# DAISY DYNO

MAINTENANCE INSTRUCTIONS

GENERAL INFORMATION:

Daisy Dyno demonstrates the motor effect, and introduces the use of a commutator in a DC motor. A moving charge in a magnetic field is forced at right angles to the direction of motion. If the charges are trapped in a conductor, as is almost always the case, there is a force exerted on the conductor. Daisy Dyno illustrates a practical application of this effect. The user can touch a wire to a flat segmented disc-like rotor located in a strong magnetic field, and cause the rotor to spin.

General Cleaning:

The finished or painted surfaces of the exhibit may be cleaned with a mild soap solution or general purpose cleaner. The Plexiglas panels should be cleaned with a plexi cleaner and a soft wipe that will not leave scratches, (we suggest Wype-All™).

Wire Feed:

The wire probe is expended as the exhibit is operated. The wire should be inspected about once a week. Approximately 1 cm of wire should be exposed passed the insulation. This is accomplished by stripping off insulation as the wire wears down. More wire can be advanced through the wire support by unlocking the bottom panel of the exhibit, and feeding more wire from the coil in through the bottom of the wire support. If the motor is run continuosly for more than thirty seconds, the wire will heat up. For this reason, an additional heat insulator is provided where the wire protrudes from the support. It consists of a 3" (8 cm) piece of silicone hose glued with rubber cement into the end of the wire support.

Trouble-shooting:

The motor should be able to spin up to 100 RPM or faster by using the right amount of pressure on the wire. If the motor turns slowly, check that the brush in the center of the disc has the correct pressure on the copper slip ring, and that the copper is clean. It may also be necessary to cut off the end of the copper wire if the strands have become fused together. (The fused ends normally wear off when the motor runs properly.)

If changing the brush pressure, and cleaning the slip-ring fails to correct the problem, then the next thing to check is that the power supply provides at least 10 Amps of current when the probe wire is touched to the disc. Do this by exposing 1 cm of fresh wire from the hand held probe lead. Clip an ammeter capable of measuring at least 20 amps from the lead to the edge of the disc, (using at least 12 gage wire from the meter to the disc edge,) and switch the exhibit on. If the meter reads less than 15 amps, then try connecting the meter lead to the brass slip-ring, then the brush holder, then the brush support, successively closer to the power supply.

If the problem still has not been isolated, then open up the power supply case to access the output terminals directly. If connoting the meter to the terminals directly, still fails to draw 15 amps, then the diodes or transformer would become suspect. If 15 amps can be drawn at the output terminal, but not delivered to the disc, clamp the wire probe onto the edge of the disc, and measure the voltage drops across the connections; terminal to brush support, brush support to brush holder, brush holder to slip-ring. Also check the voltage drop in the probe wire from tip to terminal screw in case the crimp connector is bad, or the wire itself which may have been damaged from stresses at the strain relief.

Check the following list of procedures for the applicable connections found to have tested with high voltage drops:

A. The wire for the hand probe should be at an 8 or 10 gage multi-strand conductor. Wire strands that have become fused together should be trimmed. Strip the insulation to expose at least 1 cm of fresh wire.

B. Check for voltage drops across crimp connectors. Replace any with appreciable loses.

C. Check that the slip-ring at the center of the disc is clean and conducting well to the brush. Clean the slip-ring by using a piece of fine steel wool pressed against the face near the brush holder, and giving the disc a spin.

D. Check that the brush has optimal pressure on the slip ring at the center of the disc. The brush holder can be adjusted up and down to provide the optimum pressure for the disc speed. (Too little pressure causes excessive arcing which quickly degrades the electrical contact.) The end of the brush should be flat so that it conducts over most of its face, and square, so that it does not try to tilt in the holder. The brush will need to be replaced if worn so short that the holder is almost touching the slip-ring at the maximum disc speed

E. Check for any voltage drops in the parts of the brush support assembly, including the power supply lead. The dissimilar metals may corrode over time, and require disassembly, cleaning and reassembly to return the quality of the electrical connection.

The disc will spin very fast when the connections are clean, the power supply is delivering 10-15 amps, and the brush pressure is light. The bush pressure should then be increased to reduce the speed of the disc, and more importantly, to increase the brush and slip-ring life.