



HORUS
PHOTOVOLTAIC
PROTECTION



PHOTOVOLTAIC

FUSE LINKS & FUSE HOLDERS FOR PHOTOVOLTAIC APPLICATIONS

gPV CYLINDRICAL fuse links

CYL 14x51



10x38

14x51

10x85

10/14x85

22x65

PROTECTING THE WORLD



RATED VOLTAGE
1100V DC
1000V DC

RATED CURRENT
15A | 20A
25A | 32A

BREAKING CAPACITY
10kA
30kA

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



Cylindrical fuse links for photovoltaic applications

gPV 14x51 cylindrical fuse links from DF Electric have been developed to offer a compact, safety and economic protection of photovoltaic modules (string protection) with voltages up to 1.000/1.100V DC.

The range comprises the following fuse links:

- Size 14x51 1100V DC 15A and 20A
- Size 14x51 1000V DC 25A and 32A

They provide protection against overloads as well as short-circuit (gPV class according to the requirements of IEC60269-6 and UL248-19 Standards).

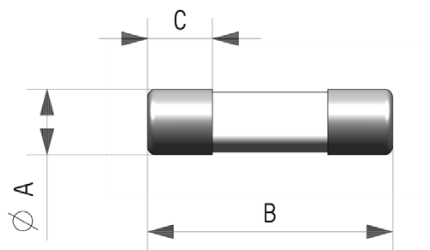
Made with ceramic tube with high withstand to internal pressure and thermal shock, that allows a high breaking capacity in a reduced physical space.

Contacts are made in silver plated copper 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 **14x51 PMX-PV fuse holders**.



Dimensions



A	B	C
14,3	51	13

Weight 18gr

Range

U (V DC)	I _n (A)	REFERENCE	PACKING Uni /BOX
1100	15	491647	10/50
	20	491648	10/50
1000	25	491650	10/50
	32	491655	10/50



Technical data

Rated voltage	1100V DC 1000V DC
Rated current	1100V DC → 15A 20A 1000V DC → 25A 32A
Rated breaking capacity	1100V DC → 10kA 1000V DC → 30kA
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

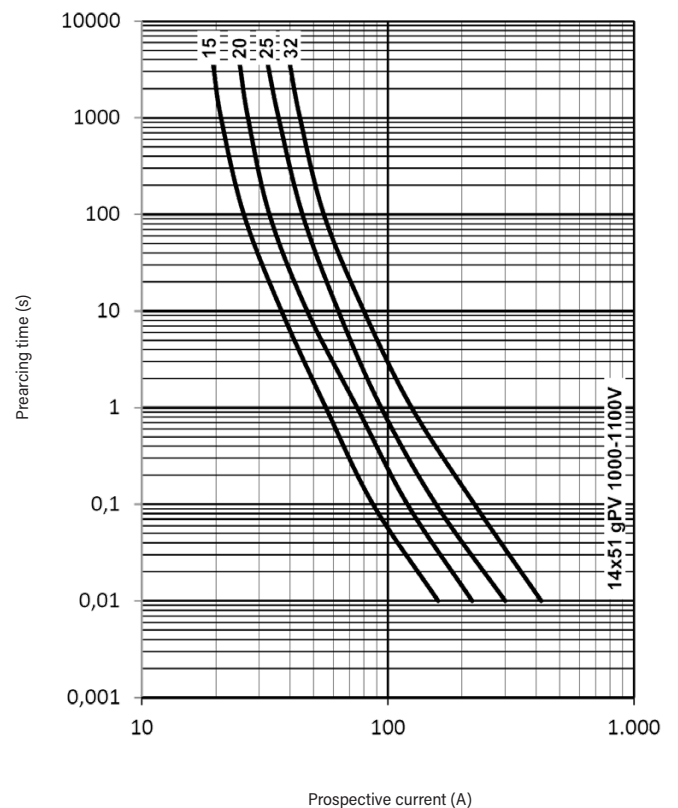
IEC/EN 60269-1
IEC/EN 60269-6
UL248-1
UL248-19
RoHS Compliant



Power dissipation

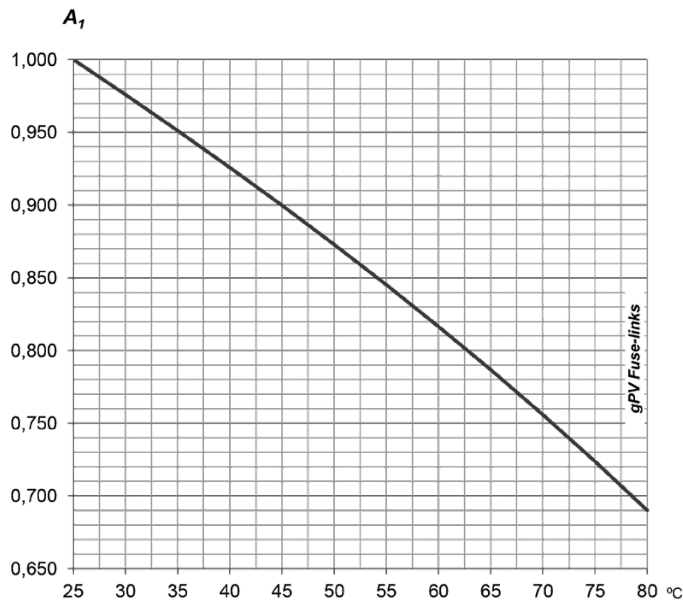
I _n	PREARcing I _t ²	OPERATING I _t ²	POWER DISSIPATION 0.7 · I _n	POWER DISSIPATION I _n
(A)	(A ² S)	(A ² S)	(W)	(W)
15	48	112	1,34	3,14
20	99	367	1,55	3,68
25	275	650	1,60	3,80
32	550	1300	2,00	4,70

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 applications 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).

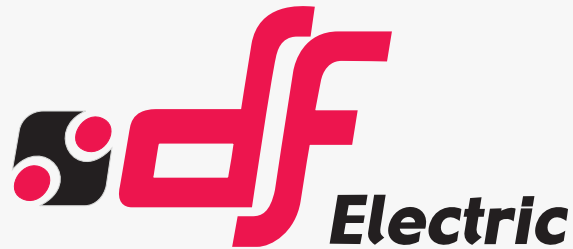
It should be applied a derating factor (A_1) as function of ambient temperature.

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

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

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

$$I_N(\text{fuse link}) \geq \frac{I_{SC\ STC}}{0,90 \cdot 0,80} \geq I_{SC\ STC} \cdot 1,4$$



PROTECTING THE WORLD

HEAD OFFICE AND FACTORY

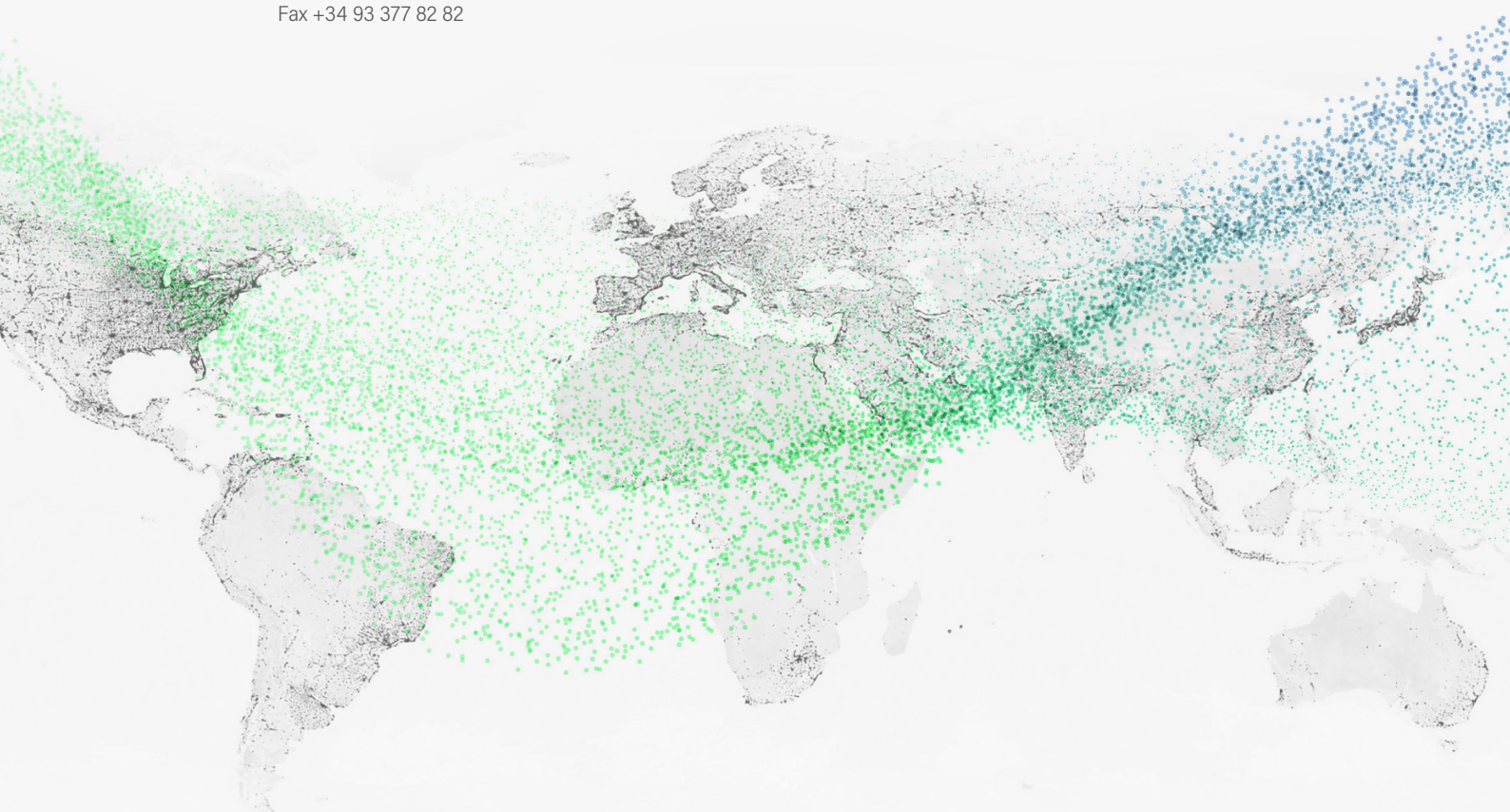
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The "electro technical expert" logo marked on the products included in this data sheet indicates that the installation of these products must be carried out by expert personnel with specialized knowledge.



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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