



PHOTOVOLTAIC

FUSE LINKS & FUSE HOLDERS FOR PHOTOVOLTAIC APPLICATIONS

gPV NH XL 1500V DC

fuse links



BOLTED BLADE
WITH STRIKER

**PROTECTING
THE WORLD**





KNIFE
BLADE

RATED VOLTAGE
1500V DC

RATED CURRENT
40A...200A

BREAKING CAPACITY
UL > 30kA
IEC > 100kA^{40A...160A}
30kA^{200A}

STANDARDS
IEC/EN 60269-1
IEC/EN 60269-6
UL248-1
UL248-19



KNIFE BLADE

NH XL 1500V DC fuse links for photovoltaic applications

NH1 XL gPV 1500 VDC fuse links for photovoltaic installations from DF Electric have been developed to offer a safety protection solution in sub-array, array or inverter DC input of photovoltaic installations.

The range comprises the following fuse links:

→ Size NH1 XL 1500V DC 40A to 200A

There are two versions of contacts, knife type to use in fuse bases and bolted version to mount directly on busbar.

They provide protection against overloads as well as short-circuits (gPV class according to IEC60269 and UL248-19 Standards, with a minimum fusing current of 1,35In.

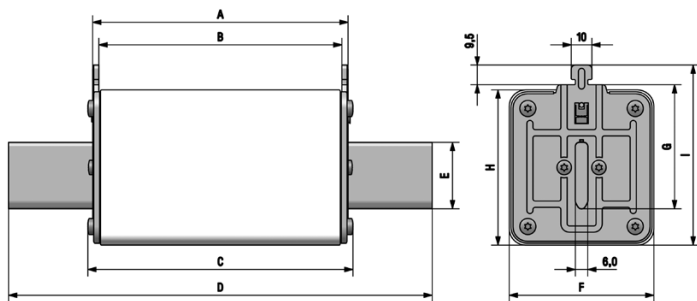
Made with ceramic body with high withstand to internal pressure and thermal shock. Contacts are made in silver plated copper or brass and melting elements are made in pure silver in order to avoid the aging and thus keep unalterable the electric characteristics. They have a low power losses values to get a good efficiency.

For these fuse links we recommend the utilization of **1500V DC NH1 XL ST fuse bases**.

UL Listed (File E355019).



Dimensions



A	B	C	D	E	F	G	H	I
126	120	129	191	20	39	40	52,5	64,5

Weight 650gr

Range

I_n (A)	REFERENCE	PACKING Uni /BOX
40	372225	1/18
50	372230	1/18
63	372235	1/18
80	372240	1/18
100	372245	1/18
125	372250	1/18
160	372255	1/18
200	372260	1/18



BOLTED
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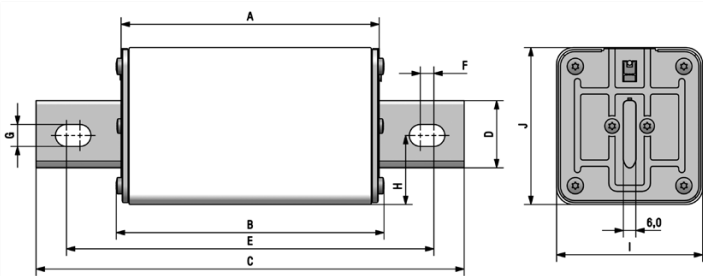
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UL Listed (File E355019).



Dimensions



A	B	C	D	E	F	G	H	I	J
126	129	191	20	170,5	9	8,5	25,6	39	52,5

Range

In (A)	REFERENCE	PACKING Uni /BOX
40	372225B	1/18
50	372230B	1/18
63	372235B	1/18
80	372240B	1/18
100	372245B	1/18
125	372250B	1/18
160	372255B	1/18
200	372260B	1/18

Weight	640gr
Recommended torque for connection screws (M8)	10...12Nm
Minimum recommended distance between fuse links	15mm



Technical data

Rated voltage	1500V DC		
Rated current	40A...200A		
Rated breaking capacity	UL	30kA	
	IEC	100kA 40A...160A	30kA 200A
Minimum interrupt rating	1,35·I _n		
Non fusing current	1,13·I _n		
Storage temperature	-40°C ... 90°C		
Operating temperature *	-40°C ... 80°C		

* For ambient temperatures higher than 25°C it is necessary to apply a derating in maximum current.

Standards

IEC/EN 60269-1
IEC/EN 60269-6
UL248-1
UL248-19
RoHS Compliant



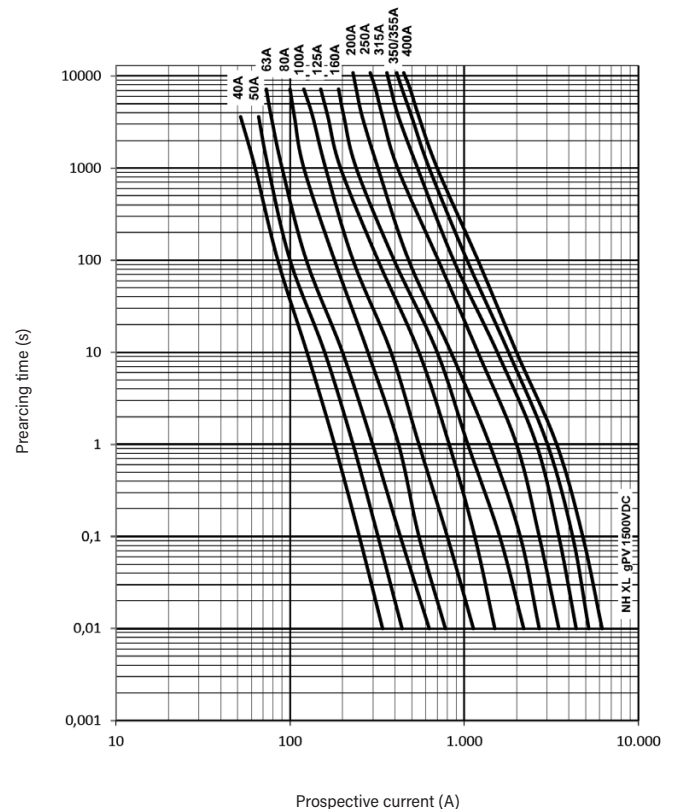
Materials

Body	Ceramics
Contact blades	Copper or brass (silver plated)
Plates	Aluminium
Screws	Zinc plated steel

Power dissipation

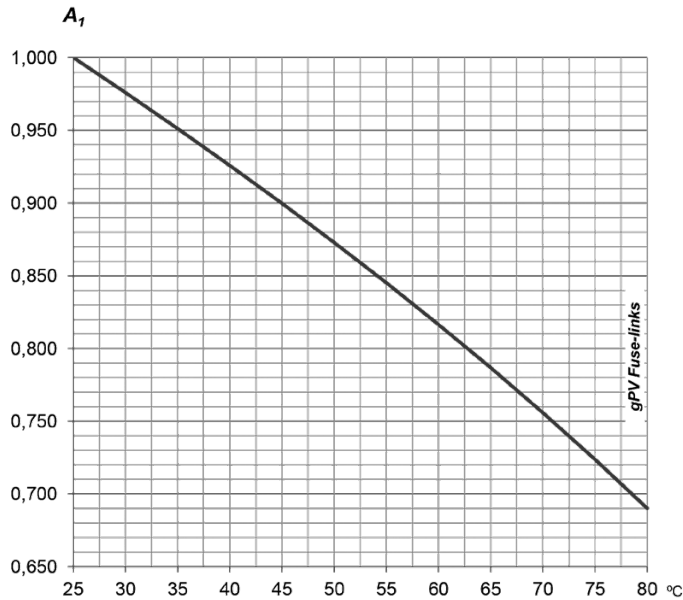
I _n	PREARCING I _t	OPERATING I _t	POWER DISSIPATION 0.7 · I _n	POWER DISSIPATION I _n
(A)	(A ² S)	(A ² S)	(W)	(W)
40	260	490	6,3	15
50	560	1170	7,2	18
63	1160	2460	7,6	19
80	1760	3720	10	25
100	3970	8380	10,4	26
125	7070	14900	12	30
160	13360	28180	15	38
200	24850	52400	19	47

t-I characteristics





Ambient temperature derating factor



ta (°C)	A1
25	1,00
30	0,98
35	0,95
40	0,93
45	0,90
50	0,87
55	0,84
60	0,82
65	0,79
70	0,76
75	0,72
80	0,69

Selection and application's guide

In photovoltaic plants, there are a special installation and working conditions that must be considered to select the appropriate fuse links.

These fuses are usually placed inside plastic watertight boxes, where high ambient temperatures are reached. This condition force to reduce the maximum current that can circulate through the fuse links, otherwise it would be have premature aging. To avoid nondesired operation of fuse links it is necessary to apply a derating when select the appropriate rated current.

On the other hand, the day/night cycles as well as the pass of clouds cause a constant current changes that generates continuous heating and cooling, and this cause a thermal stress in fuselinks materials, especially in the melting elements. To avoid premature aging another derating must be applied (DF Electric recommend a value of 0,80 for this application).

With these considerations it is possible to select the suitable fuse.

To verify that the rated voltage of fuse link is sufficient, the following points must be taken into account:

- Open circuit voltage $V_{OC\ STC}$ of PV modules.
- Numbers of modules connected in series (M).
- Safety factor (20%) to take into account the rise of open circuit voltage at very low temperatures.

According to this, rated voltage in DC of fuse links must be:

$$V_{DC}(\text{fuse link}) \geq V_{OC}(\text{STC}) \cdot M \cdot 1,2$$

Open circuit voltage $V_{OC\ STC}$ of PV modules is the maximum voltage that a Photovoltaic module can deliver when is working without load, measured under standard test conditions (STC).

This information is given by the manufacturer of PV modules.

To choose rated current of fuse links, points to be taken into account are the following:

- Short circuit current of PV modules $I_{SC\ STC}$.
- Derating factor for ambient temperature (A_1).
- Derating factor for current variation (A_2).

Short circuit current of PV modules $I_{SC\ STC}$ is the maximum current that one module can deliver measured under standard test conditions (STC). This data is also given by the manufacturer of PV modules.

Recommended derating factor for current variation (A_2): 0,80.

Ambient temperature inside boxes where are placed protections can reach easily 40°C or 45°C (for tropical countries it is necessary to consider higher values).

It should be applied a derating factor (A_1) as function of ambient temperature.

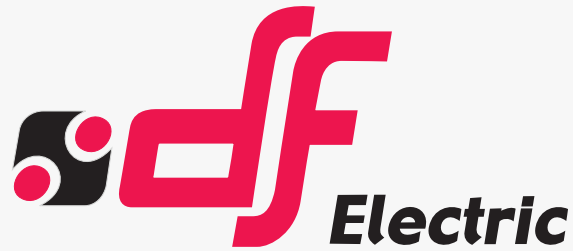
With previous considerations, rated current of fuse-link should be:

$$I_N(\text{fuse link}) \geq \frac{I_{SC\ STC}}{A_1 \cdot A_2} \cdot N_S$$

For example, if we consider a maximum ambient temperature of 45°C, the rating to use would be:

$$I_N(\text{fuse link}) \geq \frac{I_{SC\ STC}}{0,90 \cdot 0,80} \geq I_{SC\ STC} \cdot N_S$$

$$I_N(\text{fuse link}) \geq 1,40 \cdot I_{SC\ STC} \cdot N_S$$



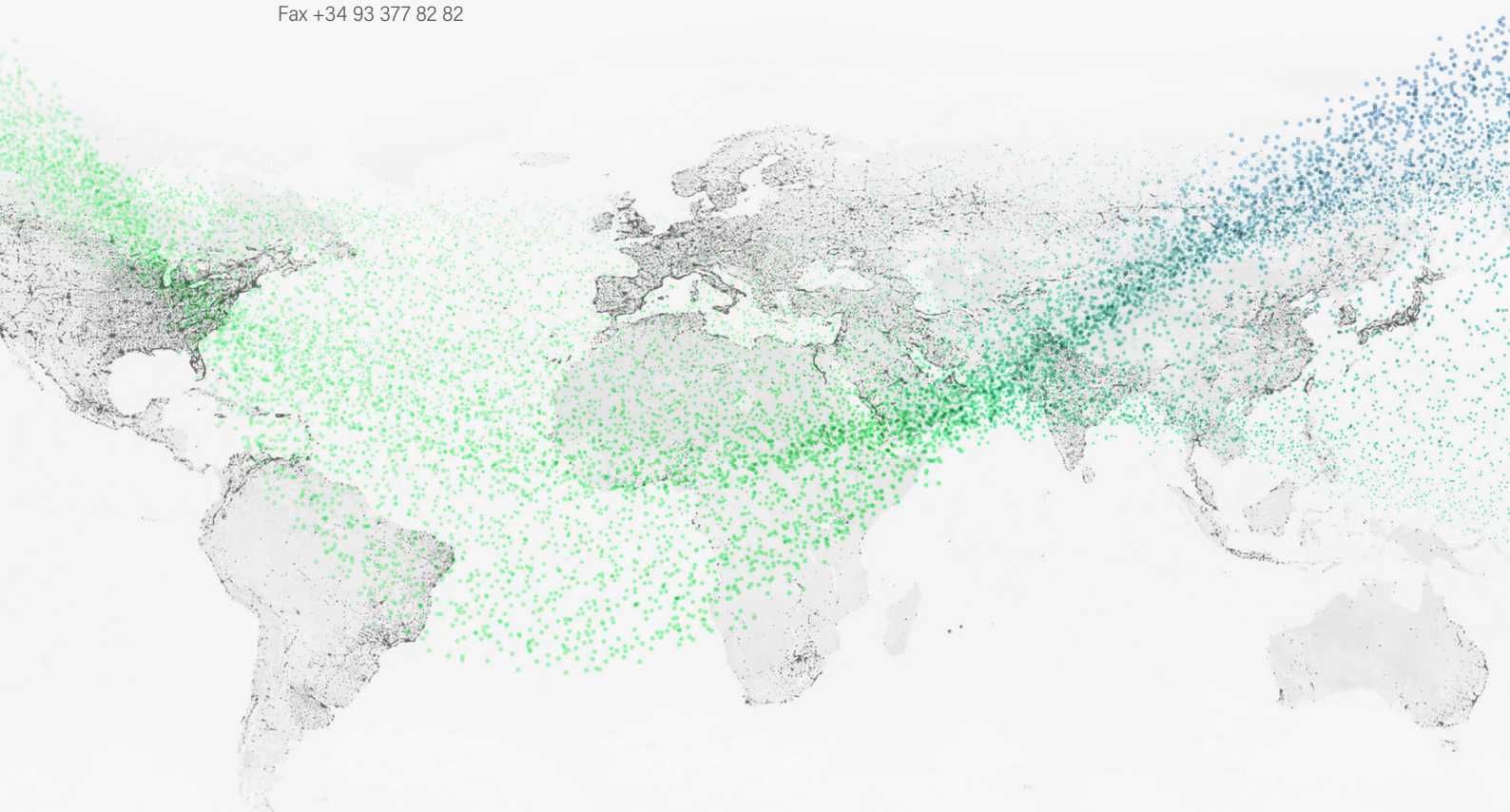
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The "electro technical expert" logo marked on the products included in this data sheet indicates that the installation of these products must be carried out by expert personnel with specialized knowledge.



To prevent electrical hazards, carry out the installation without voltage.



Safety notice
Please capture the following QR code and read our safety notice carefully before installing our products.



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DF ELECTRIC cannot guarantee the characteristics of an installation, machine or equipment that has been designed by a third party. Once a product has been selected, the user must verify that it is appropriate for its application, through the verifications and/or tests that it deems appropriate.

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