df Electric

HORUS PHOTOVOLTAIC PROTECTION

PHOTOVOLTAIC

FUSE LINKS & FUSE HOLDERS FOR PHOTOVOLTAIC APPLICATIONS

gPV
NH 1000V DC
fuse links

NH NH2

NH1 NH2 NH3

PROTECTING THE WORLD

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gPV
NH 1000V DC
fuse links

PHOTOVOLTAIC

HORUS PHOTOVOLTAIC PROTECTION

NH2

NH2
KNIFE BLADE

RATED VOLTAGE
1000V DC

RATED CURRENT
200A | 250A

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

NH2 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 NH2 1000V DC 200A and 250A**

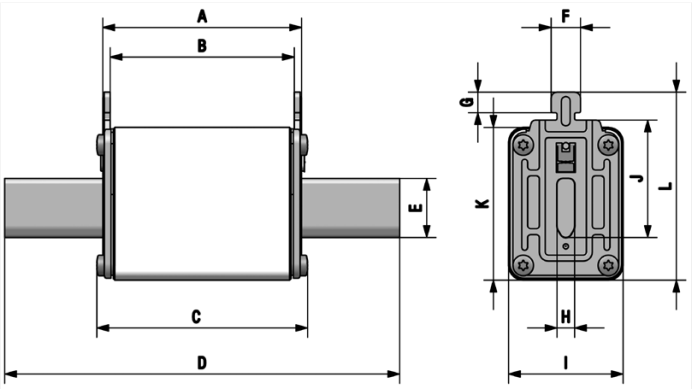
They provide protection against overloads as well as short-circuits (gPV class according to IEC 60269 and UL248-19 Standards, with a minimum fusing current of 1,35·In.

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**.

RoHS COMPLIANT

Dimensions

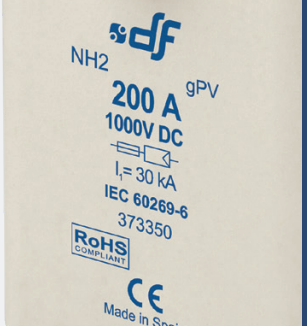


A	B	C	D	E	F	G	H	I	J	K	L
68	62	71,5	150	25	10	9,5	6	53	48	60	72

Weight 620gr

Range

In (A)	REFERENCE	PACKING Uni /BOX
200	**373350**	1/15
250	**373360**	1/15



gPV
NH 1000V DC
fuse links

NH2

PHOTOVOLTAIC

HORUS PHOTOVOLTAIC PROTECTION

NH2
BOLTED BLADE

RATED VOLTAGE
1000V DC

RATED CURRENT
200A | 250A

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

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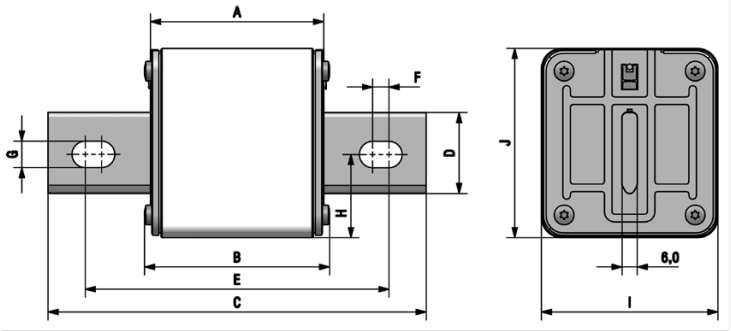
RoHS COMPLIANT

Dimensions



A	B	C	D	E	F	G	H	I	J
68	71,5	150	25	118	9	10,5	27	53	60,5

Weight	610gr
Recommended torque for connection screws (M10)	30...35Nm
Minimum recommended distance between fuse links	12mm

Range

In (A)	REFERENCE	PACKING Uni /BOX
200	**373350B**	1/15
250	**373360B**	1/15

gPV
NH 1000V DC
fuse links

NH2

PHOTOVOLTAIC

HORUS PHOTOVOLTAIC PROTECTION

Technical data

Rated voltage	1000V DC
Rated current	200A | 250A
Rated breaking capacity	30kA
Utilization category	gPV
Minimum interrupt rating	1,35·In
Non fusing current	1,13·In
Storage temperature	-40°C ... 90°C
Operating temperature *	-40°C ... 80°C

* For ambient temperatures higher than 25ºC 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

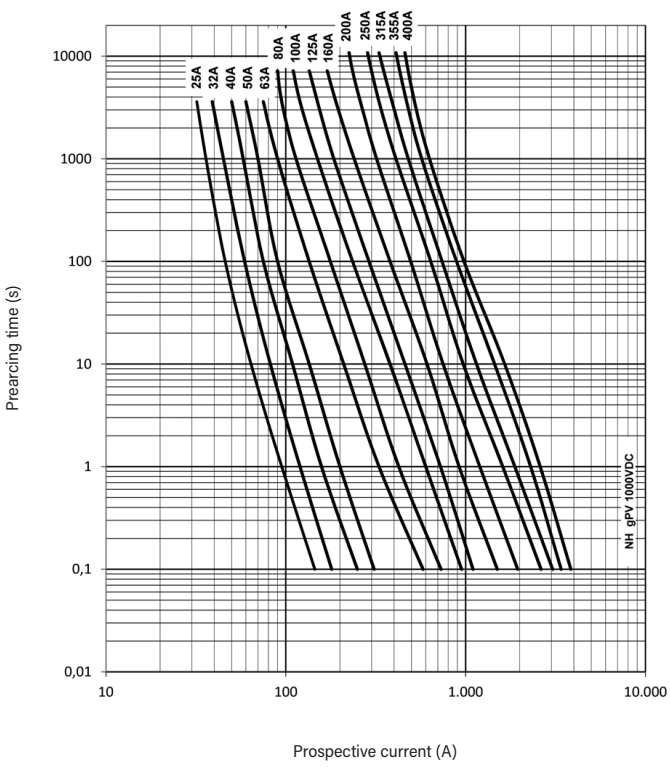
Materials

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

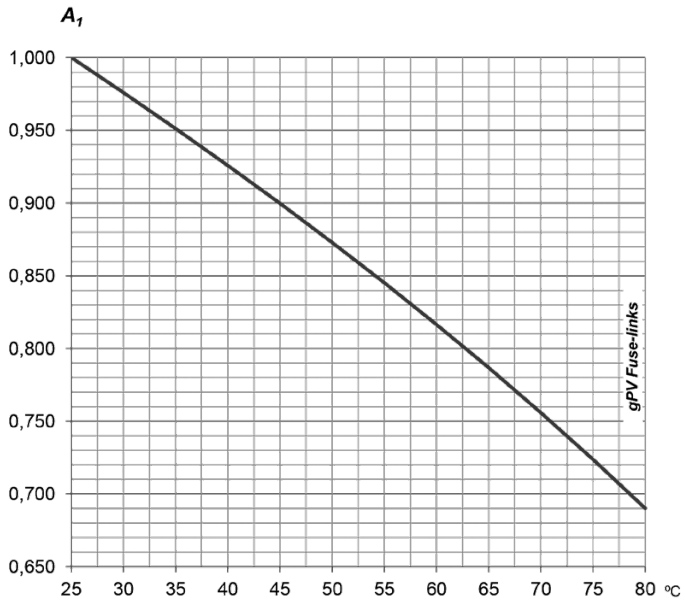
Power dissipation

I_n	PREARCING I^2t	OPERATING I^2t	POWER DISSIPATION $0.7 \cdot I_n$	POWER DISSIPATION I_n
(A)	(A^2S)	(A^2S)	(W)	(W)
200	18700	36400	11,4	28,0
250	36800	71500	13,0	33,3

t-I characteristics



Ambient temperature derating factor



t_a (°C)	A_1
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 40ºC or 45ºC (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 45ºC, 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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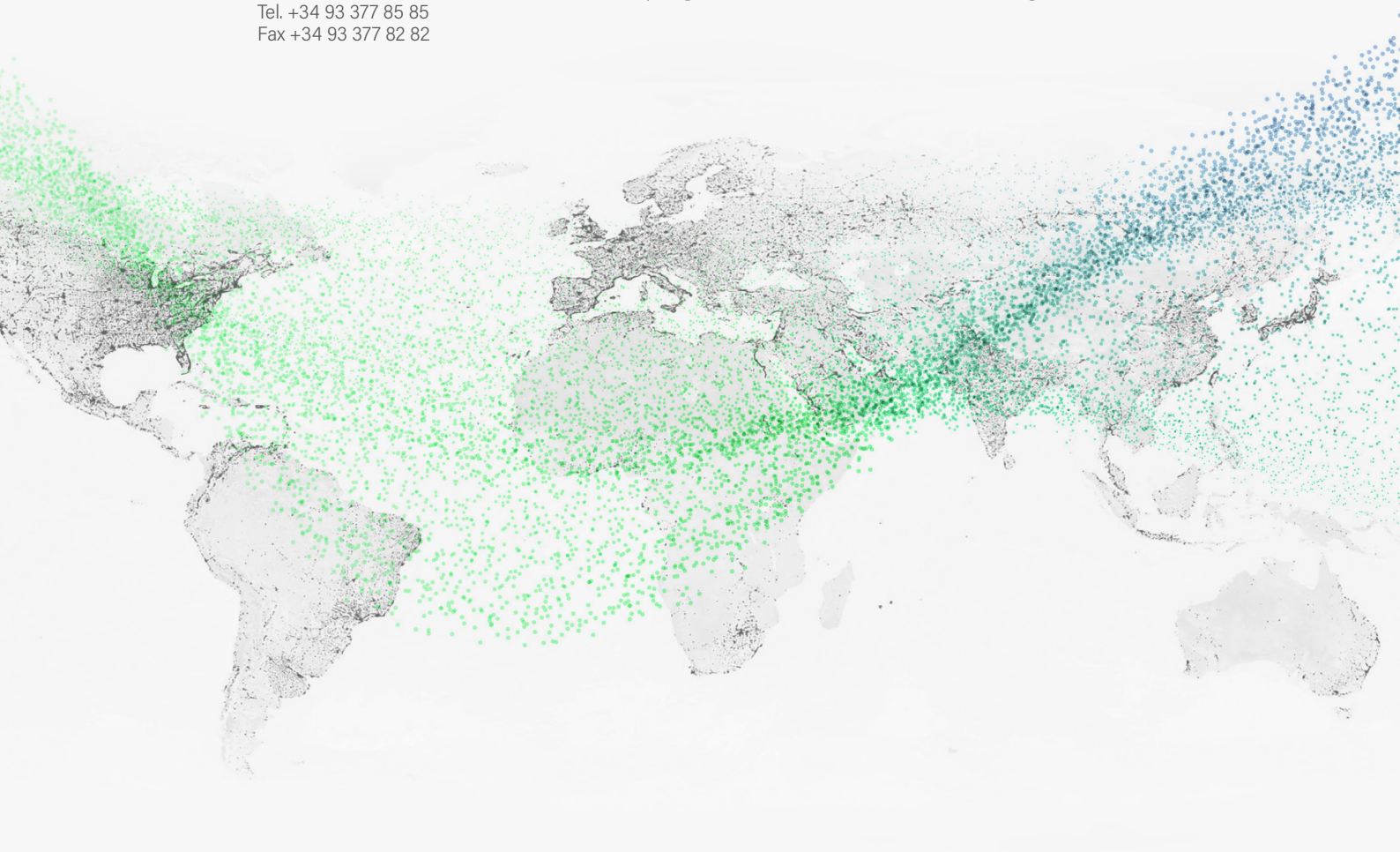

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MADE IN SPAIN

According to the waste of electrical and electronic equipment directive, electrical material should not be part of the usual waste. This symbol alerts users that these products should be recycled according to local environmental waste disposal regulations.

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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