

Trouble-Shooting Equipment

The following description covers basic trouble-shooting tasks that can be performed in the field. Some companies also publish in-depth trouble-shooting guides for testing control boxes and branch circuitry. Always obtain trouble-shooting guides from the manufacturer of your equipment, if available.

Equipment Type: backpack, tow-barge, shore-based shockers

Problem: No power output to water. This lack of power in water can be detected by control box meters or power-on light, an in-water voltage gradient probe, an audio-amplifier with leads placed in the water, attaching leads from a multimeter to the anode and cathode, etc.

Possible Solutions:

- **Battery** weak or dead. 1) Check input voltage meter (with output activated) or 2) use a multimeter set to volts. Clip on multimeter leads to battery terminals and check voltage with output activated (battery must be under load). Replace battery if necessary.
- Loose or corroded connection at **battery terminals**. Tighten (clean) connection if possible. If connection is broken or burned, replace.
- Broken wire in **anode pole**. Try a different pole or test existing pole for broken conductors/connections.
 1. Disconnect pole from shocker.
 2. Set multimeter to resistance (Ohms); a resistance reading near zero Ohms indicates unbroken wires and connections (continuity); many multimeters will give a beep sound when continuity detected.
 3. Connect red lead of ohmmeter to appropriate pin in plug on end of curl cord; if you know which pin is on the main power circuit, connect to that pin (information from manufacturer, pins often denoted "A", "B", "C", or "D"); otherwise, you'll have to experiment and try different pins.
 4. Connect black lead of ohmmeter to anode electrode or bottom of pole.
 5. The multimeter should read near zero ohms regardless of pole switch position, if not the pole has a broken wire or connection in the main power circuit; (shake the curl cord during this test, if the reading changes, the curl cord is bad).
 6. Now check the safety switch; connect the red lead of the multimeter to a different pin in plug at end of curl cord (must know the pins for the low voltage safety circuit or experiment as before).
 7. Connect the black lead to another pin in the plug.
 8. The multimeter should read infinite resistance until the pole switch is pressed. If not, the safety switch is bad.

- **Broken cathode.** Try a different cathode or test existing electrode for broken connections.
 1. Disconnect cathode from shocker.
 2. Connect red lead to appropriate pin in plug on end of cathode, if known; otherwise, experiment.
 3. Connect black lead of multimeter to bare cathode cable.
 4. As before, set the multimeter to resistance (Ohms).
 5. The resistance reading should be near zero ohms. If not the cathode is bad. Pull on the cable, if the reading changes the cathode is bad.
 6. If all pins are supposed to be connected to the cathode, repeat the above process for each pin

If the anode pole or cathode fail any of the above tests, they must be repaired or replaced. Continuity checks such as these can be performed on cables to check for breaks or on fuses.

If the battery is charged with tight terminal connections and the anode and cathode pass all tests, then the problem may be in the control box. Do not open control boxes right away after the unit has been on- the capacitors need time to self discharge, usually less than 5 minutes (contact manufacturer). Some control boxes cannot be fixed except by the manufacturer, other models have fuses that can be checked and replaced if necessary or are capable of component replacement, even to the extent of a complete motherboard. Ability and options to fix control boxes in the field is a topic to discuss with the manufacturer.

Maintenance

Anode electrodes: a couple notes on maintenance of electrodes. Anode rings or droppers may become anodized and less conductive with normal use (check with multimeter set to resistance). Mechanical removal of deposits should be performed periodically. Clean ring with wire wheel or abrasive pad but do not sand.

Boom and electrode array connection: to insure proper operation of your electrode arrays, the inner surfaces of the brass quick-connect fittings must be conductive. During normal operation, dirt and corrosive material build-up on the inner surfaces restricting conductivity. Using a soft cloth with mild soapy water or a brass cleaner, clean the male fitting connected to the boom and the female fitting connected to the array, wiping away any build up. Last, apply a lubricant such as petroleum jelly.