



HORUS
PHOTOVOLTAIC
PROTECTION



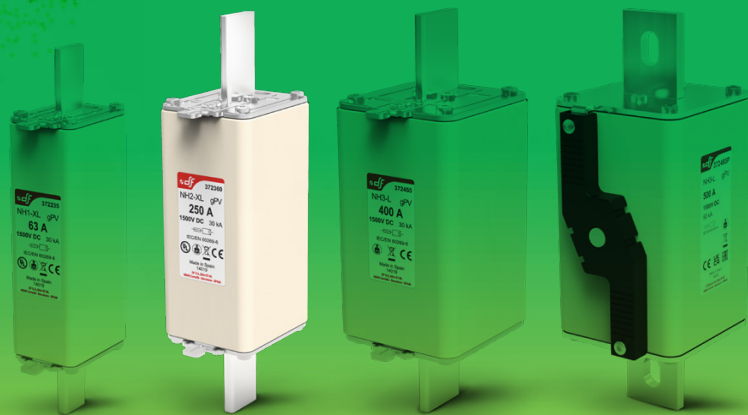
**PROTECTING
THE WORLD**



PHOTOVOLTAIC

FUSE LINKS & FUSE HOLDERS FOR PHOTOVOLTAIC APPLICATIONS

gPV
NH XL 1500V DC
fuse links



BOLTED BLADE
WITH STRIKER



RATED VOLTAGE
1500V DC

RATED CURRENT
315A...400A

BREAKING CAPACITY
UL > 30kA
IEC > 100kA

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



KNIFE BLADE

NH XL 1500V DC fuse links for photovoltaic applications

NH2 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 NH2 XL 1500V DC 200A and 250A

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.

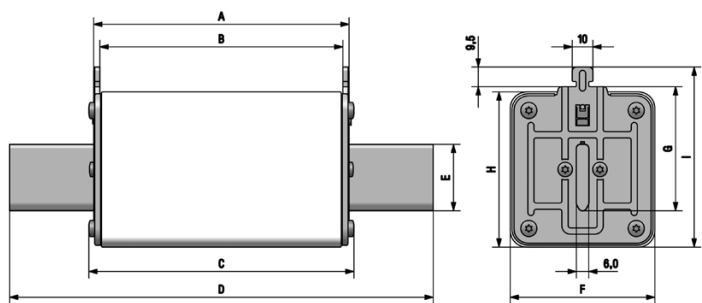
Made with ceramic body with high withstand to internal pressure and thermal shock. Contacts are made in silver plated copper or brass and melting elements are made in pure silver in order to avoid the aging and thus keep unalterable the electric characteristics. They have a low power losses values to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

For these fuse links we recommend the utilization of **1500V DC NH2 XL ST fuse bases**.

UL Listed (File E355019).





Dimensions



A	B	C	D	E	F	G	H	I
122,6	117,6	126,7	205	25	53	48	60,5	72

Weight 990gr

Range

I_n (A)	REFERENCE	PACKING Uni /BOX
200	372350 	1/10
250	372360 	1/10



RATED VOLTAGE
1500V DC

RATED CURRENT
315A...400A

BREAKING CAPACITY
UL > 30kA
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BOLTED BLADE

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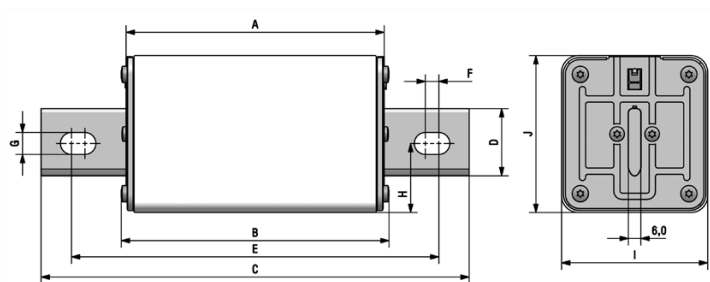
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UL Listed (File E355019).





Dimensions



A	B	C	D	E	F	G	H	I	J
122,6	126,7	205	25	173	9	10,5	27	53	60,5

Range

In (A)	REFERENCE	PACKING Uni /BOX
200	372350B 	1/10
250	372360B 	1/10

Weight	980gr
Recommended torque for connection screws (M10)	30...35Nm
Minimum recommended distance between fuse links	15mm

Technical data

Rated voltage	1500V DC	
Rated current	200A 250A	
Rated breaking capacity	UL	30kA
	IEC	100kA
Utilization category	gPV	
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



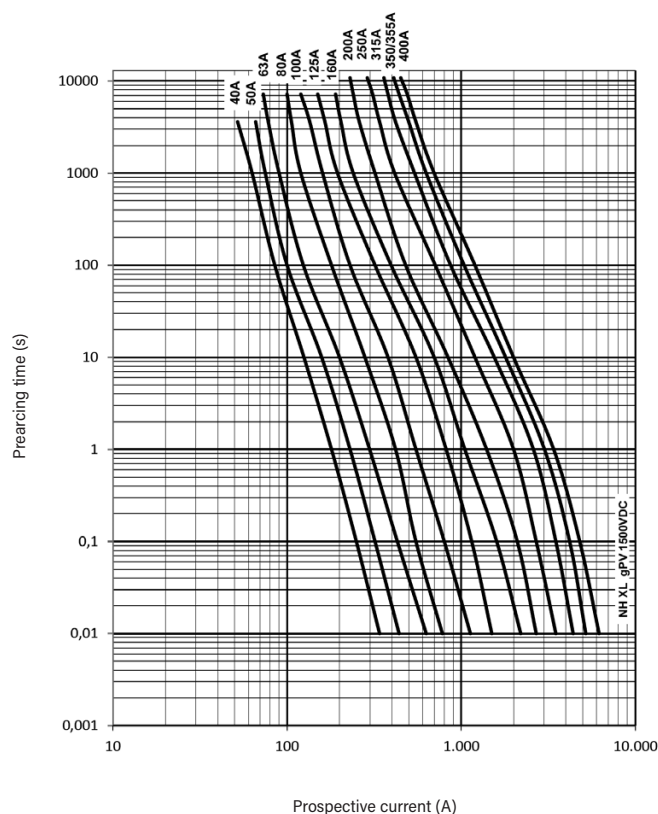
Materials

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

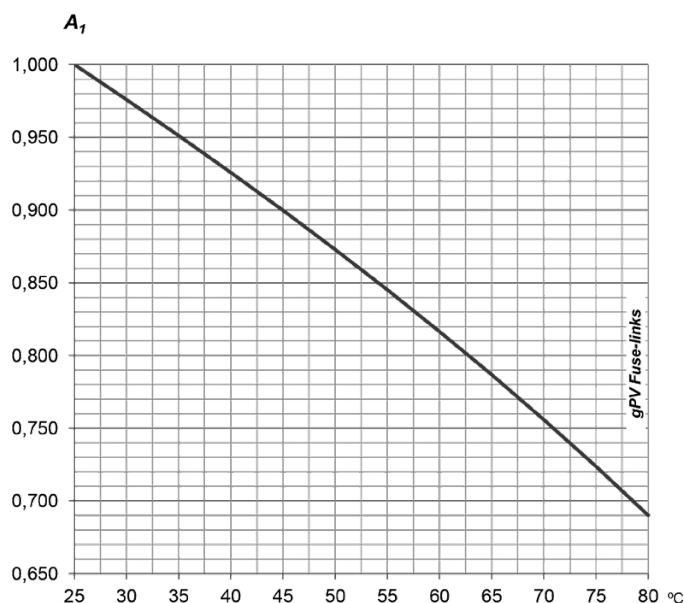
Power dissipation

I _n	PREARcing I _t	OPERATING I _t	POWER DISSIPATION 0.7 · I _n	POWER DISSIPATION I _n
(A)	(A²S)	(A²S)	(W)	(W)
200	24850	52360	18	45
250	42000	88500	21	52

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 undesired 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:

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

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:

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

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



PROTECTING THE WORLD



HEAD OFFICE AND FACTORY

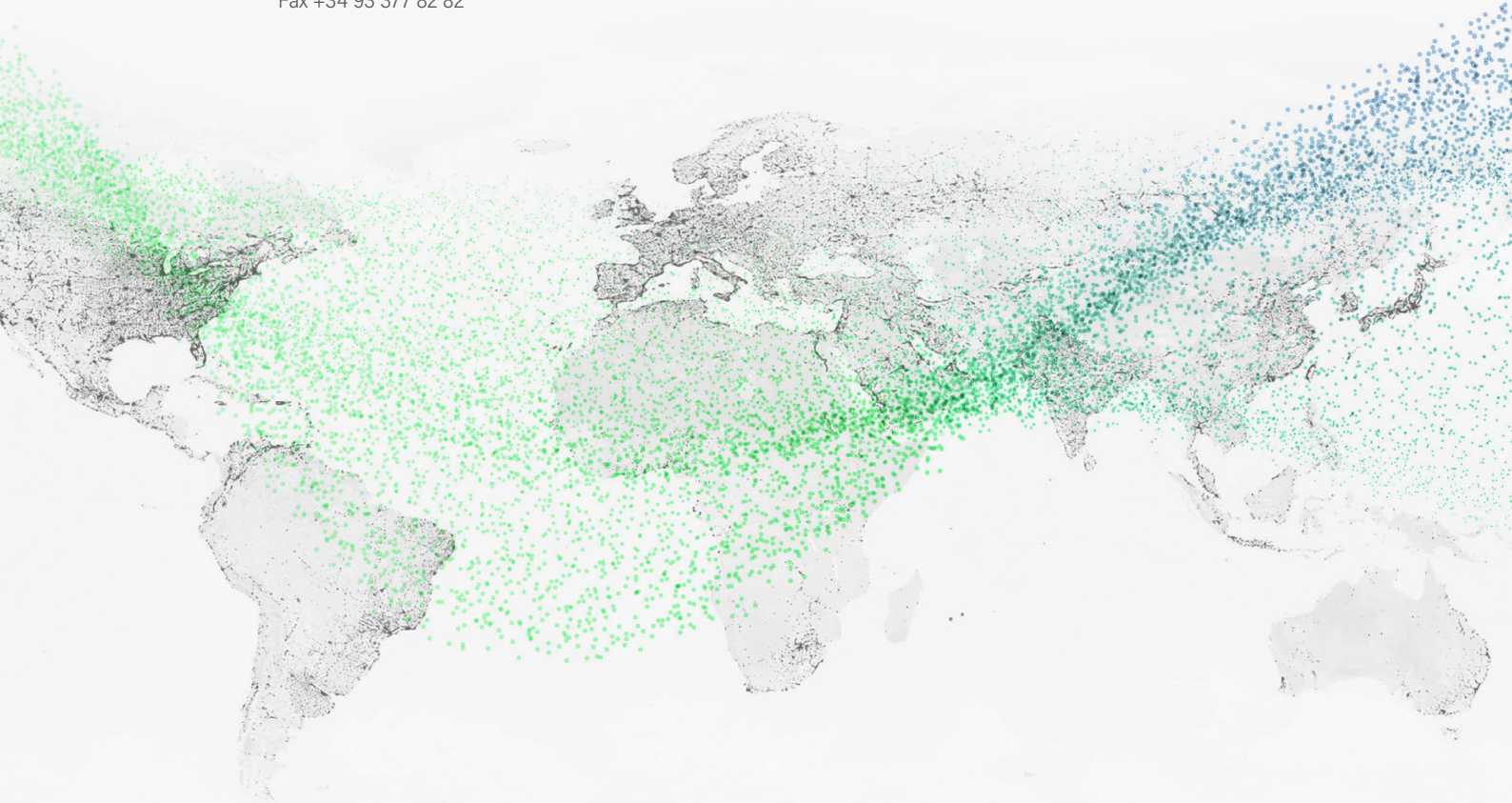
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The "electro technical expert" logo marked on the products included in this data sheet indicates that the installation of these products must be carried out by expert personnel with specialized knowledge.



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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