



Troubleshooting Guide:

Problem	Possible Source	Correction
NO PROPULSION OF VEHICLE	Key is in "OFF" position or no direction is selected	Turn "KEY" to the "ON" position and select a direction
	Battery bank discharged	Charge battery bank
	Battery bank unable to be charged	Clean and tighten all battery connections.
	Corroded/loose battery connections to controller, direction switch, and/or motor	Repair/replace deficient wiring
	Solenoid has failed	Replace solenoid
	Key switch has failed	Replace key switch
	Throttle switch has failed	Replace throttle switch
	Connector loose or disconnected	Reinstall connector appropriately
	Deficient motor	Repair/replace motor Test by checking for continuity of the field coils and armature as per procedure in Appendix A Also check for motor function as per procedure in Appendix B
	Deficient controller system	Test and replace components as per procedure in Appendix C
VEHICLE SPEED FLUCTUANT	Deficient controller system	Test and replace components as per procedure in Appendix C
REVERSE SPEED NOT REDUCED	Deficient controller system	Test and replace components as per procedure in Appendix C
MOTOR NOISE	Worn bearing	Replace bearing
	Commutator bar(s) raised	Repair/replace motor
	Mounting hardware loose	Tighten all hardware
BATTERIES REFUSE CHARGE	Charger not performing properly	Repair/replace charger
	Deficient charger wiring	Repair/replace charger wiring
	Flawed charger connector	Repair/replace charger connector
	Damaged battery case	Replace battery
	Battery capacity not sufficient	Load test Replace battery if necessary

Safety Precautions For Motor Testing



Before beginning any test procedure on electrical components be sure that the following precautions are **ALWAYS** taken:

- Be sure that the key switch is **OFF** as well as all electrical accessories
- Remove any jewelry you may be wearing
- When working on or near the battery bank, only use insulated tools. Wrap any tools with electrical tape to prevent any direct shorts if and when tools are dropped.
- **DO NOT**, under any circumstances, create a direct short between battery posts. This may result in an explosion and, at the very least, damage the batteries.
- The batteries are heavy. Always use proper lifting technique when moving the batteries. It is best to use a commercially available battery lifting instrument.

Appendix A

Continuity Test For Electric Motor

Step 1: Disconnect all leads from motor.

Step 2: With the multi-meter set to the continuity setting (beep setting), touch one lead to the F1 post and the other to the F2 post. If you hear a beeping sound (from the multi-meter) signifying continuity, then all is well and you can move on to Step 4. Otherwise, you have a faulty motor. Repair/replace.

Step 3: With the multi-meter set to the continuity setting, touch one lead to the A1 post and the other to the A2 post. Again, you should hear a beeping sound (from the multi-meter) signifying continuity. If so, all is well and you can move on to Step 5. Otherwise, you have a faulty motor. Repair/replace.

Step 4: With the multi-meter set to the continuity setting, touch one lead to the F1 post and the other to any metal part on the motor housing. If you hear a beeping sound (from the multi-meter), you have a faulty motor. Repair/Replace. Otherwise, move on to Step 6.

Step 5: With the multi-meter set to the continuity setting, touch one lead to the F2 post and the other to any metal part on the motor housing. If you hear a beeping sound (from the multi-meter), you have a faulty motor. Repair/Replace. Otherwise, move on to Step 7.

Step 6: With the multi-meter set to the continuity setting, touch one lead to the A1 post and the other to any metal part on the motor housing. If you hear a beeping sound (from the multi-meter), you have a faulty motor. Repair/Replace. Otherwise, move on to Step 8.

Step 7: With the multi-meter set to the continuity setting, touch one lead to the A2 post and the other to any metal part on the motor housing. If you hear a beeping sound (from the multi-meter), you have a faulty motor. Repair/Replace. Otherwise, move on to Step 9.

Step 8: If you have made it to this step, your motor is likely functioning properly. To be sure, test motor as per procedure outlined in Appendix B.

Appendix B

"Jump Off" Test for Electric Motor Function

Step 1: Jack rear of vehicle off the ground and place jack stands where appropriate. If you are testing on a 4x4 vehicle, be sure to disengage front drive-train, or place jack stands on all four corners of vehicle.

Step 2: Disconnect main positive lead from battery bank.

Step 3: Utilize only two batteries from the battery bank and wire, in series, to the motor. Connect the positive (+) lead from your new 16V battery pair to the A1 post on your motor. Connect the negative (-) lead from the 16V battery pair to the F1 post.

Step 5: Using one of the jumper wires from the battery bank, connect the F2 and A2 posts. Be sure to hold the insulated part of the jumper wire during this step. If the motor begins to run, then the motor is functioning properly. Otherwise, you have a faulty motor. Repair/Replace.

Appendix C

Electronic Speed Control Troubleshooting

This section is under construction and should be coming soon.

_Engineering and R&D