

Knowledge Domain: Motors

Unit: Cleaning/Lubrication

Skill: Brush frozen away from commutator (Cleaning)

Tools and Parts Required:

- 1) Electric motor to be inspected
- 2) Power Supply
- 3) Screw driver
- 4) Sandpaper (grit size of at least 80)
- 5) Work gloves
- 6) Safety goggles

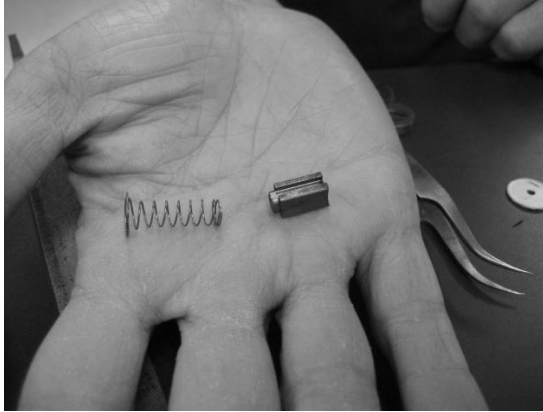
Introduction

An electric brush is part of a motor. DC motors have several spring-loaded brushes pushing against each side of the motor's commutator. Electric brushes conduct electricity between the motor's fixed wiring (stator) and the motor's moving parts (rotor, commutator).

Example

Below are pictures of electric motor brushes.





Identification and Diagnosis

The brushes are pushed against the moving parts of a motor and wear out. Brushes can accumulate dirt, dust and other debris. Dirt, dust and debris reduce proper contact of brushes with the commutator. Improper brush contact is a source of motor problems.

Procedure

1. Wear work gloves and safety goggles.
2. Use a screw driver to remove the casing of the electric motor.
3. Connect the motor to the power supply.
4. Start the motor.
5. If the motor does not start, examine the contact of the electric brushes.
6. If the motor starts, look for sparking between the commutator and brushes.
 - a. Sparking indicates that the brushes are not making good contact with the commutator.
7. Disconnect the power supply from the motor.
8. Check the brush connections.
 - a. If both of the brushes are in contact with the commutator, there may be another fault in the motor.
 - b. If the brushes have accumulated dirt, dust or other debris, you should clean the brushes.
 - c. If the brushes are not seating properly in their grooves, you should correct this contact. Brushes that are seated properly will be straight and move easily in the sleeve.
9. If you must clean the brush or if you must correct the contact: use a piece of sandpaper (15cm long and slightly wider than the brush) to clean and seat the brush in its groove. Do not use standard garnet emery sandpapers. You must use paper with a grit size of at least 80.
 - a. Keep the sandpaper flat against the commutator so the brush face edges are not rounded.
 - b. Slide the sandpaper back and forth under the brush until the brush is in place.

10. If only one of the brushes is in contact with the commutator, both brushes will need to be replaced to prevent further uneven wearing.
 - a. Also replace brushes if they are shorter than they are wide.
11. To replace brushes: unscrew the end cap by unscrewing the retaining screws with a screwdriver. Lift the brush spring and take out the brush assembly.
 - a. Replace any springs that appear to be weak. Reference the relevant procedure in the BTA skill *Motors-BrushSub-SpringRepair* to replace springs.
12. Identify the markings on the brush and replace the brush with an identical part.
13. Orient the new brush in the brush holder/slot the same way as the original brush.
14. Check your brushes to make sure they are fitting properly and making proper contact with the commutator.
 - a. Your brushes should move freely in their housings.
15. Reinstall the motor casing and holding screws.
16. Start the motor to verify operation.

Exercise

Your instructor will give you an electric motor to inspect. Follow the procedure above and determine whether the brushes in motor are faulty. Clean the brushes if required. Follow the procedure to determine whether the brushes need to be replaced. Replace the brushes if necessary. Refer to the skill *Motors-BrushSub-Filing*. Your instructor must verify your work before you proceed.

Preventative Maintenance and Calibration

Always calibrate every medical device before returning it to use.