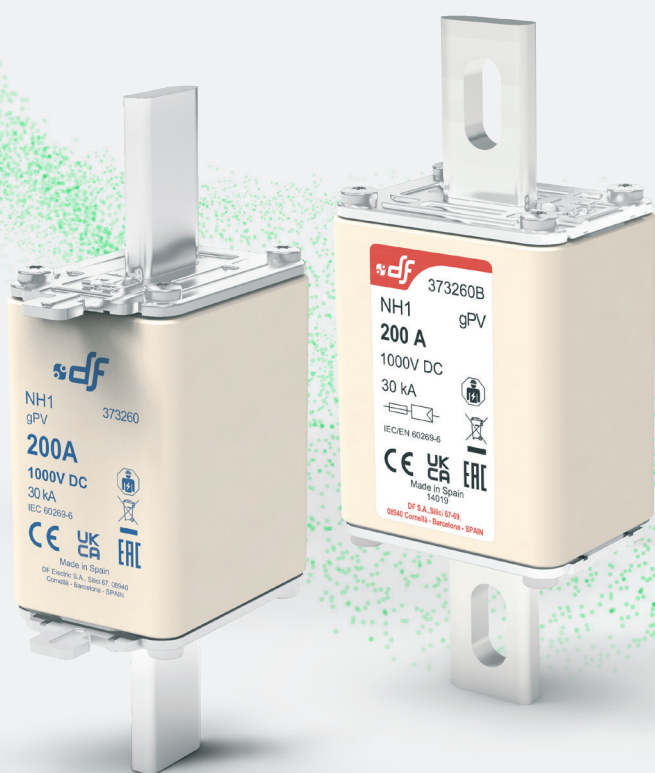


HORUS
PHOTOVOLTAIC
PROTECTION



**PROTECTING
THE WORLD**

PHOTOVOLTAIC

FUSE LINKS & FUSE HOLDERS FOR PHOTOVOLTAIC APPLICATIONS

gPV
NH 1000V DC
fuse links



NH1

NH2

NH3



RATED VOLTAGE
1000V DC

RATED CURRENT
25A...200A

BREAKING CAPACITY
30kA

STANDARDS

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



KNIFE BLADE

NH 1000V DC fuse links for photovoltaic applications

NH1 gPV 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 1000V DC 25A to 200A

They provide protection against overloads as well as short-circuits (gPV class according to IEC 60269 and UL248-19 Standards, with a minimum fusing current of 1,35·In.

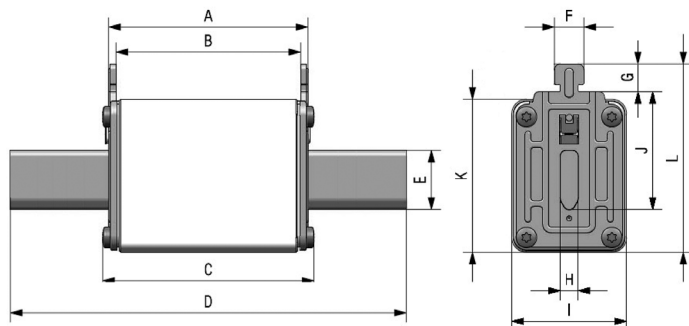
Made with ceramic body with high withstand to internal pressure and thermal shock. Contacts are made in silver plated copper or brass and melting elements are made in pure silver in order to avoid the aging and thus keep unalterable the electric characteristics.

For these fuse-links we recommend the utilization of **1000V DC NH ST fuse bases**.

UL Listed (File E355019)











Dimensions



A	B	C	D	E	F	G	H	I	J	K	L
68	62	71,5	135	20	10	9,5	6	39	40	52	64

Weight 380gr

Range

In (A)	REFERENCE	PACKING Uni /BOX
25	373210 	1/30
32	373215 	1/30
40	373225 	1/30
50	373230 	1/30
63	373235 	1/30
80	373240 	1/30
100	373245 	1/30
125	373250 	1/30
160	373255	1/30
200	373260	1/30



RATED VOLTAGE
1000V DC

RATED CURRENT
25A...200A

BREAKING CAPACITY
30kA

STANDARDS

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



BOLTED BLADE

NH 1000V DC fuse links for photovoltaic applications

NH1 gPV 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:

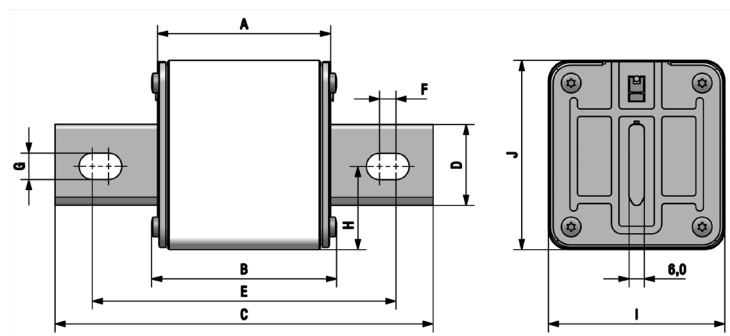
→ Size NH1 1000V DC 25A to 200A

They provide protection against overloads as well as short-circuits (gPV class according to IEC 60269 and UL248-19 Standards, with a minimum fusing current of 1,35I_n).

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.



Dimensions



A	B	C	D	E	F	G	H	I	J
68	71,5	135	20	113	9	8,5	25,6	39	52,5

Range

I _n (A)	REFERENCE	PACKING Uni /BOX
25	373210 B	1/30
32	373215 B	1/30
40	373225 B	1/30
50	373230 B	1/30
63	373235 B	1/30
80	373240 B	1/30
100	373245 B	1/30
125	373250 B	1/30
160	373255 B	1/30
200	373260 B	1/30

Weight	370gr
Recommended torque for connection screws (M8)	10...12Nm
Minimum recommended distance between fuse links	12mm

Technical data

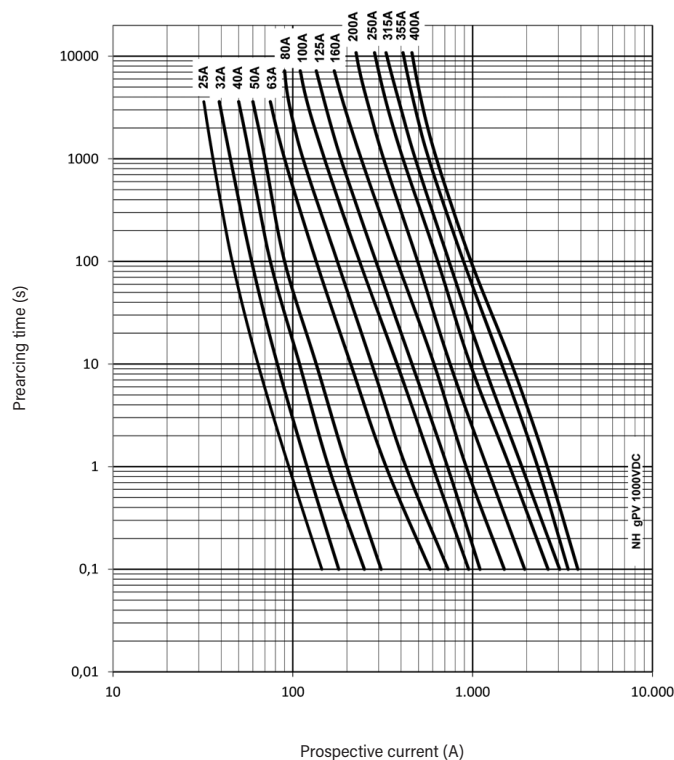
Rated voltage	1000V DC
Rated current	25A...200A
Rated breaking capacity	30kA
Operating class	gPV
Minimum interrupt rating	1,35·I _n
Non fusing current	1,13·I _n
Storage temperature	-40°C ... 90°C
Operating temperature *	-40°C ... 80°C

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

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



t-I characteristics



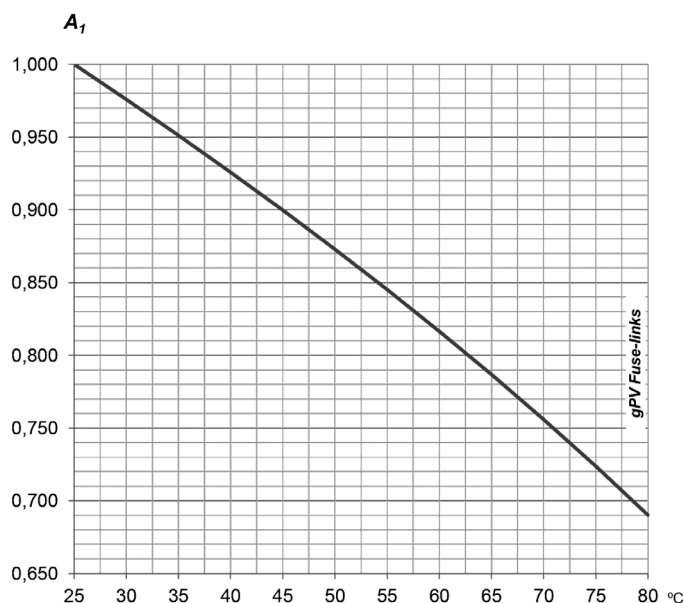
Materials

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

Power dissipation

I _n	PREARcing I _p t	OPERATING I _p t	POWER DISSIPATION 0.7 · I _n	POWER DISSIPATION I _n
(A)	(A ² S)	(A ² S)	(W)	(W)
25	62	94	5,2	12,5
32	122	184	6,3	15,5
40	302	454	6,7	16,6
50	562	844	7,5	18,0
63	1210	1815	8,2	20,0
80	2250	3375	10,0	27,0
100	4000	6000	11,0	28,0
125	6500	9700	12,5	32,0
160	10300	19800	10,0	25,0
200	19900	38300	12,5	30,0

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

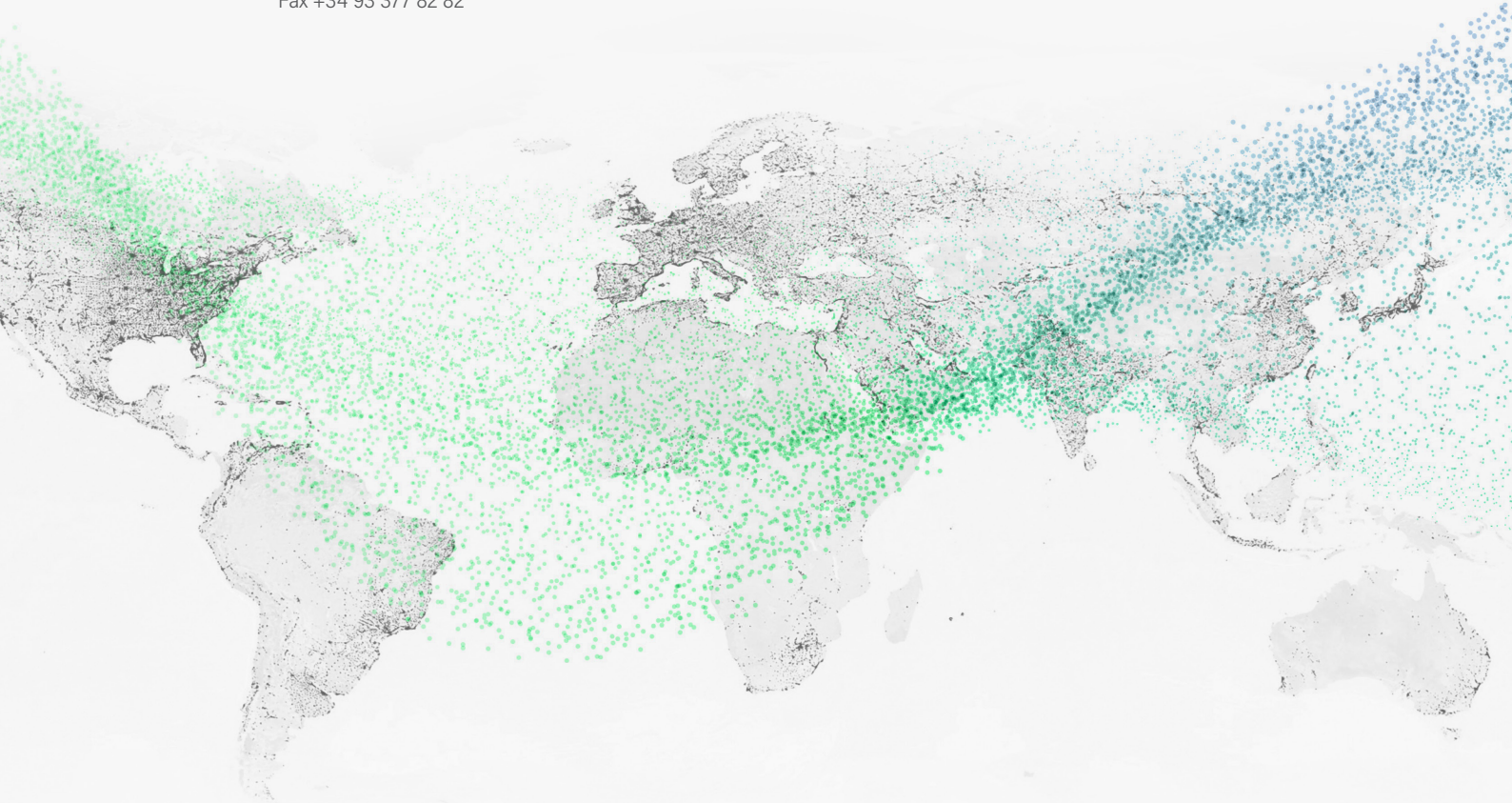
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The "electro technical expert" logo marked on the products included in this data sheet indicates that the installation of these products must be carried out by expert personnel with specialized knowledge.



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.



The data reflected in this technical record are subject to the correct installation of the product in accordance with manufacturer's instructions, relevant installation standards and professional practices, maintained and used in applications for which they were made.

The products described in this document have been designed, developed and tested in accordance with specific standard. They are considered components that are integrated as part of installation, machine or equipment. The correct general operation of the referred product is responsibility of the manufacturer of the installation, machine or equipment.

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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