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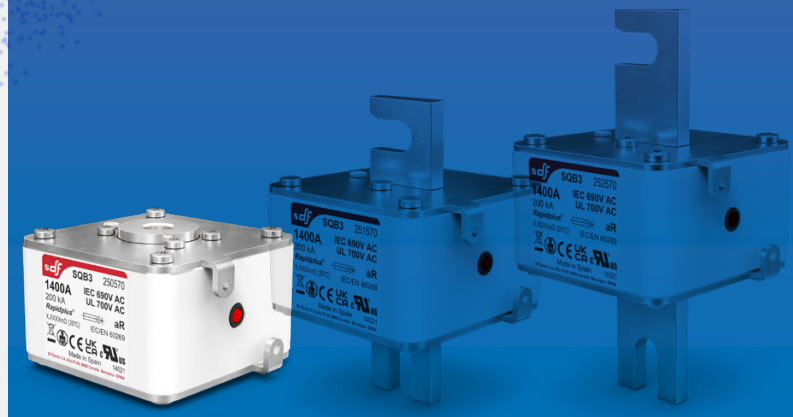
RAPIDPLUS

HIGH SPEED FUSE LINKS FOR SEMICONDUCTORS



aR
SQB
square body
semiconductor protection
fuse links

SQB · SQB3 · FLUSH END CONTACT



FLUSH END CONTACT · BLADE CONTACT 80mm · BLADE CONTACT 110mm

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semiconductor protection fuse links

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SQB3 FLUSH END CONTACT

SQB3 FLUSH END CONTACT

RATED VOLTAGE
690V AC

RATED CURRENT
500A...1400A

BREAKING CAPACITY
200kA

STANDARDS
IEC/EN 60269-1
IEC/EN 60269-4
UL248-1
UL248-13



Rapidplus® SQB
Square body fuse links for semiconductors

RAPIDPLUS SQUARE BODY (SQB) aR fuse links are specially designed for protection of power semiconductor devices.

Typical application comprise protection of diodes, thyristors, triacs and IGBTs, used in power rectifiers, UPS, converters, motor drives, soft starters, solid state relays, photovoltaic inverters, welding inverters and any application in power electronics, where it is necessary to protect power semiconductor devices.

Thanks to the design of their melting elements, the materials employed and their construction with solidified sand, these fuses provide excellent characteristics:

- Ultra-fast acting.
- Very good current limiting.
- Very low I^2t values.
- High breaking capacity.
- Excellent cycling capability

The range comprises the following fuse links:

→ **Size SQB3 690V AC 500A to 1400A (FLUSH END CONTACT)**

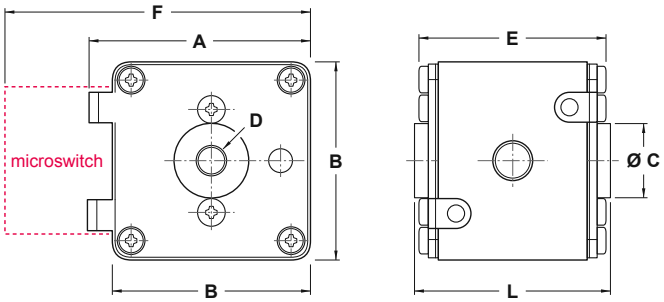
These fuse links have a trip indicator that can be used as a visual indication or can be equipped with a microswitch mounted directly on the fuse link.

UL certification according to UL248-13 standard. UL file Nr. E477155.

c UL us

RoHS COMPLIANT

Dimensions



A	B	C	D		E	F	L
			THREAD	DEPTH			
81	73,5	29,5	M12	12	50,5	109	52

Weight 825gr

Range

In (A)	REFERENCE	PACKING Uni /BOX
500	**250525**	3
550	**250530**	3
630	**250535**	3
700	**250540**	3
800	**250545**	3
900	**250550**	3
1000	**250555**	3
1100	**250560**	3
1250	**250565**	3
1400	**250570**	3



aR SQB square body

semiconductor protection fuse links

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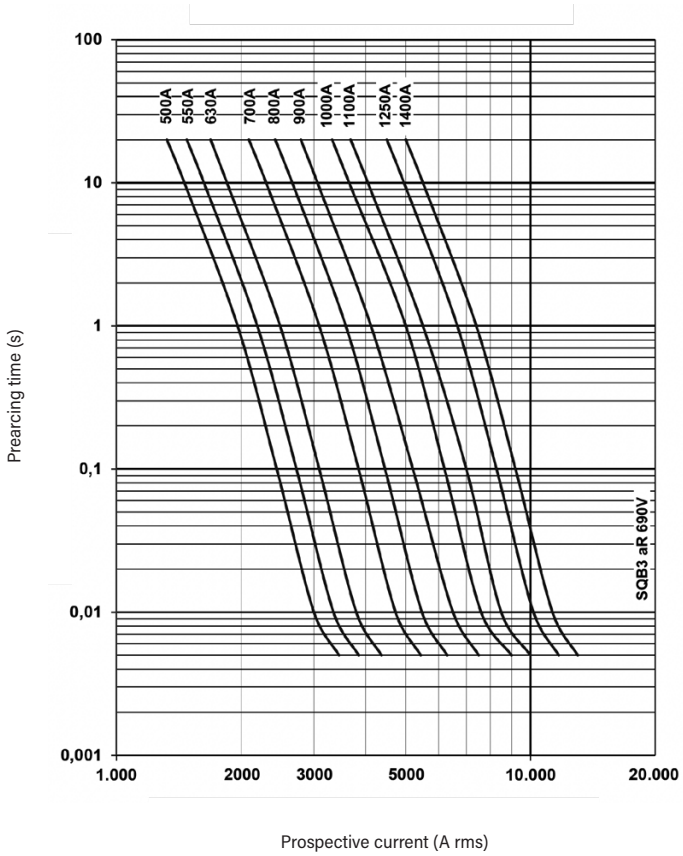
SQB3 FLUSH END CONTACT

Technical data

Rated voltage	IEC → 690V AC +5% UL → 700V AC
Rated current	500A...1400A
Rated breaking capacity	200kA
Operating class	aR
Minimum breaking current	3,5·In
Rated frequency	42…62Hz
Max. altitude *	2000 m
Storage temperature	-40°C ... 90°C
Operating temperature *	-40°C ... 80°C

* For altitudes higher than 2000 m it is necessary to apply a derating in maximum current (consult us).
** For ambient temperatures higher than 25ºC it is necessary to apply a derating in maximum current.

t-I characteristics



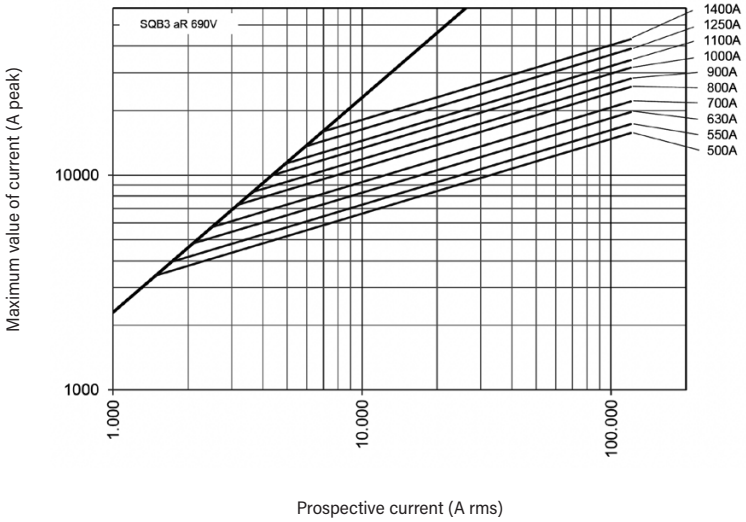
Standards

IEC/EN 60269-1
IEC/EN 60269-4
UL248-1
UL248-13
RoHS Compliant

Materials

Body	High grade ceramics
Contact blades	Copper (tin plated)
Plates	Brass (tin plated)
Screws	Zinc plated steel

Cut-off characteristics



Power dissipation

I_n (A)	POWER DISSIPATION In (W)	PREARCING I^2t (A^2S)	OPERATING I^2t (A^2S)
500	84	18700	137000
550	85	24900	182900
630	98	36500	269000
700	100	51500	379000
800	104	82500	600000
900	111	108000	790000
1000	117	153500	1125000
1100	125	196000	1400000
1250	133	282000	2050000
1400	146	383000	2800000



aR SQB square body

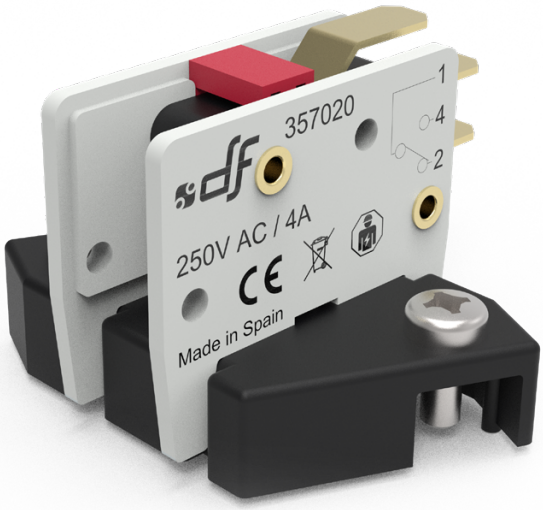
semiconductor protection fuse links

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SQB3 FLUSH END CONTACT

Microswitch system

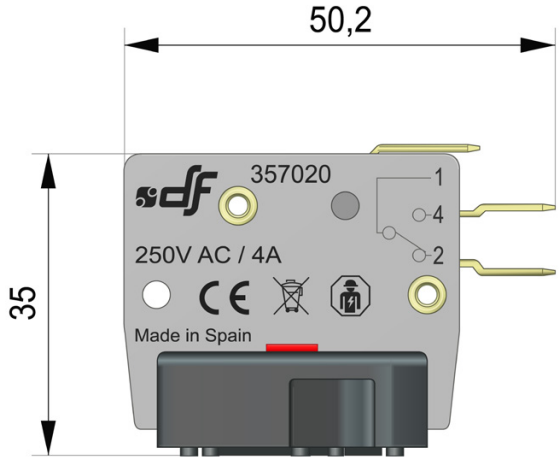


Range

REFERENCE	DESCRIPTION	PACKING Uni /BOX
357015	MICROSWITCH SYSTEM* FOR SQUARE BODY aR 690V FUSE LINKS	1/10

* Kit includes the striker support, two fixing screws and the microswitch ref. 357020

Dimensions



Weight 23,5gr

Technical data

Contact type	Changeover (NO-NC)
Connection	Fast-on terminals 6,3 x 0,8mm
Ambient temperature of service	-40°C ... 80°C

AC

Type of load	Maximum operating current			
	24V	**48V**	**127V**	**250V**
AC-12 Resistive	20A	20A	16A	16A
AC-15 Inductive	6A	6A	5A	4A

DC

Type of load	Maximum operating current			
	24V	**48V**	**127V**	**250V**
DC-12 Resistive	2,5A	2,5A	0,8A	0,3A
DC-13 Inductive	2,5A	1,2A	0,35A	0,2A



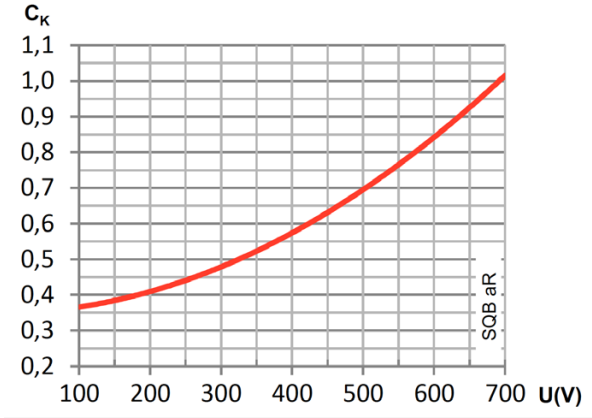
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semiconductor protection fuse links

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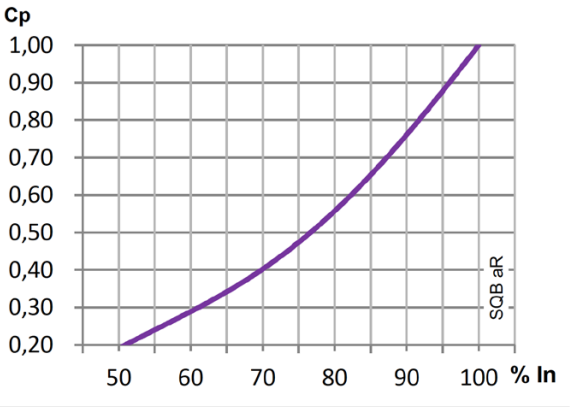
SQB3 FLUSH END CONTACT



I^2t Correction factor C_K

The total clearing I^2t at rated voltage and at power factor of 0,15 are given in the electrical characteristics.

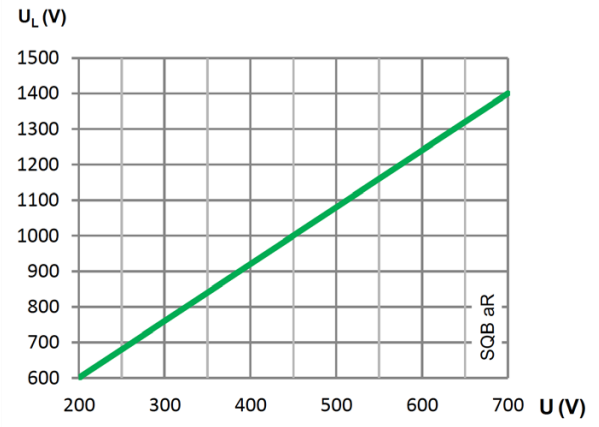
For other voltages, the clearing I^2t is found by multipliying by correction factor, K.



Correction factor for power loss C_p

Power dissipation values are given at rated current (In).

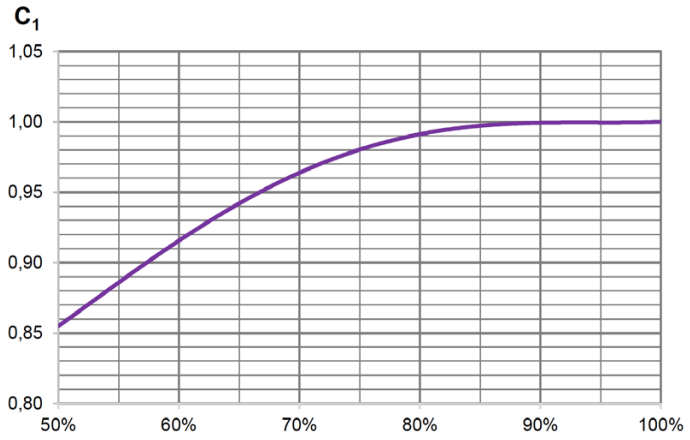
It is possible to calculate values of power dissipation for other currents multiplying these values by correction factor C_p for power loss as a function of % of rated current.



Arc voltage U_L

This graphic gives the peak arc voltage U_L that can appear across the fuse-link during operation as a function of operating voltage.





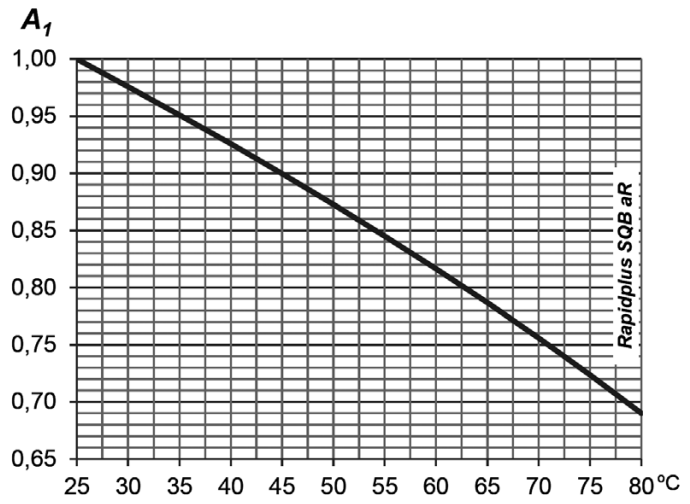
Percentage of the recommended conductor size (100% = 1,3 A/mm²)

Conductor size correction factor C_1

These fuses generate a lot of heat that is partly evacuated by thermal conduction through the conductors (cables or busbars). In some applications, the fuse will work with conductor sections lower than those used in standard type tests carried out in the laboratory according to Standard IEC/EN 60269-4, which means that the heat generated by the fuse does not be evacuated optimally.

To compensate for this lack of conduction cooling, a correction coefficient is applied. To obtain the value of the C1 coefficient from the curve, we have to calculate the current density value at which the conductors will work and determine what % of the reference value it represents.

A current density of 1.3 A/mm² is considered as the reference value (100%). In the event that the two conductors are not the same, we can use the average value of the two current density values.



Ambient temperature derating factor A_1

Fuse link current ratings are established by type tests conducted in laboratory with an ambient temperature of 25°C.

When the utilization ambient temperature is higher than this reference value, the fuse-link must be "derated".

The rated current of fuse-link must be multiplied by a derating factor A1 to find the maximum operating current.

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



Installation guidelines

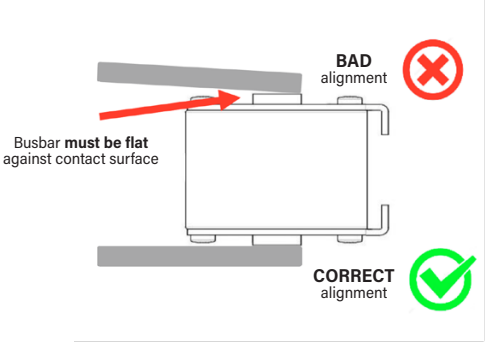
Square body semiconductor fuses require correct installation to ensure proper operation.

It is very important that the contact between the fuse link and the fuse-base or the connecting busbars/cables is optimal, because in addition to the electrical contact itself, it must be taken into account that these fuses generate a lot of heat that is partially evacuated by thermal conduction through these connections.

Bad connection due to inadequate assembly or lack of maintenance may cause overheating of the fuse and could reduce the expected life of the fuse.

The use of copper conductors and busbars is recommended.

Excessive tension, compression or torsion that could be caused by a misalignment between the fuse and the connection busbars must be avoided.



It is important to apply the correct tightening torques when mounting the fuses.

The contacts should be retightened at least once a year.

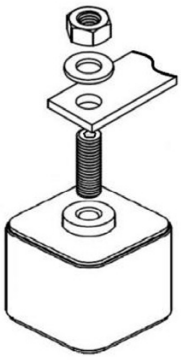
To prevent any damage inside these fuses, the use of screws to make the connection is not recommended.

It is recommended to make the connection using threaded studs according to DIN 913 (ISO 4026) or DIN 916 (ISO 4029) with a washer and the corresponding nut.

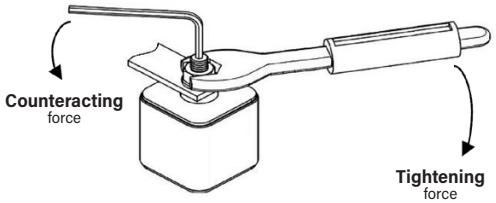
It is recommended to include a conical contact washer (NF E 25-511) or a flat washer (DIN 125) plus some elastic fixing element like a spring curved washer (DIN 137), a grower washer (DIN 127 - DIN 7980), a serrated lock washer (DIN 6798A) or similar.

This stud must be screwed onto the fuse with a tightening torque of approximately 5Nm. The recommended tightening torque for the nut is as follows:

Size	Thread	Recommended torque
SQB3	M12	45…50Nm



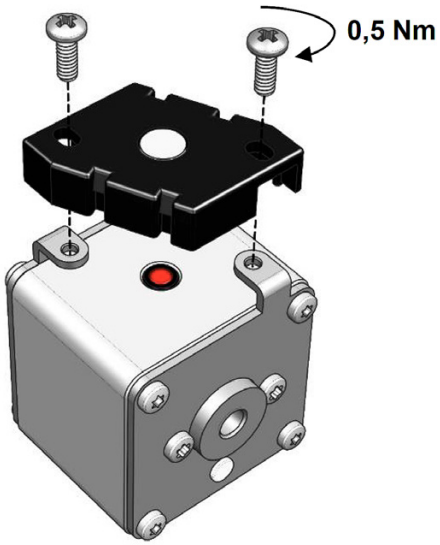
When tightening the nuts using the torque wrench, it is recommended to use an Allen key to prevent the stud from turning.



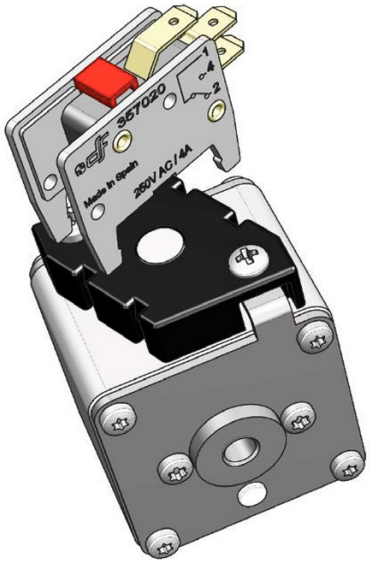


Microswitch assembly

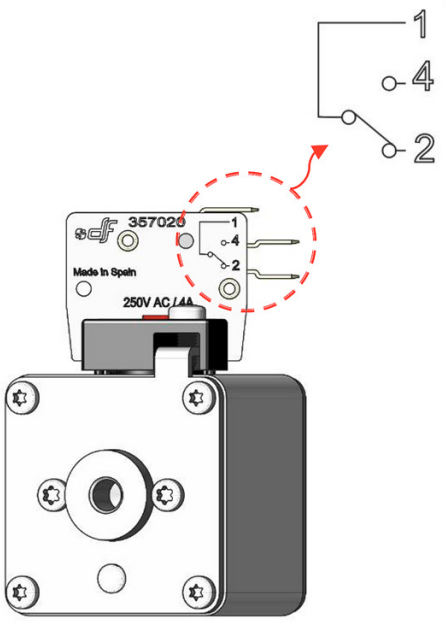
STEP 1
Mount the striker support on the fuse



STEP 2
Clip the microswitch on the striker support



STEP 3
Connect with fast-on terminals 6,3 x 0,8mm

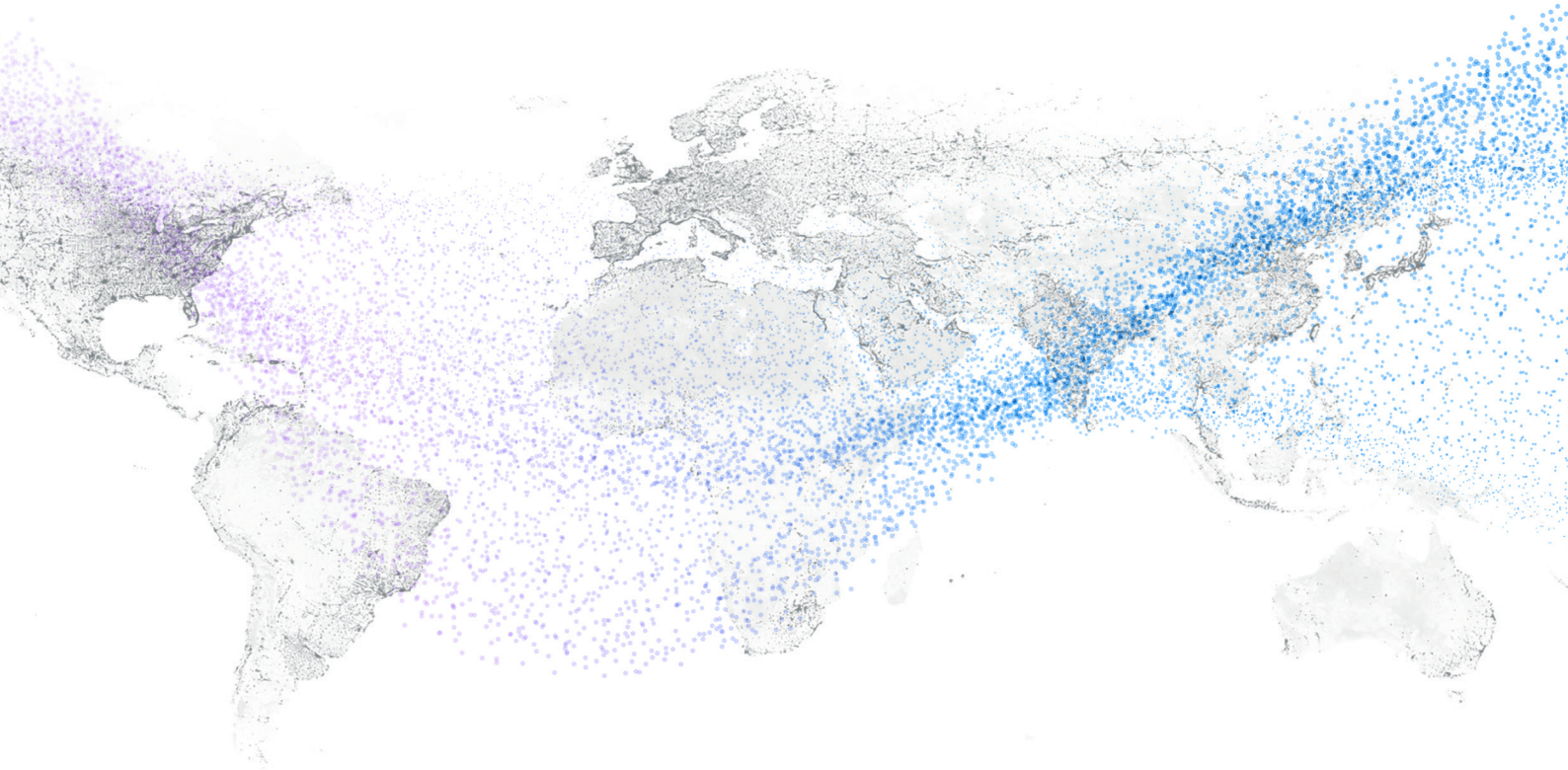


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To prevent electrical hazards, carry out the installation without voltage.

Safety notice
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