

Rapidplus®



RAPIDPLUS

HIGH SPEED FUSE LINKS FOR SEMICONDUCTORS

aR
SQB
square body
 semiconductor protection
 fuse links



**PROTECTING
 THE WORLD**



RATED VOLTAGE
690V AC

RATED CURRENT
400A...1000A

BREAKING CAPACITY
120kA

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_t^2 values.
- High breaking capacity.
- Excellent cycling capability

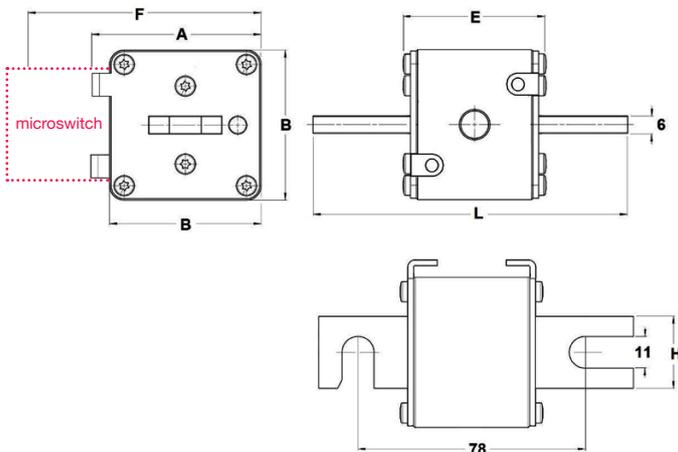
The range comprises the following fuse links:

→ Size SQB2 690V AC 400A to 1000A (**BLADE CONTACT 80mm**)

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.



Dimensions



A	B	E	F	H	L
66	60	49	95	25	108,5

Weight 565gr

Range

I_n (A)	REFERENCE	PACKING Uni /BOX
400	251425	3/21
450	251430	3/21
500	251435	3/21
550	251440	3/21
630	251445	3/21
700	251450	3/21
800	251455	3/21
900	251460	3/21
1000	251465	3/21



Technical data

Rated voltage	690V AC
Rated current	400A...1000A
Rated breaking capacity	120kA
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 25°C it is necessary to apply a derating in maximum current.

Standards

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



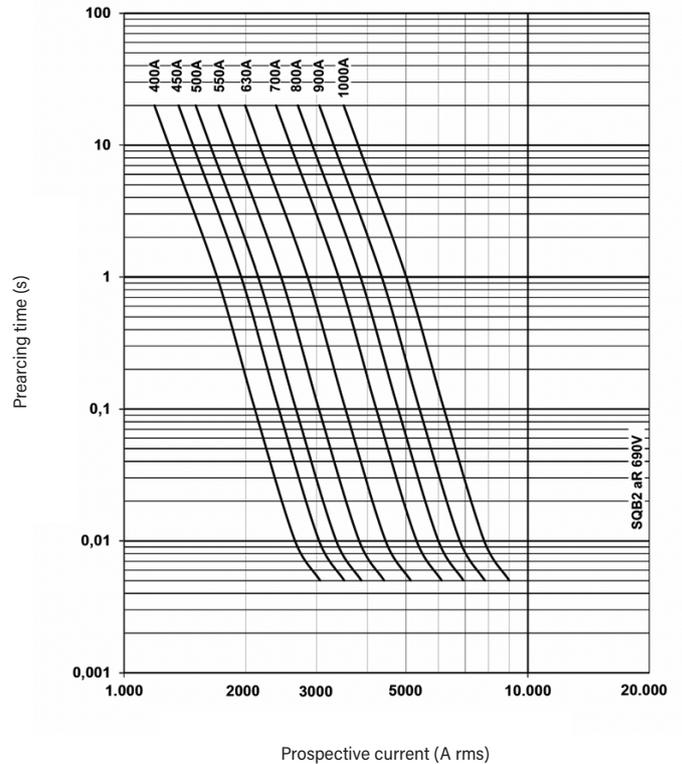
Materials

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

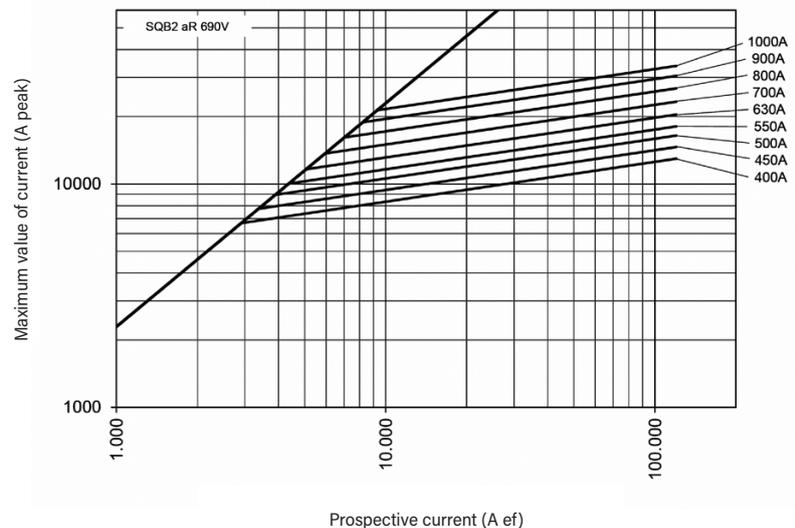
Power dissipation

In	POWER DISSIPATION In	PREARCING I _t	OPERATING I _t
(A)	(W)	(A ² S)	(A ² S)
400	77	10500	79250
450	79	15200	114100
500	80	20400	153100
550	86	28740	215700
630	95	41390	610600
700	97	61380	464100
800	102	93130	699000
900	107	136250	1027000
1000	120	186250	1390000

t-I characteristics

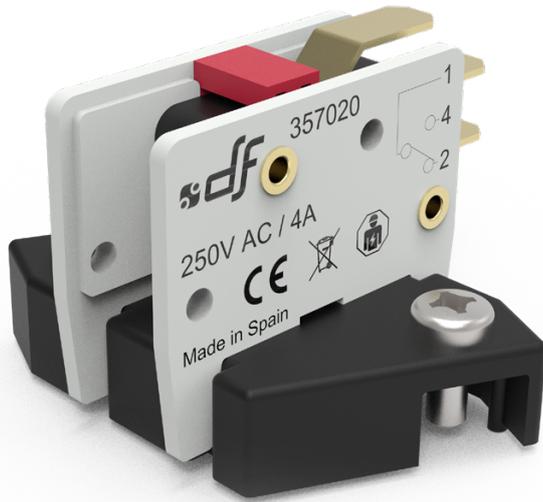


Cut-off characteristics





Microswitch system

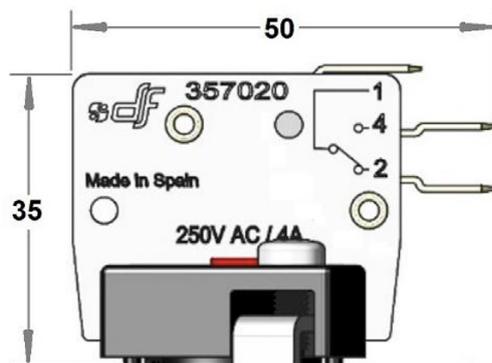


Range

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

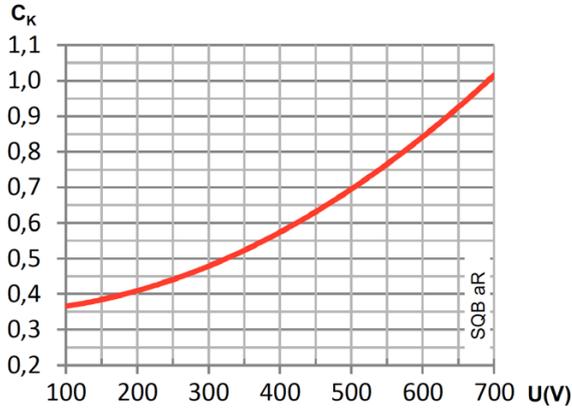
Contact type	Changeover (NO-NC)
Connection	Fast-on terminals 6,3 x 0,8mm
Ambient temperature of service	-40°C ... 80°C

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

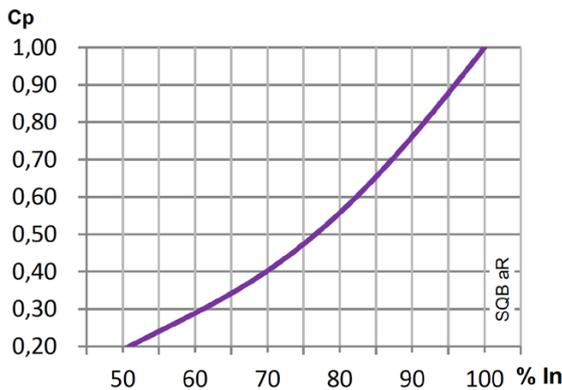
Type of load	Maximum operating current			
	24V	48V	127V	250V
DC-12 Resistive	2,5A	2,5A	0,8A	0,3A
DC-13 Inductive	2,5A	1,2A	0,35A	0,2A



I²t Correction factor

Total clearing I²t values at rated voltage are given in electrical characteristics tables.

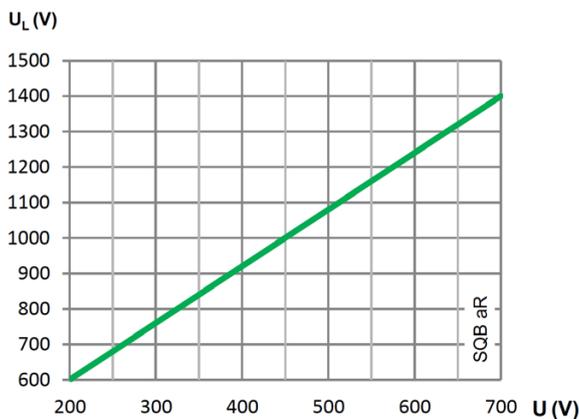
For other voltages, clearing I²t values can be calculated multiplying these values by correction factor C_k.



Correction factor for power loss

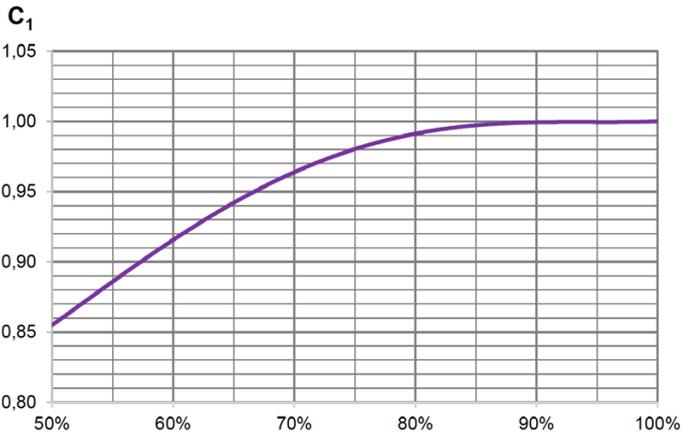
Power dissipation values are given at rated current (In).

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.



Peak arc voltage

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



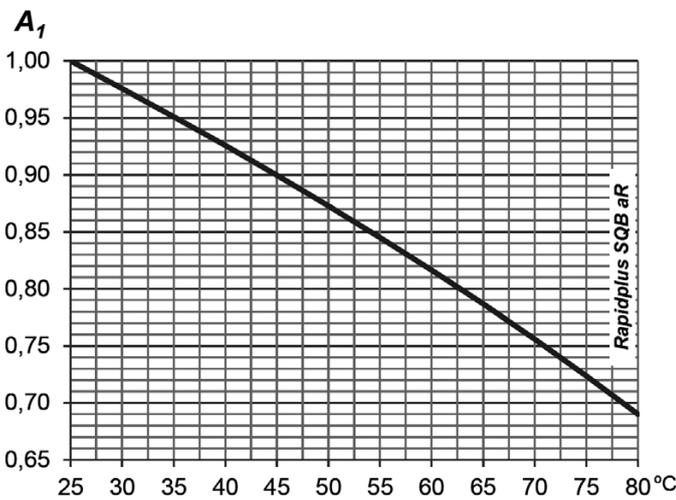
Percentage of the recommended conductor size (100% = 1,3 A/mm²)

Conductor size correction factor

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

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.

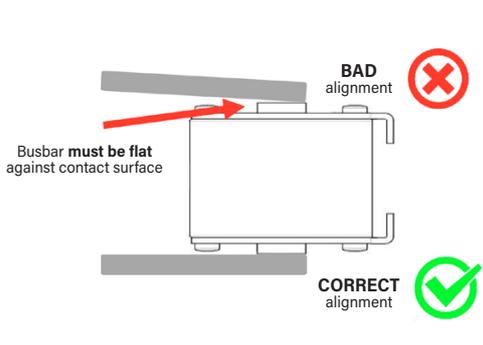
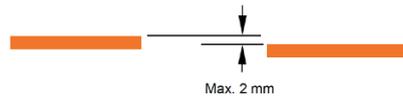
Fuse links with slotted contact knives can be mounted on special fuse bases or directly on busbars.

The connection must be made with M10 bolts and nuts. The use of washers is recommended.

If a fuse base is used, the tightening torques indicated by the manufacturer will be applied.

In case of direct mounting on busbars, a tightening torque between 30Nm and 40Nm is recommended.

In case of assembly between two busbars, these must be in the same plane, with a maximum difference of 2 mm.



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

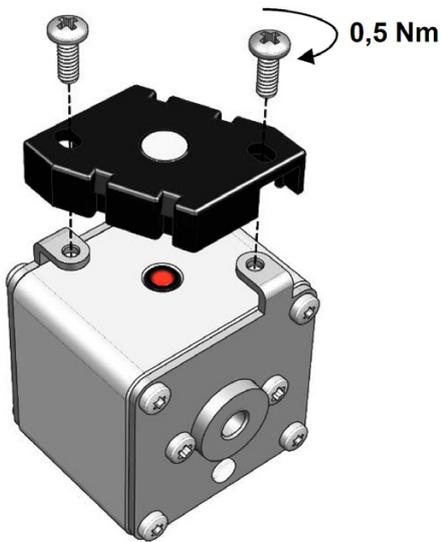
The contacts should be retightened at least once a year.



Microswitch assembly

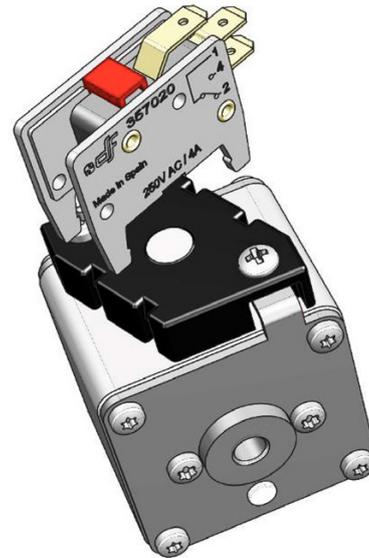
STEP 1

Mount the striker support on the fuse



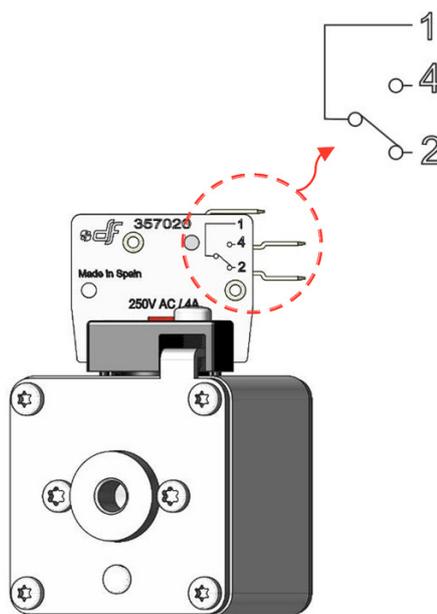
STEP 2

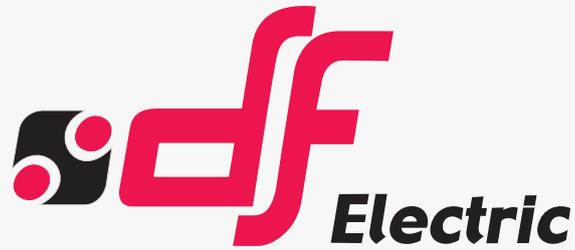
Clip the microswitch on the striker support



STEP 3

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





PROTECTING THE WORLD

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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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