

## Troubleshooting Guides

### Aotema Motor Kit Testing Procedure.

Symptom: motor does nothing

1. Measure battery voltage, make sure it is  $\geq 34V$
2. Check LEDs on controller, red steady on, green blinking 1 sec cycle. If no LEDs, check power connections, if ok, open controller and check wires on power switch.
3. Disconnect brake cutoff cable from controller (2-pin connector). Try again.
4. Check voltages on throttle:  
Black = Ground  
Red = +5V  
White = Throttle Out , measure .8V-4V when activated  
Purple = +Battery  
Caution: Do not short out contacts when measuring the voltages.  
Put the probes on opposite sides of the connector so they can't touch each other.  
A. Measure from ground to +5V, if no voltage, then controller is bad.  
B. Measure from ground to throttle out (white) while turning throttle. If no output, replace throttle.

**\*\*\* ALL STEPS BELOW DONE WITH BATTERY DISCONNECTED \*\*\***

5. With power off, lift wheel and spin it. If it spins freely go to next step. If it is very hard to turn and you feel resistance going on and off like a cogging or pulsing, disconnect the phase wires from the controller. Spin the wheel again. If it now spins freely, the controller is bad. If it still cogs, there is a short in the wiring. Check the wires where they exit the axle for damage.
6. Check for continuity on the motor phase wires using an ohm meter. Measure from each of the 3 phases to each other and to the motor case. There should be infinite resistance from all phases to the case, if not then there is a short in the motor. The phase wires should all have very low resistance to each other, if not the connector is bad or there is a broken wire in the motor.
7. Set the meter to measure a diode. Measure between the motor connector on the controller (phase wires) and the power connector on the controller. First place the red meter probe on the black power wire going into the controller. Then using the black probe, touch each of the three phase wires and note the reading on the meter. The reading will be in the 500-600 range but we are really just looking to see if there is an open connection or short. If there is no diode selection on the meter, you can measure resistance on the 20Kohm scale which results in a reading of 7K to 10K ohm.

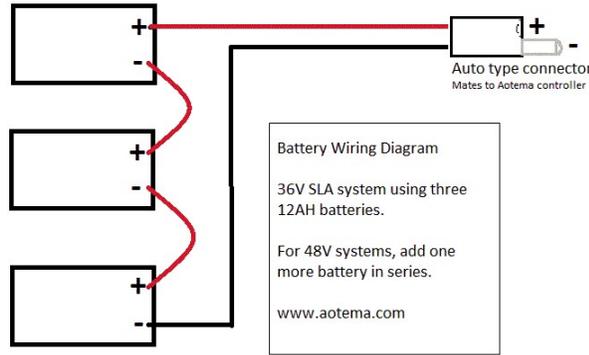
If any of the three measurements result in no reading (open connection) then the motor connector might be bad. Open the controller and follow the wire from the pin with no reading to the point on the circuit board where that wire is soldered to the PCB. Move the probe from the motor connector to the PCB. While keeping the other probe on the power wire, repeat reading. If you now get a reading, replace the connector.

Now place the black meter probe on the red power wire going to the controller. Repeat the measurements. If you measure a short on any reading, you have a blown MOSFET. You can follow the color of the wire you are probing to the bad MOSFET group (3 groups of 4 mosfets). One parallel pair will be connected to ground, and one pair will be connected to +BATT. The power wire you are probing when you find a short will isolate which pair is blown. Unless you are an experienced electronics technician, you will need to return unit to HTB for repair.

8. If you have the correct voltages on the throttle, LEDs on the controller, the motor does not cog, and there are no shorts or opens on the motor phase wires or opens on the controller connector, then the problem may still be the controller and you should try swapping it out if a known working unit is available. Warning: if the motor was hard to turn when not connected to the controller, do not try another controller as it might be damaged. You first have to fix the short.

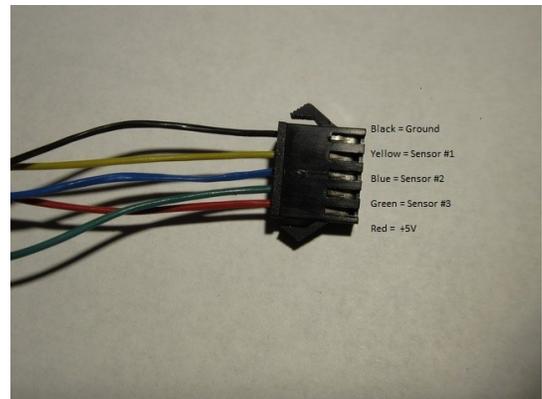
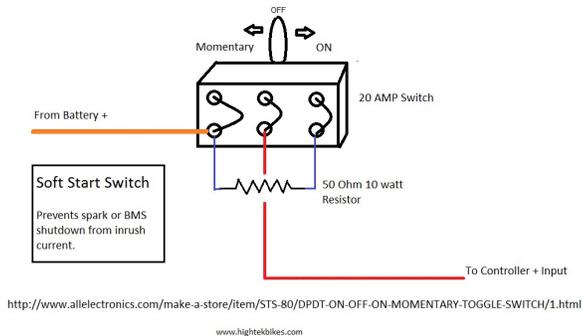
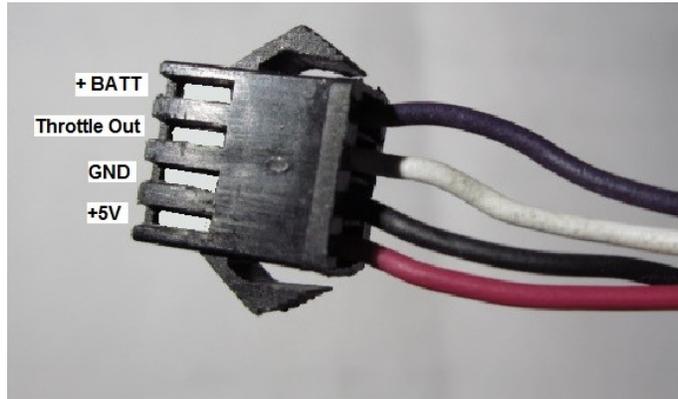
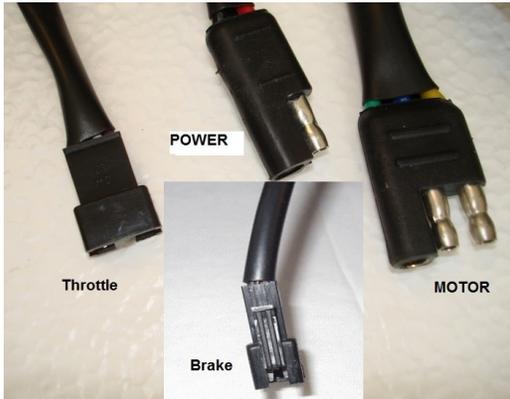
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### Battery Wiring Diagram



Click image to enlarge.

### Wiring Diagrams and Pinouts (click on image to enlarge)



### Testing motor sensor using external power

