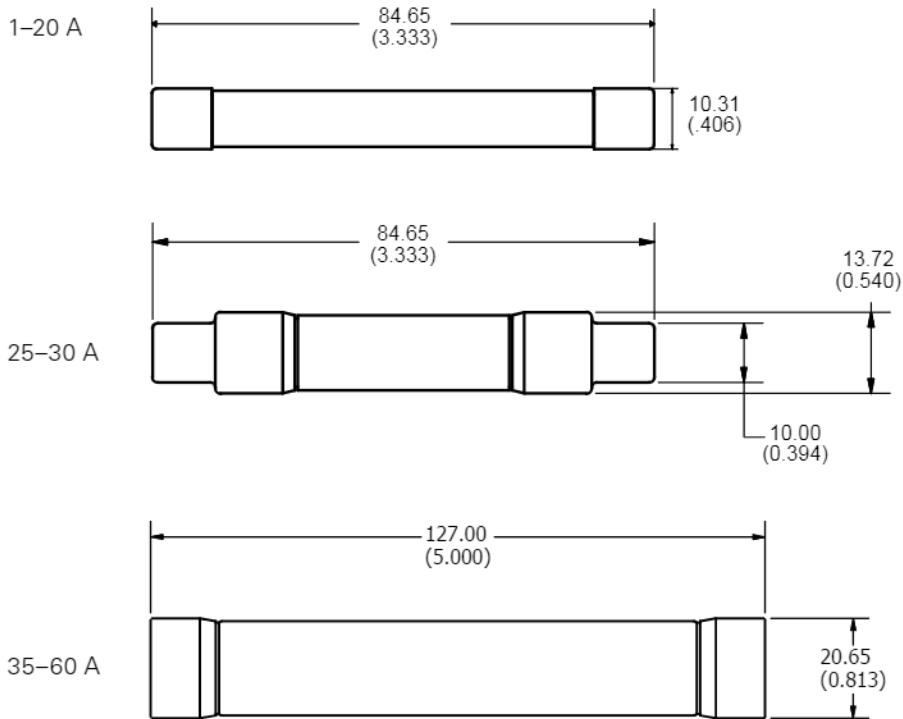


SERIES	AMPERAGE	PACKAGE QUANTITY	CATALOG NUMBER	ORDERING NUMBER
SPXV	6	10	SPXV006	SPXV006.T
SPXV	20	50	SPXV020	SPXV020.L
SPXV	32	10	SPXV032-M	SPXV032.TXM
SPXV	60	10	SPXV060	SPXV060.T

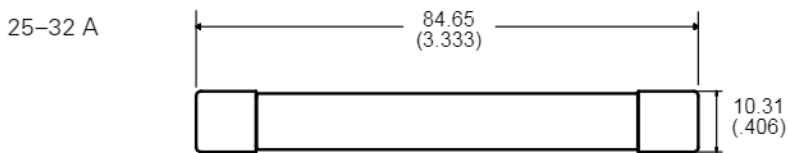




**SPXV Dimensions mm (in)**



**SPXV-M Dimensions mm (in)**



# Solar Products

## SPXI SERIES IN-LINE SOLAR FUSE

1500 V dc • 1–60 A



1



### 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

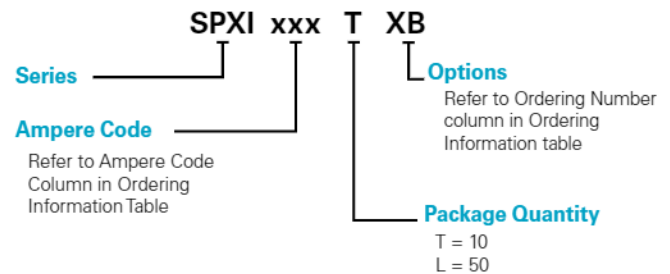
### Recommended Crimping Tool

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, 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 SPXI 35–50 A and SPXI-B 35–60 A: 50 kA SPXI-M and SPXI-BM 25–32A: 50 kA
<b>Time Constant</b>	≤ 1ms
<b>Material</b>	Body: melamine Caps: copper alloy (nickel plated)
<b>Approvals</b>	UL Recognized (File: E339112) TUV (Cert: J 50495785)
<b>Applicable Standards</b>	UL 248-1, 248-19 IEC 60269-6 (electrically only)
<b>Environmental</b>	RoHS Compliant REACH
<b>Country of Origin</b>	Mexico
<b>US Patent</b>	9,564,281

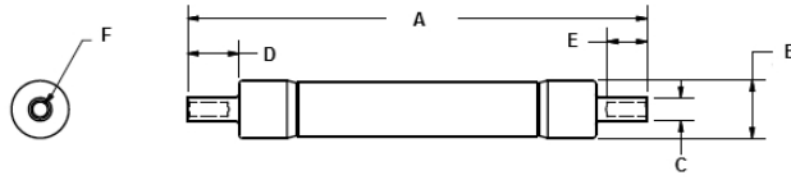
### Part Numbering System



### Web Resources

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

**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 (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 (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 (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 (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 (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 (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 (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 (10mm <sup>2</sup> )

# Solar Products

## SPNH SERIES SOLAR FUSE

1500 V dc • 50–400 A • NH Style



1



### Description

The SPNH series has been designed to meet the emerging circuit protection needs for 1500 volt photovoltaic 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

- Compact NH XL sizes
- Low watt loss design
- 1500 V dc rating for high efficiency designs
- Designed to protect against a full range of overcurrents

### Applications

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

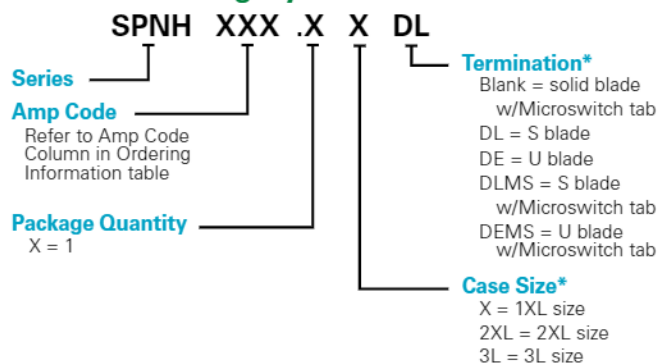
### Web Resources

- 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 End Bells: copper alloy
<b>Approvals</b>	UL 248-19 Listed (File: E339112)
<b>Applicable Standards</b>	UL 248-1, 248-19 IEC 60269-6
<b>Environmental</b>	RoHS Compliant

### Part Numbering System



SERIES	AMP	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

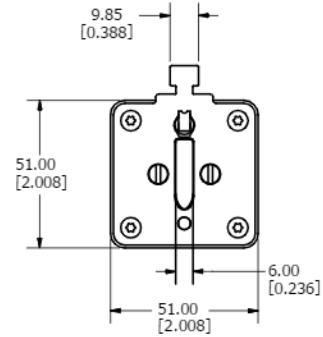
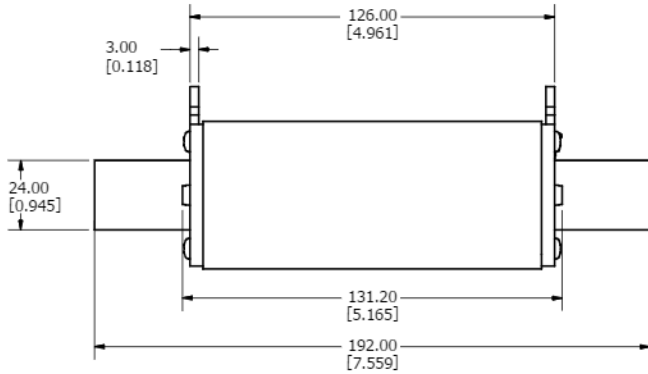




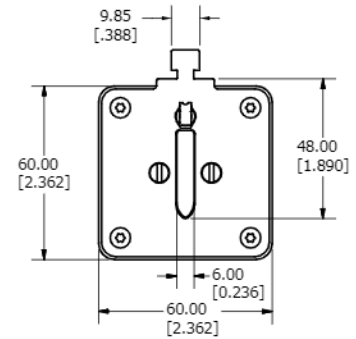
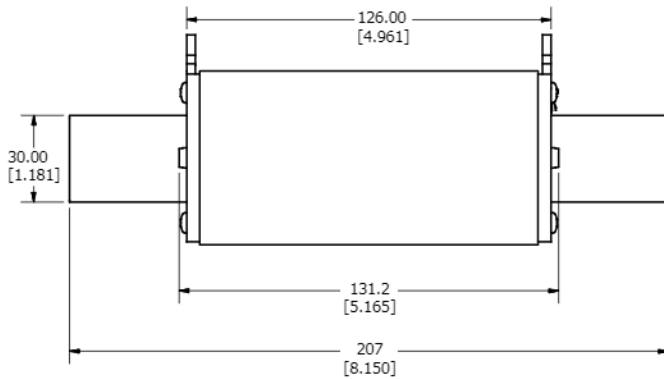


**Dimensions Millimeters (in)**

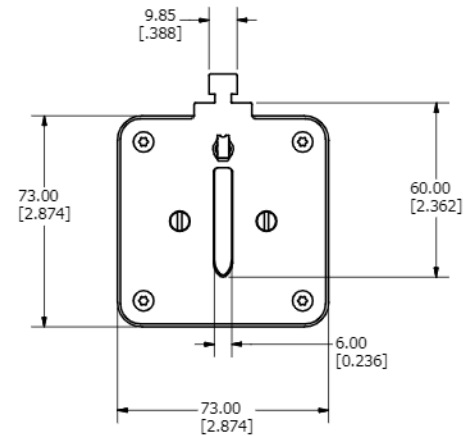
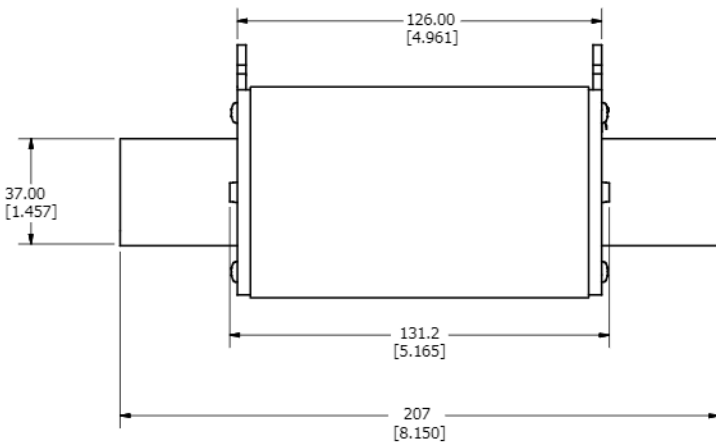
**Size: 1 XL w/ Microswitch Tab**



**Size: 2 XL w/ Microswitch Tab**



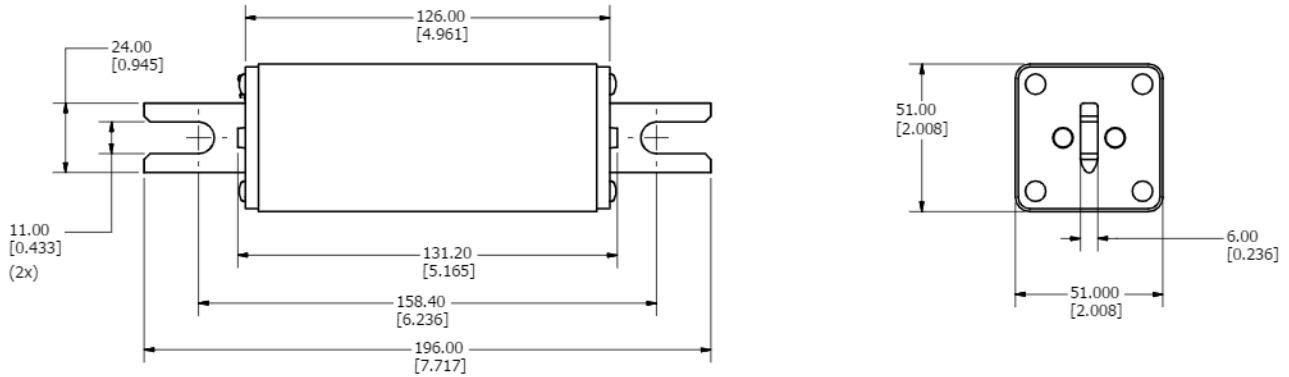
**Size: 3 L w/ Microswitch Tab**



### Dimensions Millimeters (in)

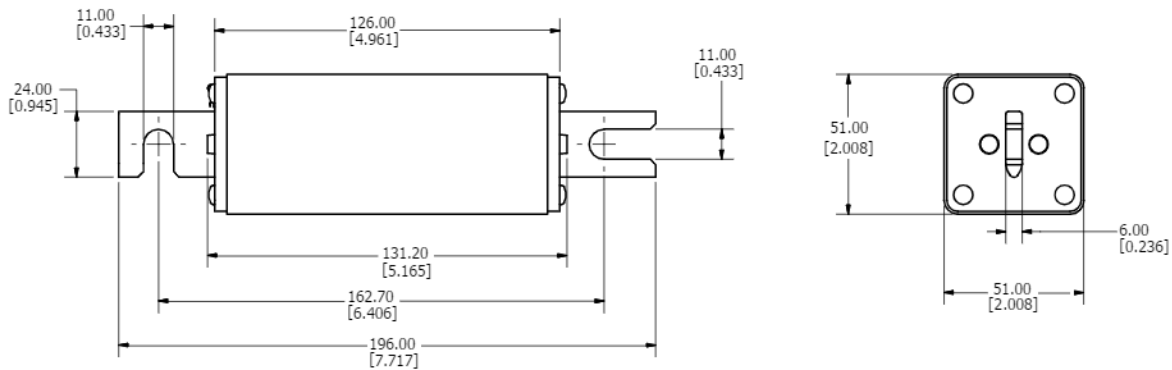
#### Size: 1XL DE Blade

Recommended Torque: 44 Nm\*



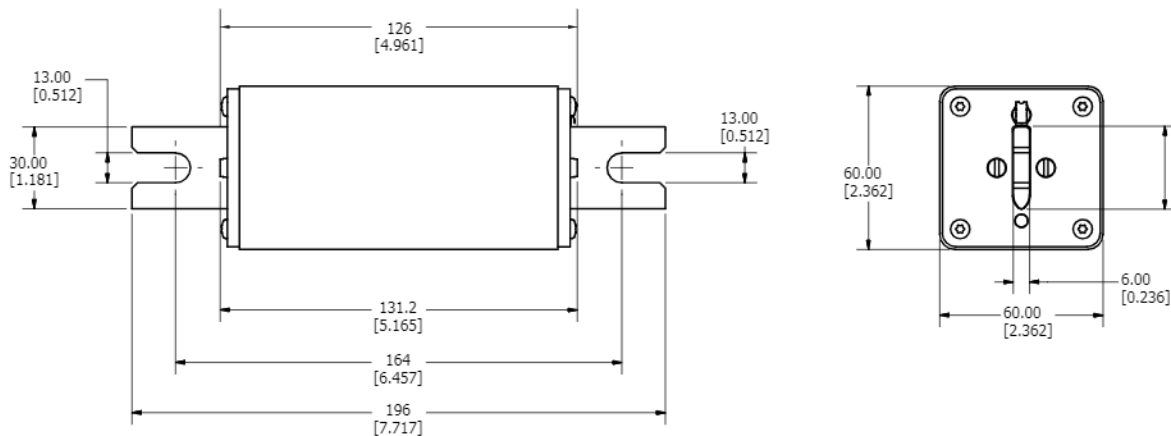
#### Size: 1XL DL Blade

Recommended Torque: 44 Nm\*



#### Size: 2 XL DE Blade

Recommended Torque: 77 Nm\*

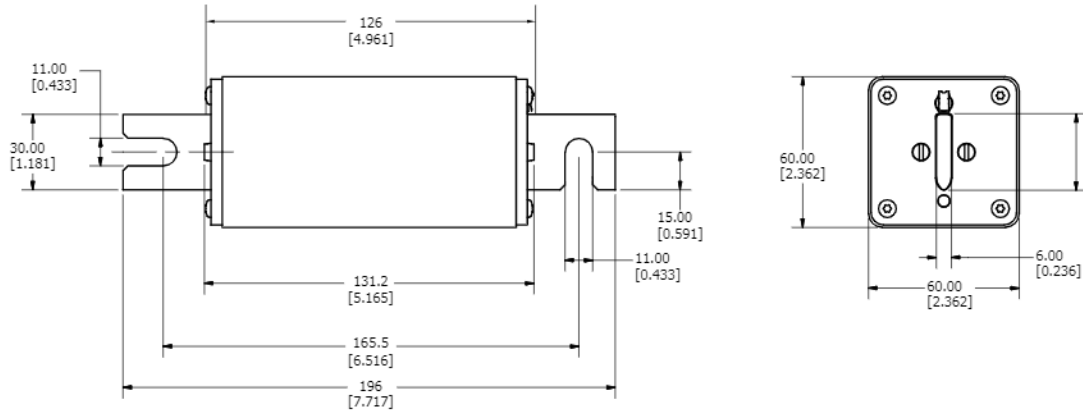


\*recommended torque values are for grade 8 steel hardware

### Dimensions Millimeters (in)

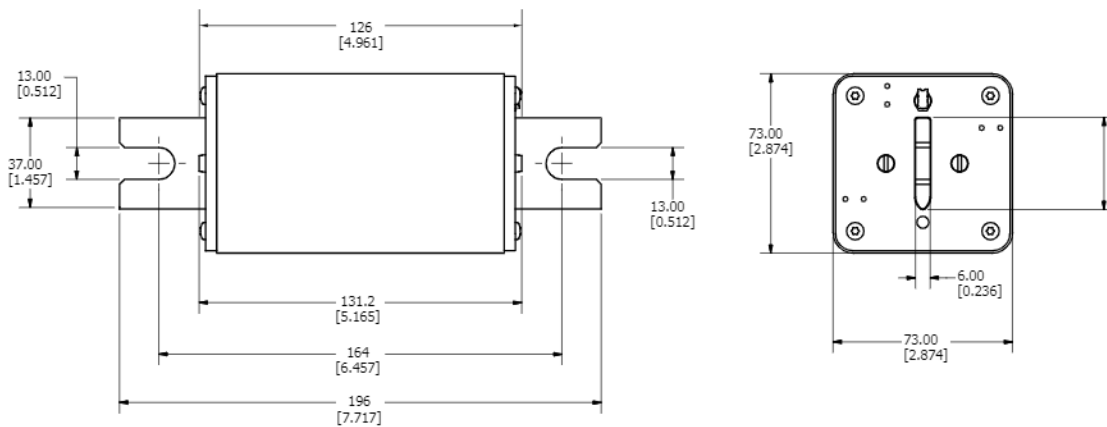
#### Size: 2 XL DL Blade

Recommended Torque: 44 Nm\*



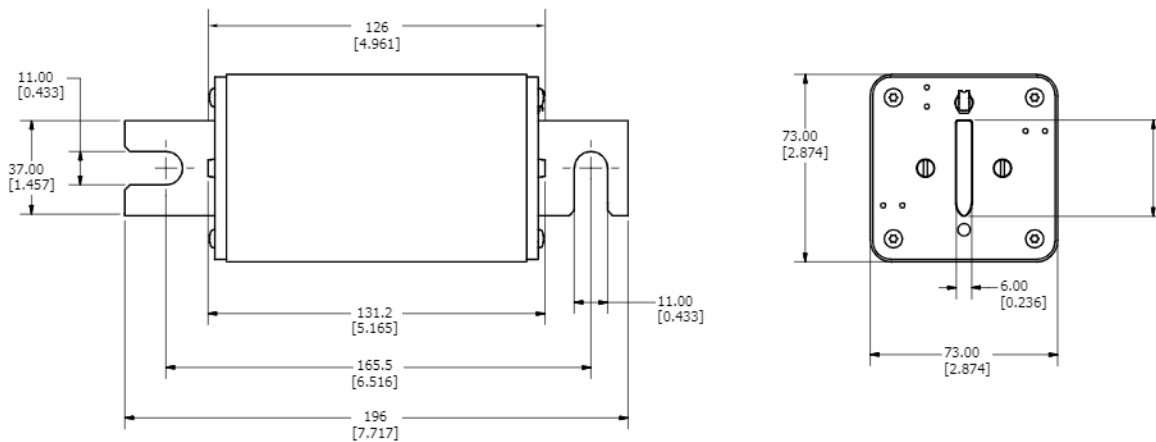
#### Size: 3 L DE Blade

Recommended Torque: 77 Nm\*



#### Size: 3 L DL Blade

Recommended Torque: 44 Nm\*

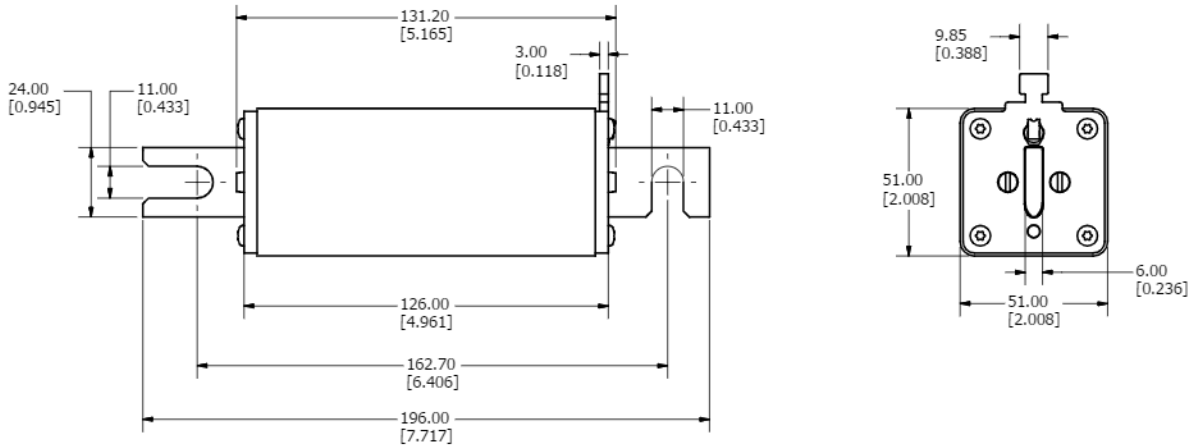


\*recommended torque values are for grade 8 steel hardware

### Dimensions Millimeters (in)

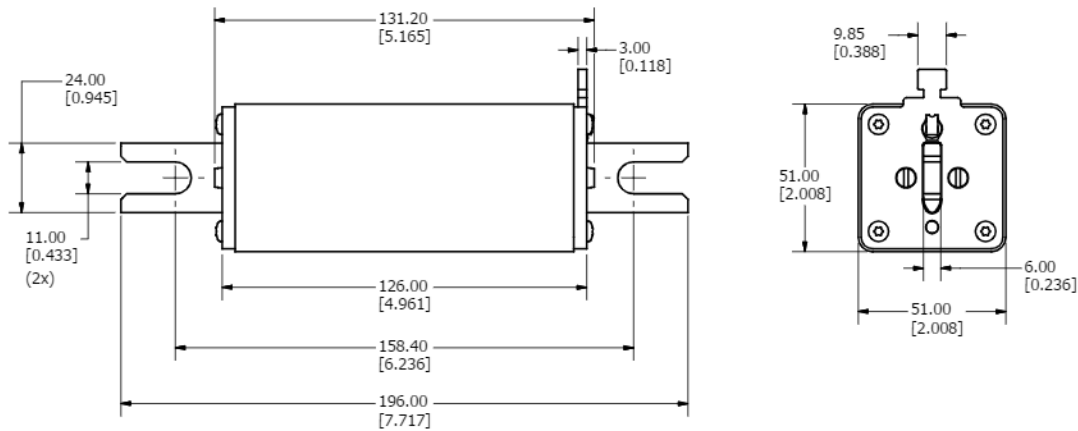
#### Size: 1 XL DL Blade w/ Microswitch Tab

Recommended Torque: 44 Nm\*



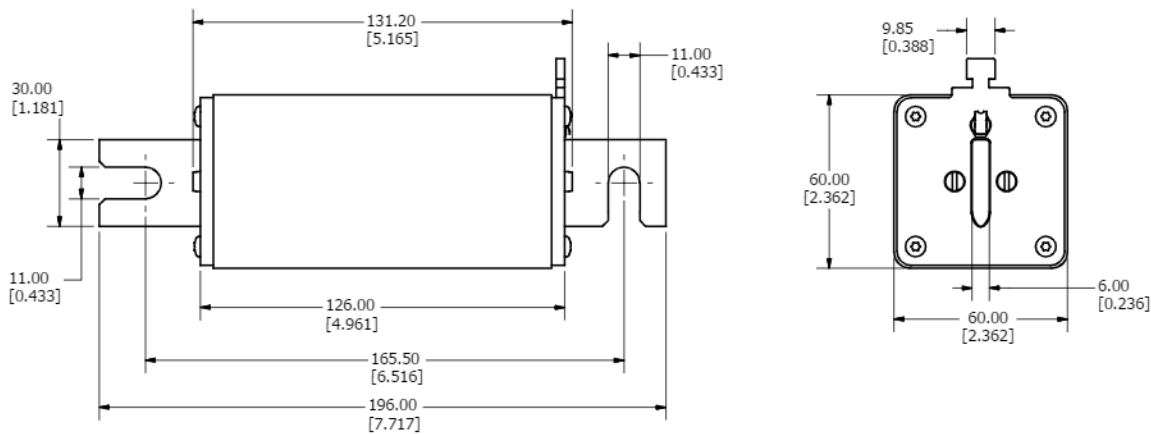
#### Size: 1 XL DE Blade w/ Microswitch Tab

Recommended Torque: 44 Nm\*



#### Size: 2 XL DL Blade w/ Microswitch Tab

Recommended Torque: 44 Nm\*



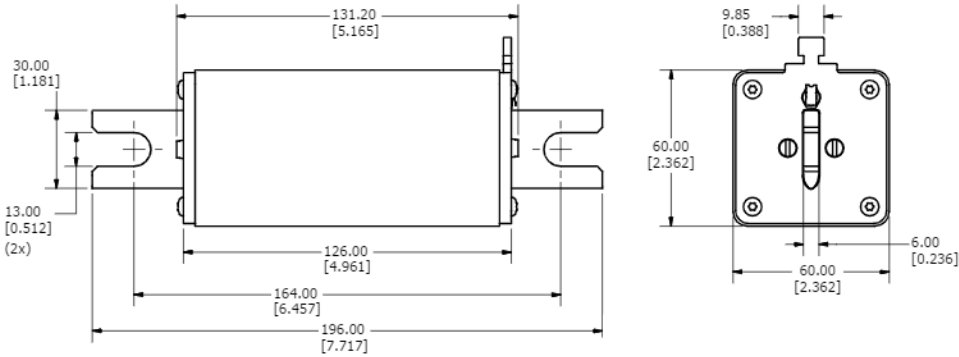
\*recommended torque values are for grade 8 steel hardware



### Dimensions Millimeters (in)

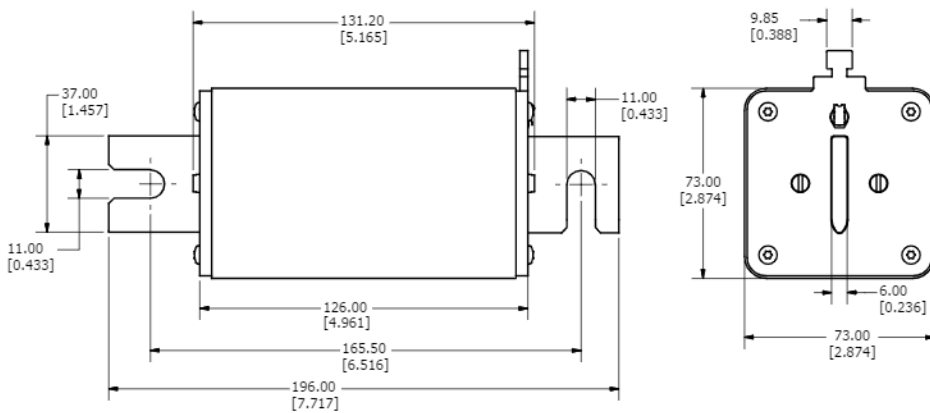
#### Size: 2 XL DE Blade w/ Microswitch Tab

Recommended Torque: 77 Nm\*



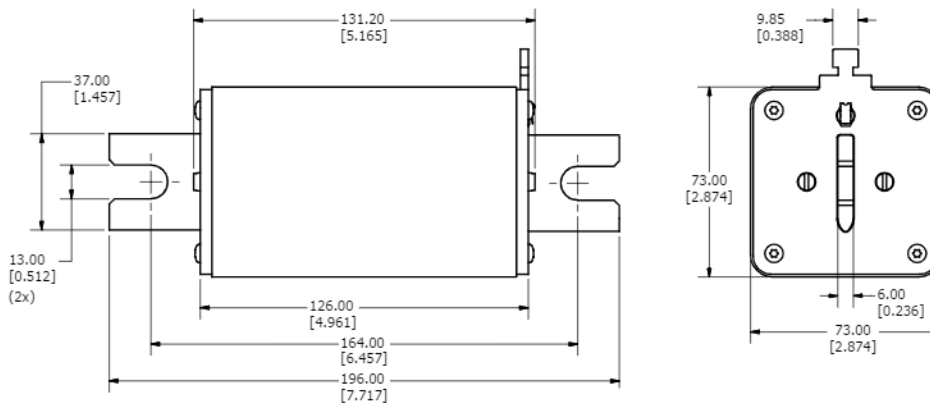
#### Size: 3 L DL Blade w/ Microswitch Tab

Recommended Torque: 44 Nm\*



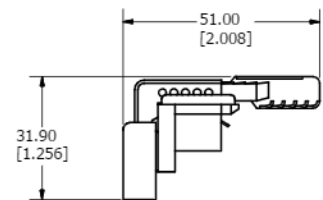
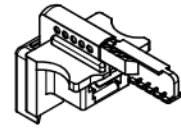
#### Size: 3 L DE Blade w/ Microswitch Tab

Recommended Torque: 77 Nm\*



\*recommended torque values are for grade 8 steel hardware

### Microswitch MSSPNH1500X



1

# Solar Products

## LFXV15 SERIES FUSE BLOCK & COVER

1500 V • 35–60 A

REACH    

1



### Description

The Littelfuse LFXV15 series fuse block and cover is designed to hold 1500 V size 20 x 127 mm fuses rated 35–60 amperes. Suitable for photovoltaic systems (string and high-capacity combiner boxes) with fault currents up to 50 kA.

With available ampere ratings up to 60 A, more strings can be pre-combined in harnesses to reduce the number of inputs into combiner boxes, thereby decreasing installation time and labor costs.

### Features/Benefits

- Dead-front cover design offers personnel protection
- Ventilated design keeps the fuse running cooler, even at high ambient temperatures and current ratings, to increase fuse longevity
- Narrower width accommodates more blocks in a panel to maximize space
- Designed for easy fuse removal and replacement to minimize maintenance time. No tools required
- 35 mm DIN-rail mounting option for quick assembly and installation
- Accepts both wire and busbar for added flexibility
- Positive lock feature secures the fuse puller in the block when the fuse is absent

### Recommended Fuses

Littelfuse SPXV 20 x 127 mm fuses rated 35–60 amperes.

### Ordering Information

VOLTAGE (V dc)	AMPERE RATING	POLES	FUSE BLOCK & COVER ORDERING NUMBER	CONNECTOR TYPE	DRIVE	TORQUE	WIRE RANGE	WIRE TYPE	
1500	60	1	LFXV15060-BC*	Box Lug	3/16 Inch Hex	5.6 N-m (50 lb-in)	2–4 AWG (35–25 mm <sup>2</sup> )	CU only	Stranded
						2.8 N-m (25 lb-in)	6–14 AWG (16–2.5 mm <sup>2</sup> )		

\*For replacement only: Fuse Block LFXV150601C or Cover LFXV15060FBC

### Specifications

<b>Voltage Ratings</b>	1500 V dc
<b>Amperage Rating</b>	60 A
<b>Withstand Rating</b>	50 kA
<b>Power Acceptance</b>	24.1W Maximum
<b>Fuse Size</b>	20 x 127 mm
<b>Material</b>	Thermoplastic
	Fuse Clip: Tin-plated copper alloy
	Screws: Tin-plated aluminum
<b>Operating Temperature</b>	-55 °C to +125 °C
<b>Flammability Rating</b>	UL94 V-0
<b>Temperature Stability</b>	Base: 130 °C Cover: 140 °C
<b>Approvals</b>	Block: UL 4248-19 Listed (File E345481) Cover: UL Listed Fuse Accessory (File E184929)
<b>Environmental</b>	RoHS compliant, Lead (Pb) free, REACH
<b>Recommended DIN Rail</b>	TH 35-7.5 per IEC 60715

WIRE TYPE	
75 °C or 90 °C CU Only Stranded	UL Class B and Class C wire IEC Class 5 Flexible Wire (self-certified)

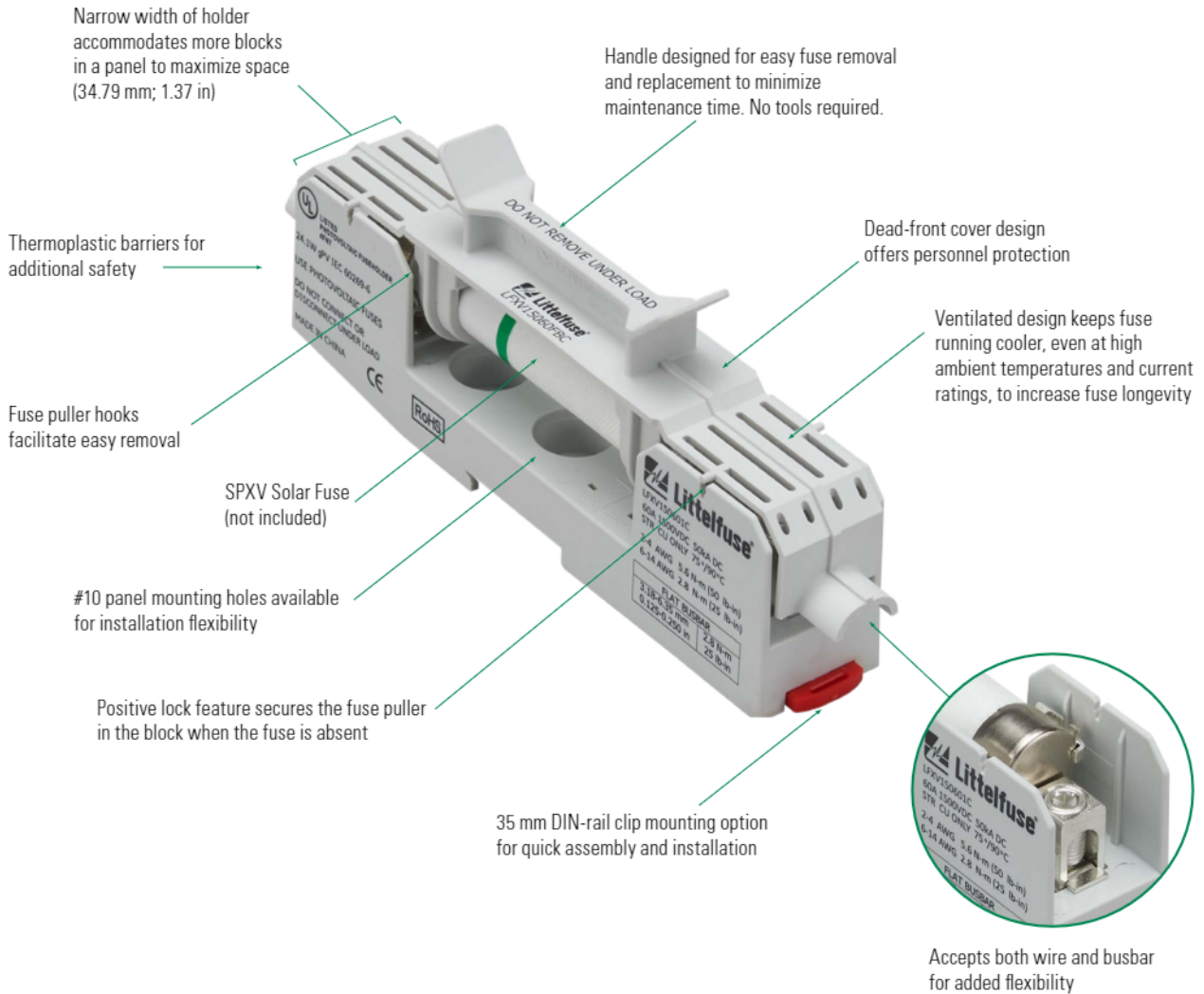
BUSBAR SPECIFICATIONS			
TERMINAL	THICKNESS	WIDTH	TORQUE
Maximum	0.250 in (6.35 mm)	0.290 in (7.37 mm)	25 lb-in (2.8 N-m)
Minimum	0.125 in (3.18 mm)	0.200 in (5.08 mm)	25 lb-in (2.8 N-m)

### Web Resources

Download the complete datasheet and other technical documents: [Littelfuse.com/LFXV15](https://www.littelfuse.com/LFXV15)



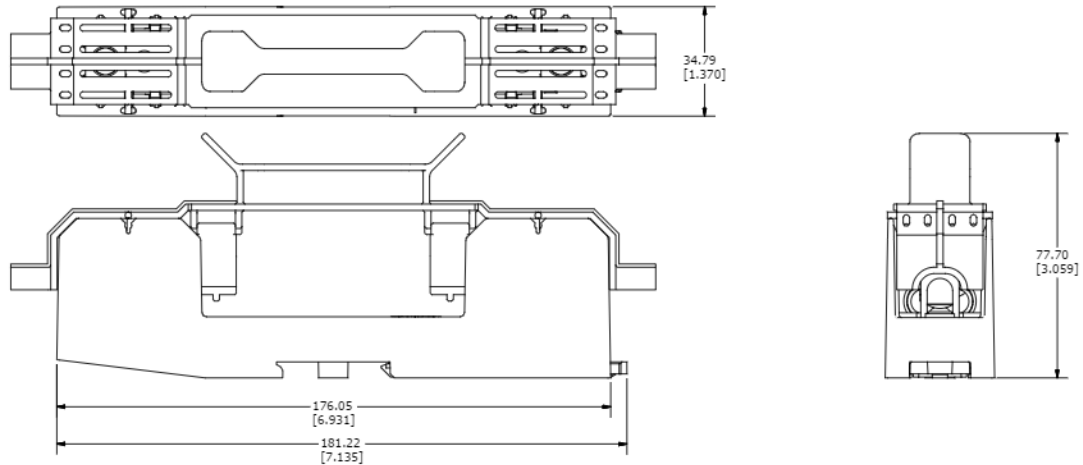
### LFXV15 Features & Benefits



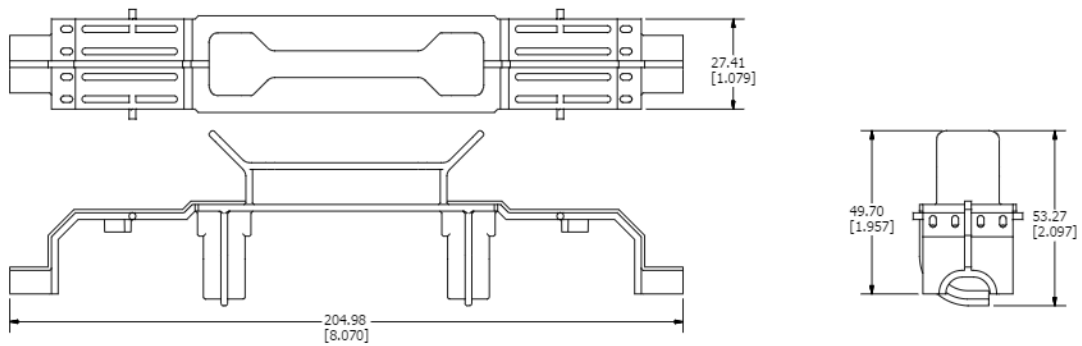
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### Dimensions Millimeters (in)

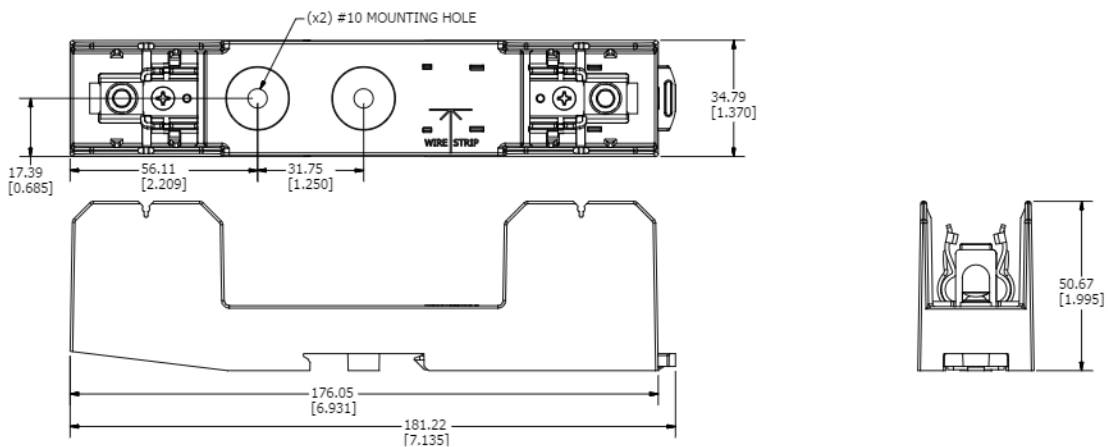
#### Fuse Block & Cover Assembly: LFXV15060-BC



#### Fuse Cover: LFXV15060FBC



#### Fuse Block: LFXV150601C



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



# Solar Products

## LFPXV TOUCH-SAFE FUSE HOLDERS

1500 V • 30 A



### 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](http://Littelfuse.com/LFPXV)

### Ordering Information

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

\*Must be the same cross-sectioned size

### Specifications

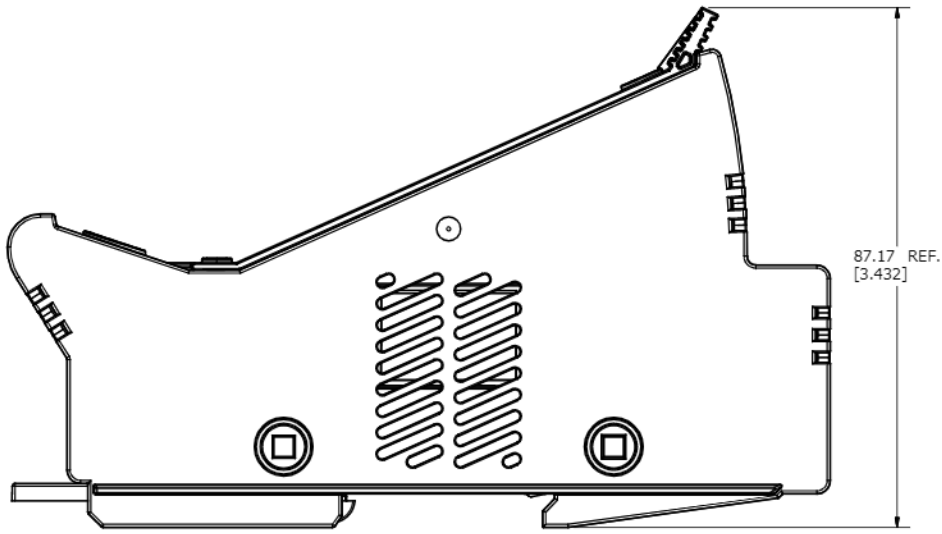
<b>Voltage Ratings</b>	1500 V dc
<b>Amperage Rating</b>	30 A UL, 32 A Littelfuse self-certified
<b>SCCR Rating</b>	50 kA
<b>Power Dissipation</b>	8W maximum
<b>Fuse Type</b>	10 x 85 mm
<b>Material</b>	Thermoplastic
	Fuse Clip: Silver-plated copper alloy
	Screws: Zinc-plated steel
<b>Operating Temperature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

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

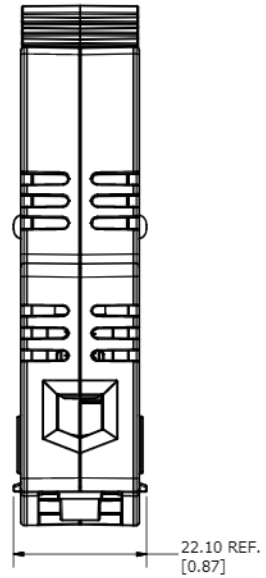
BUSBAR SPECIFICATIONS			
TERMINAL	THICKNESS	WIDTH	TORQUE
Maximum	0.188 in (4.78 mm)	0.290 in (7.37 mm)	24-28 lb-in (2.71-3.16 N-m)
Minimum	0.125 in (3.18 mm)	0.200 in (5.08 mm)	

1

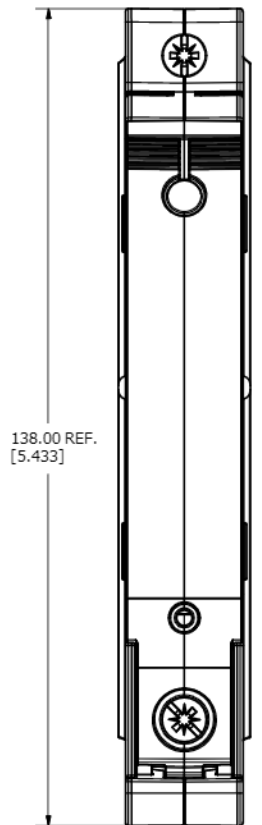
Dimensions Millimeters (in)



Side View



Top View



Front View



### 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 UL4248-19 FILE: E345481 Vol. 2
<b>Environmental</b>	RoHS Compliant
<b>Material</b>	Fuse Clip: Silver-Plated Copper Spring: Zinc-Plated Steel Mounting Plate: Zinc-Plated Steel Insulator: Ceramic

### 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)

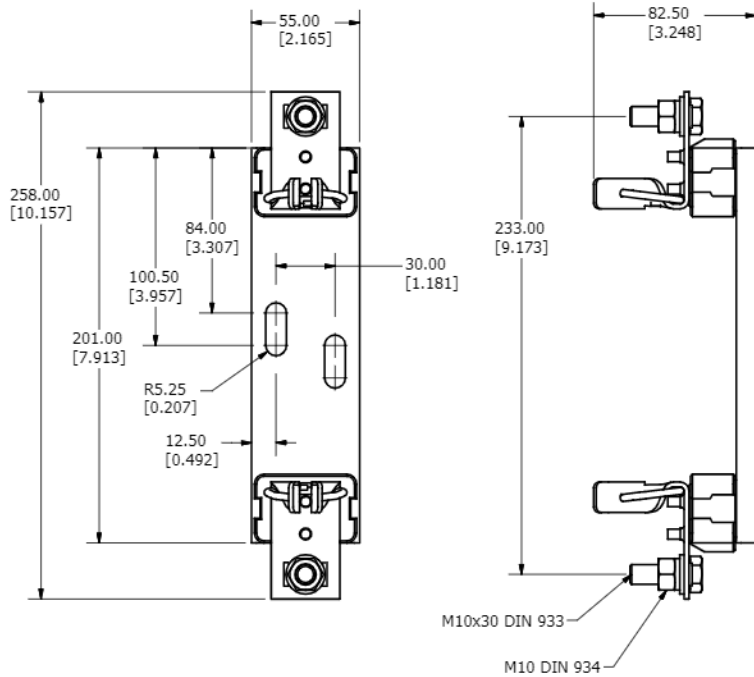
### Ordering Information

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

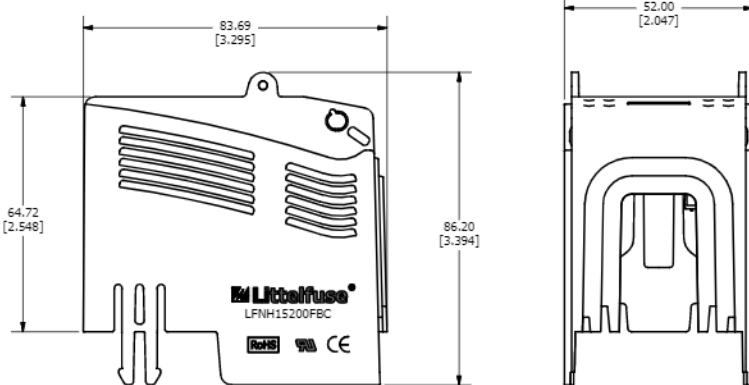
\*Terminal covers sold separately

1

### Dimensions Millimeters (in)



**Fuse Block**  
**LFNH152001CST**



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

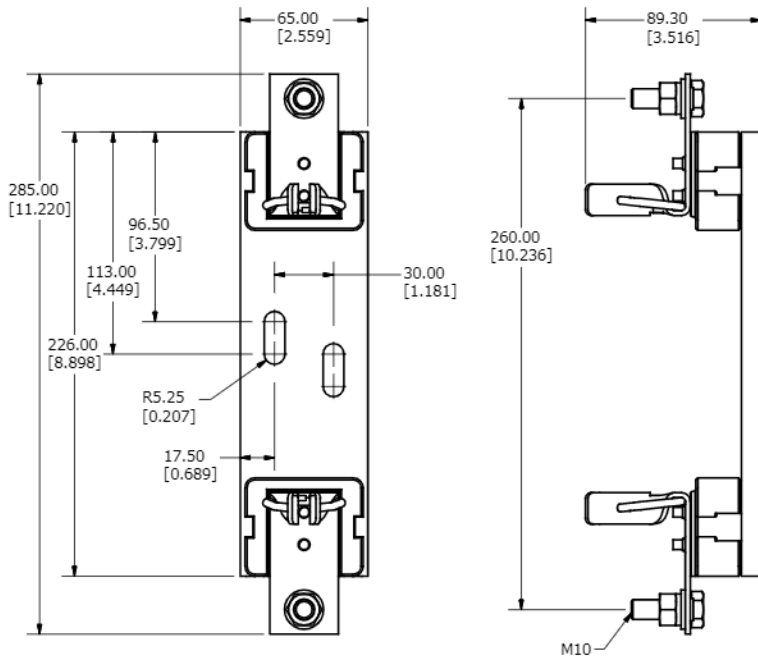
### Specifications

<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

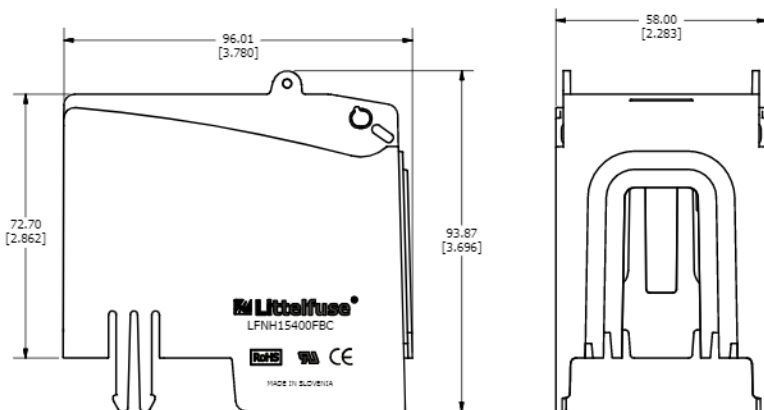




**Dimensions Millimeters (in)**



**Fuse Block**  
**LFNH154001CST**



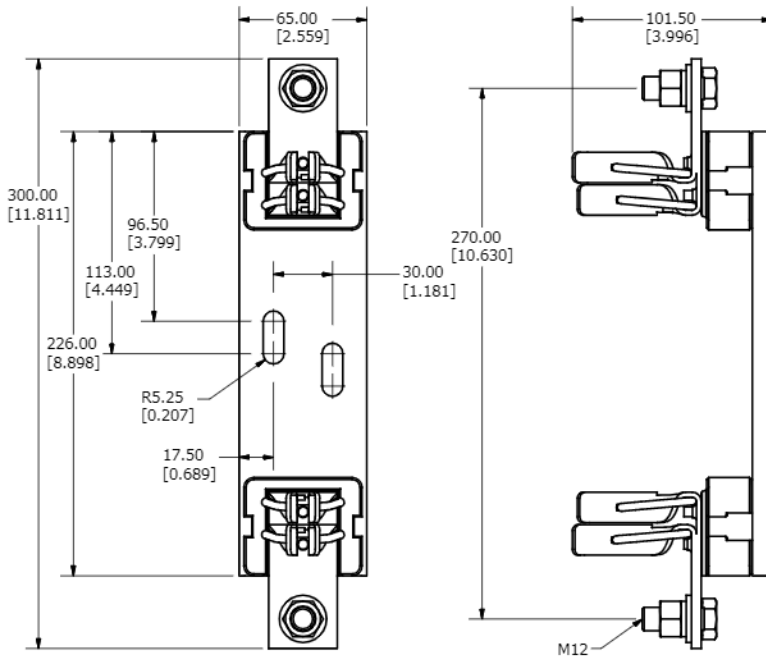
**Fuse Terminal Cover**  
**LFNH15400FBC**

**Specifications**

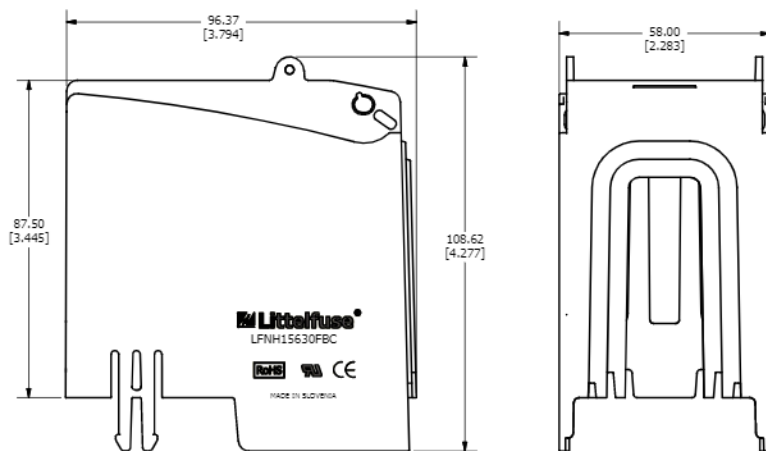
<b>Voltage Rating:</b>	1500 V
<b>Ampere Rating:</b>	400 amperes
<b>Flammability Rating:</b>	UL 94 V-0
<b>Material:</b>	V0-rated Nylon
<b>Packaging:</b>	Sold in pairs

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

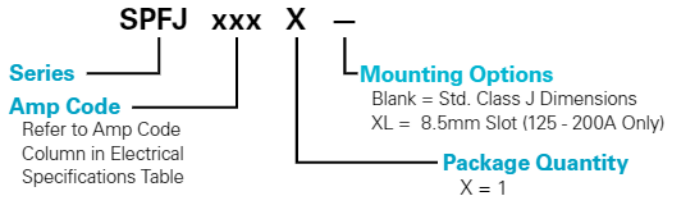
Download technical documents: [Littelfuse.com/spfj](http://Littelfuse.com/spfj)

### Specifications

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

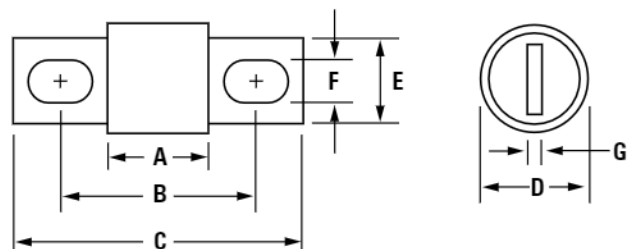
2

### 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 midget-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 multiple ampere ratings to match specific requirements in a variety of applications.

### Features/Benefits

- Full range, fast-acting fuse helps eliminate common low-overload faults
- Prevents power generation losses due to nuisance tripping from changes in temperature
- 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

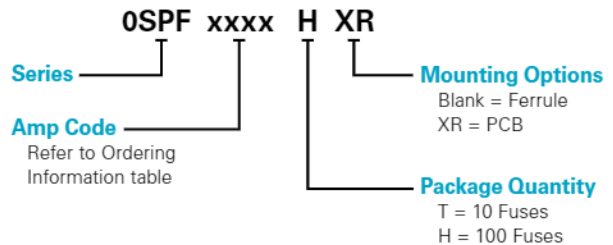
### Web Resources

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

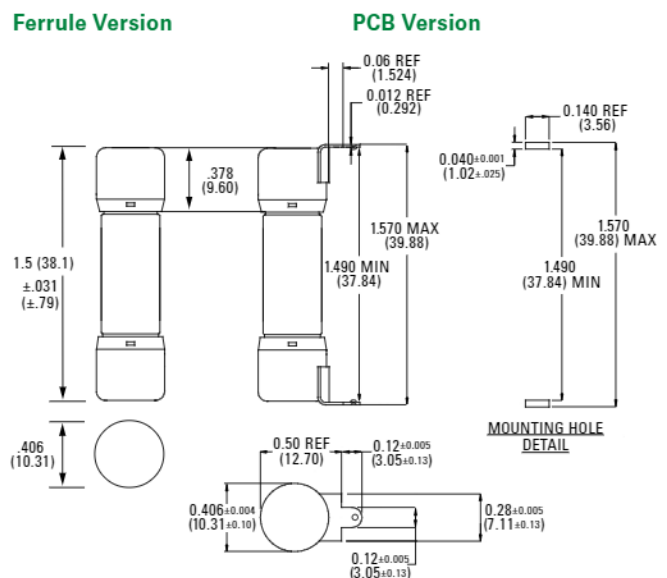
### Specifications

<b>Voltage Rating</b>	1000 V dc
<b>Amperage 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 50 kA - 25 A - 30 A
<b>Time Constant</b>	≤ 2ms
<b>Material</b>	Body: Melamine Caps: Copper Alloy
<b>Approvals</b>	UL Listed (File: E339112) CSA Certified (File: 029862_0_000) TUV (Cert: J 50494849)
<b>Applicable Standards</b>	UL 248-1, 248-19 IEC 60269-6
<b>Environmental</b>	RoHS Compliant
<b>Country of Origin</b>	Mexico

### Part Numbering System



### Dimensions Inches (mm)



# Solar Products

## SPFI SERIES IN-LINE SOLAR FUSE

1000 V dc • 2–30 A









### Description

The Littelfuse SPFI solar fuse is designed to integrate into an in-line assembly within a wire harness. It has been specifically engineered to protect photovoltaic (PV) systems meeting UL 248-19 standards. The SPFI can be electrically insulated by either overmolding or using heat-shrink.

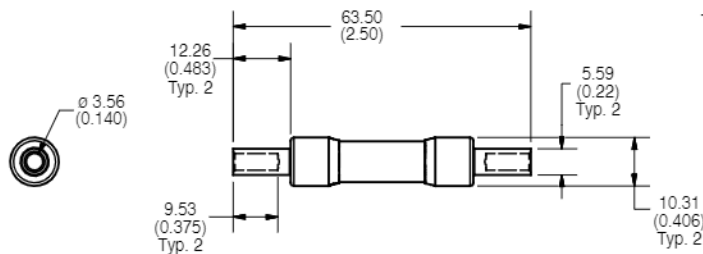
### Features/Benefits

- One-piece cap design, without joints, offers easier wire crimping and more streamlined molding
- No fuse holder required helps save space, time, and money
- 20,000 A Interrupting Rating

### Applications

- Photovoltaic wire harness

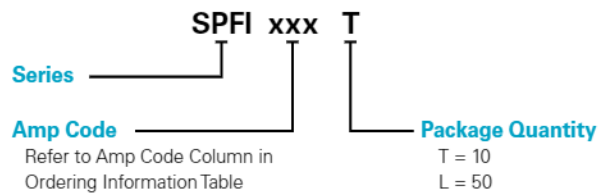
### Dimensions mm (in)



### 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>	≤ 1ms
<b>Material</b>	Body: Melamine Caps: Copper Alloy (Nickel Plated)
<b>Approvals</b>	UL 248-19 Recognized (File: E339112) TUV (Cert: J 50505290)
<b>Applicable Standards</b>	UL 248-1, 248-19 IEC 60269-6 (electrically only)
<b>Environmental</b>	RoHS Compliant REACH
<b>Country of Origin</b>	Mexico
<b>US Patent</b>	9,564,281

### Part Numbering System



### Web Resources

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

### Recommended Crimping Tool

T&B Sta-Kon ERG4002

# 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/ 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" 5/16"	30-40 in-lb 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	
			TERMINAL		BOLT SIZE	TORQUE
200	LFJ102001CST	20 kA	200 in-lb (22.6 N-m)	.774" (19.66 mm)	1/4" 5/16"	30-40 in-lb 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 File: E345481 Vol. 1
<b>Environmental</b>	RoHS Compliant

### 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.

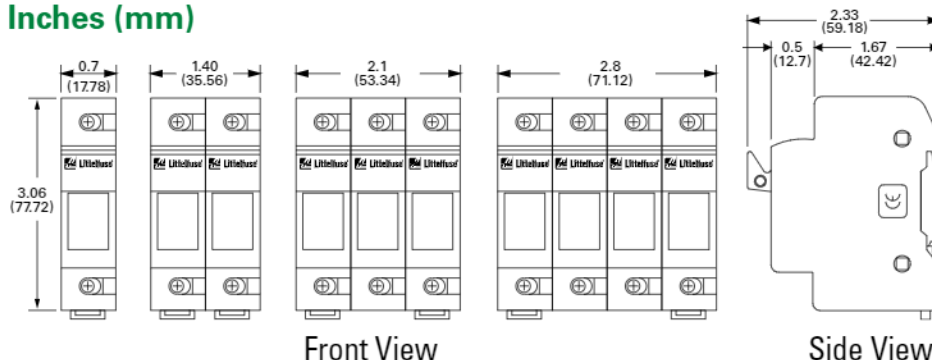
### Features/Benefits

- 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 NUMBER	ORDERING NUMBER	TERMINAL TYPE	WIRE TYPE	WIRE RANGE	TERMINAL TORQUE	ROHS
LPHV	1	LPHV001	LPHV0001Z	Pressure Plate	75 °C or 90 °C CU Only	Stranded / [Solid]	17.7 in-lbs (2 N-m)	•
LPHV	2	LPHV002	LPHV0002Z					•
LPHV	3	LPHV003	LPHV0003Z					•
LPHV	4	LPHV004	LPHV0004Z					•

### Dimensions Inches (mm)



### 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 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

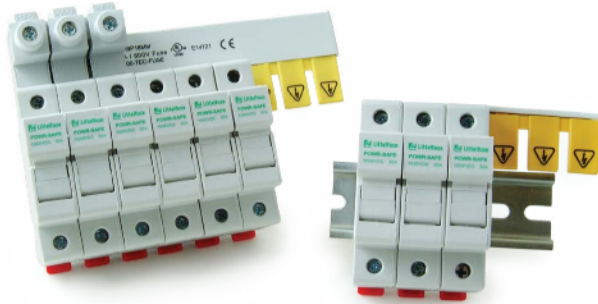
10 x 38 mm 1000 V dc Fuses  
SPF 1000 V Series  
FLU 1000 V Series



# Solar Products

## BUS BAR SYSTEM

### POWR-BAR Distribution



### 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 / LFPSM / 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>1</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>1</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

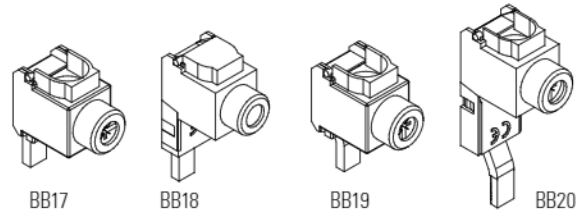
3 PHASE, 18 mm <sup>2</sup>			3 PHASE, 25 mm <sup>2</sup>		
ORDERING NUMBER	POLES	LENGTH (mm)	ORDERING NUMBER	POLES	LENGTH (mm)
3PH6P18 mm	6	104	3PH6P25 mm	6	104
3PH9P18 mm	6	158	3PH9P25 mm	9	158
3PH12P18 mm	12	214	3PH12P25 mm	12	214
3PH15P18 mm	15	266	3PH15P25 mm	15	266
3PH57P18 mm	57	1009	3PH57P25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

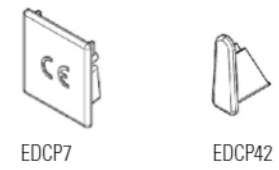
#### Power Feed Lug

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

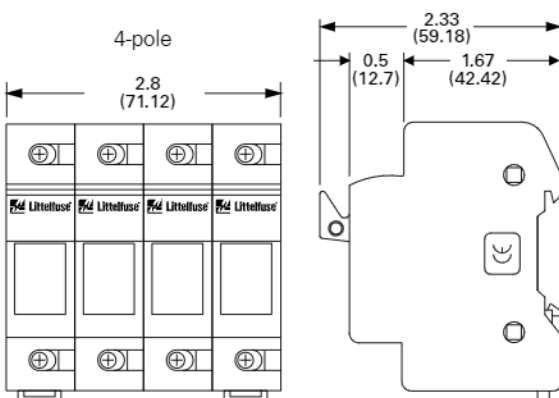
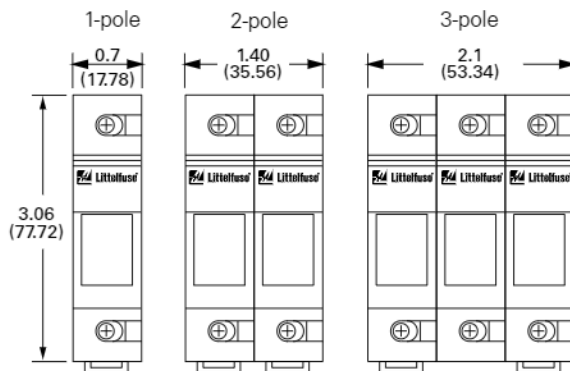
600 V



### 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) 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) UL Recognized (LPSM File: E14721) 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 pliers & 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

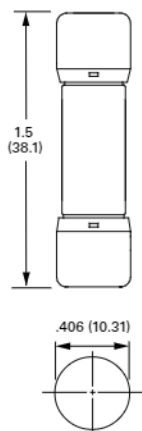
- Designed to UL and IEC photovoltaic specifications
- 1/10 - 30 A ratings available
- 50,000 A Interrupting Rating
- Available in ferrule or PCB mount options
- 1-5 A meets UL 1741 GFDI requirements

### Applications

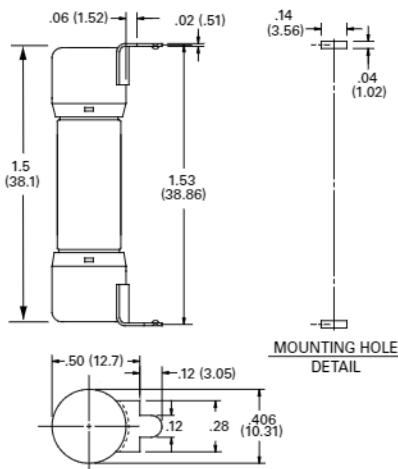
- Combiner boxes and inverters
- Power supplies
- Desktop meters

### Dimensions Inches (mm)

#### Ferrule Version



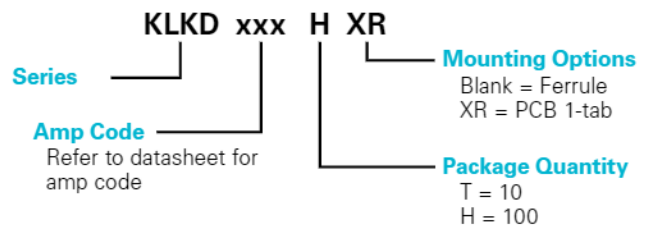
#### PCB 1-Tab



### Specifications

<b>Voltage Rating</b>	600 V ac/V dc
<b>Amperage Rating</b>	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
<b>Interrupting Ratings</b>	AC: 100 kA 200 kA Littelfuse self-certified
<b>Material</b>	Body: Melamine / Caps: Copper Alloy
<b>Operating Temperature</b>	See rating curve
<b>Approvals</b>	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)
<b>Environmental</b>	RoHS Compliant
<b>Country of Origin</b>	Mexico

### 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)

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 Copper: Highly conductive copper, tin plated
<b>Flammability Rating</b>	UL 94 V-0
<b>Approvals</b>	UL Recognized - OLD/OLS Series (File: E171395) LFD/LFS Series (File: E309688) CSA Certified - OLD/OLS Series (File: LR700111) LFD/LFS Series (File: 007316_0_000) UL Listed - OLD57xxxx (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



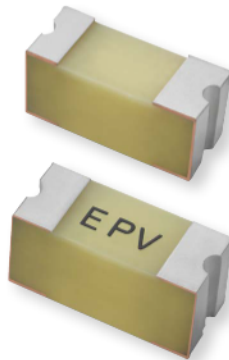
\*NEC is a trademark of its respective owner



# Solar Products

## 400PV SERIES SURFACE MOUNT FUSE

### 2410 Photovoltaic Fuse



### Description

Littelfuse 400PV Series is a 2410 size Surface Mount Fuse which offers relatively low resistance. It provides UL 248-19 compliant overcurrent protection for photovoltaic (PV) cells.

The 400PV series meets environment standards and is able to operate at high temperatures.

### Features & Benefits

- Wide operating temperature range
- 100% lead-free, halogen-free, and RoHS compliant
- Reliable overcurrent performance in high temperature environments
- Small and compact
- Surface mountable
- Compatible with common soldering assembly processes
- Recognized to UL/CSA 248-1 and UL/CSA 248-19

### Applications

- Photovoltaic shingles
- Photovoltaic cells

4

### Agency Approvals

Agency	Agency File Number	Ampere Rating
c UL US	E339112	0.375 A

### Electrical Characteristics

% of Ampere Rating	Ampere Rating	Opening Time
100%	0.375 A	4 hours, Minimum
135%	0.375 A	3600 seconds Maximum
200%	0.375 A	240 seconds Maximum

### Electrical Specifications

Ampere Rating (A)	Max Voltage Rating (V)	Interrupting Rating	Nominal Cold Resistance (Ohms)	Nominal Melting I <sup>2</sup> t (A <sup>2</sup> Sec.) <sup>1</sup>	Agency Approvals
0.375	86	10,000 A @ 86 VDC	0.31	0.010	c UL US X

Note  
1. Nominal Melting I<sup>2</sup>t measured at 1 msec. opening time

### Additional Information



Resources



Accessories



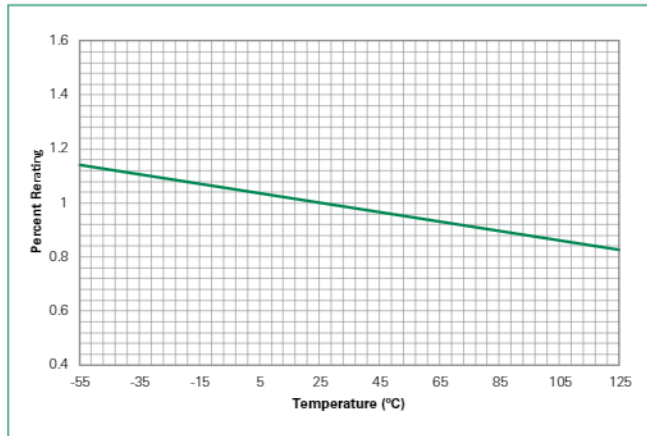
Samples

# Solar Products

## 400PV SERIES SURFACE MOUNT FUSE

### 2410 Photovoltaic Fuse

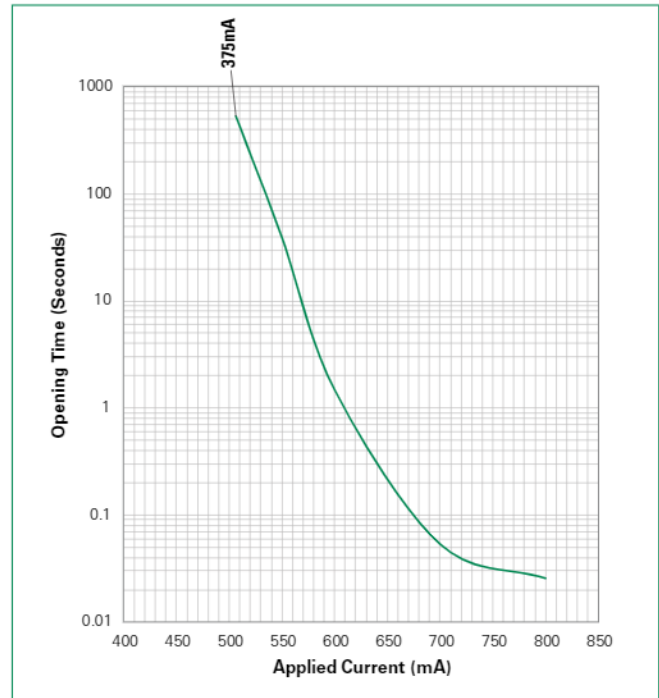
#### Temperature Re-rating Curve



**Note**  
Derating depicted in this curve is in addition to the standard derating of 25% for continuous operation.

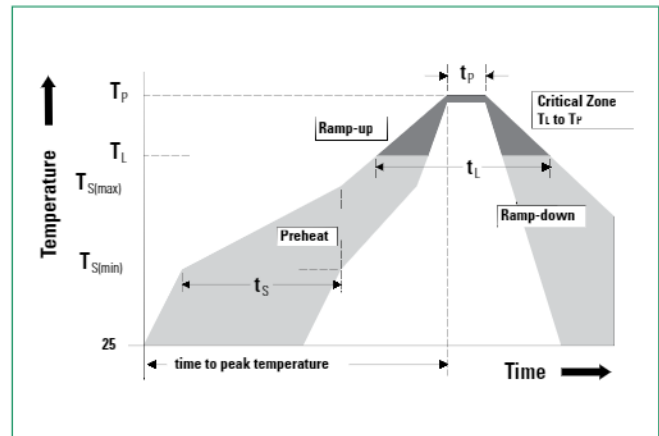
**Example**  
For continuous operation at 85 degrees celsius, the fuse should be derated as follows:  
 $I = (0.75)(0.90)I_n = (0.675)I_n$

#### Average Time Current Curve



#### Soldering Parameters – Reflow Soldering

Reflow Condition		Pb-free assembly
Pre Heat	- Temperature Min ( $T_{s(min)}$ )	150° C
	Temperature Max ( $T_{s(max)}$ )	200° C
	- Time (Min to Max) ( $t_s$ )	60–180 secs
Average ramp up rate (Liquidus Temp ( $T_L$ ) to peak)		3° C/second max.
$T_{s(max)}$ to $T_L$ - Ramp-up Rate		5° C/second max.
Reflow	- Temperature ( $T_L$ ) (Liquidus)	217° C
	- Temperature ( $t_L$ )	60–150 seconds
Peak Temperature ( $T_p$ )		260 <sup>+0/-5</sup> °C
Time within 5° C of actual peak Temperature ( $t_p$ )		10–30 seconds
Ramp-down Rate		6° C/second max.
Time 25° C to peak Temperature ( $T_p$ )		8 minutes max.
Do not exceed		260° C
Wave Soldering	260° C, 10 seconds max.	



# Solar Products

## 400PV SERIES SURFACE MOUNT FUSE

### 2410 Photovoltaic Fuse

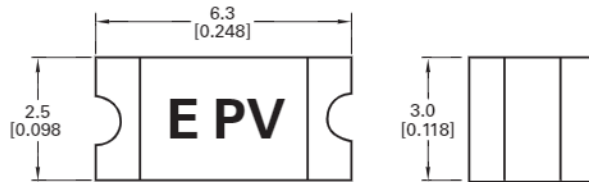
#### Product Characteristics

<b>Materials</b>	Body: Epoxy resin (UL 94 V-0 certified) Terminations: Cu/Ni/Sn (100% Pb-free)
<b>Moisture Sensitivity Level</b>	IPC/JEDEC J-STD-020C, Level 1
<b>Solderability</b>	IPC/EIC/JEDEC J-STD-002B, Condition B
<b>Humidity</b>	UL 248-19 Section 6.7.3
<b>Resistance to Soldering Heat</b>	MIL-STD-202, Method 210F, Condition B
<b>Thermally Induced Drift</b>	UL 248-19 Section 6.6.1
<b>Moisture Resistance</b>	MIL-STD-202, Method 106G

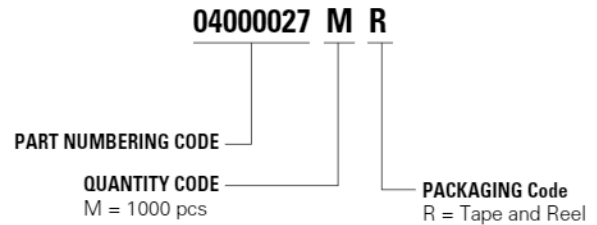
<b>Thermal Shock</b>	MIL-STD-202, Method 107G, Condition B-3
<b>Mechanical Shock</b>	MIL-STD-202, Method 213B, Condition A
<b>Vibration</b>	MIL-STD-202, Method 201A
<b>Vibration, High Frequency</b>	MIL-STD-202, Method 204D, Condition D
<b>Dissolution of Metallization</b>	IPC/EIC/JEDEC J-STD-002B, Condition D
<b>Terminal Strength</b>	IEC 60127-4
<b>Temperature Extremes</b>	UL 248-19 Section 6.6.2

4

#### Dimensions



#### Part Numbering System



#### Packaging

Packaging Option	Packaging Specification	Quantity	Quantity & Packaging Code
12 mm Tape and Reel	EIA-481/IEC 60286-3	1000	MR



# 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

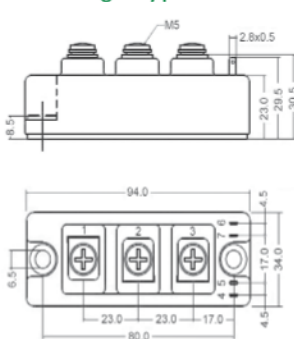
- AC motor control
- Inverter
- Motion/servo control
- Power supplies
- Photovoltaic/fuel cell

### Web Resources

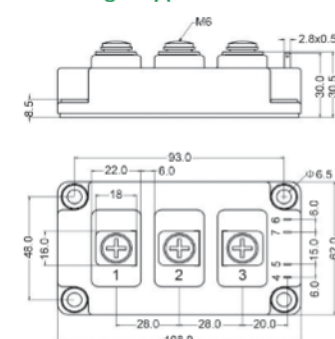
Download the complete datasheet and other technical information: [littelfuse.com](http://littelfuse.com)

### Dimensions Inches (mm)

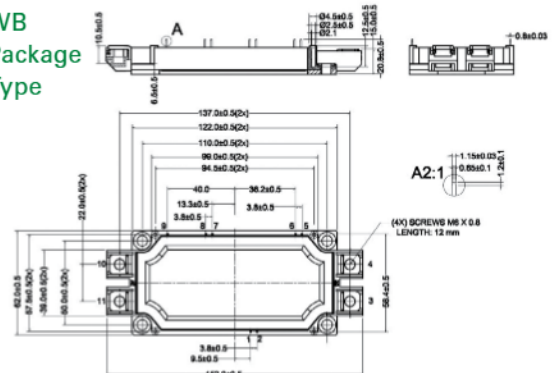
S Package Type



D Package Type



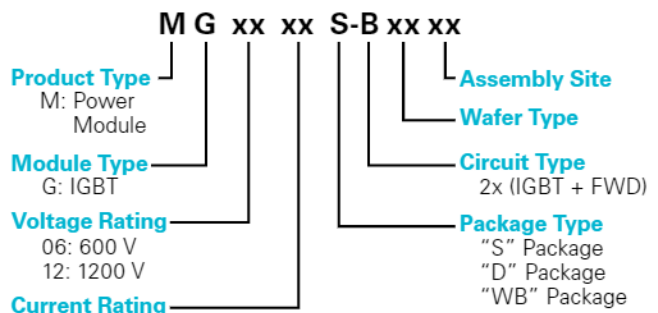
WB Package Type



### Specifications

<b>Voltage Rating</b>	600 / 1200 V
<b>Amperage Rating</b>	S Package: 75, 100, 150, 200 D Package: 100, 150, 200, 300, 400 WB Package: 225, 300, 450, 600
<b>Circuit Type</b>	Half-Bridge
<b>Approvals</b>	UL Listed (File: E71639)
<b>Environmental</b>	RoHS Compliant

### 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.

5

SERIES NAME	PHOTO	PACKAGE TYPE	REVERSE STANDOFF VOLTAGE (V <sub>R</sub> )	PEAK PULSE POWER RANGE (P <sub>PP</sub> 10/1000 $\mu$ s)	PEAK PULSE CURRENT (I <sub>PP</sub> 8/20 $\mu$ s)	OPERATING TEMPERATURE	HF	ROHS
<b>SURFACE MOUNT - STANDARD APPLICATION (200-5000 W)</b>								
SMF		SOD-123	5.0-85	200 W	–	-67 °F to +302 °F (-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	–		•	•
<b>AXIAL LEADED - STANDARD APPLICATION (400-5000 W)</b>								
P4KE		DO-41	5.8-468	400 W	–	-67 °F to +347 °F (-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	–		•	•
<b>AXIAL LEADED - HIGH POWER (15000-30000 W; 1-15 kA)</b>								
15KPA		P600	17-280	15000 W	–	-67 °F to +347 °F (-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 (-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:

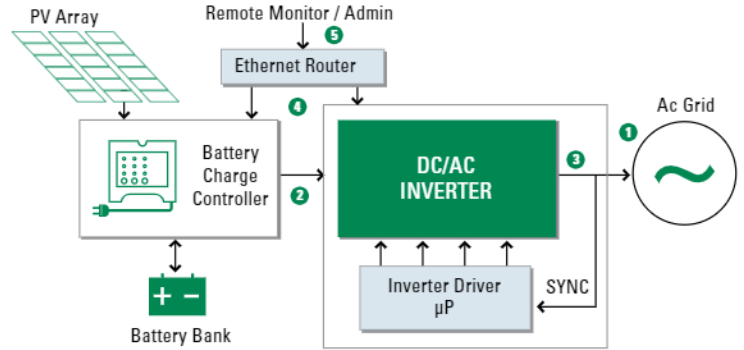
Microprocessor-controlled inverter with the ac output synchronized to the ac grid stores energy in utility company and maximizes photovoltaic (PV) array energy output.

#### 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)

5

SERIES NAME	PHOTO	OPERATING V AC RANGE	OPERATING V DC RANGE	PEAK CURRENT RANGE* (A)	PEAK ENERGY RANGE (J)	OPERATING TEMPERATURE	MOUNT/ FORM FACTOR	DISC SIZE	AGENCY APPROVALS								
									UR	CSA	VDE	CECC	ROHS	HF			
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 Radial Leads	25 mm	•						•		
SMOV™ 34S		115-750	150-970	40000	280-1200	-45 to +75 °C	Industrial Packaged 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	•		•	•	•	•	•	•	•

### Dc Ground-Fault Monitor



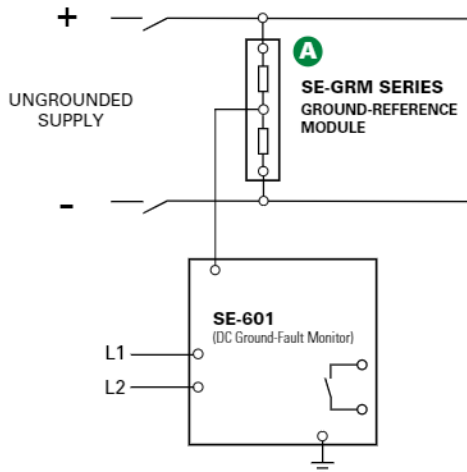
### Description

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

### Simplified Circuit Diagram



6

### 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.

### Accessories

**A** **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"); <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), CE (European Union), C-Tick (Australian)
<b>Warranty</b>	5 years
<b>Mounting</b>	DIN, surface (standard) Panel (with PMA-55 or PMA-60 adapter)



# Solar Products

## EL731 SERIES

### Ac/Dc Sensitive Earth-Leakage Relay

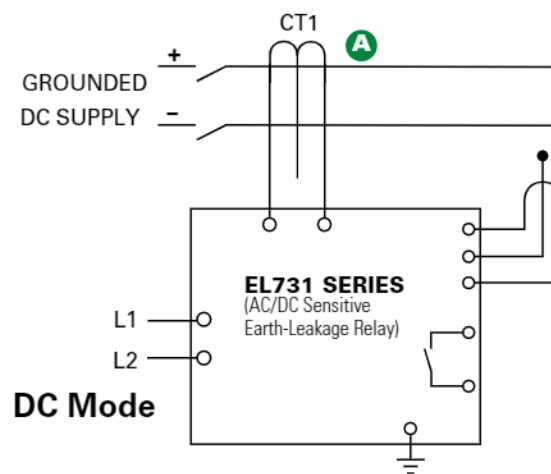
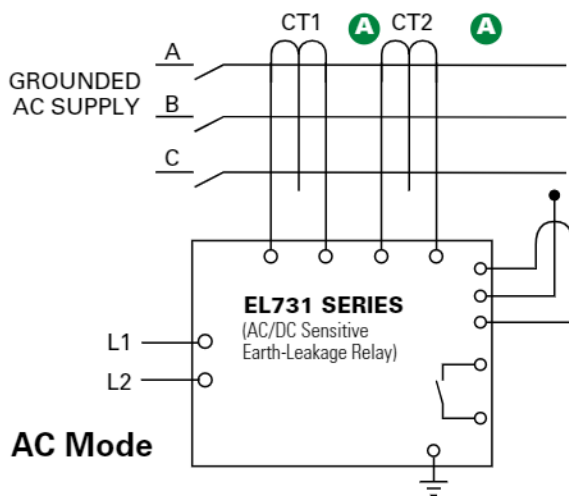


### Description



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

- A**  **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

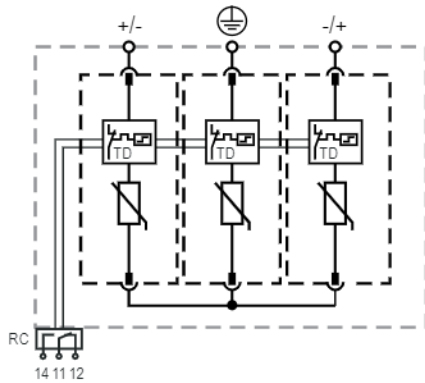


### Description

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

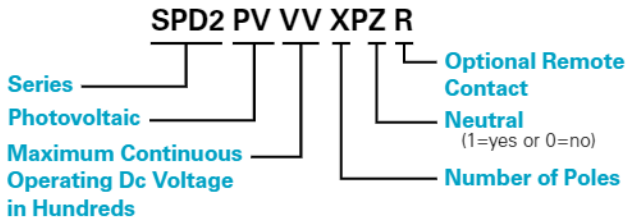
### Module & Base Ordering Information

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 ( $I_{SCPV}$ )	Maximum Permitted Dc Voltage ( $U_{pVdc}$ )	Voltage Protection Rating (VPR)	Nominal Discharge Current (8/20 $\mu$ s) ( $I_n$ )	Short-Circuit Current Rating (SCCR)	
SPD2-PV11-3P0 SPD2-PV11-3P0-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-PV15-3P0 SPD2-PV15-3P0-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)

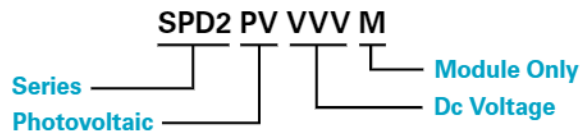
# Solar Products

## 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)/ 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 UL 94 V-0
<b>Thermal Protection</b>	Yes

<b>Operating State/Fault Indication</b>	Green Flag/No Green Flag
<b>Remote Contact Switching Capacity</b>	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
<b>Remote Contact Conductor Cross Section (max)</b>	1.5 mm <sup>2</sup> (16 AWG) (Solid)
<b>Standards Passed</b>	EN 50539-11:2013+A1:2014 UL 1449 4th Edition; E320116

<b>Product Dimensions</b>	
<b>3TE Module and Base</b>	<b>H</b> 90.7 mm (3.57"); <b>W</b> 53.8 mm (2.11"); <b>D</b> 66.1 mm (2.60")
<b>1TE Replacement Module</b>	<b>H</b> 45.0 mm (1.77"); <b>W</b> 18.0 mm (0.71"); <b>D</b> 57.2 mm (2.25")
<b>Package Dimensions</b>	
<b>3TE Module and Base</b>	<b>H</b> 102.0 mm (4.01"); <b>W</b> 64.0 mm (2.52"); <b>D</b> 110.0 mm (4.33")
<b>1TE Replacement Module</b>	<b>H</b> 102.0 mm (4.01"); <b>W</b> 28.0 mm (1.10"); <b>D</b> 110.0 mm (4.33")

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



# Solar Products

## LS7R0250 1500 V DC DISCONNECT SWITCH

1500 V Dc • 250 A

REACH EAC CE IEC UL RoHS



### Description

The Littelfuse LS7R dc series is an energy-efficient, compact disconnect switch that quickly breaks or resumes the flow of current safely to prevent shock hazards when trying to isolate circuits or repair systems. It is a 1500 V dc disconnect for ungrounded systems.

### Features/Benefits

- The patented operation system minimizes damage caused by arcs upon disconnection to increase product reliability and longevity
- Streamline design eliminates the need for external bridging links (jumpers) to lower heat dissipation for increased energy efficiency, decreased installation and maintenance time, and reduced footprint for added design flexibility
- High-level disconnection insulation provides a barrier to stop conduction when switch is in off position for added safety
- The self-cleaning blade contacts eliminate performance degradation (from increased electrical resistance over time) to ensure consistent behavior across the product's lifespan
- The internally-located "sandwich-type" 2-contact symmetrical design mitigates the electromagnetic force of repulsion to offer enhanced functionality in short-circuit conditions
- Meets UL 94 flammability requirements with self-extinguishing/non-flammable materials to prevent fires

### Applications

- Solar/PV systems: combiner boxes, recombiner boxes and inverters
- Energy storage systems: disconnection of batteries, containerized batteries
- Oil & gas: dc drives
- Railway: earthing switches and battery disconnection
- UPS: switching and isolation of batteries
- Electrical vehicle chargers

### Specifications

#### UL 98B Standards

Total Voltage Rating	1500 V dc
Amperage Rating	250 A
SCCR Rating	10 kA
Ambient Temperature	-20 to 50 °C (-4 to 122 °F)

#### IEC 60947-3 Standards

Insulation Voltage Rating $U_i$	1500 V dc
Impulse Withstand Voltage	

Rating $U_{imp}$	12 kV
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Operational Current	
DC21B Rating	250 A / 1500 V dc

#### Other Characteristics

Power Losses at 250 A	8.26 watts
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#### Maximum Busbar

Connection Range	1 bar x 5 mm (.20") H x 32 mm (1.25") L
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Number of Circuits/Switches	1
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Tightening Torque	159 lbf-in (18 N·m)
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Material	Plastic housing Silver-plated copper terminals
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Base Mounting	Screws
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Flammability Rating	UL 94 V-0
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Approvals	UL 98B & UL 94 UL Guide WHVA UL Listed E511898 NEC Article 690 for PV systems IEC-60947-3
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	CE EAC
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Environmental	RoHS compliant
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	REACH
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Country of Origin	Spain
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### Recommended Accessories

- **Panel Handle with Shaft LDSSA11**  
For closed panel door access
- **Direct Handle LDSI11**  
For open panel door access
- **Auxiliary Contact LDMAU11**  
Remotely indicates switch position

# Solar Products

## LS7R0250 1500 V DC DISCONNECT SWITCH

### Part Numbering System

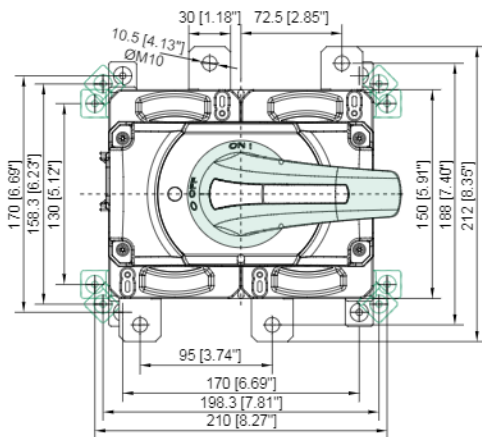


### Ordering Information

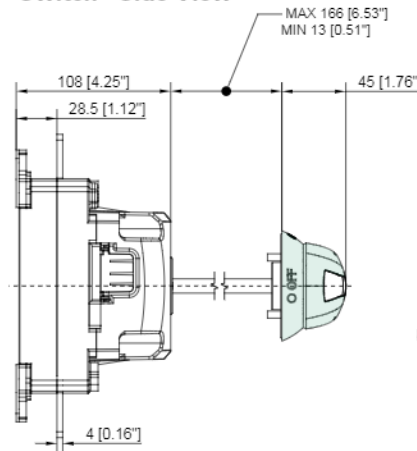
DC DISCONNECT SWITCH					
PART NUMBER	VOLTAGE	AMPERAGE	INSTALLATION	CONFIGURATION	SINGLE UNIT WEIGHT
LS7R02502PS00L	1500 V dc	250 A	Ungrounded	Type 2P	3 kg

### Dimensions Millimeters (Inches)

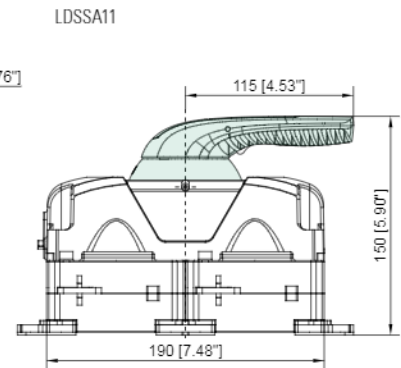
Dc Disconnect Switch



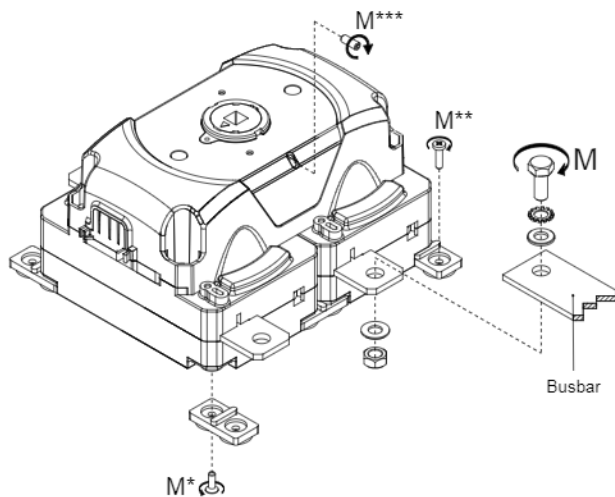
Switch - Side View



Panel Handle with Shaft



Switch - 3D Installation View



Busbar

QTY	TYP	COPPER BUSBAR M (TERMINAL TORQUE) (+5%   -10%)		COPPER BUSBAR H MAX (CU)		COPPER BUSBAR L MAX (CU)	
		N•M	LBF•INCH	MM	INCH	MM	INCH
1	M10	18	159	5	13/64	32	1 ¼
M	TYP	M (+5%   -10%)		MINIMUM BUSBAR SECTION ACCORDING TO UL 98B			
		N•M	LBF•INCH	H L			
*	T20	M4	1.2	10.6			
**	—	M4	1.5	13.3			
***	Allen	M5	1.5	13.3			

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# Solar Products

## LS7R0320 1500 V DC DISCONNECT SWITCH

1500 V Dc • 320 A

REACH EAC CE IEC UL RoHS



### Description

The Littelfuse LS7R dc series is an energy-efficient, compact disconnect switch that quickly breaks or resumes the flow of current safely to prevent shock hazards when trying to isolate circuits or repair systems. It is a 1500 V dc disconnect for ungrounded systems.

### Features/Benefits

- The patented operation system minimizes damage caused by arcs upon disconnection to increase product reliability and longevity
- Streamline design eliminates the need for external bridging links (jumpers) to lower heat dissipation for increased energy efficiency, decreased installation and maintenance time, and reduced footprint for added design flexibility
- High-level disconnection insulation provides a barrier to stop conduction when switch is in off position for added safety
- The self-cleaning blade contacts eliminate performance degradation (from increased electrical resistance over time) to ensure consistent behavior across the product's lifespan
- The internally-located "sandwich-type" 2-contact symmetrical design mitigates the electromagnetic force of repulsion to offer enhanced functionality in short-circuit conditions
- Meets UL 94 flammability requirements with self-extinguishing/non-flammable materials to prevent fires

### Applications

- Solar/PV systems: combiner boxes, recombiner boxes and inverters
- Energy storage systems: disconnection of batteries, containerized batteries
- Oil & gas: dc drives
- Railway: earthing switches and battery disconnection
- UPS: switching and isolation of batteries
- Electrical vehicle chargers

### Specifications

#### UL 98B Standards

Total Voltage Rating	1500 V dc
Amperage Rating	320 A
SCCR Rating	10 kA
Ambient Temperature	-20 to 50 °C (-4 to 122 °F)

#### IEC 60947-3 Standards

Insulation Voltage Rating Ui	1500 V dc
Impulse Withstand Voltage Rating Uimp	12 kV
Operational Current DC21B Rating	320 A / 1500 V dc

#### Other Characteristics

Power Losses at 320 A	13.55 watts
Maximum Busbar Connection Range	1 bar x 5 mm (.20") H x 40 mm (1.58") L
Number of Circuits/Switches	1
Tightening Torque	159 lbf-in (18 N·m)
Material	Plastic housing Silver-plated copper terminals
Base Mounting	Screws
Flammability Rating	UL 94 V-0
Approvals	UL 98B & UL 94 UL Guide WHVA UL Listed E511898 NEC Article 690 for PV systems IEC-60947-3 CE EAC

#### Environmental

RoHS compliant  
REACH

#### Country of Origin

Spain

### Recommended Accessories

- **Panel Handle with Shaft LDSSA11**  
For closed panel door access
- **Direct Handle LDSI11**  
For open panel door access
- **Auxiliary Contact LDMAU11**  
Remotely indicates switch position

# Solar Products

## LS7R0320 1500 V DC DISCONNECT SWITCH

### Part Numbering System

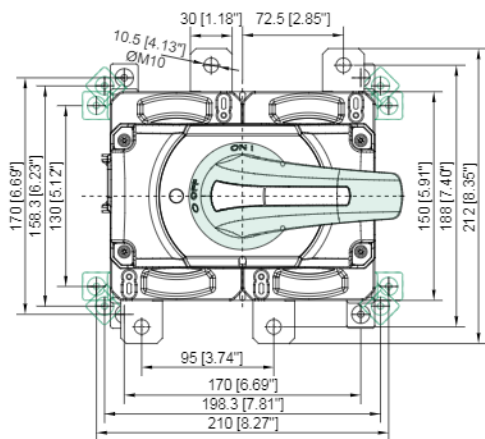


### Ordering Information

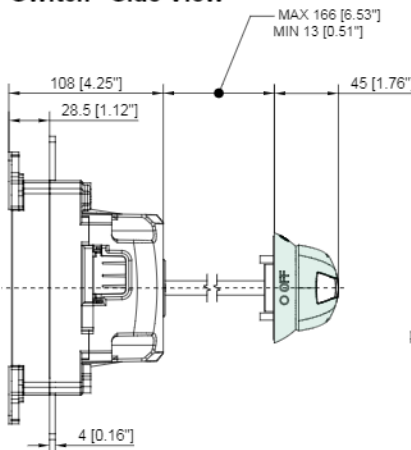
DC DISCONNECT SWITCH					
PART NUMBER	VOLTAGE	AMPERAGE	INSTALLATION	CONFIGURATION	SINGLE UNIT WEIGHT
LS7R03202PS00L	1500 V dc	320 A	Ungrounded	Type 2P	3 kg

### Dimensions Millimeters (Inches)

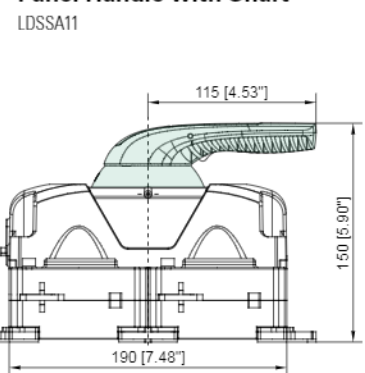
Dc Disconnect Switch



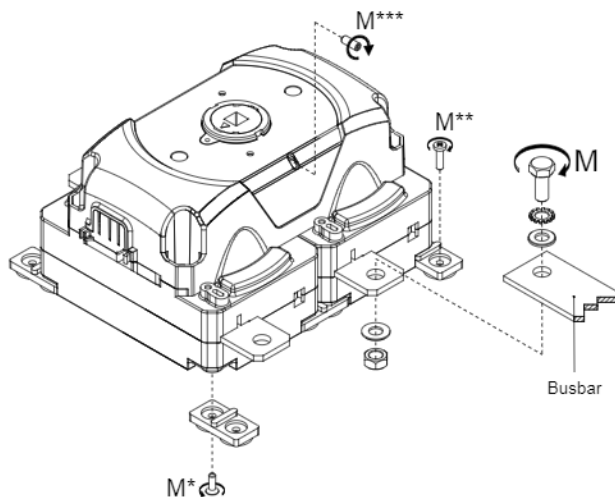
Switch - Side View



Panel Handle with Shaft



Switch - 3D Installation View



Busbar

QTY	TYP	COPPER BUSBAR M (TERMINAL TORQUE) (+5%   -10%)		COPPER BUSBAR H MAX (CU)		COPPER BUSBAR L MAX (CU)	
		N•M	LBF•INCH	MM	INCH	MM	INCH
1	M10	18	159	5	13/64	40	1 37/64
M	TYP	M (+5%   -10%)		MINIMUM BUSBAR SECTION ACCORDING TO UL 98B			
*	T20	M4	1.2	10.6			
**	—	M4	1.5	13.3			
***	Allen	M5	1.5	13.3			

# Solar Products

## LS7R0400 1500 V DC DISCONNECT SWITCH

1500 V Dc • 400 A

REACH EAC CE IEC UL RoHS



### Description

The Littelfuse LS7R dc series is an energy-efficient, compact disconnect switch that quickly breaks or resumes the flow of current safely to prevent shock hazards when trying to isolate circuits or repair systems. It is a 1500 V dc disconnect for ungrounded systems.

### Features/Benefits

- The patented operation system minimizes damage caused by arcs upon disconnection to increase product reliability and longevity
- Streamline design eliminates the need for external bridging links (jumpers) to lower heat dissipation for increased energy efficiency, decreased installation and maintenance time, and reduced footprint for added design flexibility
- High-level disconnection insulation provides a barrier to stop conduction when switch is in off position for added safety
- The self-cleaning blade contacts eliminate performance degradation (from increased electrical resistance over time) to ensure consistent behavior across the product's lifespan
- The internally-located "sandwich-type" 2-contact symmetrical design mitigates the electromagnetic force of repulsion to offer enhanced functionality in short-circuit conditions
- Meets UL 94 flammability requirements with self-extinguishing/non-flammable materials to prevent fires

### Applications

- Solar/PV systems: combiner boxes, recombiner boxes and inverters
- Energy storage systems: disconnection of batteries, containerized batteries
- Oil & gas: dc drives
- Railway: earthing switches and battery disconnection
- UPS: switching and isolation of batteries
- Electrical vehicle chargers

### Specifications

#### UL 98B Standards

Total Voltage Rating	1500 V dc
Amperage Rating	400 A
SCCR Rating	10 kA
Ambient Temperature	-20 to 50 °C (-4 to 122 °F)

#### IEC 60947-3 Standards

Insulation Voltage Rating $U_i$	1500 V dc
Impulse Withstand Voltage	

Rating  $U_{imp}$  12 kV

Operational Current	
DC21B Rating	400 A / 1500 V dc

#### Other Characteristics

Power Losses at 400 A	21.15 watts
Maximum Busbar	
Connection Range	2 bars x 4 mm (.16") H x 32 mm (1.25") L
Number of Circuits/Switches	1
Tightening Torque	159 lbf-in (18 N·m) for M10 screw
Material	Plastic housing Silver-plated copper terminals
Base Mounting	Screws
Flammability Rating	UL 94 V-0
Approvals	UL 98B & UL 94 UL Guide WHVA UL Listed E511898 NEC Article 690 for PV systems IEC-60947-3 CE EAC

Environmental RoHS compliant

REACH

Country of Origin Spain

### Recommended Accessories

- **Panel Handle with Shaft LDSSA11**  
For closed panel door access
- **Direct Handle LDS11**  
For open panel door access
- **Auxiliary Contact LDMAU11**  
Remotely indicates switch position



# Solar Products

## LS7R0400 1500 V DC DISCONNECT SWITCH

### Part Numbering System

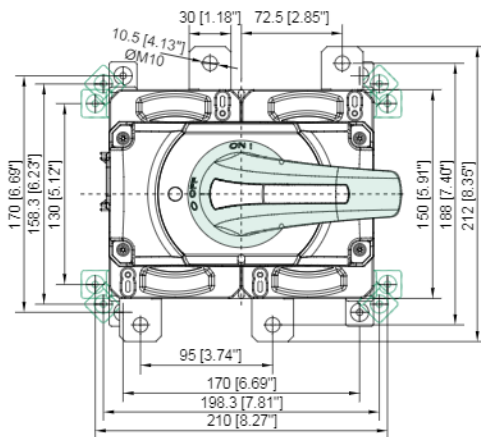


### Ordering Information

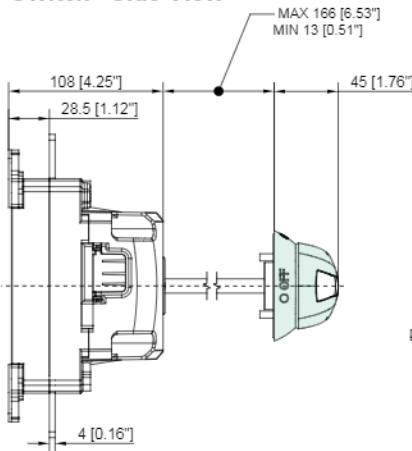
DC DISCONNECT SWITCH					
PART NUMBER	VOLTAGE	AMPERAGE	INSTALLATION	CONFIGURATION	SINGLE UNIT WEIGHT
LS7R04002PS00L	1500 V dc	400 A	Ungrounded	Type 2P	3 kg

### Dimensions Millimeters (Inches)

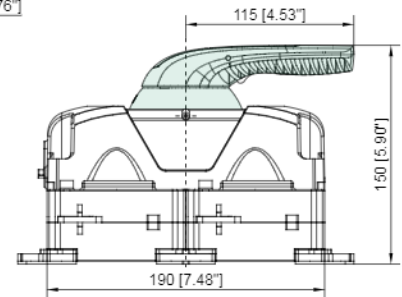
Dc Disconnect Switch



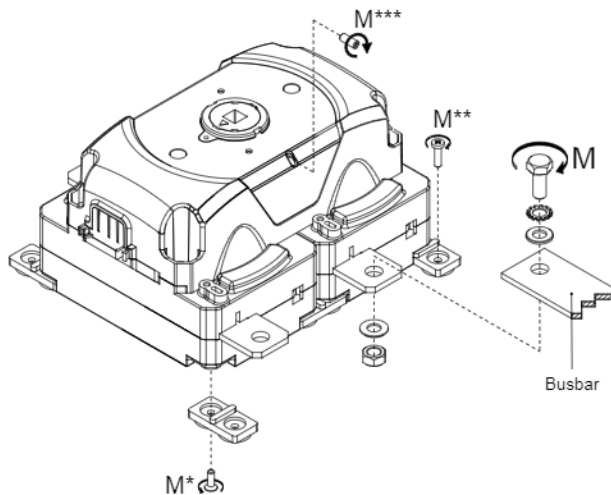
Switch - Side View



Panel Handle with Shaft  
LDSSA11



Switch - 3D Installation View



Busbar

QTY	T	COPPER BUSBAR M (TERMINAL TORQUE) (+5%   -10%)		COPPER BUSBAR H MAX (CU)		COPPER BUSBAR L MAX (CU)		
		N•M	LBF•INCH	MM	INCH	MM	INCH	
2	M10	18	159	4	5/32	32	1¼	
M	T	M (+5%   -10%)		MINIMUM BUSBAR SECTION ACCORDING TO UL 98B				
		N•M	LBF•INCH					
*	T20	M4	1.2	10.6				
**	—	M4	1.5	13.3				
***	Allen	M5	1.5	13.3				

# Solar Products

## LS7R0500 1500 V DC DISCONNECT SWITCH

1500 V Dc • 500 A

REACH ENEC CE IEC UL RoHS



### Description

The Littelfuse LS7R dc series is an energy-efficient, compact disconnect switch that quickly breaks or resumes the flow of current safely to prevent shock hazards when trying to isolate circuits or repair systems. It is a 1500 V dc disconnect for ungrounded systems.

### Features/Benefits

- The patented operation system minimizes damage caused by arcs upon disconnection to increase product reliability and longevity
- Streamline design eliminates the need for external bridging links (jumpers) to lower heat dissipation for increased energy efficiency, decreased installation and maintenance time, and reduced footprint for added design flexibility
- High-level disconnection insulation provides a barrier to stop conduction when switch is in off position for added safety
- The self-cleaning blade contacts eliminate performance degradation (from increased electrical resistance over time) to ensure consistent behavior across the product's lifespan
- The internally-located "sandwich-type" 2-contact symmetrical design mitigates the electromagnetic force of repulsion to offer enhanced functionality in short-circuit conditions
- Meets UL 94 flammability requirements with self-extinguishing/non-flammable materials to prevent fires

### Applications

- Solar/PV systems: combiner boxes, recombiner boxes and inverters
- Energy storage systems: disconnection of batteries, containerized batteries
- Oil & gas: dc drives
- Railway: earthing switches and battery disconnection
- UPS: switching and isolation of batteries
- Electrical vehicle chargers

### Specifications

#### UL 98B Standards

Total Voltage Rating	1500 V dc
Amperage Rating	500 A
SCCR Rating	10 kA
Ambient Temperature	-20 to 50 °C (-4 to 122 °F)

#### IEC 60947-3 Standards

Insulation Voltage Rating Ui	1500 V dc
Impulse Withstand Voltage	

Rating Uimp 12 kV

#### Operational Current

DC21B Rating 500 A / 1500 V dc

#### Other Characteristics

Power Losses at 500 A 33.05 watts

#### Maximum Busbar

Connection Range 2 bars x 5 mm (.20") H x 32 mm (1.25") L

Number of Circuits/Switches 1

Tightening Torque 212 lbf-in (24 N·m)

#### Material

Plastic housing

Silver-plated copper terminals

Screws

Flammability Rating UL 94 V-0

Approvals UL 98B & UL 94

UL Guide WHVA

UL Listed E511898

NEC Article 690 for PV systems

IEC-60947-3

CE

EAC

Environmental RoHS compliant

REACH

Country of Origin Spain

### Recommended Accessories

- **Panel Handle with Shaft LDSSA11**  
For closed panel door access
- **Direct Handle LDSI11**  
For open panel door access
- **Auxiliary Contact LDMAU11**  
Remotely indicates switch position



# Solar Products

## LS7R0500 1500 V DC DISCONNECT SWITCH

### Part Numbering System

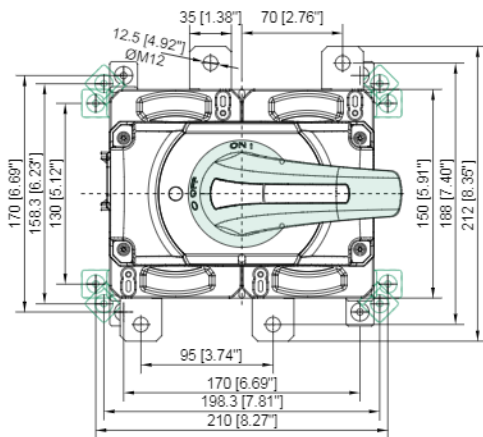


### Ordering Information

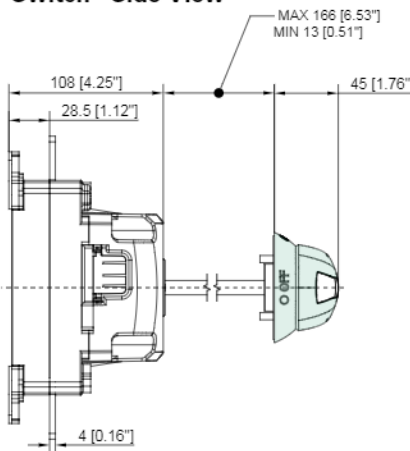
DC DISCONNECT SWITCH					
PART NUMBER	VOLTAGE	AMPERAGE	INSTALLATION	CONFIGURATION	SINGLE UNIT WEIGHT
LS7R05002PS00L	1500 V dc	500 A	Ungrounded	Type 2P	3 kg

### Dimensions Millimeters (Inches)

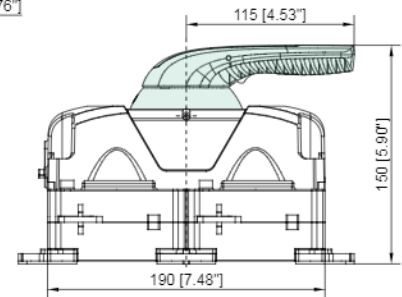
Dc Disconnect Switch



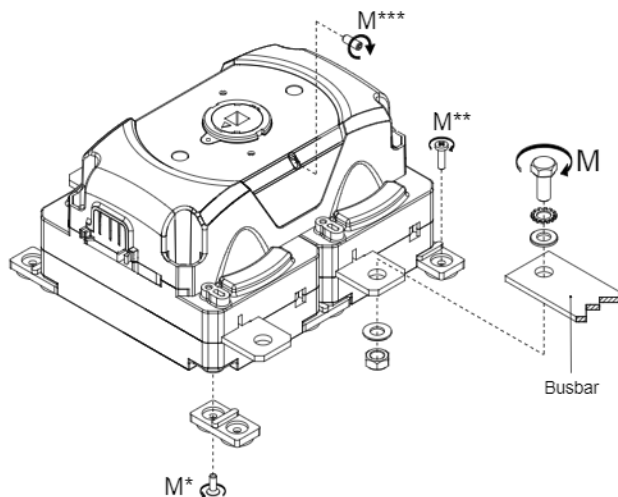
Switch - Side View



Panel Handle with Shaft  
LDSSA11



Switch - 3D Installation View



Busbar

QTY	T	COPPER BUSBAR M (TERMINAL TORQUE) (+5%   -10%)		COPPER BUSBAR H MAX (CU)		COPPER BUSBAR L MAX (CU)	
		N•M	LBF•INCH	MM	INCH	MM	INCH
2	M12	24	212	5	13/64	32	1¼
M	T	M (+5%   -10%)		MINIMUM BUSBAR SECTION ACCORDING TO UL 98B			
		N•M	LBF•INCH				
*	T20	M4	1.2	10.6			
**	—	M4	1.5	13.3			
***	Allen	M5	1.5	13.3			

# Solar Products

## LS6R0250 1500 V DC SERIES DISCONNECT SWITCH

1500 V dc • 250 A • 1 Pole  
1500 V dc • 250 A • 2 Pole (750 V dc per pole)

REACH EAC CE IEC UL RoHS



2 Pole (Type CB)  
Dc Ungrounded

1 Pole (Type 4D)  
Dc Grounded with handle attached



### Description

The Littelfuse LS6R dc series is an energy-efficient, compact disconnect switch that quickly breaks or resumes the flow of current safely to prevent shock hazards when trying to isolate circuits or repair systems.

### Features/Benefits

- The patented operation system minimizes damage caused by arcs upon disconnection to increase product reliability and longevity
- Streamline design eliminates the need for external bridging links (jumpers) to lower heat dissipation for increased energy efficiency, decreased installation and maintenance time, and reduced footprint for added design flexibility
- High-level disconnection insulation provides a barrier to stop conduction when switch is in off position for added safety
- The self-cleaning blade contacts eliminate performance degradation (from increased electrical resistance over time) to ensure consistent behavior across the product's lifespan
- The internally-located "sandwich-type" 2-contact symmetrical design mitigates the electromagnetic force of repulsion to offer enhanced functionality in short-circuit conditions
- Meets UL 94 flammability requirements with self-extinguishing/non-flammable materials to prevent fires

### Applications

- Solar/PV systems: combiner boxes, recombiner boxes and inverters
- Energy storage systems: disconnection of batteries, containerized batteries
- Oil & gas: dc drives
- Railway: earthing switches and battery disconnection
- UPS: switching and isolation of batteries

### Specifications

#### UL 98B Standards

Total Voltage Rating	1500 V dc
Amperage Rating	250 A
SCCR Rating	10 kA
Ambient Temperature	-20 to 50 °C (-4 to 122 °F)

#### IEC 60947-3 Standards

Insulation Voltage Rating Ui	1500 V dc
Impulse Withstand Voltage	

Rating Uimp	12 kV
Operational Current DC21B Rating	250 A / 1500 V dc

#### Other Characteristics

Power Losses at 250 A	2 Pole (CB): 4.13 watts/pole 1 Pole (4D): 4.13 watts total
-----------------------	---

#### Maximum Busbar

Connection Range	2 bars x 4 mm (.16") H x 30 mm (1.18") L
------------------	--

#### Number of Circuits/Switches

1
---

#### Mechanical Operations

8,000
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#### Tightening Torque

212 lbf-in (24 N·m)
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#### Material

Plastic housing
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Silver-plated copper terminals
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Screws
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UL 94 V-0
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UL 98B & UL 94
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UL Guide WHVA
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UL Listed E511898
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NEC Article 690 for PV systems
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IEC-60947-3
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CE
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EAC
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RoHS compliant
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REACH
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Country of Origin
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Spain
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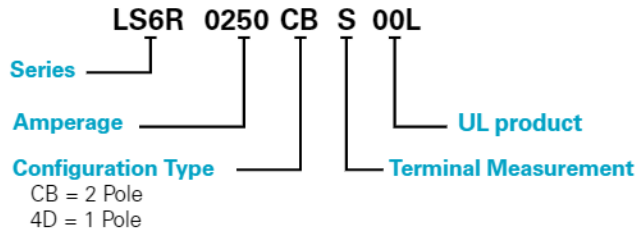
### Recommended Accessories

- **Panel Handle with Shaft LDSSA11**  
For closed panel door access
- **Direct Handle LDSI11**  
For open panel door access
- **Auxiliary Contact LD5LAU01**  
Remotely indicates switch position

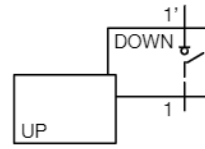
# Solar Products

## LS6R0250 1500 V DC SERIES DISCONNECT SWITCH

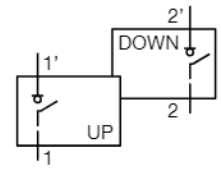
### Part Numbering System



### Configuration



Type 4D (1 Pole)



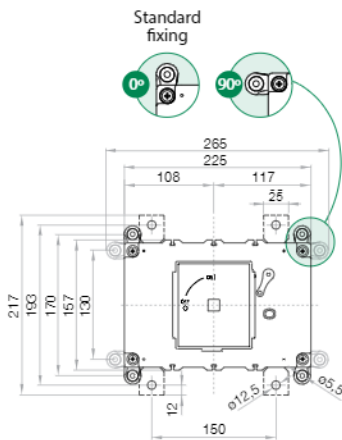
Type CB (2 Pole)

### Ordering Information

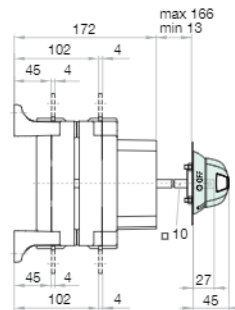
DC DISCONNECT SWITCH						
SERIES	TOTAL VOLTAGE	AMPERAGE	INSTALLATION	CONFIGURATION	POLES	SINGLE UNIT WEIGHT
LS6R02504DS00L	1500 V dc	250 A	Grounded	Type 4D	1	4.5 kg
LS6R0250CBS00L	1500 V dc	250 A	Ungrounded	Type CB	2	4.5 kg

### Dimensions Millimeters

#### Dc Disconnect Switch

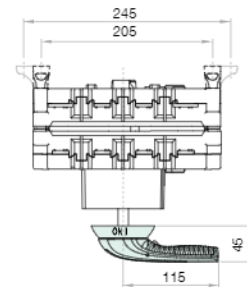


#### Switch - Side View



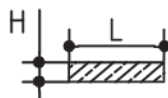
#### Panel Handle with Shaft

LDSSA11



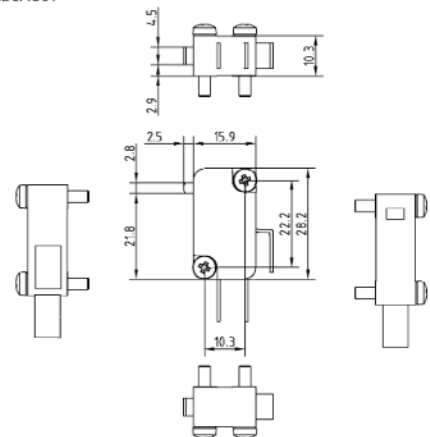
#### Busbar

BUSBAR H MAX (CU)		BUSBAR L MAX (CU)		COPPER BAR M (TERMINAL TORQUE) (+5%   -10%)	
MM	INCH	MM	INCH		
4	5/32	36	1 3/16	M12	
				N•M	LB•INCH
				24	212



#### Auxiliary Contact

LD5AU01



# Solar Products

## LS6R0400 1500 V DC SERIES DISCONNECT SWITCH

1500 V Dc • 400 A • 1 Pole  
1500 V Dc • 400 A • 2 Pole (750 V dc per pole)

REACH EAC CE IEC UL RoHS



2 Pole (Type CB)  
Dc Ungrounded



1 Pole (Type 4D)  
Dc Grounded with handle attached



### Description

The Littelfuse LS6R dc series is an energy-efficient, compact disconnect switch that quickly breaks or resumes the flow of current safely to prevent shock hazards when trying to isolate circuits or repair systems.

### Features/Benefits

- The patented operation system minimizes damage caused by arcs upon disconnection to increase product reliability and longevity
- Streamline design eliminates the need for external bridging links (jumpers) to lower heat dissipation for increased energy efficiency, decreased installation and maintenance time, and reduced footprint for added design flexibility
- High-level disconnection insulation provides a barrier to stop conduction when switch is in off position for added safety
- The self-cleaning blade contacts eliminate performance degradation (from increased electrical resistance over time) to ensure consistent behavior across the product's lifespan
- The internally-located "sandwich-type" 2-contact symmetrical design mitigates the electromagnetic force of repulsion to offer enhanced functionality in short-circuit conditions
- Meets UL 94 flammability requirements with self-extinguishing/non-flammable materials to prevent fires

### Applications

- Solar/PV systems: combiner boxes, recombiner boxes and inverters
- Energy storage systems: disconnection of batteries, containerized batteries
- Oil & gas: dc drives
- Railway: earthing switches and battery disconnection
- UPS: switching and isolation of batteries

### Specifications

#### UL 98B Standards

Total Voltage Rating	1500 V dc
Amperage Rating	400 A
SCCR Rating	10 kA
Ambient Temperature	-30 to 50 °C (-22 to 122 °F)

#### IEC 60947-3 Standards

Insulation Voltage Rating Ui	1500 V dc
Impulse Withstand Voltage	

Rating Uimp	12 kV
Operational Current DC21B Rating	400 A / 1500 V dc

#### Other Characteristics

Power Losses at 400 A	2 Pole (CB): 10.58 watts/pole 1 Pole (4D): 10.58 watts total
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#### Maximum Busbar

Connection Range	2 bars x 4 mm (.16") H x 32 mm (1.26") L
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#### Number of Circuits/Switches

1
---

#### Mechanical Operations

8,000
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#### Tightening Torque

212 lbf-in (24 N·m)
---------------------

#### Material

Plastic housing
-----------------

Silver-plated copper terminals
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Screws
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UL 94 V-0
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UL 98B & UL 94
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UL Guide WHVA
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UL Listed E511898
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NEC Article 690 for PV systems
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IEC-60947-3
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CE
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EAC
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RoHS compliant
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REACH
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Spain
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Country of Origin
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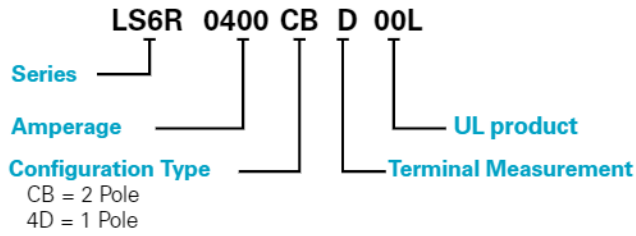
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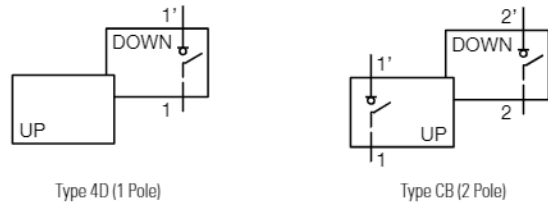
# Solar Products

## LS6R0400 1500 V DC SERIES DISCONNECT SWITCH

### Part Numbering System



### Configuration

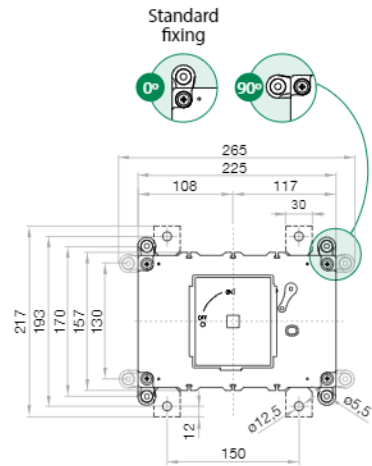


### Ordering Information

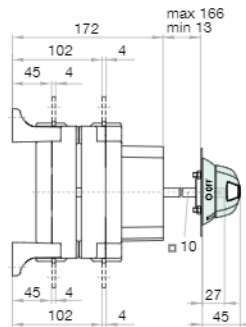
DC DISCONNECT SWITCH						
SERIES	TOTAL VOLTAGE	AMPERAGE	INSTALLATION	CONFIGURATION	POLES	SINGLE UNIT WEIGHT
LS6R04004DD00L	1500 V dc	400 A	Grounded	Type 4D	1	4.5 kg
LS6R0400CBD00L	1500 V dc	400 A	Ungrounded	Type CB	2	4.5 kg

### Dimensions Millimeters

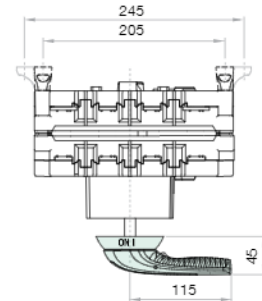
#### Dc Disconnect Switch



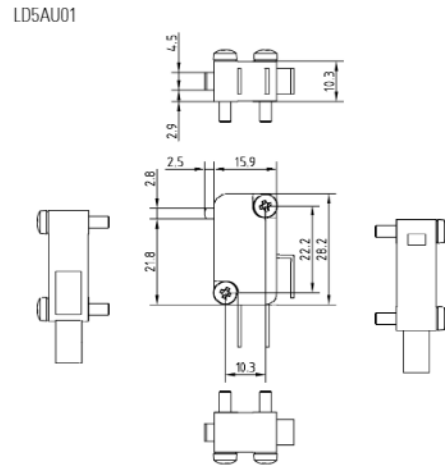
#### Switch - Side View



#### Panel Handle with Shaft LDSSA11

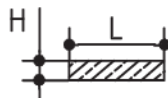


#### Auxiliary Contact LD5AU01



#### Busbar

BUSBAR H MAX (CU)		BUSBAR L MAX (CU)		COPPER BAR M (TERMINAL TORQUE) (+5%   -10%)
MM	INCH	MM	INCH	
4	5/32	32	1¼	M12
				N•M
				LB.INCH
				24
				212





# Solar Products

## LS60250 1000 V DC SERIES DISCONNECT SWITCH

1000 V dc • 250 A • 1 Pole  
1000 V dc • 250 A • 2 Pole (500 V dc per pole)

REACH ENE CE IEC UL RoHS



2 Pole (Type 2E)  
Dc Ungrounded



1 Pole (Type 1M)  
Dc Grounded with Handle Attached



### Description

The Littelfuse LS6 dc series is an energy-efficient, compact disconnect switch that quickly breaks or resumes the flow of current safely to prevent shock hazards when trying to isolate circuits or repair systems.

### Features/Benefits

- Streamline design eliminates the need for external bridging links (jumpers) to lower heat dissipation for increased energy efficiency, decreased installation and maintenance time, and reduced footprint for added design flexibility
- High-level disconnection insulation provides a barrier to stop conduction when switch is in off position for added safety
- The self-cleaning blade contacts eliminate performance degradation (from increased electrical resistance over time) to ensure consistent behavior across the product's lifespan
- The internally-located "sandwich-type" 2-contact symmetrical design mitigates the electromagnetic force of repulsion to offer enhanced functionality in short-circuit conditions
- Meets UL 94 flammability requirements with self-extinguishing/non-flammable materials to prevent fires

### Applications

- Solar/PV systems: combiner boxes, recombiner boxes and inverters
- Energy storage systems: disconnection of batteries, containerized batteries
- Oil & gas: dc drives
- Railway: earthing switches and battery disconnection
- UPS: switching and isolation of batteries

### Specifications

#### UL 98B Standards

Total Voltage Rating	1000 V dc
Amperage Rating	250 A
SCCR Rating	10 kA
Ambient Temperature	-20 to 50 °C (-4 to 122 °F)

#### IEC 60947-3 Standards

Insulation Voltage Rating $U_i$	1500 V dc
Impulse Withstand Voltage Rating $U_{imp}$	12 kV
Operational Current DC21B Rating	250 A/1000 V dc

#### Other Characteristics

Power Losses at 250 A	2 Pole (2E): 10.08 watts/pole 1 Pole (1M): 19.59 watts total
-----------------------	---

#### Minimum Connection

Wire Range/AWG 400 kcmil/MCM (203 mm<sup>2</sup>)

#### Maximum Connection

Wire Range/AWG 500 kcmil/MCM (253 mm<sup>2</sup>)

#### Number of Circuits/Switches

1

#### Mechanical Operations

8,000

#### Tightening Torque

159 lbf-in (18 N·m)

#### Material

Plastic housing  
Silver-plated copper terminals

#### Base Mounting

Screws

#### Flammability Rating

UL 94 V-0

#### Approvals

UL 98B & UL 94  
UL Guide WHVA  
UL Listed E511898  
UL Listed E511898  
NEC Article 690 for PV systems  
IEC-60947-3  
CE  
EAC

#### Environmental

RoHS compliant

#### Country of Origin

REACH

Spain

### Recommended Accessories

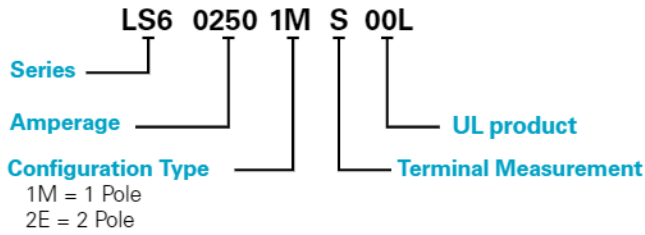
- Panel handle with shaft LDSSA11 for closed panel door access
- Direct handle LDSI11 for open panel door access
- Auxiliary contacts LD5LAU01 remotely indicate switch position
- Phase barriers LDRSF11 (Type 1M) and LDRSF13 (Type 2E) isolate sections to eliminate arcing between the phases
- Terminal lug LDRTL11W safely connects electrical and mechanical devices (phase barriers must be used in order to maintain the required clearance)
- Terminal shrouds LDRCU13W offer protection against direct contact after wiring
- Spacers LDREL11W increase distance between switch and mounting plate



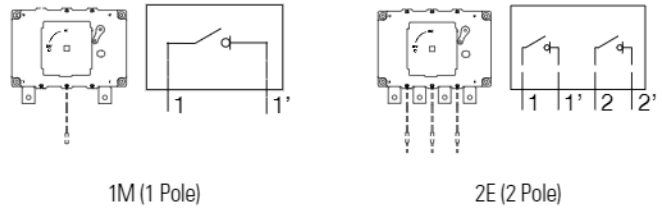
# Solar Products

## LS60250 1000 V DC SERIES DISCONNECT SWITCH

### Part Numbering System



### Configuration

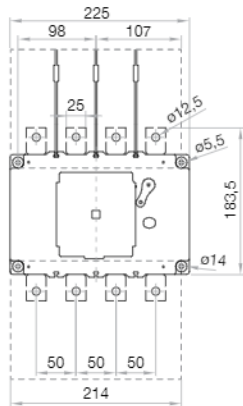


### Ordering Information

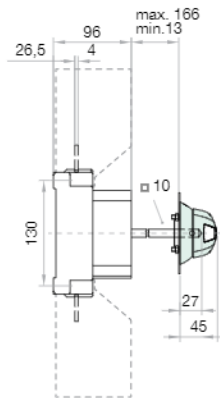
DC DISCONNECT SWITCH						
SERIES	TOTAL VOLTAGE	AMPERAGE	INSTALLATION	CONFIGURATION	POLES	SINGLE UNIT WEIGHT
LS602501MS00L	1000 V dc	250 A	Grounded	Type 1M	1	2 kg
LS602502ES00L	1000 V dc	250 A	Ungrounded	Type 2E	2	3 kg

### Dimensions Millimeters

#### Dc Disconnect Switch

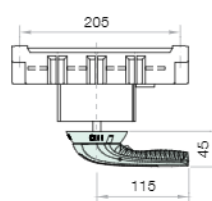


#### Switch + Direct Handle - Side View



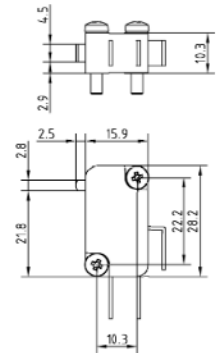
#### Panel Handle with Shaft

LDSSA11




#### Auxiliary Contact

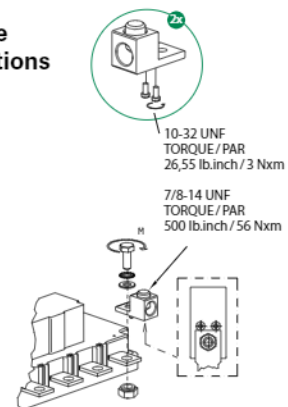
LD5AU01



### Terminal Lug Measurements

LDRTL11W				
3/0 85 MM <sup>2</sup> MIN. --- 400 KCMIL 240 MM <sup>2</sup> MAX.	CONDUCTOR TEMPERATURE RATING		COPPER WIRE ONLY M (TERMINAL TORQUE) (+5%   -10%)	
			N•M	LB.INCH
	75 °C	M10	18	159

### Torque and Cable Capacity Instructions



# Solar Products

## LS60400 1000 V DC SERIES DISCONNECT SWITCH

1000 V dc • 400 A • 1 Pole  
1000 V dc • 400 A • 2 Pole (500 V dc per pole)

REACH ENE CE IEC UL RoHS



2 Pole (Type 2E)  
Dc Ungrounded

1 Pole (Type 1M)  
Dc Grounded with Handle Attached



### Description

The Littelfuse LS6 dc series is an energy-efficient, compact disconnect switch that quickly breaks or resumes the flow of current safely to prevent shock hazards when trying to isolate circuits or repair systems.

### Features/Benefits

- Streamline design eliminates the need for external bridging links (jumpers) to lower heat dissipation for increased energy efficiency, decreased installation and maintenance time, and reduced footprint for added design flexibility
- High-level disconnection insulation provides a barrier to stop conduction when switch is in off position for added safety
- The self-cleaning blade contacts eliminate performance degradation (from increased electrical resistance over time) to ensure consistent behavior across the product's lifespan
- The internally-located "sandwich-type" 2-contact symmetrical design mitigates the electromagnetic force of repulsion to offer enhanced functionality in short-circuit conditions
- Meets UL 94 flammability requirements with self-extinguishing/non-flammable materials to prevent fires

### Applications

- Solar/PV systems: combiner boxes, recombiner boxes and inverters
- Energy storage systems: disconnection of batteries, containerized batteries
- Oil & gas: dc drives
- Railway: earthing switches and battery disconnection
- UPS: switching and isolation of batteries

### Specifications

#### UL 98B Standards

Total Voltage Rating	1000 V dc
Amperage Rating	400 A
SCCR Rating	10 kA
Ambient Temperature	-20 to 50 °C (-4 to 122 °F)

#### IEC 60947-3 Standards

Insulation Voltage Rating $U_i$	1500 V dc
Impulse Withstand Voltage	

Rating $U_{imp}$	12 kV
Operational Current DC21B Rating	400 A/1000 V dc

#### Other Characteristics

Power Losses at 400 A	2 Pole (2E): 18.4 watts/pole 1 Pole (1M): 36.11 watts total
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#### Minimum Connection

Wire Range / AWG	300 kcmil/MCM (152 mm <sup>2</sup> )
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#### Maximum Connection

Wire Range / AWG	350 kcmil/MCM (177 mm <sup>2</sup> )
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#### Number of Circuits/Switches

	1
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#### Mechanical Operations

	8,000
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#### Tightening Torque

	212 lbf-in (24 N·m)
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#### Material

	Plastic housing
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	Silver-plated copper terminals
--	--------------------------------

	Screws
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	UL 94 V-0
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	UL 98B & UL 94
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	UL Guide WHVA
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	UL Listed E511898
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	NEC Article 690 for PV systems
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	IEC-60947-3
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	CE
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	EAC
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	RoHS compliant
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	REACH
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	Spain
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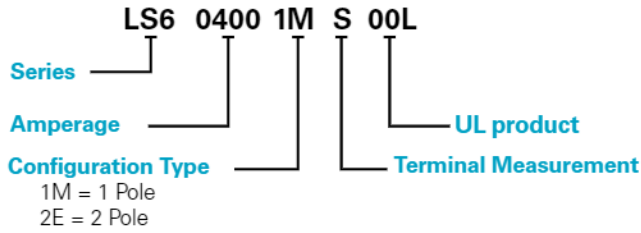
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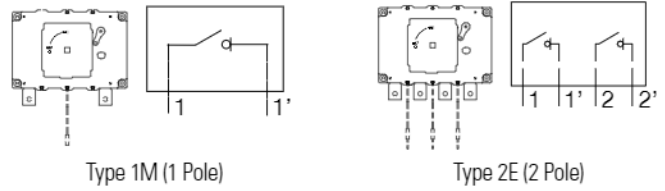
# Solar Products

## LS60400 1000 V DC SERIES DISCONNECT SWITCH

### Part Numbering System



### Configuration

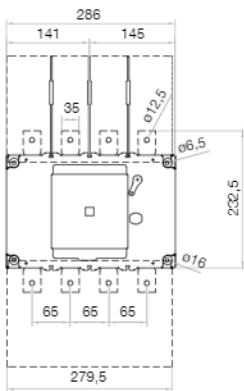


### Ordering Information

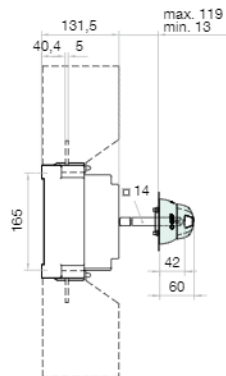
DC DISCONNECT SWITCH						
SERIES	TOTAL VOLTAGE	AMPERAGE	INSTALLATION	CONFIGURATION	POLES	SINGLE UNIT WEIGHT
LS604001MS00L	1000 V dc	400 A	Grounded	Type 1M	1	2 kg
LS604002ES00L	1000 V dc	400 A	Ungrounded	Type 2E	2	3 kg

### Dimensions Millimeters

#### Dc Disconnect Switch

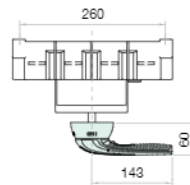


#### Switch + Direct Handle - Side View



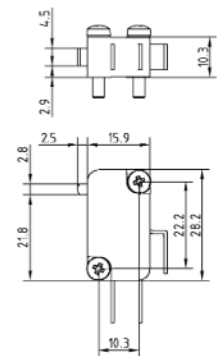
#### Panel Handle with Shaft

LDSL A21




#### Auxiliary Contact

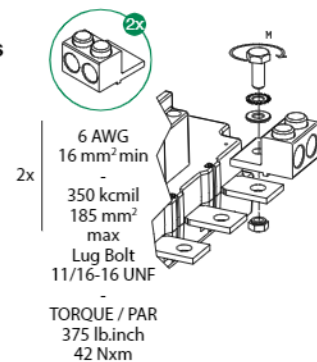
LD5AU01



### Terminal Lug Measurements

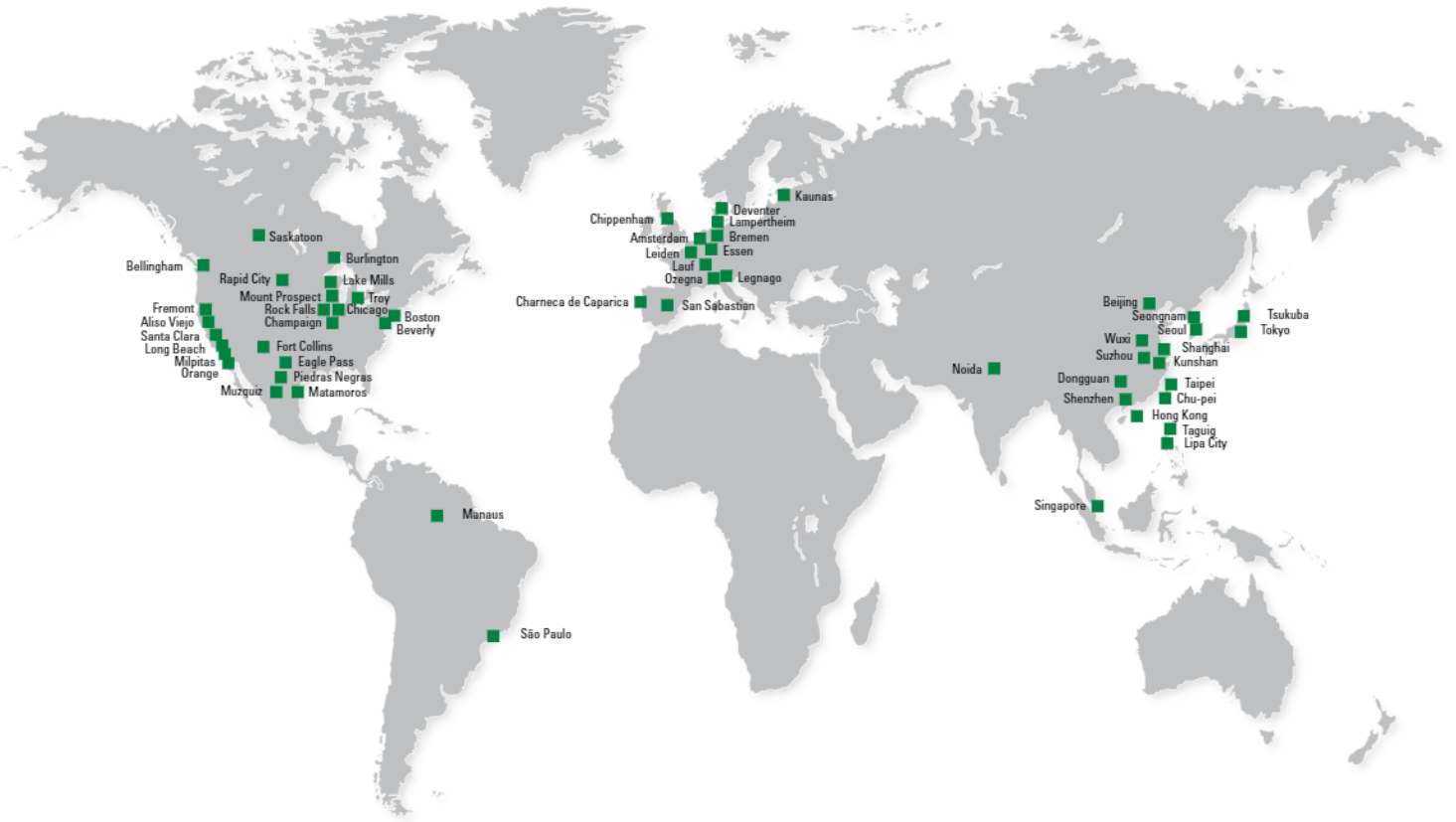
LDRTL22W				
3/0 85 MM <sup>2</sup> MIN. --- 400 KCMIL 240 MM <sup>2</sup> MAX.	CONDUCTOR TEMPERATURE RATING		COPPER WIRE ONLY M (TERMINAL TORQUE) (+5%   -10%)	
			N•M	LB.INCH
	75 °C	M10	24	212

### Torque and Cable Capacity Instructions





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### Protection Relays & Controls Catalog (PF130N)

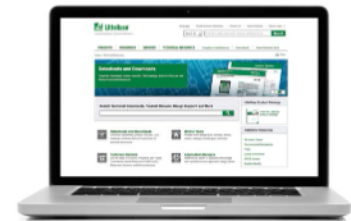
The comprehensive line of electronic and microprocessor-based protection relays, timers, and flashers safeguard equipment and personnel to prevent expensive damage, downtime or injury due to electrical faults.

### Fuses & Fuse Holders Catalog (PF101N)

Littelfuse offers a complete circuit protection portfolio of industrial power fuses, including time-saving indication products for an instant visual blown-fuse identification.

### Surge Protection Devices Catalog (PF612)

These surge protection devices safeguard components from transient overvoltage or surges.



### Visit Technical Resources at [Littelfuse.com](http://Littelfuse.com)

Technical information is only a click away. The Littelfuse Technical Resources section contains datasheets, product manuals, white papers, application guides, demos, on-line design tools, and more.







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