FUSE MOUNTING RECOMMENDATIONS

APPLICATION NOTE

OBJECT

Ultra fast fuses are sophisticated electromechanic components so it's very important the mounting and maintenance process, this ensures the fuse throughout life protection.

This document makes reference to:

- Contact pressure and torque.
- Mounting alignment .
- Contact surface

And also some relevant things to consider:

- Shock and vibration resistance
- Maintenance
- Environmental cares

CONTACT PRESSURE AND TORQUE

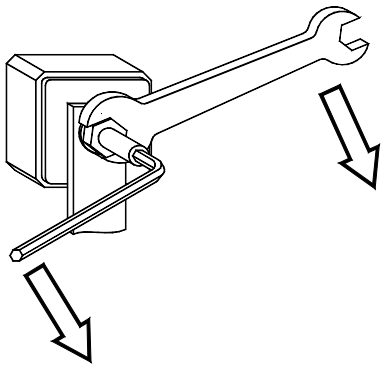
The ultra rapid fuses characteristic depends on the electric contact, terminals and wires quality connections. There are two important reasons, on the one hand it's evident that a good electric contact is required, and on the other hand we must keep in mind that during the fuse working time, they generate significant heat which is transmitted to the connections. An inadequate contact, directly affects to a temperature increase, so it reduce the fuse lifetime. For a correctly fuse installation you must considerate an adequate torque.

FUSES WITH SCREW CONTACTS

In general, DIN913 bolts with internal hexagon should be used, and mounted to the fuse with a 5 – 8Nm torque.

Terminal torque will depend on the screw type (depending on the fuse size), referring to the table below:

SCREW	TORQUE
M8	13.5 Nm (+0. -0.2 Nm)
M10	15 Nm (+0. -0.2 Nm)
M12	15 Nm (+0. -0.2 Nm)



During the assembly process, torsion efforts on the fuse capsule must be avoided, so the DIN913 bolt internal hexagon will be used to maintain it fixed (through a allen wrench), proceeding to torque with a spanner. It's recommend to use a DIN125 flat washer and some fixing elements (DIN7981 grover washer, DIN137 cog-washer, etc).

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BLADE CONTACT FUSES

Generally, two groups must be distinguished, DIN43653 with blades to mount directly to the terminals or special bases, and DIN43620 to be mounted by pressure upon bases with elastic contacts.

For DIN43653 types, the most great and adjusted screws/nuts must be used, being washers recommended. Torque can be 50Nm.

Referring to the mounting parameters, normally the values are notified by the base characteristics, but normally a 4Nm torque it's accepted.

For DIN43620 there's no specifications, because the bases have a spring system specially designed for this application. But the base-terminal contact torque must be considered and normally its 10Nm as maximum.

PRESSURE MOUNTING FUSES (PRESS-PACK)

Considering that several semiconductors must be mounted by pressure, usually diodes and thyristors, it's common to use fuses connected in series with them which simplifies the mechanical stack because all elements are pressed at the same time, especially in big compact power systems refrigerated by water. The compressing strength for these fuses depends on different factors, like the contact section, temperature gradient between contacts and also the load working conditions.

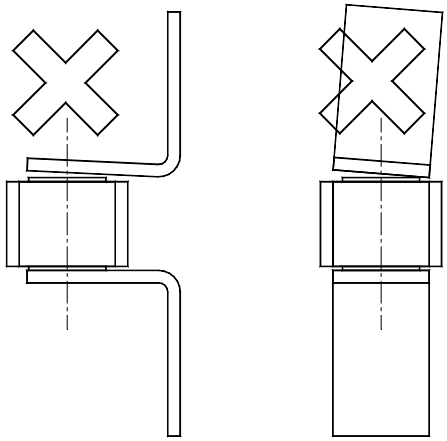
To obtain a good thermal and electric behave, without damaging the fuse, the approximately pressure is between 2N/mm^2 and 15N/mm^2.

Referring to the fuses which can only be refrigerated for one side the difference of temperature must be limited at 55ºC, for the two side refrigerated fuses, the differences are not significant.

ALIGNMENT OF CONTACTS

In order to avoid mechanical efforts which could affect to the fuse functions, a good alignment between the fuse contacts, terminals and supports must be guaranteed.

Only when the fuse is fitted to the terminals, then the torque can be proceeded.



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CONTACT SURFACE MATERIAL

Generally, the fuse contact surfaces are tinned or silvered, in both cases, the experience has demonstrated that these contacts finished are the ones which offers the best behave in front of copper, nickel and aluminum, considering all the possible working temperatures margin (until a maximum of 130ºC).

SHOCK AND VIBRATION RESISTANCE

Ultra rapid fuses are not prepared to resist a vibration excess, typical values are about 5g for the continued vibrations and 7g for short periods (shocks).

PREVENTIVE MAINTENANCE.

Things to be considered to ensure the good condition of the fuses:

- Check that the contact torque is correct (to use a dynamometric spanner).
- Check that there's any fissure on the ceramic fuse body .
- In case of fusion or micro contacts indicators, verify their operation condition.

FUSE REPLACING AFTER USE

After a fuse had exerted it's function (open circuit), it must be replaced for an equal type AND ALSO all the other fuses which had suffered the current exceed, although they didn't became in open mode (the typical example is a 3-phase grid, where the three fuses must be replaced).

The overcurrent can produce changes in the internal fuse resistance, changing the working characteristics, so it's no longer reliable.

STORAGE

Fuses must be kept in the original packages, avoiding dust and dirtiness and not to exceed a 70% of humidity, with a -40ºC to 85ºC temperature range.

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