The George Washington University

Thruster Troubleshooting Manual

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I Introduction

This document will contain all the steps necessary for thruster troubleshooting including: applying carbon paint, finding the correct resistance values between the anode and cathode and fixing a loose anode ring terminal.

Contents

II Loose Anode Ring Terminal

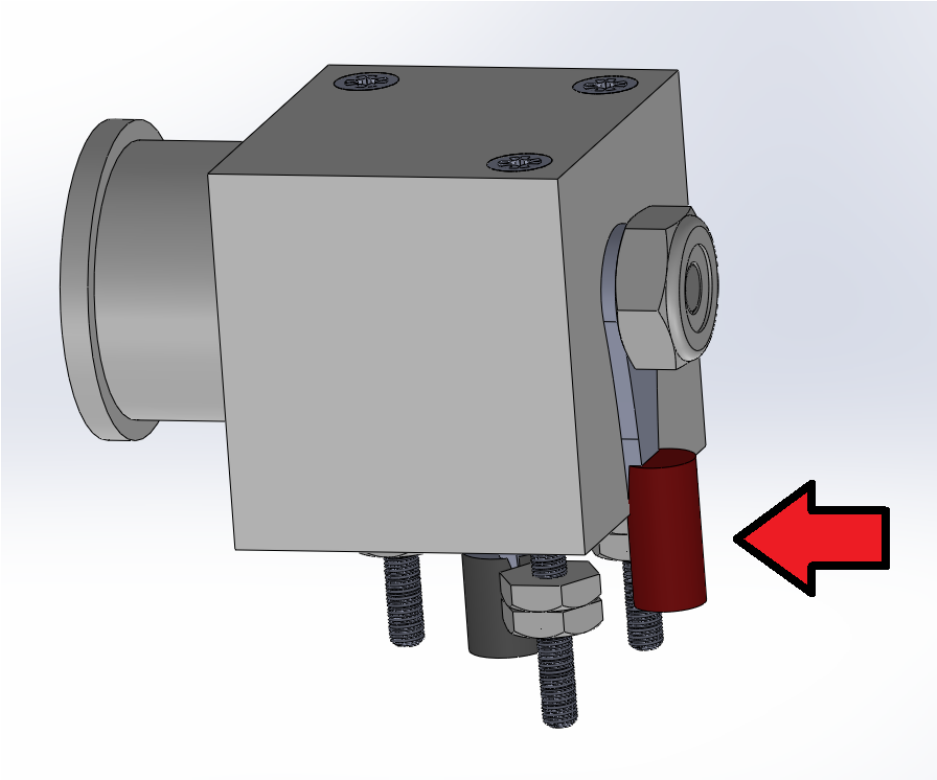

Figure 1: For a loose anode ring terminal (shown with arrow), you will need to remove both the lock nut and the ring terminal itself.

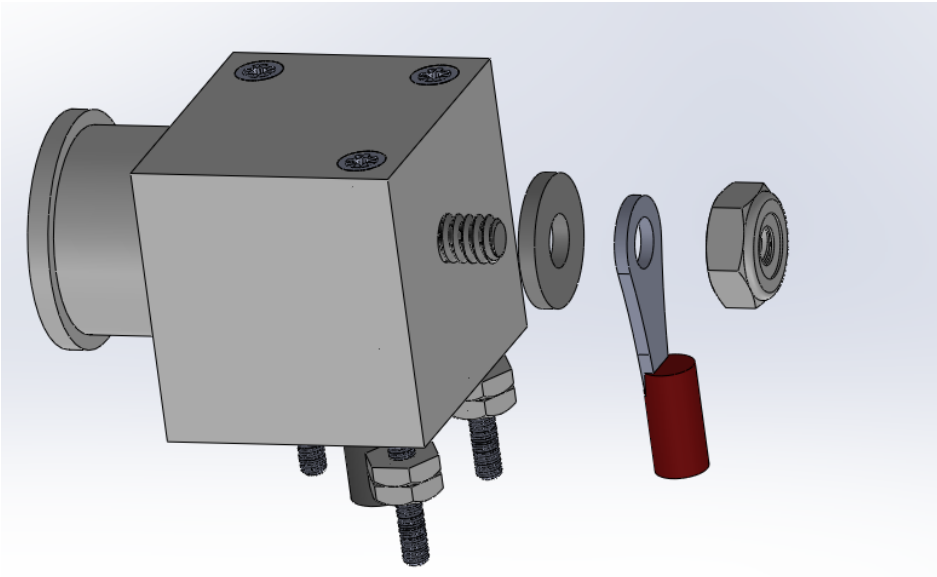

Figure 2: A **Number 4 Washer** should be placed before the ring terminal, which should then be followed by a lock nut. Continue to add washers and repeat as necessary to create sturdiness in the anode ring terminal.

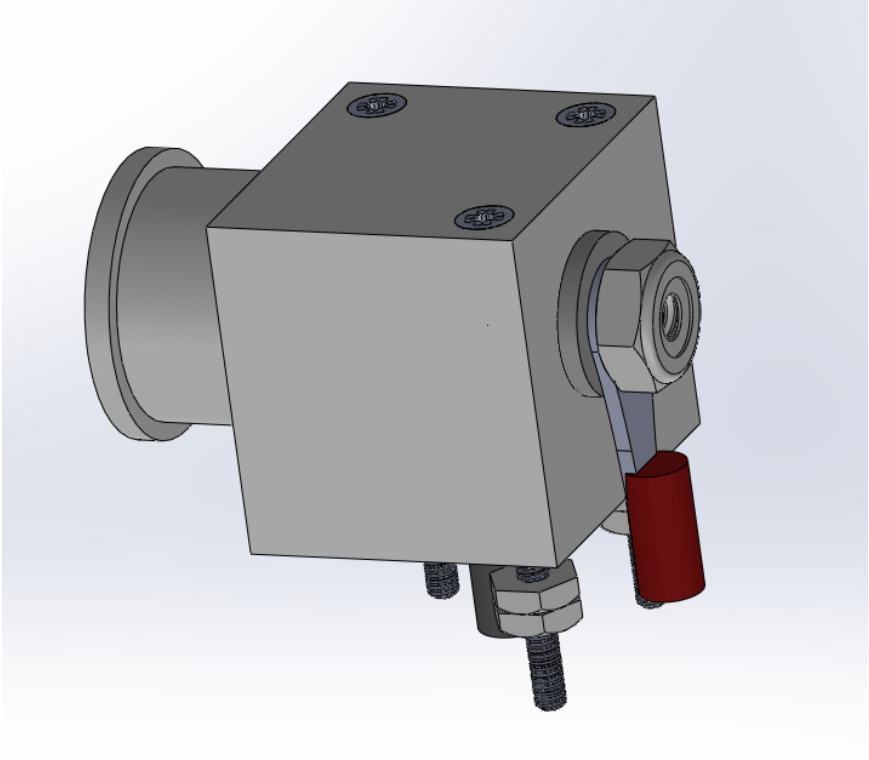

Figure 3: A complete assembly will look like the picture above.

III Resistance Values

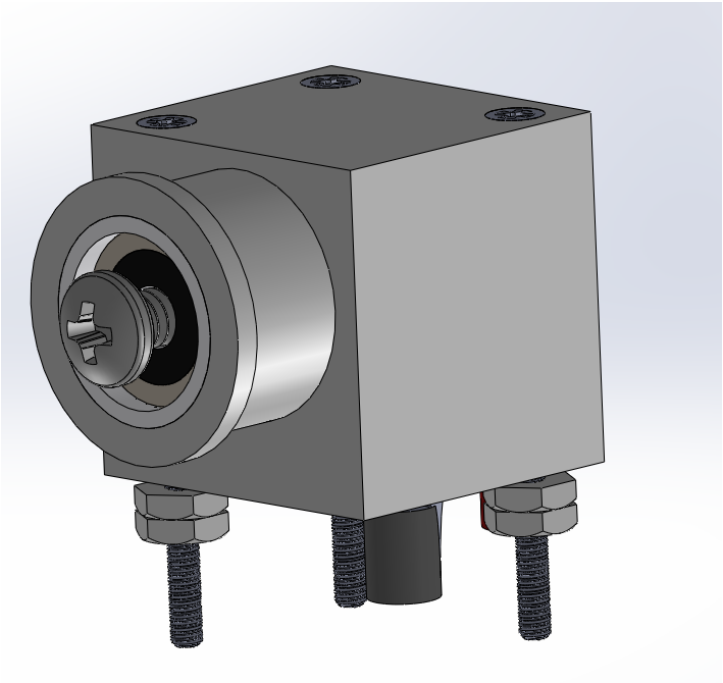

Figure 4: As you tighten the lock nut, the lock nut will stop at a certain point and cause the screw to turn. This will begin to elevate the screw from the inner ceramic and create an open circuit (Zero Ohm reading between the anode and cathode.)

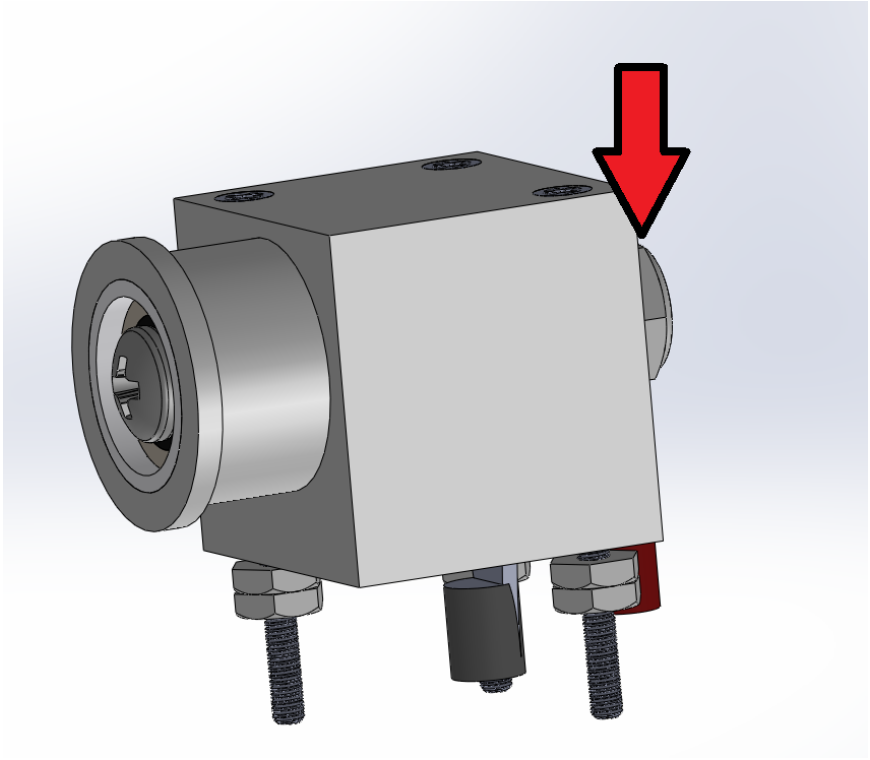

Figure 5: To tighten the screw back in place, you will need to hold the lock nut (shown with arrow) while you turn the screw itself. Tighten until the bottom of the screw head appears flush with the inner ceramic and cathode. From here, you should do a resistance check between the anode and cathode. Typical resistance values for the CANYVAL Thruster should be anywhere between **0.5** $k\Omega$ **and a few** $M\Omega$**s.** An ideal case will be in the $k\Omega$ range.

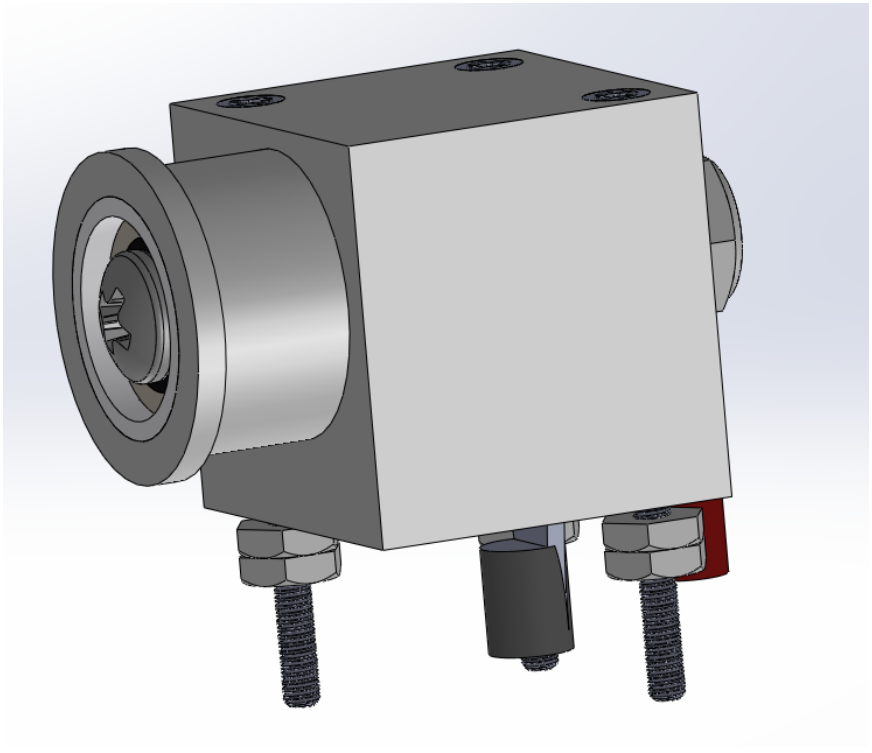

Figure 6: Turn the screw in quarter turns and measure the resistance until an ideal value is found.

IV Carbon Paint Application

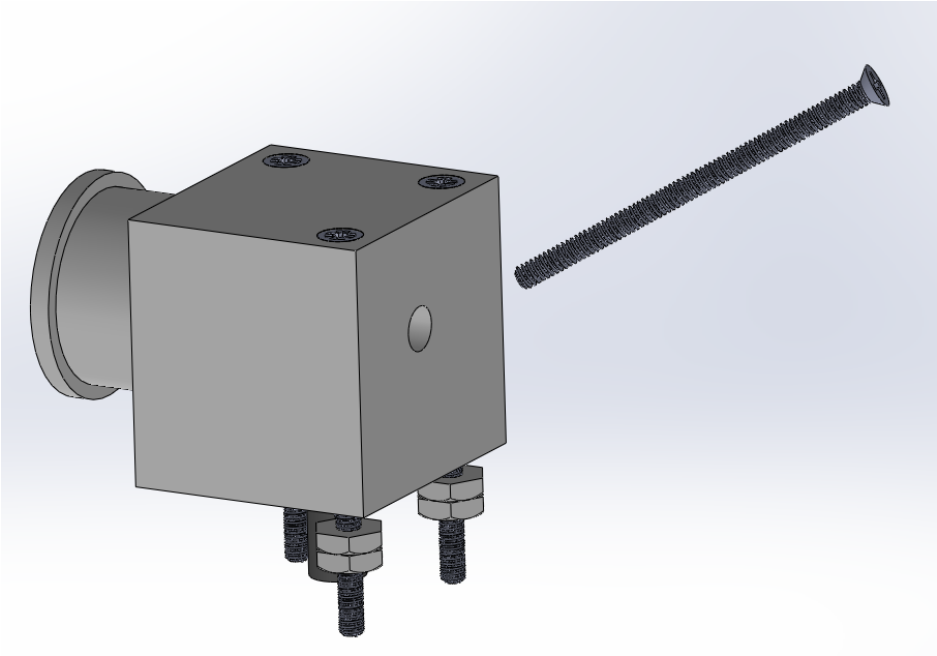

Figure 7: Remove the anode, anode ring terminal, lock nut and any washers. You can use an attached thruster screw (used to attach the thruster to the board) or any other small, blunt object to push the inner ceramic out. This should be done at an angle (shown) to push the back edge of the inner ceramic.

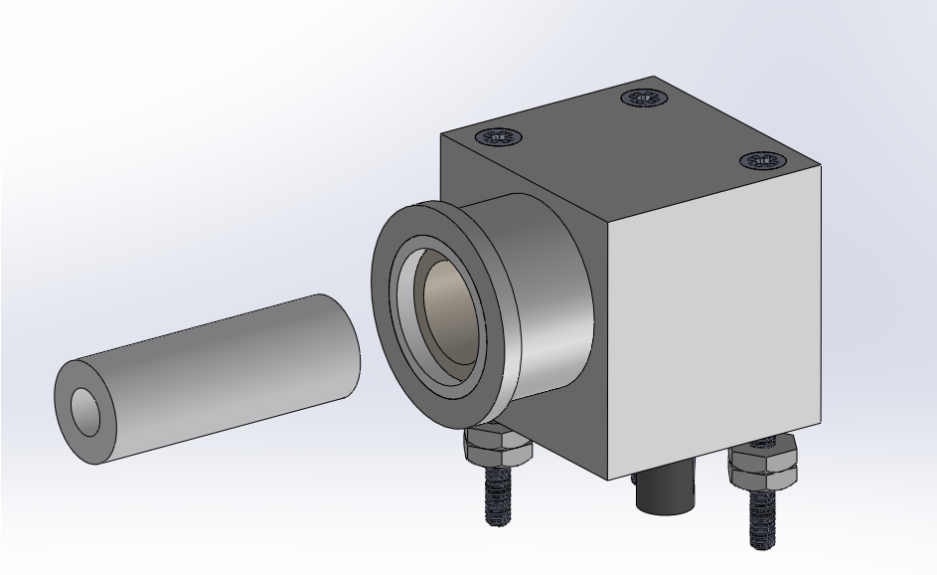

Figure 8: The inner ceramic should be elevated enough for you to freely pull it out. In case this is difficult, you may need to use tweezers to assist in pulling it out.

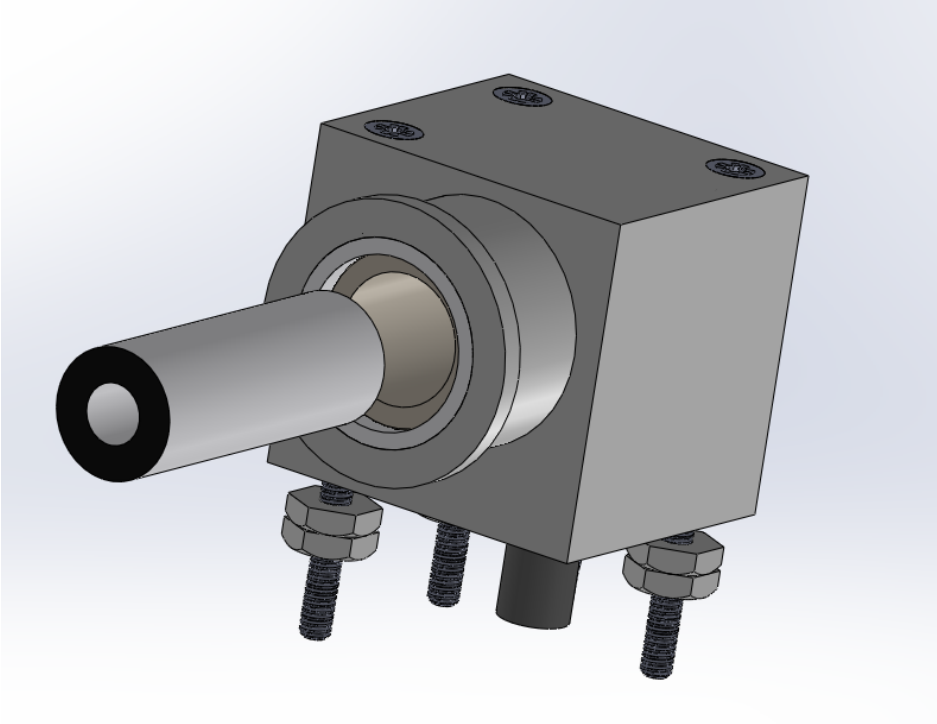

Figure 9: With the inner ceramic out, apply a **thin** layer of carbon paint. This should be done using a light brush stroke or a Q-Tip. Allow to dry for 10 to 15 minutes.

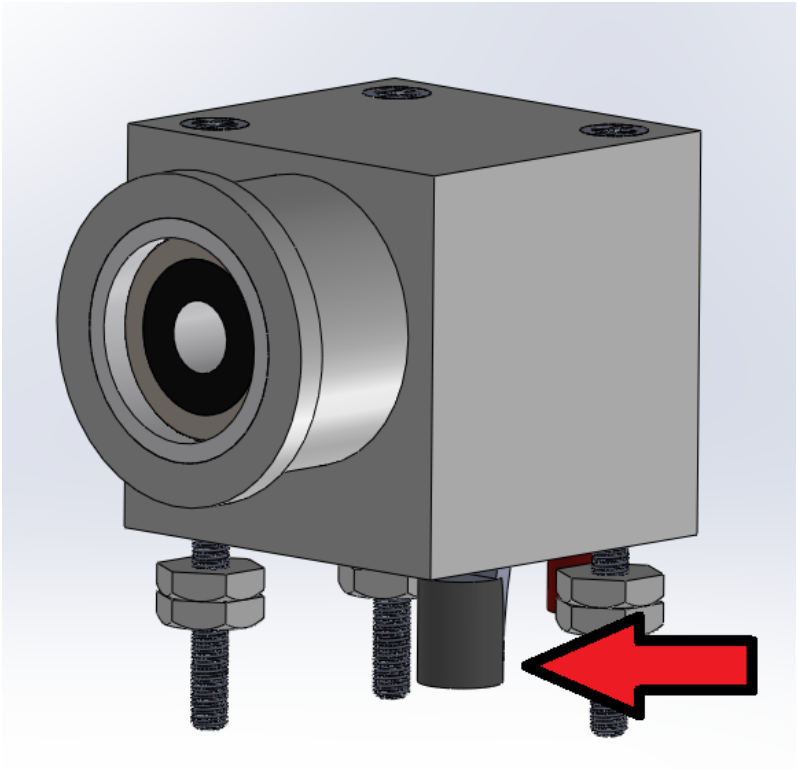

Figure 10: To push the ceramic back in, you should be able to press it in with your finger. If trouble arises, use a thin, soft material to press it down until it is flush with the cathode. You may need to adjust the Cathode Ring Terminal (shown with arrow) to allow the inner ceramic to be flush. This involves moving it left and right while pushing the ceramic down.

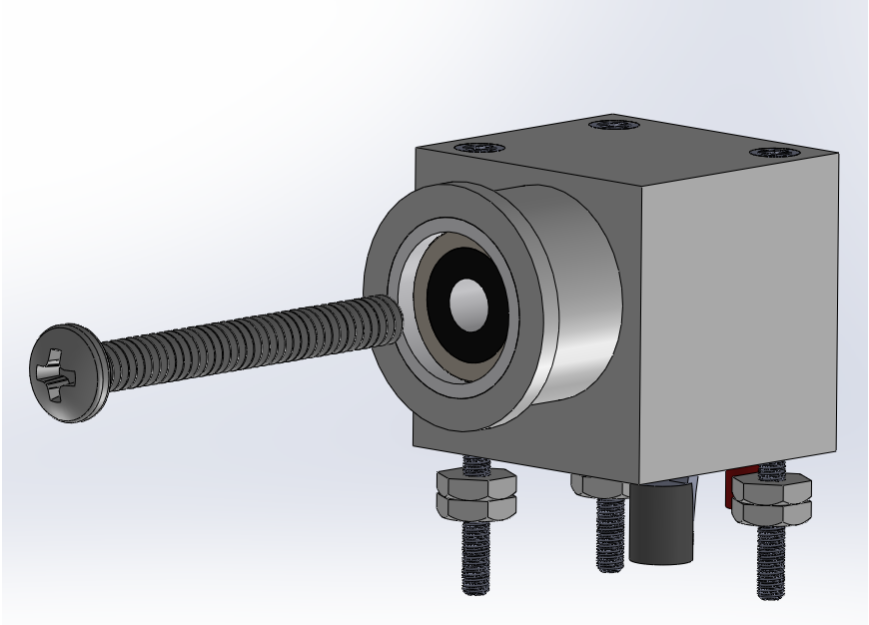

Figure 11: Once the ceramic is flush, put the anode screw back in.

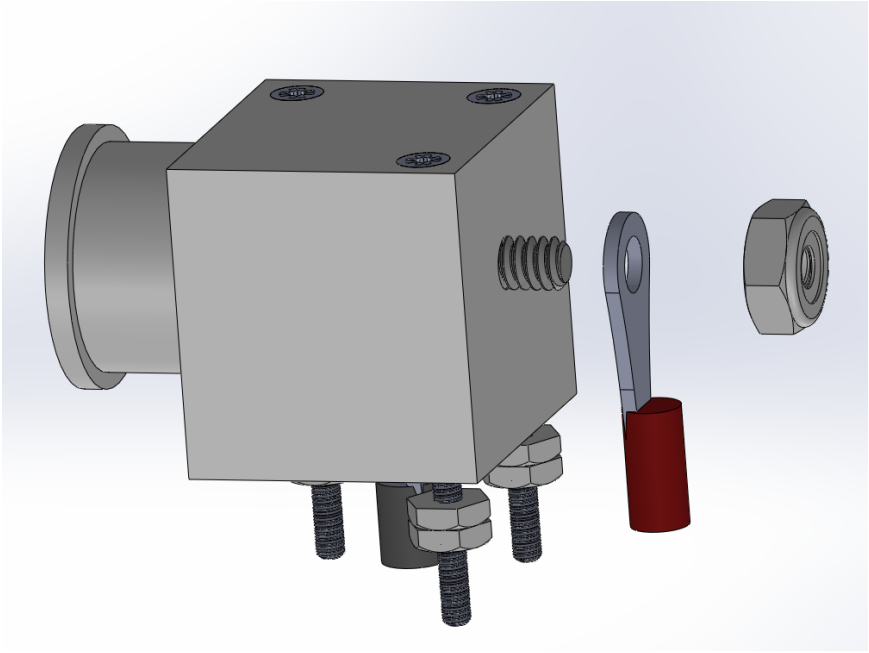

Figure 12: Place in any needed washers (not shown), the anode ring terminal and lock nut. Repeat the steps found in **Figures 4 to 6** to get the correct resistance values.

NOTE: With fresh carbon paint, a thruster may not fire immediately. If there is a correct resistance value, allow the thruster to run for five to ten minutes. A spark should eventually occur during that time.