



Solar Power Protection Solutions Guide 2011





Photovoltaic technology

Fusetek offers one of the most extensive range of products for photovoltaic and wind generation applications in Canada. Whether your installations are small residential, commercial or utility scale, we have products that you need.

Circuit protection for PV – an overview

Generally, less than 3 arrays (strings) do not require overcurrent protection. Above this, the combined current from the solar arrays is enough to cause damage from reverse overcurrents unless a fuse or circuit breaker is used to quickly isolate the faulted array.

Strings are typically 'combined' into single circuits in a combiner box. Each string will be protected by its own fuse which feeds onto a common bus which is then taken off to the inverter.

Short circuit levels generated by solar panels are typically less than 110% of the connected solar arrays' full load current – so the emphasis is on overcurrent devices having quick over-load response rather than raw interrupting rating. Our PV fuses from SIBA and Littelfuse meet this balanced requirement.



Note: Fuseholders should not be opened under load. Injury and/or damage could occur.

Small off grid systems

Because of the low power requirements and voltages employed, a wide range of standard fuses and holders has been used over the years. Fusetek has replacements for all these types.



Grid-Tie Systems

Grid-tie systems are designed to produce power that is fed back onto the utility grid and they are operating at higher voltages for efficiency and utility grid requirements. These systems require higher levels of protection to provide the necessary safeguards on the way to the utility grid. 600Vdc is presently the most common design voltage for protective devices, although European standards are going up to 1000Vdc and are being seen here too. Fusetek offers an extensive range of products for both 600Vdc and 1000Vdc.



microFit Systems – less than 10 kilowatts

Typical 'roof top' installations will use 3-5 strings which are connected together in a combiner box with a fuse and fuseholder for each string. These all feed a common bus which is connected to the inverter. microFit systems are all 600Vdc or less at present.



FIT systems – 10kW to 10 megawatts

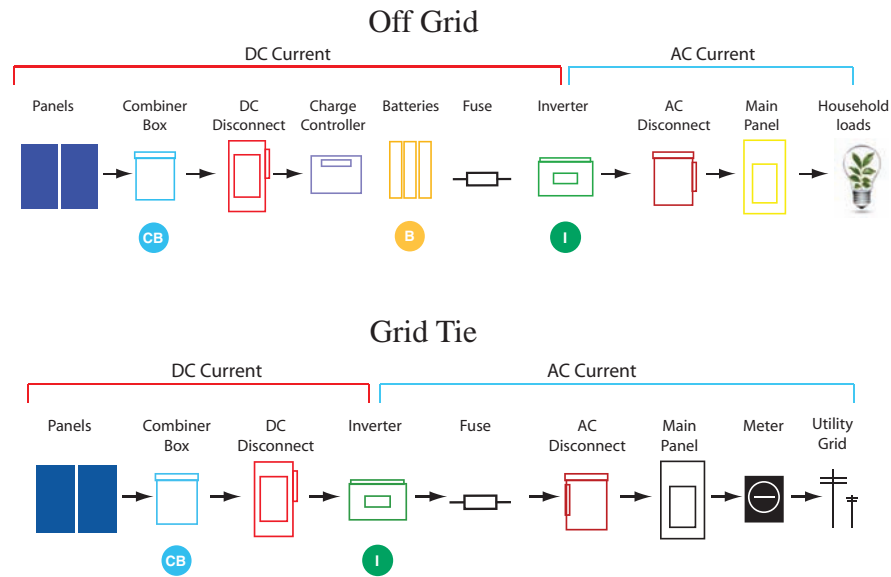
Large rooftop installations and 'solar farms' are utility scale installations. These larger installations can benefit from the efficiencies of 1000Vdc systems. Fusetek offers 1000Vdc rated fuses and disconnects.



For fuseholders, distribution & splitter blocks (any device where the voltage rating is an insulation rating), AC and DC are considered equal by CSA and UL. However, switching devices like disconnects, fuses and breakers must be specifically designed and certified for the DC system voltage as the clearing duties in DC circuits is much more difficult than on AC.

The products on the following pages represent the most popular types of solar products. They are by no means the extent of our product offering. If you can't find what you're looking for, please contact us.

Examples of Off Grid and Grid Tie systems



Solar Power Protection Solutions

SPF Midget Solar Rated Fuse CB

- 1000VDC
- CSA / UL Approved
- 1 - 30A
- 20kAIR L/R <2mS
- Recommended holder LPHV

The SPF was specifically designed for photovoltaic (PV) systems. They can safely protect PV modules and their conductors from reverse overcurrent conditions despite the associated challenges of DC power.



SPFR 1000VDC Solar Fuse I

- 1000VDC
- UL Recognised 250, 300, 350 & 400A
- 10kA at 1mS time constant
- Fast acting
- Use fuse holder SPFRHD

The SPFR series was designed to meet the growing needs of the solar industry



KLKD Midget Fuse CB

- 600VAC/DC
- CSA/UL Approved
- 1 - 30A
- 50kAIR DC

Fast-acting, high-interrupting capacity, current-limiting type fuse. Especially suited for DC control circuits.



LPSM POWR-SAFE Midget Fuse Holders CB

- 30A 600VAC/DC
- CSA / UL Approved
- 100kAIR
- Indicating / Non-indicating versions
- 1, 2, 3 and 4 Pole



FLU Series CB

- 1000VAC/DC
- CSA/UL
- I.R. 44/100A 10kA
- I.R. 11A 20kA
- FLU-44 = 1A
- FLU-11 = 15A

Protection for photovoltaic cells and multimeters.



LPHV POWR-SAFE Midget Fuse Holder CB

- 1000VDC self certified
- CSA / UL
- 30A
- SCCR rating 20,000 Amperes
- Indicating / Non- indicating versions



MEGA Fuse Series

- 32VDC
- 40 - 500A
- I.R. 2000A @ 32VDC
- Use fuse holder 298900

The MEGA Fuse is ideal for low voltage battery and alternator applications and other heavy gauge cables requiring ultra-high current protection.



B

MEGA Fuse Blocks

- Use with MEGA® fuses up to 250 amps. Ideal for battery applications requiring ultra high current protection. Includes protective cover. Features interconnecting pins on side of fuse block for secure multiple block configurations.



B

IDSR Class RK5

- 600VAC/DC
- CSA / UL Approved
- 200kAIR
- 20kAIR DC
- 1/10 - 600
- Use fuse block series LR600



600VAC/DC make it ideal for DC applications

B I

Class R Fuse Bases

- 600 VAC /DC
- CSA / UL Approved
- 0 - 600Amps
- 1, 2 and 3 Poles
- Screw, pressure plate or Box lug

Class R fuse blocks feature clip designs to maximize electrical contact and minimize heat rise.



B I

POWR-BLOCKS

- 600VAC/DC
- CSA / UL Approved
- 175A
- Box Lugs

POWR-BLOCKS are ideal in combiner box applications where many leads need to be combined into a single large cable. Splicer blocks offer 1-1 connection for ground feed thru.



B CB

Modular Fuse Blocks

Mount any fuse with mounting holes. Available in two sizes up to 800A / 1000VDC CSA approved

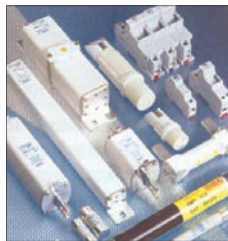
- LSCR001
- 1/4 - 20 Stud
- LSCR002
- 3/8 - 16 stud



I B

Overview of standard PV products Available

For the inverter - SIBA URS square body fuses 700V or 1300V series fuses. For transformer's high side and filtering use SIBA DIN series fuses listed at the end of this section.



DIMENSIONS	RATED VOLTAGE	RATED CURRENT
MM/SIZE	V	A
6.3 X 32	400VDC	6.3 - 20
10 X 38	1000VDC	0.5 - 20 **
14 X 51	1000VDC	10 - 25
10 X 51	1100VDC	6 - 20
10 X 85	1100VDC	2 - 20
NH1	1100VDC	50 - 200*
NH3	1100VDC	50 - 400
20 X 127	1500VDC	2 - 63

* UL pending
** cUL rec.

5106304DC 1000V 10mm x 38mm Fuse Holder

- 30A / 1000VDC
- Din-Rail mountable
- Non Indicating
- 1 & 2 Pole
- Gangable

SIBA offers a new 10x38mm fuse holder rated at 1000VDC for photovoltaic applications.



CB

5019906 10mm x 38mm 1000VAC/DC

- 1000VAC/DC
- 1, 2, 4, 6, 8, 10, 12, 16A
- Max. I.R 38kA(L/R=1ms)
- Ultra fast Acting
- Standard Midget format
- Use with 1000V rated holders and in DMM's



CB

Provides optimum protection to personnel

PV NH1 2002820

I

- 1000VDC
- Size NH1
- 50 - 200A
- Larger ampacities
- Indicating /Non indicating versions



Matching bases available. Contact Fusetek

7017240 6mm x 32mm 1000VAC/VDC

CB

- 1000VAC/DC UL
- Ultra fast acting (FF)
- 0.315, 0.5, 0.8, 1, 1.6, 2A
- Use in control circuits
- Designed for long life in severe conditions



URS Square Body Rectifier Fuses

I

- 700VAC & 1300VAC
- 50 - 3000A
- aR Class
- High interrupting rating 200kA
- N.A. & European standards.



Matching bases available. Contact Fusetek

Medium Voltage DIN Fuses

U

We offer a full range of DIN distribution fuses and accessories.

DIN fuses are the choice for most Canadian switchgear manufacturers.

DIN fuses are typically used to protect primary of power distribution transformers.



ICB Polycarbonate Component Box

CB

The ICB enclosures series offers water, dust and corrosion proof protection for your components. Integral DIN rail is perfect for mounting fuse holders or MSB's. Lockable clear Lexan cover lets you view status of devices without the need to open enclosure.



AVAILABLE HV DIN FUSES Always in stock

Part Number	# of Circuit Breakers	# of rows in unit	Outside Dimension (in.)		
			L	W	H
ICB-0465/4	4 Single Pole	1	8.30	5.60	4.00
ICB-0865/8	8 Single Pole	1	8.30	8.50	4.00
ICB-1265/12	12 Single Pole	1	10.40	12.40	5.60
ICB1865/18	18 Single Pole	1	11.30	16.80	5.80
ICB-2465/24	24 Single Pole	2	16.50	12.40	5.60
ICB-3665/36	36 Single Pole	2	18.50	16.80	5.80
ICB-5465/54	54 Single Pole	3	25.90	16.80	5.80

KV	Amp from	Amp to
3.0 / 7.3kV	6.3A	500A
10 / 17.5kV	6.3A	200A
20 / 27.5kV	6.3A	125A
36kV	6.3A	100A

Telergon Load Break DC Switches

B I

- 600VDC - UL
- 1000VDC - IEC
- 160A, 250A, 400A
- For PV inverters & Grid Tie systems



Telergon DC load break switches offer compact DC switching performance for todays PV systems.

TECHNA DC Breakers

B I

- 1 - 63A @ 125VDC
- interchangeable with standard DIN rail fuseholders
- Thermal / magnetic trip
- 10kA



TECHNA 489DC breakers offer a compact alternative to fuse based combiner applications. Current and energy limiting.



599 Norris Court
Kingston, On. Canada K7P-2R9
T:800-479-3875 F: 800-866-7690
W: www.fusetek.com