



## Changing External DC Motor Brushes

### Introduction

Sherline has been offering the DC motor since 1993, and it has provided very good service. In 2002, we switched to motors with externally replaceable brushes. This makes the task of changing brushes very easy. Motors made between 1993 and 2002 that do not have the externally replaceable brushes are a bit more difficult and require disassembly of the motor to get to the brushes. We have sold a number of replacement brush sets, but, because we do not service the motors ourselves, we were not aware until recently that replacing the brushes requires some special techniques to keep from damaging the bearings. Because of the labor costs involved, it is more economical from our standpoint to replace the motor than to attempt to service it, but you can easily do the job if you use a few special techniques. The following sheet was developed to help you replace your brushes without damaging your motor.

The bearing in the brush plate can be damaged during reassembly if the main shaft is not supported when the bearing at the other end is pressed on. As the upper bearing is pressed back onto the shaft, the shaft is pushed downward. This transfers the force to the inner race of the lower bearings if the shaft is not supported. This can damage the bearings, which is indicated by a whining sound. Therefore, we have included a procedure to drill a hole in the end cap while it is apart. A supported pin or special fixture extends through the hole to support the end of the shaft during upper bearing reinstallation, thereby taking stress off the lower bearing. The hole is then simply covered up when the installation is complete.

### Motors with Externally Replaceable Brushes

In 2002, Sherline changed from motors with internal brushes to motors with brushes that can be changed from the outside without disassembling the motor. If your motor has the external boss with the slot for a flat bladed screwdriver you will have a different brush replacement procedure than is described here. On these newer motors, the brushes are replaced by simply unscrewing the cover, pulling out the old brush and spring, inserting the new brush and spring and replacing the cap. If you have the older style internal brushes, continue with the procedure described below.

### NOTE:

1. It is important to check the brushes periodically, and if they are shorter than .350" (or 9 mm) you should replace them ASAP before they wear out and damage the rotor.
2. Mark the brushes when you remove them, so you can reinsert them in the proper orientation.
3. If you check them, and they are OK, make sure you put them back in the same orientation as they were when you removed them. The brushes are broken in in one direction, so when reinserting them they have to be in the same direction.

### Running in New Brushes

The motor shaft should spin easily by hand. New brushes may make a slightly different sound than you are used to until they have been run a while and have had a chance to seat against the armature. This is normal.

Thank you,  
Sherline Products Inc.