

## Tutorial Motor Rebuilding

Electrical motors get worn out over time. If you do not service them, the performance drops severely, which eventually leads to motor failure.

The following tutorial teaches you how to properly rebuild an electric motor. The process is the same whether the motor is 130 size (like a Mini-Z) all the way to a 540 size (like 1:10 scale cars). In this case, we are re-building a 280 size, 1:18 scale motor. Our lathe of choice is the Integy Xipp Perfect Lathe 2, since it allows us to cut motors from 130 all the way to 550 size.

If you follow the following tutorial, you should have all your old motors running like new!

### Required Items



1. Solder
2. Soldering Iron
3. Hobby Knife
4. Phillips Screwdriver
5. Motor Lathe
6. Silver Sharpie (pen)
7. Motor to Rebuild
8. New Brushes

### Step 1



The first step is to disassemble the motor. To do this, you have to start by removing the motor springs.

## Step 2



Once the springs are removed, proceed to carefully pull out the old brushes by the wire.

## Step 3



Now unscrew the end bell of the motor. (in the case of Mini-Z's you have to "pop" it off).

## Step 4



To remove the end bell, rotate it and pull it apart like the picture. Take note of where the screws are in relationship to the magnets. The timing is adjustable and already set on the motor. You want to re-assemble the motor exactly as it was before.

## Step 5



This is what a used electric armature looks like. In this one's case, it still looks decent.

Keep an eye on the washers that come on the motor. The magnetic field is usually centered when the motor is assembled, and each motor is different. This is what the washers are for, so keep them in the same place!

## Step 6



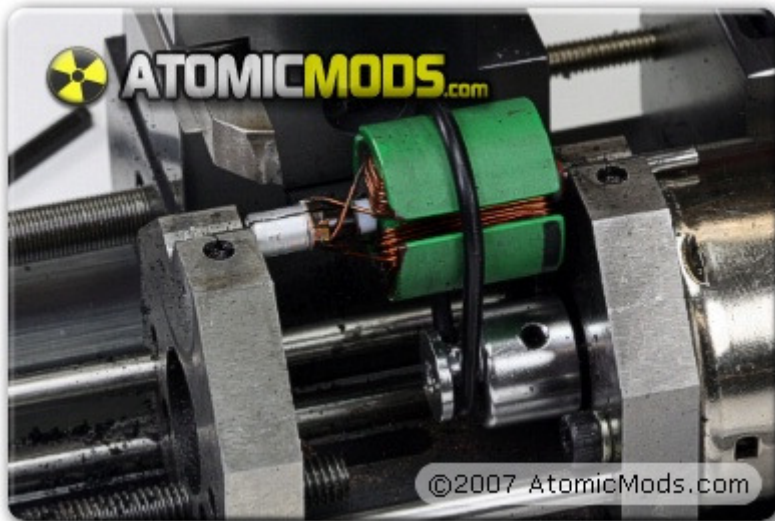
Mount your motor on the comm. lathe as per the manufacturer's instructions.

## Step 7



Use a Sharpie to cover the comm.'s surface. This not only indicates when the commutator is finally true, but also serves as lubricant for the copper surface.

## Step 8



This is what it should look like before you start turning and cutting the motor on the lathe.

## Step 9



Make sure to cut a little bit at a time, in increments of 1 line on your lathe. Start from the top of the commutator and work towards the inside of the motor. Go back and forth on the same adjustment one full time before turning the knob to cut more material off the commutator.

## Step 10



After the commutator is perfectly round again, (depending on how many times the motor was run will determine how much is needed to cut off), take your hobby knife and scrape in between the grooves. Be careful not to score the comm. though!

## Step 11



Now re-insert the armature inside the can of the motor.

## Step 12



Once again tighten the screws on the motor. Make sure that you assembled it exactly how it was before. The relationship of the screws and the indentations on the motor can is what dictates the advance of timing of the motor. The higher the timing, the more RPM's but less efficiency (motor runs hotter.) The secret is to find a good balance.

## Step 13



Remove the old brushes and install the new ones onto the end bell. Use a set of pliers to hold the tip of the wire lead so that the solder does not flow up and make the wire stiff. Stiff wires are typically less efficient.

## Step 14



Re-insert your brushes into the brush hood making sure that they slide in with out any binding. They should slide in with little or no effort.

## Step 15



Finally, re-install the springs on to the brush hoods. Be careful not to tangle the wire on to spring. This will cause the brush to bind and arc severely. Arcing makes motors run hot and burn up quickly.

## Step 16



The last thing to do is break-in your motor. The best thing to do is to hook up your motor to a 2-3V power source of any kind and run it in for about 10 minutes so the brushes seat fully. Once this is done, your motor should be as good or in many cases better than new.