

## STRIPPED DOWN MOTOR

### MAINTENANCE INSTRUCTIONS

#### GENERAL INFORMATION:

This motor is one of a series of motor exhibits that progresses from Motor Effect, Daisy Dyno, and on to DC Motor/Generator. Stripped Down Motor has 2 conducting loops in a rotating armature that are connected to a 15 Amp current source via brushes in contact with plates that turn with the loops. When you push the button, electric current flows through the loop in contact with the brushes. The charges flowing in the wire interact with the magnetic field to produce a torque on the armature. The armature rotates as a result of this torque. As the conducting loop moves away from the magnetic poles, the other conductive loop is switched on to continue the process.

The motor is held together with 5mm fasteners that thread into stainless steel barrel nuts. This system will allow numerable services to be performed on the motor if care is taken not to over-tighten the stainless threads causing them to gall or strip. Replace any suspect fasteners during re-assembly to avoid any problems.

Please refer to the drawings for the names and locations of the various components described in the following text.

#### General Cleaning:

The finished or painted surfaces of the exhibit may be cleaned with a mild soap solution or general purpose cleaner. The acrylic parts should be cleaned with a plastic cleaner and a soft wipe that will not leave scratches, (we suggest Wype-All™). (Note: Do not use alcohol on acrylic parts or graphic panels,)

#### Push-button Replacement:

The switches are accessed from underneath by removing the locking bottom. The micro-switches can be removed by sliding the wire connectors off and bending the plastic clip just enough to rotate the switch body out of the button mechanism. No tools are required and replacement is the reversal of this procedure.

### Adjusting the Brushes:

The brushes are retained in brass holders that are clamped in place with a 5mm allen screw that both connects the power supply wire, and draws the brush clamp against the body of the brush holder. Loosening these screws allow the brush holder to slide axially to press the brush against the commutator plates. The brushes need to be loaded only a minute amount of 1/2 mm. Any more will slow the motor down to a crawl, or require that the current control be turned up over 15 amps to spin the motor. Currents of 20 amps or higher will result in over heating of the power supply and premature wear on the motor commutator. Check that the brushes are aligned with their long side on a vertical plane.

Check that the commutator is clean and not pitted excessively. If pitting is found, the commutator can be cleaned with a heavy linen rag or crocus cloth by spinning the armature and pressing the cloth against the contact area. Dust from brush wear or polishing should be blown out of the assembly using compressed air.

### Disassembling the Motor:

Refer to the Motor Assembly drawing for the names of the parts referenced in this section.

Accessing the bearings and armature require removing both front and rear support plates. First remove the plastic knobs from the ends of the shaft by loosening their retaining set-screws. The support plates are fastened to the table top with 5mm x 90mm long socket head fasteners that are accessed from underneath the table top, through the locking bottom panel. The support plates can then be removed from the acrylic spreader that joins the two plates. Note the positioning of spacers located on each side of the bearings. These keep the armature in position and retain the proper brush contact.

The armature or its guard can to be accessed once the support plates are removed. The armature can be disassembled while still in the guard, or the armature and guard may be removed together by sliding the guard off of the pole piece, (smaller guard opening first,) then rocking the guard off axis, (which the larger opening will allow you to do.)

### Adjusting the Motor Current:

The power supply that provides the current for the motor operation is equipped with an adjustment to maintain the correct operating current of 15 amperes for various line voltages, and wiring characteristics. Maintaining this setting and proper care of the commutator will optimize the performance and life of the motor. The exhibit should be periodically checked that the ammeter reads 15 amps when the button is pressed. If the ammeter reads low, check all the contacts, including the brushes and commutator. A low current will usually be from brush wear or pitting of the commutator plates. If the current is correct, but the motor appears to be running slow, DO NOT increase the power. Always check the commutator for cleanliness first, and then check the bearings by giving the armature a spin, and then the brush adjustments.