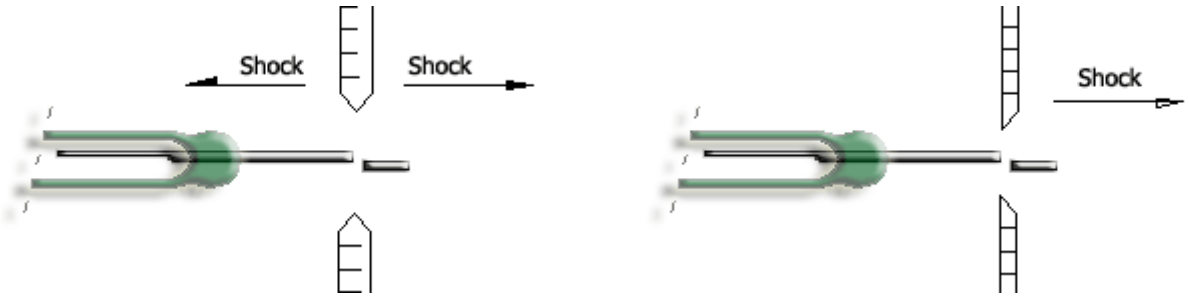
Physical Modifications

Cropping

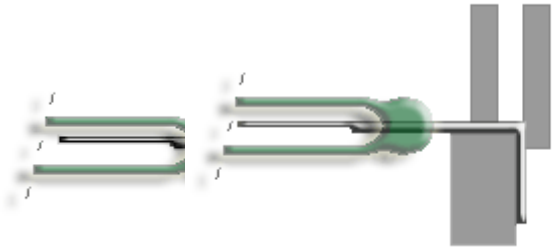
Cropping the leads of a reed switch removes low reluctance iron and introduces high reluctance air into the magnetic circuit, much the same as adding resistance to an electrical circuit. The result is that a greater number of equivalent operate AT is required to close a cropped reed switch. Cropping also increases release AT. It is recommended that end nippers be used, rather than conventional wire cutters, which may produce as much as 70-g shock in the seal area.



For miniature reed switches with glass diameter less than 2.0 mm, even end nippers may cause microscopic seal damage, and clamping the area between the seal and the cropping point is recommended before cropping.

Forming

Many of the same rules that pertain to cropping also apply to forming. Stops or guides that use the end of the seal as a reference point for forming can lead to damaged seals. Also, using the seal as a dimensional reference point invariably results in variation of the lead dimensions after forming.



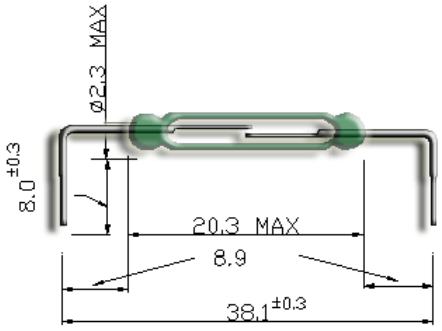
The recommended practice is to use the lead ends as a reference. Support must be provided between the seal and the forming point. A clamping device is usually recommended because as the lead is bent, stress must not be transferred to the seal area. This approach also allows for normal variations in glass length and distance between seal and each lead end.

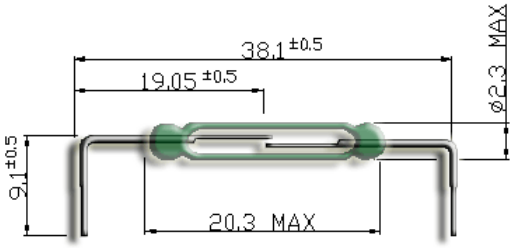
Welding and Soldering

In some instances, neither cropping nor forming can provide the required lead configuration, and welding or soldering additional material to the leads is the only answer. The leads of a standard reed switch are composed of approximately 50% nickel and 50% iron. These leads are plated after assembly with either gold or tin to improve weldability and solderability. Welding is preferred to soldering because less heat travels to the seal area. The coefficients of thermal expansion of the leads and glass are closely matched, but welding and soldering heat the wire more quickly than the glass. The result is that metal expansion can loosen or crack the glass-to-metal seal. Properly heat-sinked welding fixture and optimized welding cycles can produce strong bonds without seal degradation.

Dimensioning

Illustrated are two methods for dimensioning the same modification. The left illustration presents an impossible situation mainly because the glass length and its position relative to the gap vary greatly between switches. Compared to the precise dimensions of the reeds, it is unadvisable to use the envelope as a reference point. A common error is stacking three dimensions to come up with a toleranced overall length. This is quite an accomplishment especially when one dimension is specified as "max".





All dimensions in mm

The figure on the right has all the necessary dimensions referenced either from the air gap or the reed, both of which can be held with close tolerances. The bends are set up equally from the magnetic centre of the reed switch, which is located at the air gap. If a magnet is used for actuation, the operating point for reed switches with the same operate AT will be uniform. A switch dimensioned in this manner can have leads cut and formed in one operation. The number of measurements required to inspect the modified switch is minimized.