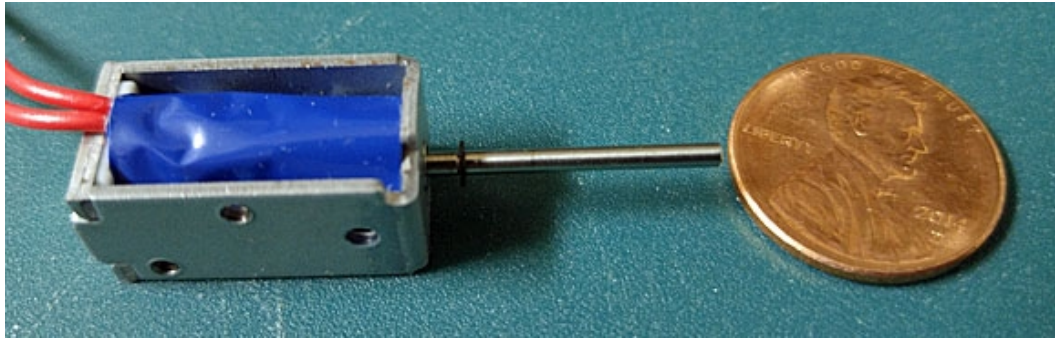


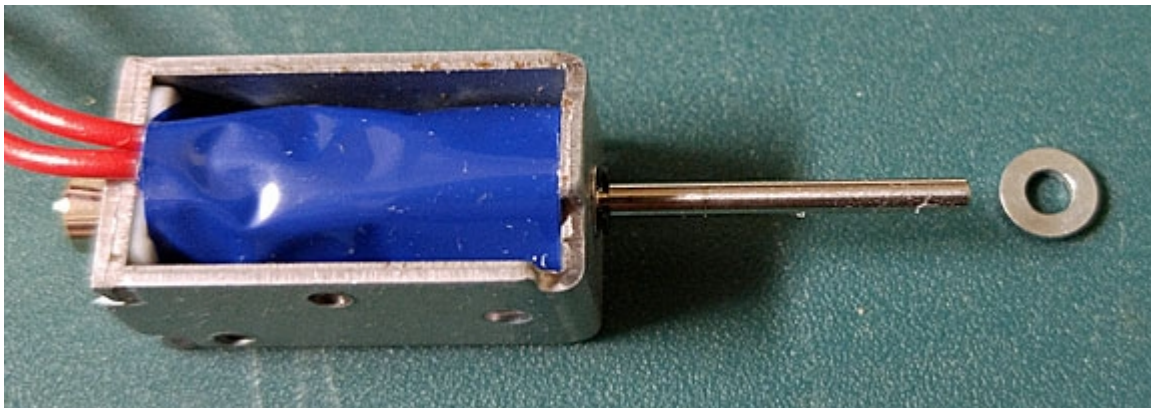
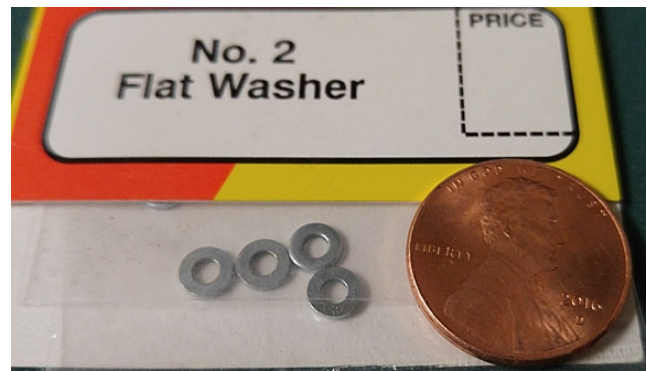
Modifying a Small Solenoid

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For a special project I needed to utilize a number of rather small solenoids. As seen here next to a penny, the shaft is merely a straight rod.



To attach the solenoid to the object that it was to control I chose to micro weld one of these small washers onto the shaft end. Once the washer was attached, I would be able to connect a variety of items to the ends of several solenoids.



With the micro welding of such small items, it is best to clamp the parts in position before welding.

Micro welding is done under a microscope. My welder is an Orion Pulse 200i pulse arc welder which outputs a small pulse of electricity to generate the tiny arc which does the welding. Built into the stereo microscope is an electronic shutter to shield the eyes from the bright arc. Everything happens in an instant. Argon gas is puffed onto the weld spot to prevent oxidation of the metals being welded.

The welder has a 10" touch screen for adjusting the arc characteristics, gas flow, etc.

Just below this screen is the stereo microscope.

Such welders are similar to a TIG welder in that a fine tungsten rod within a handpiece is used to transfer the arc. This handpiece can be mounted below the microscope or hand held depending on the job being done.

This handpiece may be seen under the microscope. On the underside of the microscope may also be seen the LED lighting and the electronic shutter mechanism. Also shown is the solenoid and the washer to be welded.



Here is a close up of the solenoid shaft end and the small washer held in position by a "third hand".

The handpiece with its central tungsten rod is just behind where the items will be welded.



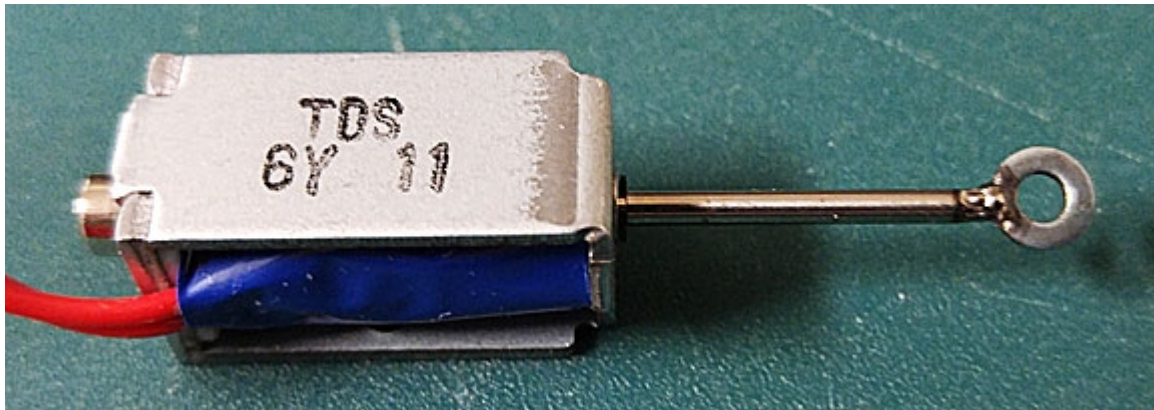
These are the arc settings that I decided to use for this weld. This versatile welder allows complete control of the arc characteristics.



Here are the solenoid rod and washer welded into position. I decided to use the arc to work the metals of the shaft and washer to get a deep bond which would not fail during use.



This is the end product right after the welding. The black will be removed with a fine glass fiber brush.



A close up image of the weld illustrates why I worked the metal a bit. The washer and the shaft were both plated and I wanted to be certain that I was welding the base metal.



After welding the washers onto the ends of several solenoid shafts, the solenoids can be easily attached to the items that they are to activate. Of course, now I may need to weld small mounting brackets onto the frame of the solenoids for easier mounting.