

Photovoltaic fuses

gPV curve

1 to 600 A, up to 1000 VDC



The solution for

> Photovoltaic protection



Strong points

> High breaking capacity up to 1000 VDC
> Product designed for photovoltaic systems
> Increased reliability
> Improved safety

Extended range

> Range of switches and sockets, combs and dedicated connection accessories

Compliance with standards

> IEC 60269-6
> IEC 60269-1
> IEC 60269-2

Function

SOCOMEC's **gPV fuses** protect photovoltaic systems against overcurrents caused by the reverse currents that these systems can generate.

Advantages

High breaking capacity
Up to 50 kA at 1000 VDC.

Product designed for photovoltaic systems
Operating ranges adapted to low overcurrents specific to photovoltaic systems.

Increased reliability

- Absolute protection over time guaranteed by the simplicity of manufacture and function (Joule effect).
- No degradation of fuse characteristics over time.

Improved safety
The energy released whilst eliminating the fault (fuse blowing) is contained within the cartridge (no degassing).

What you need to know

Characteristics used

- I_{SC}: short circuit current of the string.
- $I_{SC\ MAX}$: short circuit current of the string due to maximum sunlight intensity.
- I_{RM}: maximum permitted reverse current.
- I_n: rating or nominal current of the fuse (25 °C in an RM socket).
- N_c: number of strings in parallel.
- U_e: fuse's maximum operating voltage.
- $U_{OC\ MAX}$: maximum open circuit voltage in the lowest temperature conditions.

When to protect
A PV string requires overcurrent protection when its own maximum admissible reverse current characteristic (Irm) is less than the current generated by the rest of the installation (current generated by the other "Nc-1" strings).

How to protect
Protecting from overcurrents involves ensuring that both polarities are functionally grounded whether the DC is connected or not.

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How to choose the right fuse protection

Voltage

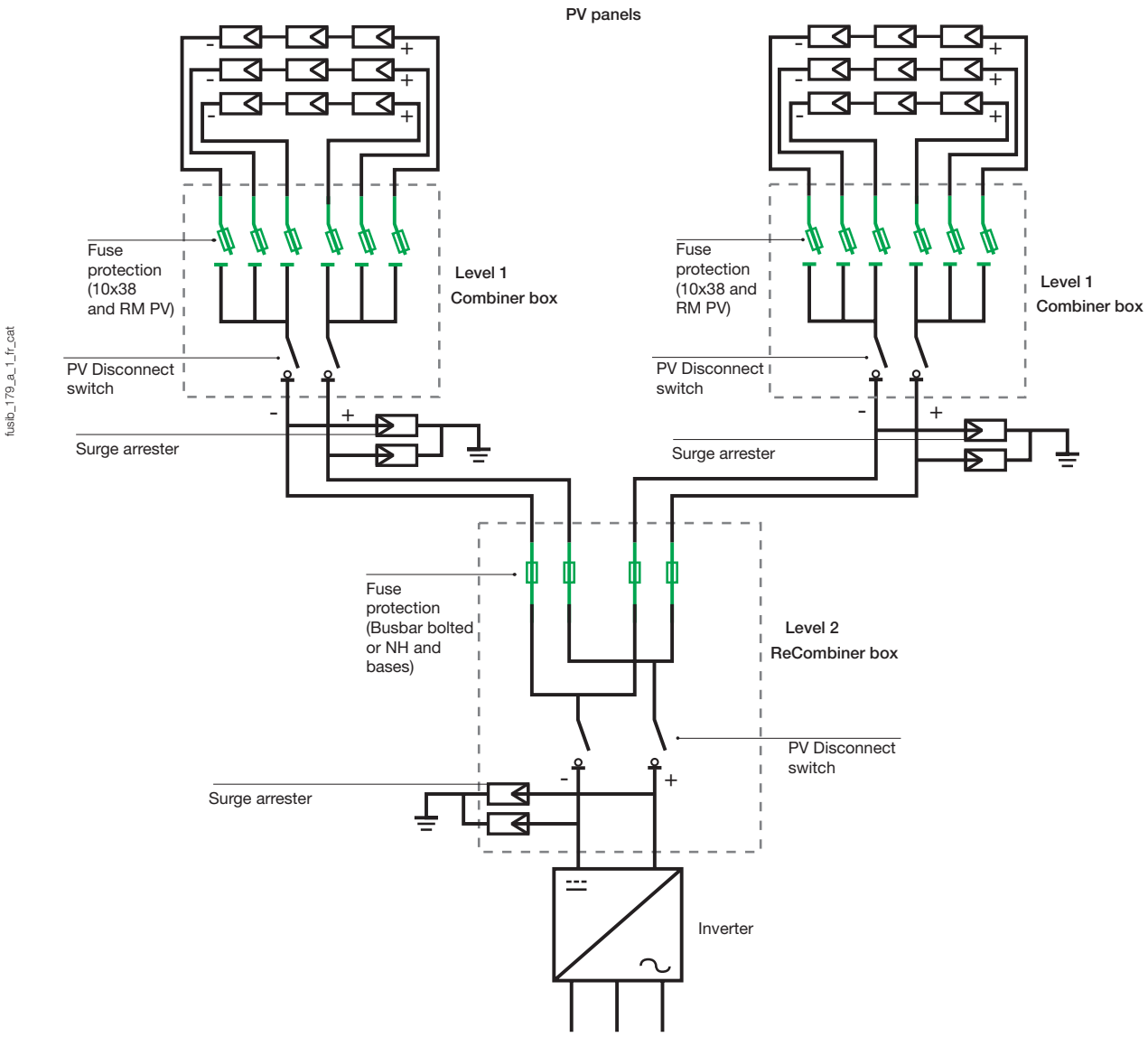
$U_e > U_{OC}$ MAX

Unless indicated otherwise, use $U_{OC\ MAX} = 1.2\ U_{OC}$

Determining the fuse rating

Determining the fuse rating involves choosing a fuse that can:

- Withstand, without blowing, normal overcurrents during sunlight hours and the ambient temperature of the enclosure in which the fuse is installed, $I_n > I_{SC\ MAX}$ Unless indicated otherwise $ISC\ MAX = 1.4\ I_{SC}$
- Melt reliably before the modules are damaged by the reverse current. $I_n < I_{RM}$



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References

Rated voltage 1000 VDC

Rating (A)	Fuse size	Dissipated power W @ In	Dissipated power W @ 0.8 In	Breaking capacity	Reference
		gPV cylindrical fuses			
1	10 x 38	0.76	0.43	30 kA	60PV **0001**
2	10 x 38	1.54	0.84	30 kA	60PV **0002**
3	10 x 38	1.35	0.74	30 kA	60PV **0003**
4	10 x 38	1.84	1.08	30 kA	60PV **0004**
6	10 x 38	2.50	1.40	30 kA	60PV **0006**
8	10 x 38	2.57	1.47	30 kA	60PV **0008**
10	10 x 38	2.58	1.51	30 kA	60PV **0010**
12	10 x 38	2.61	1.42	30 kA	60PV **0012**
15	10 x 38	2.44	1.08	30 kA	60PV **0015**
16	10 x 38	2.70	1.56	30 kA	60PV **0016**
20	10 x 38	2.99	1.75	30 kA	60PV **0020**
25	14 x 51	5.1	2.7	10 kA	60PV **0C25**
32	14 x 51	6.2	3.3	10 kA	60PV **0C32**
		gPV knife blade fuse			
32	NH1	8.5	4.3	50 kA	60PV **0032**
40	NH1	9	4.6	50 kA	60PV **0040**
50	NH1	10.5	5.4	50 kA	60PV **0050**
63	NH1	12	6.1	50 kA	60PV **0063**
80	NH1	15.5	7.9	50 kA	60PV **0080**
100	NH1	16.5	8.4	50 kA	60PV **0100**
125	NH1	17.5	8.9	50 kA	60PV **0125**
160	NH1	24	12.2	50 kA	60PV **0160**
200	NH1	25	13	50 kA	60PV **1200**
250	NH2	35	23	50 kA	60PV **1250**
315	NH3	44	27	50 kA	60PV **1315**
400	NH3	50	30	50 kA	60PV **1400**
500	3 L	85	50	50 kA	60PV **0500**
600	3 L	118	92	50 kA	60PV **0600**

Accessories

Accessories	Size NH1 Reference	Size NH2 Reference	Size NH3 Reference	Size 3L Reference
Fuse blown auxiliary contact	56PV **9901**	56PV **9901**	56PV **9901**	56PV **9901**
Fuse base recommended	65PV **1011**	65PV **1002**	65PV **1003**	65PV **1113**

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Adjustment due to ambient temperature

$$I_{nf} = I_{scgen}/K_t$$

I_{nf} - gPV fuse rated current.

I_{scgen} - short-circuit current of PV generator in STC conditions.

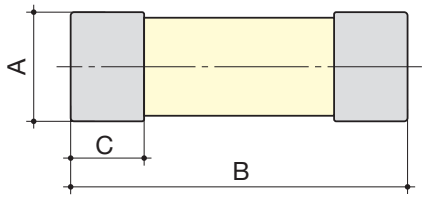
K_t - correction factor.

Max. ambient temperature (°C)	Kt: correction factor
20	1
40	0.92
45	0.90
50	0.87
55	0.85
60	0.82
65	0.79
70	0.76

Standard dimensions (mm) as per IEC 60269-2

gPV cylindrical fuses

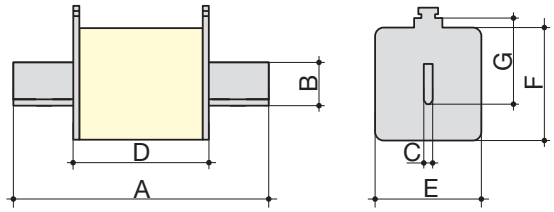
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Fuse size	Striker	A	B	C
10 x 38	Without	10.3	38	10.5
14 x 51	Without	14.3	51.5	10.10
10 x 85	Without	10.3	85	10.5

gPV knife edge fuse

fusib-pv_001_a_1_x_cat



Fuse size	Striker	A max	B	C	D max	E max	F max	G
NH1	Without	137	20	6	68	40	53	40
NH2	Without	152	25	6	75	60	61	48
NH3	Without	152	32	6	75	70	75	60
1XL	Without	190	20	6	128	51	51	40
3L	Without	205	32	6	123	74	74	60

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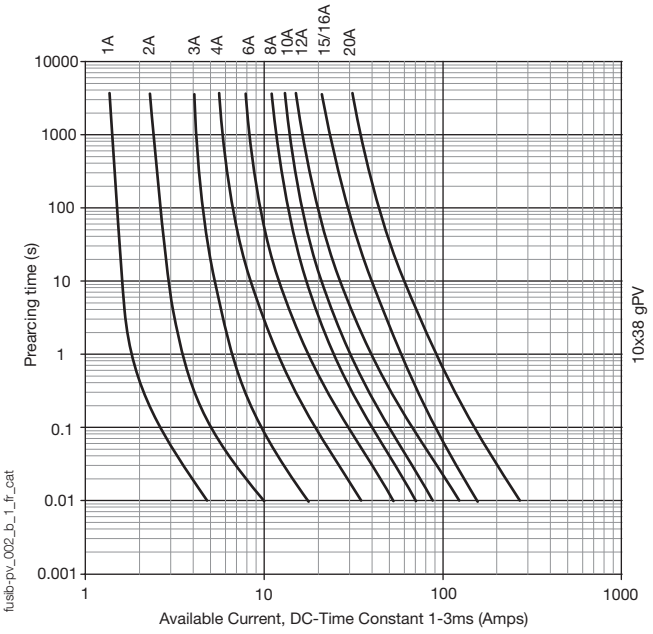
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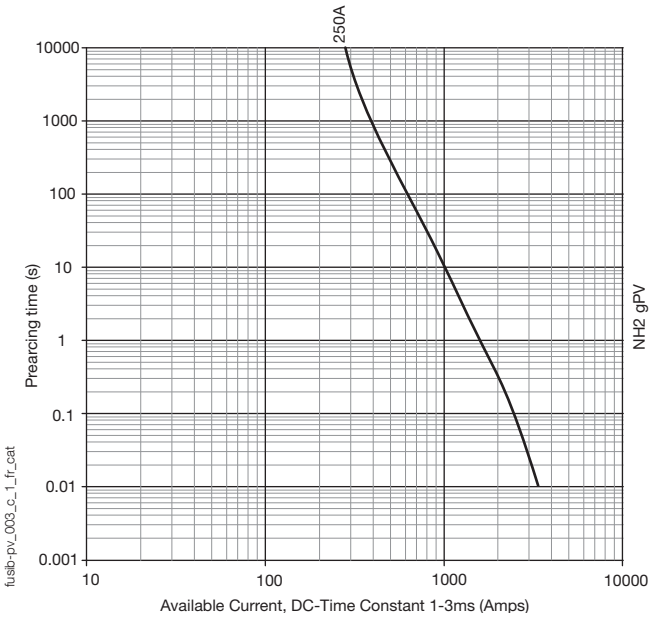
Time/current operational characteristics

Rated voltage 1000 VDC

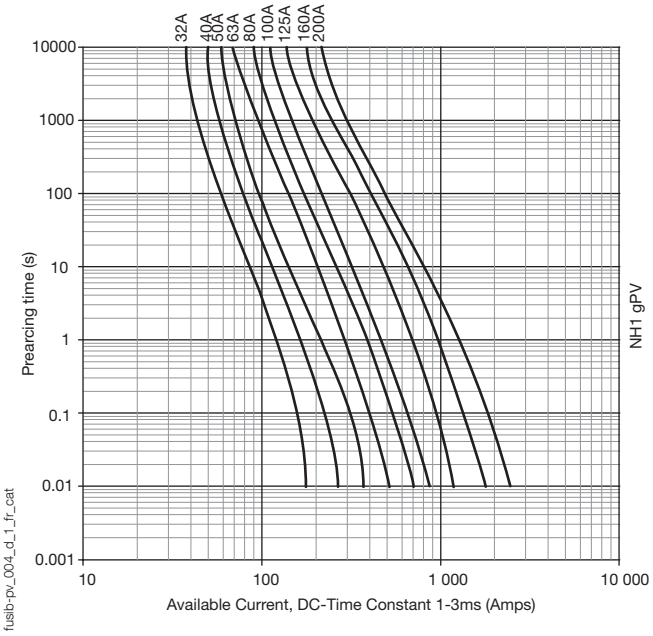
gPV cylindrical fuses 10x38



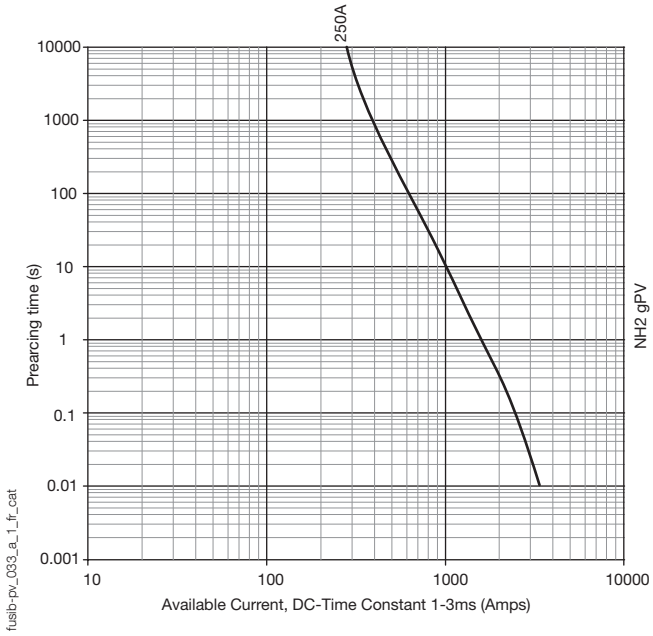
gPV cylindrical fuses 14x51



gPV NH1 knife blade fuses

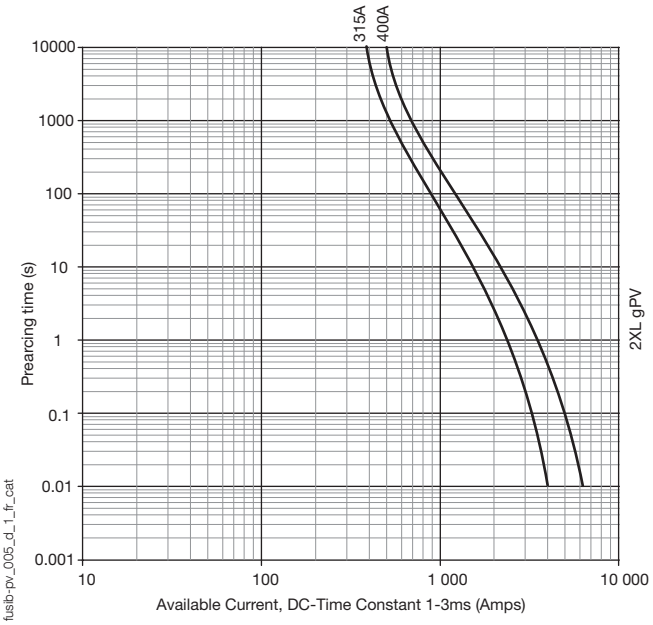


gPV NH2 knife blade fuses



Rated voltage 1000 VDC (continued)

gPV NH3 knife blade fuses



gPV 3L knife blade fuses

