RXV-E Advanced Trouble-Shooting Guide

610873

Customer Care

EZGO
A Textron Company

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Vehicle Operation

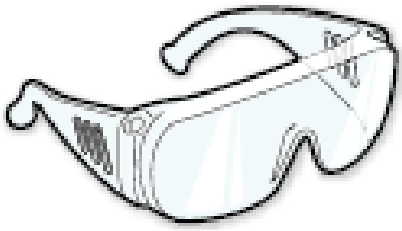
Understanding the Power-up Sequence

- The car will perform the following checks during the first second of initial key – on.
- Electric brake check – Controller tries to rotate the motor ¼ turn in both directions.
- Park brake check – Controller disengages and reengages the park brake.
- Reverse alarm check – Controller sounds the alarm for 100ms.
- Charger inhibit check – Controller checks the charge receptacle for connection to the charger.
- Throttle switch check – Throttle switch must be open to pass the start up test.
- Throttle position sensor – Controller checks the TPS for 0% throttle. .38-.56 volt
- Throttle operation check – Controller checks the TPS for the correct open and closed range. .5-4.8v

The car will not run if the controller detects a problem with any of the circuits above.

Safety

Always wear personal protective equipment



Wrap battery wrenches to prevent accidental connection.

Always properly lift the vehicle and chock the wheels to prevent accidental drive away.

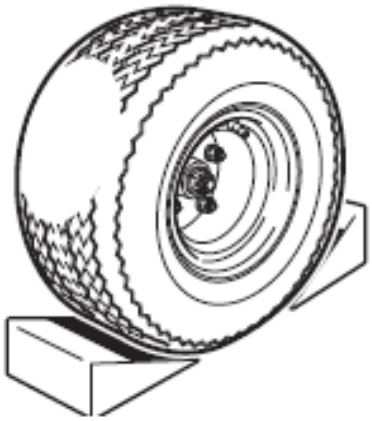


Fig. 10 Chock Wheels

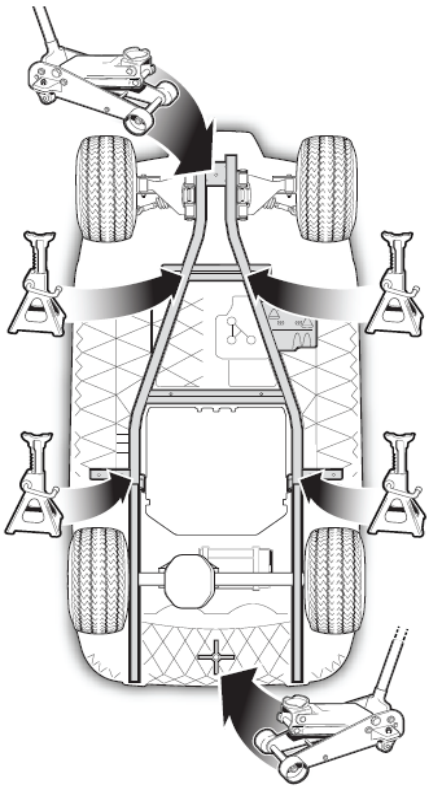


Fig. 11 Lifting the Vehicle

Use a 2X4X12" to spread the load between the jack pad and the composite bumper!

Hand Held Diagnostic Tool

Fig. 1 Hand Held Diagnostic Unit

Using The Hand Held Tool

- **Turn the key switch off.**
- **Insert the diagnostic tool plug into the CAN port under the cup holder / console.**
- **Turn the key on.**
- **The diagnostic tool screen will illuminate.**
- **The #1 & #5 arrows control upward and downward movement of the cursor.**
- **The #4 button breaks down each menu item to a sub-menu**
- **The #5 button returns the user to the previous screen.**
- **The #3 button is used to enter / reset selections.**

The Hand Held diagnostic Unit is required for all testing and warranty reporting!

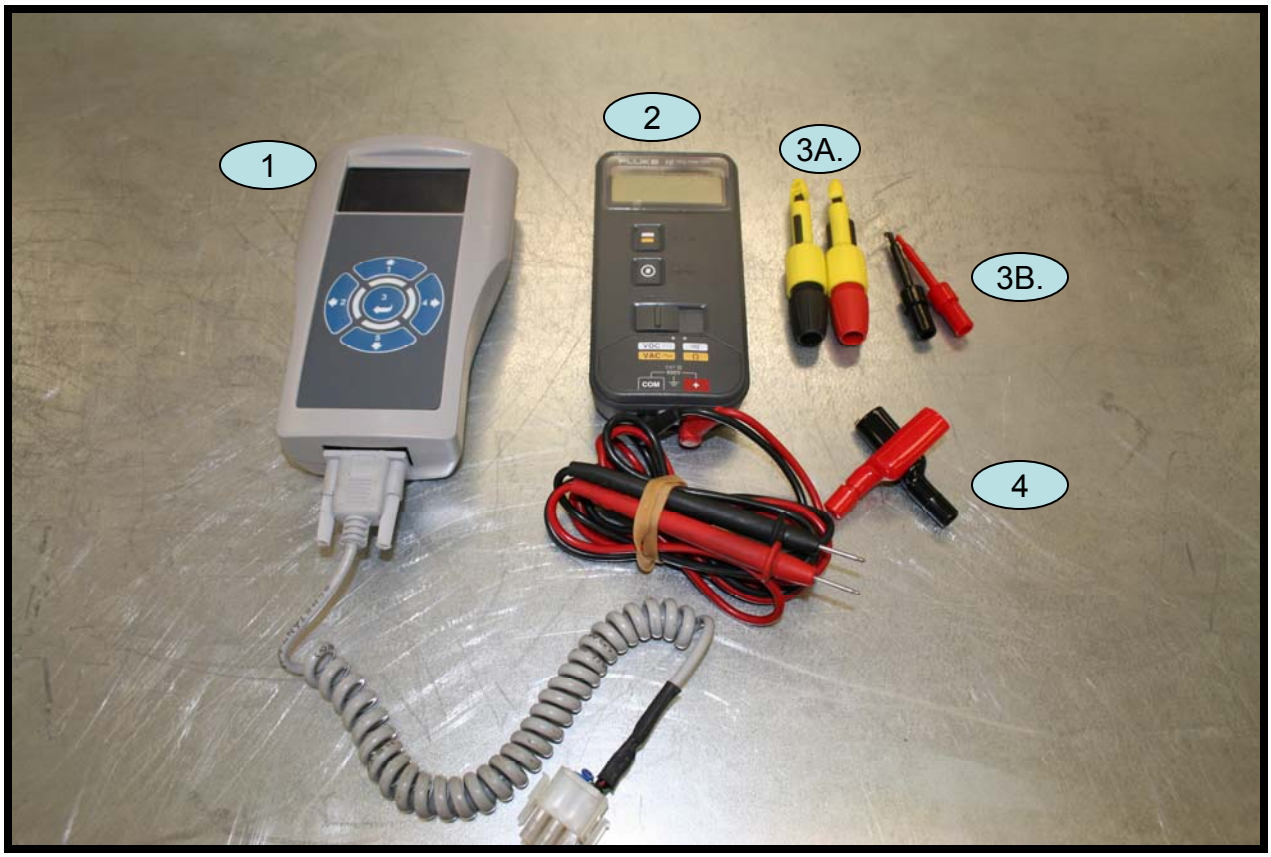
The three primary functions used for electric trouble-shooting are:

- **Diagnostic Report**
- **Errors**
- **Warnings**

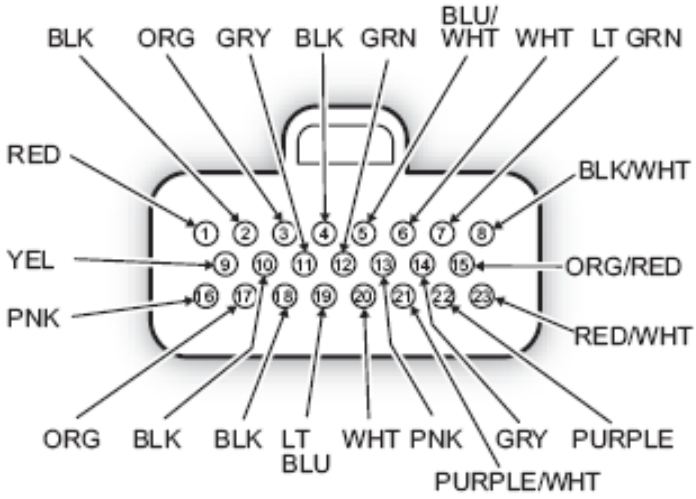
Tools

The following tools will be required to perform advanced trouble shooting procedures:

1. **Handheld diagnostic tool PN# 606215**
2. **Digital volt ohm meter (DVOM)**
3. **Wire insulation piercing tools 3A. Grainger PN# 1RK18 or 3B. Radio Shack PN# 270-334B or equivalent.**
4. **Alligator adapter clamps for meter leads Radio Shack PN#270-354 or equivalent.**

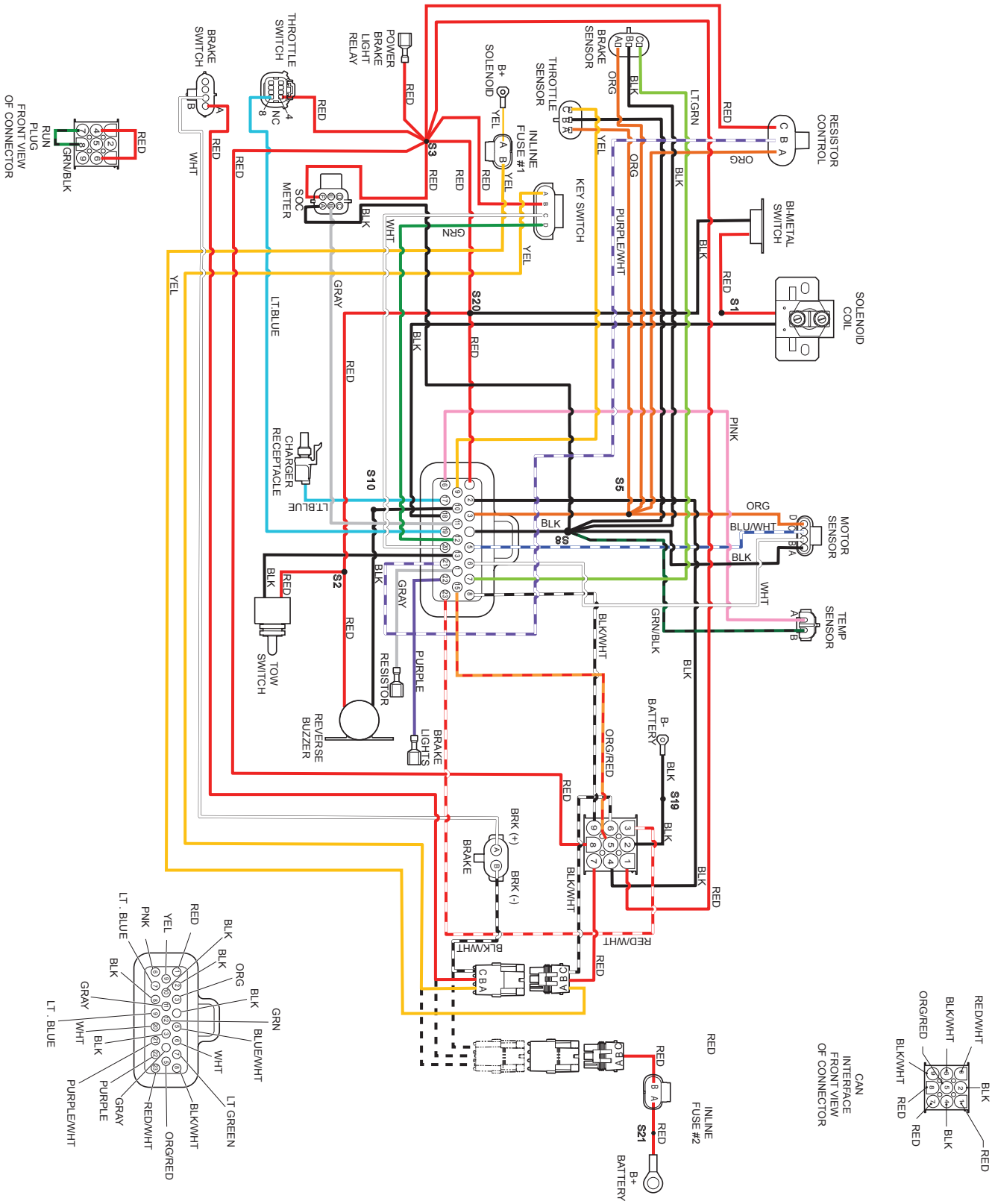


Controller 23 pin connector pin listing with voltages

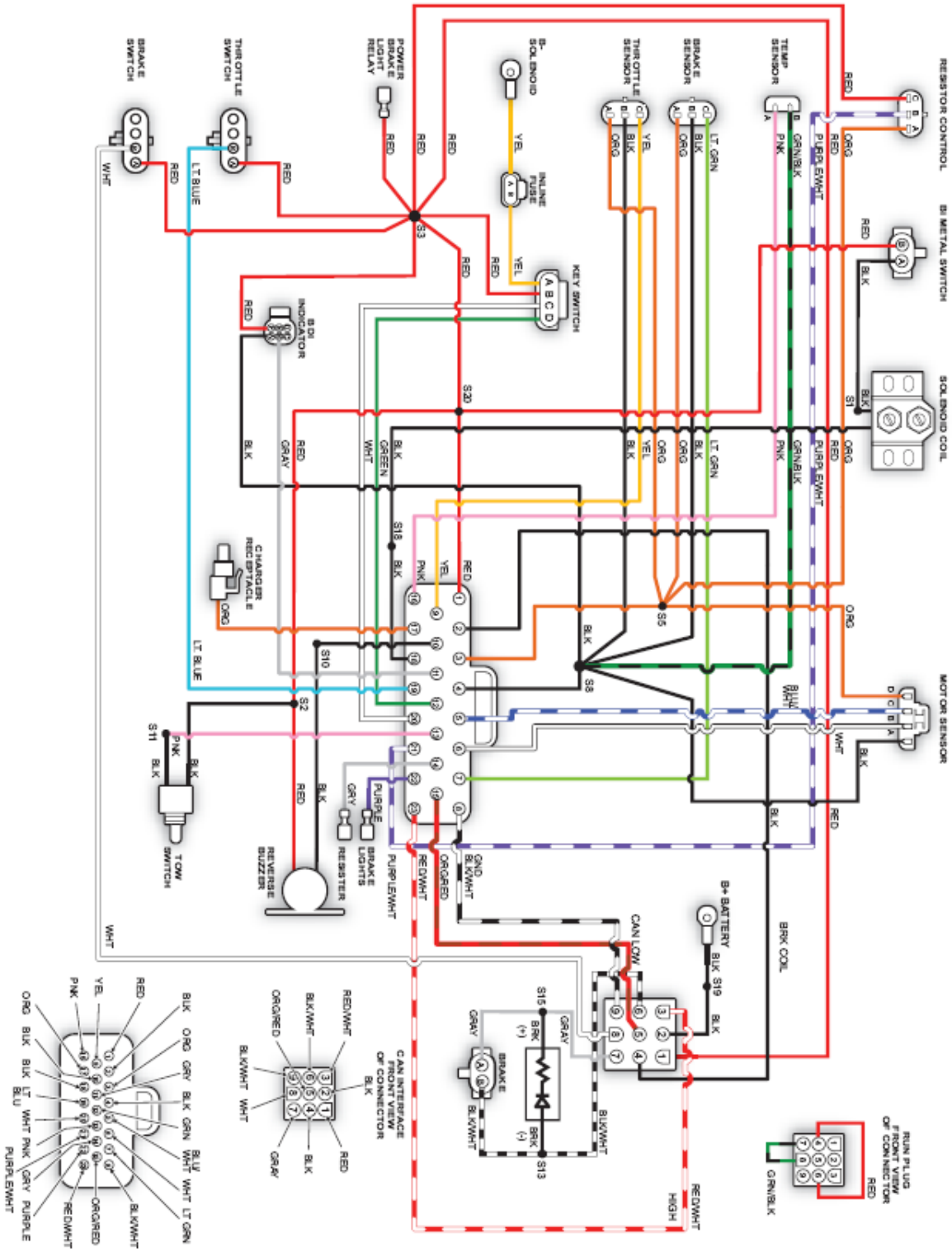


Pin 1- 48 volt input when key switch is in any position other than off. (FWD, N, REV)
Pin 2- 48v switched ground output for electric motor brake.
Pin 3- 5v positive output for sensor circuit.
Pin 4- 5v ground output for sensor circuit.
Pin 5- 5v signal input from the motor encoder. 0-5 volt variable
Pin 6- 5v signal input from the motor encoder. 0-5 volt variable
Pin 7- 5v signal input from the brake sensor. 0-.35v is a fault, .36-3.78 is linear braking, 3.78-4.8 is 100% braking, >4.8v is a fault.
Pin 8- 48v can ground, internal 48v ground.
Pin 9- 5v signal input for the accelerator sensor. 0-.35v is a fault, .36-.56 is 0% throttle, .5-4.1v is acceleration range, 4.1-4.8 is 100% throttle, >4.8v is a fault.
Pin 10- 48v ground output from controller for the reverse buzzer. active in reverse and during start up only.
Pin 11- 5v signal wire output for SOC meter. .5v at empty, 4.5v at full reading.
Pin 12- 48v positive input from key switch for forward.
Pin 13- 48v input for run/tow switch.
Pin 14- 48v positive input for resistor circuit.
Pin 15- Output CAN low.
Pin 16- 5v positive for motor temp sensor.
Pin 17- 48v positive input for charger interlock. 0v with charger plugged in. 21-28v with charger unplugged.
Pin 18- 48v output ground circuit for the solenoid.
Pin 19- 48v positive input from accelerator switch.
Pin 20- 48v input from key switch for reverse.
Pin 21- 48v ground for the resistor control circuit.
Pin 22- 15v output for the brake light circuit.
Pin 23- Can buss high for hand held.

RXV – E Wiring Diagram



RXV – E Wiring Diagram



Symptoms

Crawling: Vehicle runs extremely slow. Slower than limp home. Check motor encoder. See pages 24 - 25

Rapid solenoid engage – disengage: Occurs when the key is on and the charger is plugged in. Check key switch and charger receptacle for failed interlock. See pages 30 & 36

Motor shuttering: Check for loose connections on the V,U,&W. Check encoder connections and park brake harness connections. Verify throttle sensor. Inspect for dragging park brake. Compare command speed with actual speed on the hand held. RPM should almost be the same. If not suspect the motor or a mechanical blockage. Compare DC amp draw and AC current. AC current should be around 50% lower than DC. If not, suspect motor or mechanical blockage. See pages 9,10, 23, 24, 25, 33, & 34

Metallic Motor noise: Inspect for dragging park brake or failed motor bearing. See pages 33 & 34.

No park brake disengage even in tow position: Verify power to the park brake, solenoid, tow switch, or the brake coil driver. See pages 17,18, 33 & 34

Roll freely in the run position then lock after a few feet: Verify brake coil driver and alignment. See pages 33 & 34

Excessively loud reverse alarm: Check for DC Bus High. See pages 13 - 16

Excessively soft reverse alarm: Check for DC Bus Low or a failed reverse buzzer. See pages 17,18 & 32

Car goes into limp home mode: Check for DC Bus Low. See pages 17 - 19

Solenoid engages once then disengages: Happens as a result of damage in 5V circuit. Verify brake & throttle sensors, motor encoder, SOC meter, controller. See pages 23 - 25

Charger does not turn on: Verify charge receptacle, DC cord, AC power or charger.

Vehicle does not run or engage solenoid: Check the fuse, charge receptacle, and key switch. See pages 30 & 36

Vehicle does not run and the hand held tool will not turn on – Verify key switch voltage and can plug connections. See page 29 & 30

Error Codes

Notes:

•If the car is experiencing an error at the time of diagnostics, the error can be viewed on the error status screen.

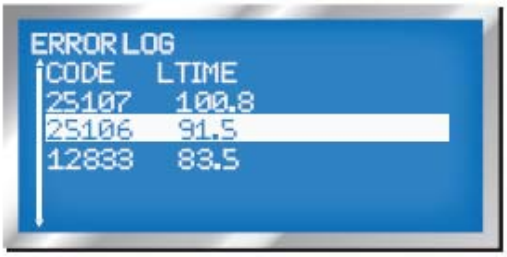
•If the car is not currently experiencing the error, but has in the past; the error can be viewed in the error log screen.

•If the failure is electrical in nature, an error will appear in the status or log screen.

•If the fault is mechanical in nature or a design function of the vehicle; an error code may not be observed on either screen.

Error codes can be accessed using the diagnostic hand held tool. Scroll down to the error code screen then press the 4 key to view sub menu codes.

Error status will show current active faults.

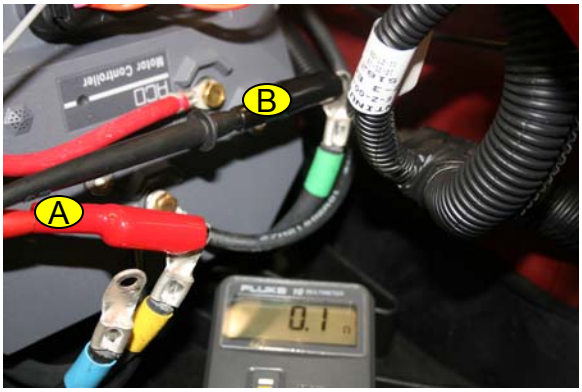


Example codes: Shown are examples of error codes stored in the error log. The log can hold up to 7 entries. Errors will remain in the log after a repair has been made. LTIME represents when a fault occurred in vehicle life time minutes which is listed as CPU time n the battery status screen. LTime is the last time this error occured. Only the Ltime will update if the code is already listed on this screen.

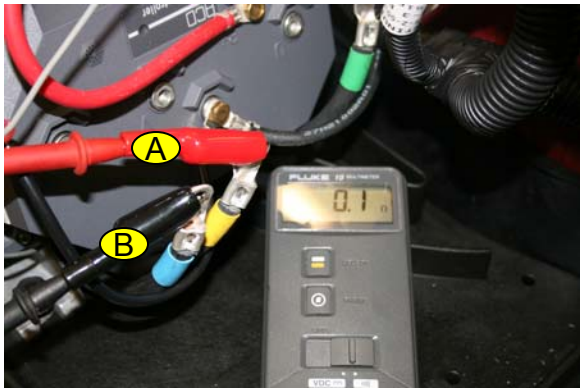
8976 AC Over Current

Caused By: Software detects motor current 50% higher than controller peak rated current.

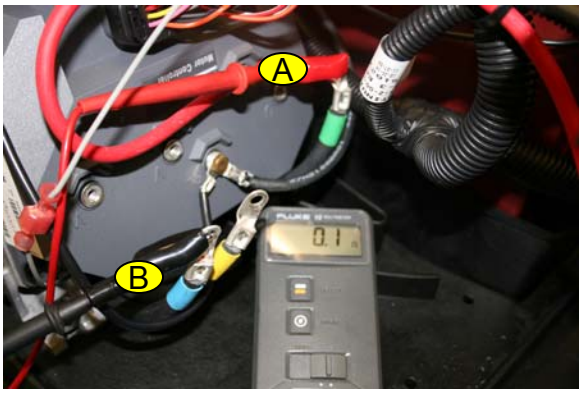
1. Turn key off and back on to reset the controller. If car runs, return to service. If not, proceed to remaining steps.



2. Disconnect all three motor wires. Contact the V wire lug to the pos. meter terminal A. Contact the U lug to the negative terminal B. Meter ohm resistance should be 0.0 – 0.2. If not, replace motor.



3. Contact the V wire lug to the pos. meter terminal A. Contact the W lug to the negative terminal B. Meter ohm resistance should be 0.0 – 0.2. If not, replace motor.



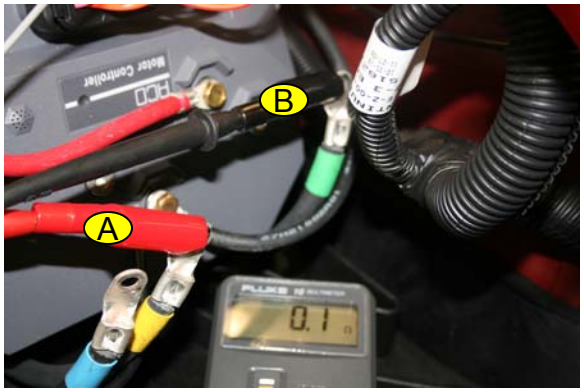
4. Contact the U wire lug to the pos. meter terminal A. Contact the W lug to the negative terminal B. Meter ohm resistance should be 0.0 – 0.2. If not, replace motor.

5. Try a known good controller if error is gone, warranty controller. Error remains, reinstall controller and contact Customer Care.

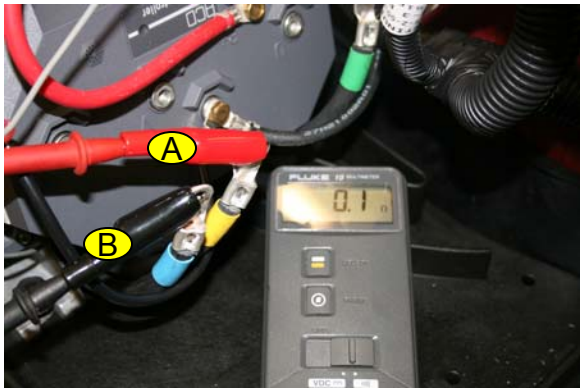
9024 AC Short Circuit

Caused by: Short circuit detected in controller, motor cables, motor, or failed solenoid.

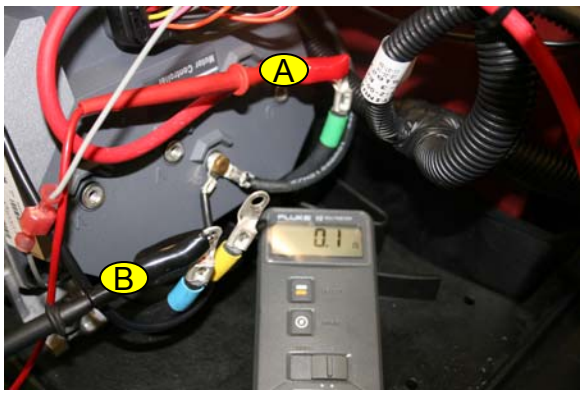
1. Turn key off and back on to reset the controller. If car runs, return to service. If not, proceed to remaining steps.



2. Disconnect all three motor wires. Contact the V wire lug to the pos. meter terminal. Contact the U lug to the negative terminal. Meter ohm resistance should be 0.0 – 0.2. If not, replace motor.



3. Contact the V wire lug to the pos. meter terminal. Contact the W lug to the negative terminal. Meter ohm resistance should be 0.0 – 0.2. If not, replace motor.

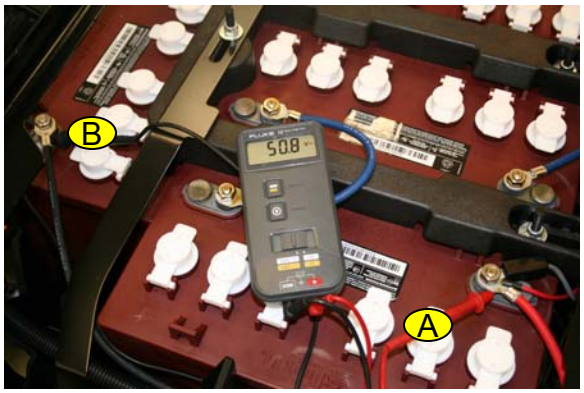


4. Contact the U wire lug to the pos. meter terminal. Contact the W lug to the negative terminal. Meter ohm resistance should be 0.0 – 0.2. If not, replace motor.

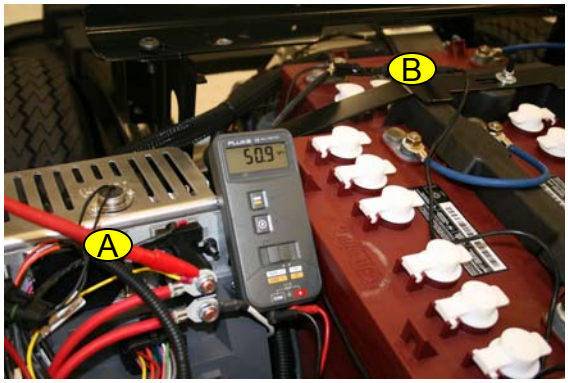
5. Try a known good controller if error is gone, warranty controller. Error remains, reinstall controller and contact Customer Care.

127576 DC Bus Timeout

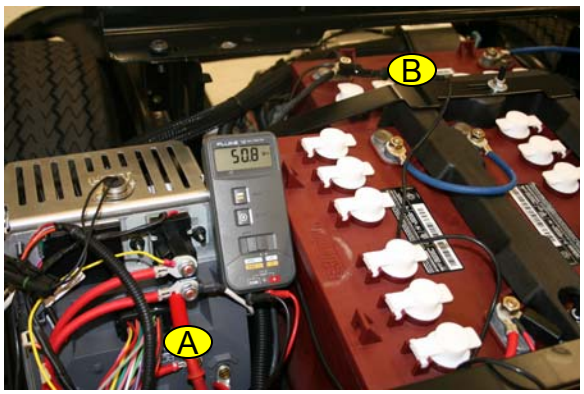
Caused by: DC voltage has not reached 24 volts within 10 seconds after key switch start.



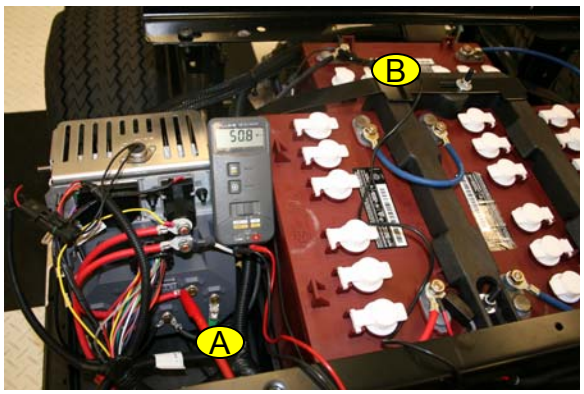
1. Place pos. meter probe A on +48V battery terminal. Place neg. meter probe B on -48V battery terminal. Voltage should read 42V minimum. If not, charge batteries. If good, proceed to the following steps.



2. Place pos. meter probe A on top solenoid post. Place neg. meter probe B on -48V battery terminal. Voltage should be the same as the battery set. If not, replace battery to solenoid wire.



3. Turn key switch to the on position. The solenoid should click. Place pos. meter probe A on bottom solenoid post. Place neg. meter probe B on -48V battery terminal. Voltage should be the same as the battery set and the top solenoid post. If voltage is >1V different between large posts, replace the solenoid. If voltage is 1-2 volts controller has disconnected solenoid. Voltage good proceed to step 4.

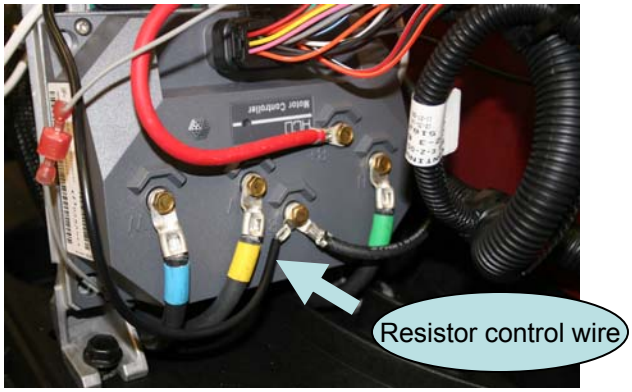


4. Place pos. meter probe A on controller terminal B+. Place neg. meter probe B on -48V battery terminal. Voltage should be the same as the battery set. If not, replace the solenoid to controller wire.

127576 DC Bus Timeout

Continued

5. Place pos. meter probe A on controller terminal B+. Place neg. meter probe B on controller B-. Voltage should be the same as the battery set. If not, replace -48V battery wire to B-. If voltage is still not the same verify steps 2 – 4.

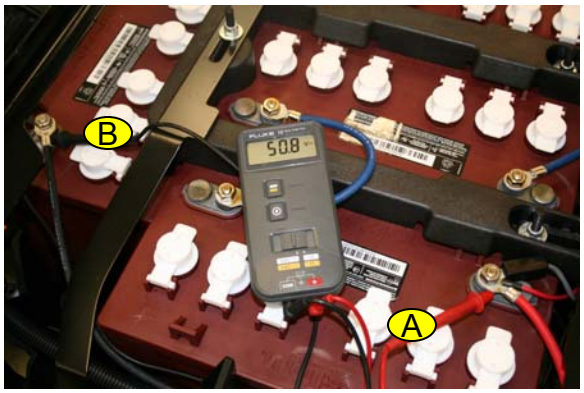


6. Disconnect resistor control module black wire from B- on the controller. If error status changes, replace the resistor module. If error continues, see step 7.

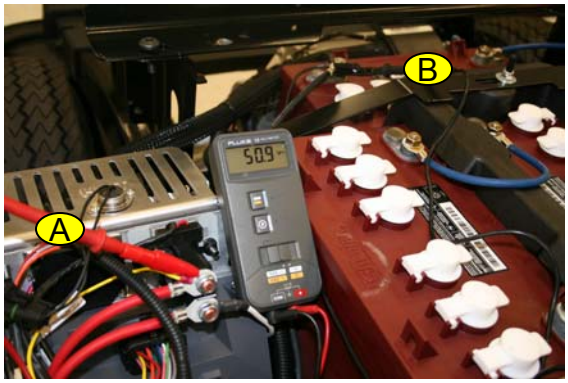
7. Try a known good controller if error is gone warranty controller. Error remains reinstall controller and contact Customer Care.

12817 DC Bus High – Software Detected

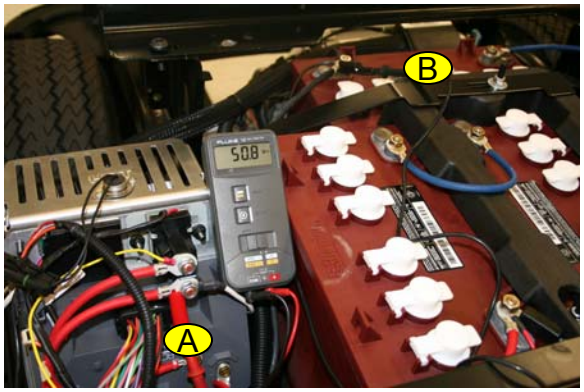
Caused by: Battery pack voltage is over 67 volts. Field faults come from excessive regenerative energy not being controlled by the resistor circuit.



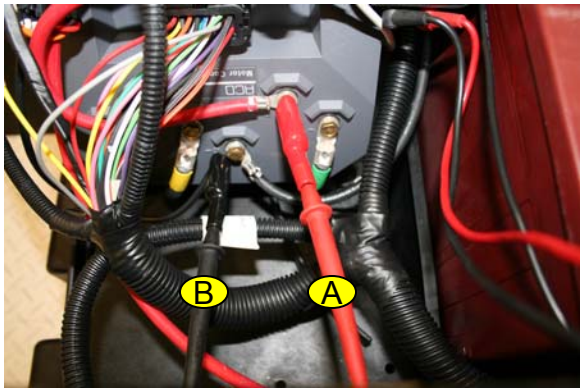
1. Verify battery pack voltage at the time of fault. Voltage should be <63V. Also verify charger output is not over 67.2V



2. Place pos. meter probe A on top solenoid post. Place neg. meter probe B on -48V battery terminal. Voltage should be the same as the battery set. If not, replace battery to solenoid wire.



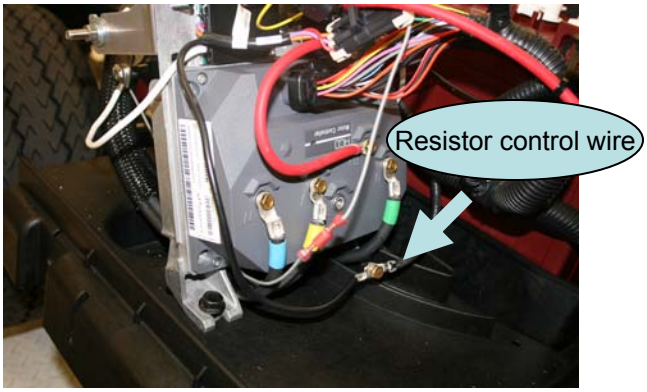
3. Turn key switch to the on position. The solenoid should click. Place pos. meter probe A on bottom solenoid post. Place neg. meter probe B on -48V battery terminal. Voltage should be the same as the battery set and the top solenoid post. If voltage is less than 1V different between large posts, replace the solenoid. between 1-2v controller has disconnected solenoid.
If voltage is good go to step 4.



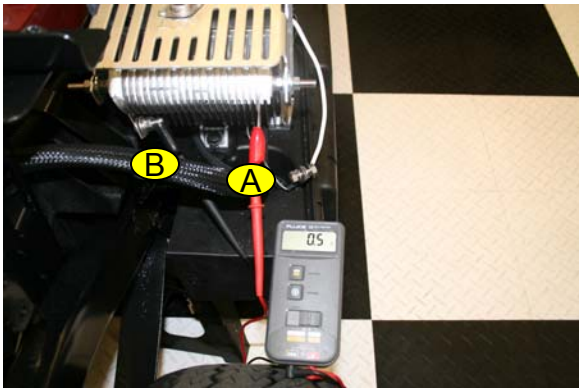
4. Place pos. meter probe A on controller terminal B+. Place neg. meter probe B on controller B-. Voltage should be the same as the battery set. If not, replace -48V battery wire to B-. If voltage is still not the same verify steps 2 – 4.

12817 DC Bus High – Software Detected

Continued



5. Disconnect resistor control module black wire from B- on the controller. If error status changes, replace the resistor module. If error continues, see step 6.

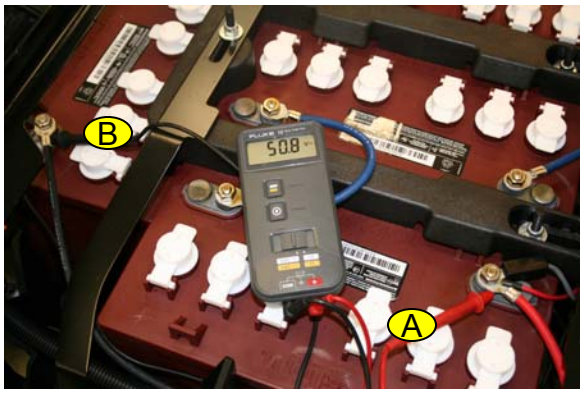


6. Place pos. meter probe A on one resistor tab and neg. meter probe B on the remaining tab. Verify 0.2 – 0.5 ohms. If resistance is out of spec. replace resistor. If resistance is good, go to step 7.

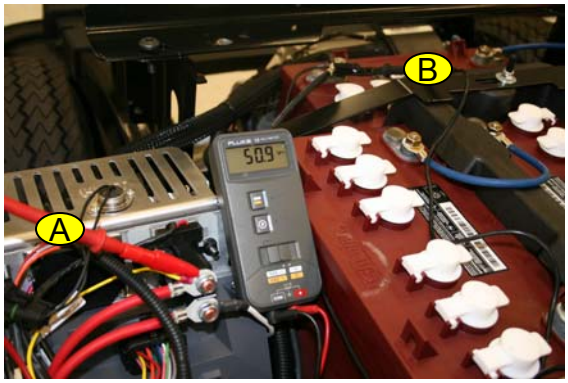
7.Try a known good controller if error is gone, warranty controller. Error remains, reinstall controller and contact Customer Care.

12 818 DC Bus High – Hardware Detected

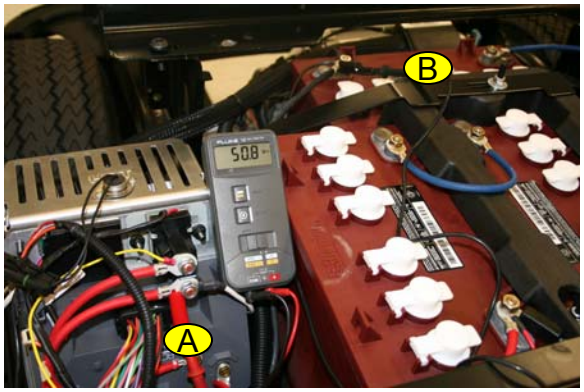
Caused by: Battery Pack voltage is over 67 volts.



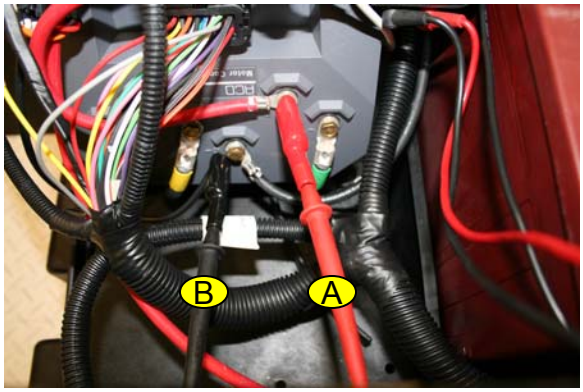
1. Verify battery pack voltage at the time of fault. Voltage should be <63V. Also verify charger output is not over 67.2V



2. Place pos. meter probe A on top solenoid post. Place neg. meter probe B on -48V battery terminal. Voltage should be the same as the battery set. If not, replace battery to solenoid wire.



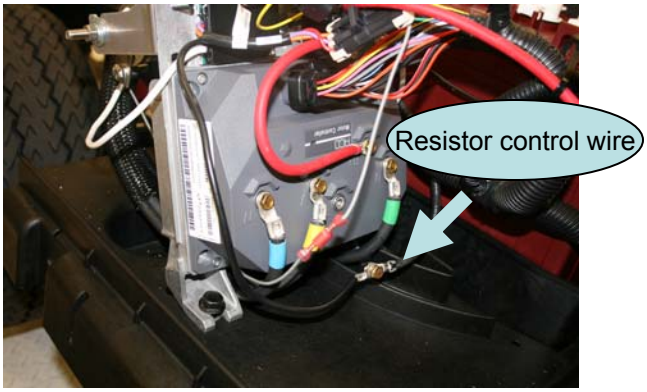
3. Turn key switch to the on position. The solenoid should click. Place pos. meter probe A on bottom solenoid post. Place neg. meter probe B on -48V battery terminal. Voltage should be the same as the battery set and the top solenoid post. If voltage is less than 1V different between large posts, replace the solenoid. If voltage is 1-2v difference controller has disconnected solenoid due to error or warning. Voltage is good go to step 4.



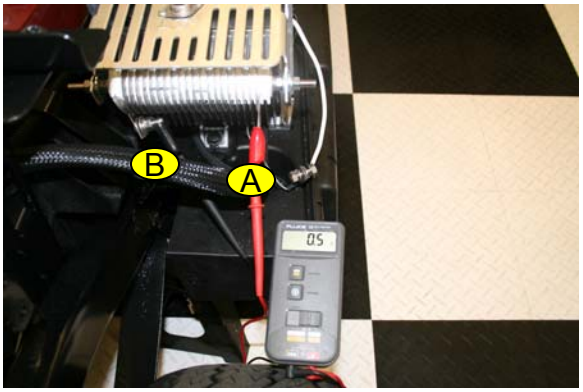
4. Place pos. meter probe A on controller terminal B+. Place neg. meter probe B on controller B-. Voltage should be the same as the battery set. If not, replace -48V battery wire to B-. If voltage is still not the same verify steps 2 – 4.

12 818 DC Bus High – Hardware Detected

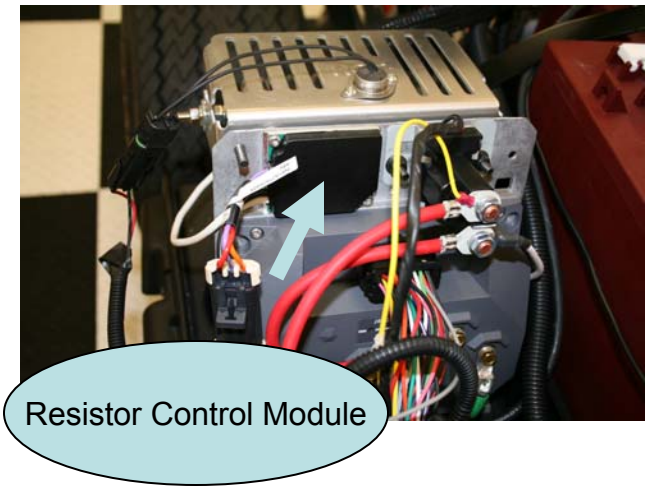
Continued



5. Disconnect resistor control module black wire from B- on the controller. If error status changes, replace the resistor module. If error continues, see step 6.



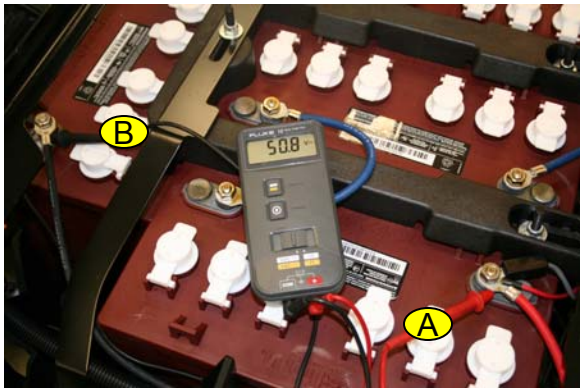
6. Place pos. meter probe A on one resistor tab and neg. meter probe B on the remaining tab. Verify 0.2 – 0.5 ohms. If resistance is out of spec. replace resistor. If resistance is good, go to step 7.



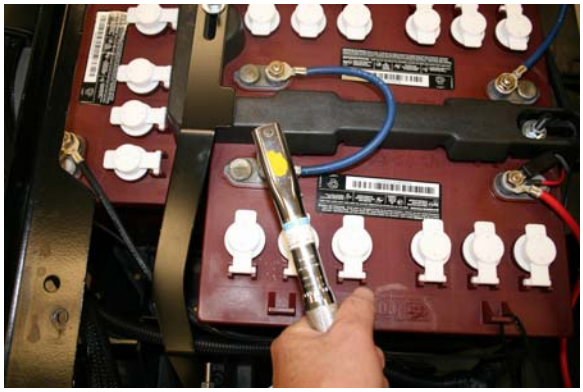
7. Try a known good controller if error is gone, warranty controller. Error remains, reinstall controller and contact Customer Care.

12833 DC Bus Low – Software Detected

Caused by: Controller DC Bus voltage has dropped below 18 volts.

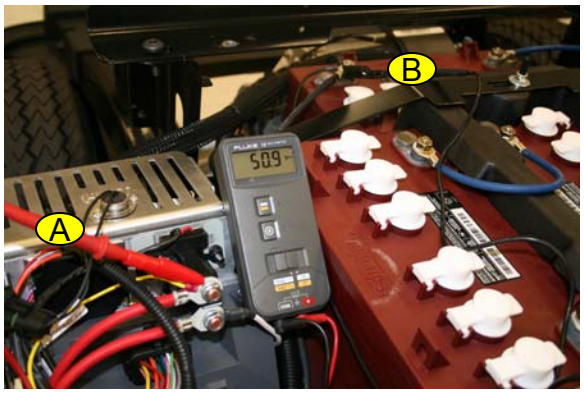


1. Verify proper open circuit battery voltage. Should be 48V or higher at the time of testing. Verify loaded voltage by performing a discharge test. Check for 12V accessory taps and verify accessory usage.



2. Check all battery terminal connections. Torque to 95 – 105 in-lbs.

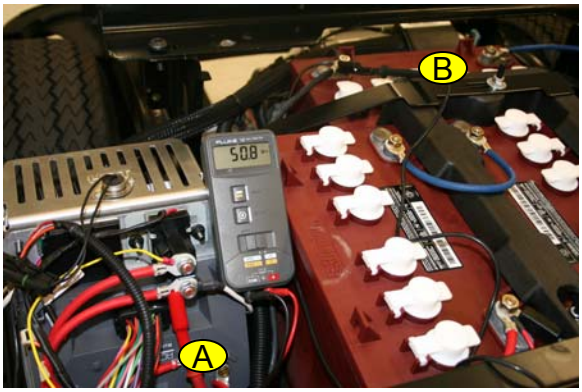
3. Check for less than 0.1 ohms resistance on each battery wire.



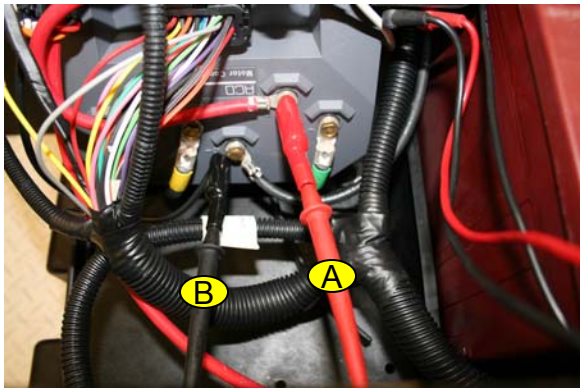
4. Place pos. meter probe A on top solenoid post. Place neg. meter probe B on -48V battery terminal. Voltage should be the same as the battery set. If not, replace battery to solenoid wire.

12833 DC Bus Low – Software Detected

Continued

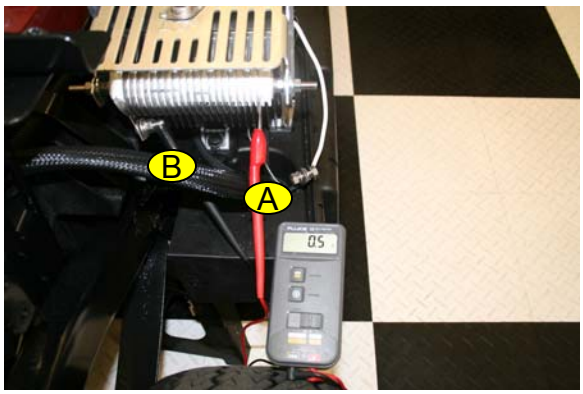


5. Turn key switch to the on position. The solenoid should click. Place pos. meter probe A on bottom solenoid post. Place neg. meter probe B on -48V battery terminal. Voltage should be the same as the battery set and the top solenoid post. If voltage is less than 1V between large posts, replace the solenoid. If voltage drop is 1-2v controller has disconnected solenoid. Voltage is good go to step 6.



6. Place pos. meter probe A on controller terminal B+. Place neg. meter probe B on controller B-. Voltage should be the same as the battery set. If not, replace -48V battery wire to B-. If voltage is still not the same verify steps 2 – 5.

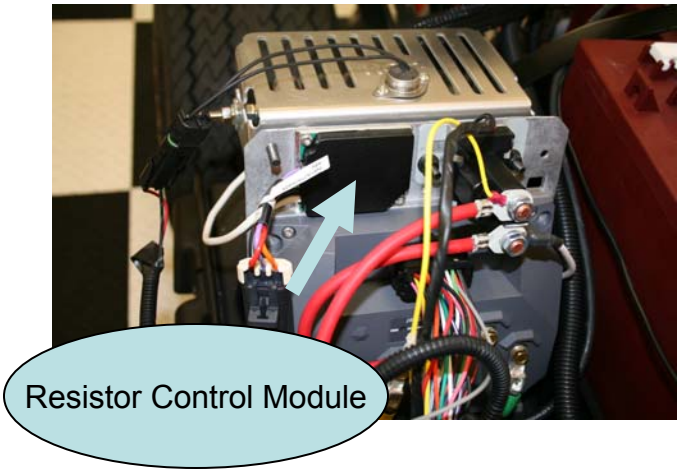
7. Disconnect resistor control module black wire from B- on the controller. If error status changes, replace the resistor module. If error continues, see step 8.



8. Place pos. meter probe A on one resistor tab and neg. meter probe B on the remaining tab. Verify 0.2 – 0.5 ohms. If resistance is out of spec. replace resistor. If resistance is good, go to step 9.

12833 DC Bus Low – Software Detected

Continued



9. Replace resistor control module with known good unit. Module may be staying “on” which causes a drain on the battery set. Resistor coil will be hot if the module is on. If module checks good, go to step 10.

Tech Tip:

Always verify accessories and usage. Warranty requires a 48-12v DC to DC converter for all accessories. The converter will allow equal accessory draw on all four batteries.

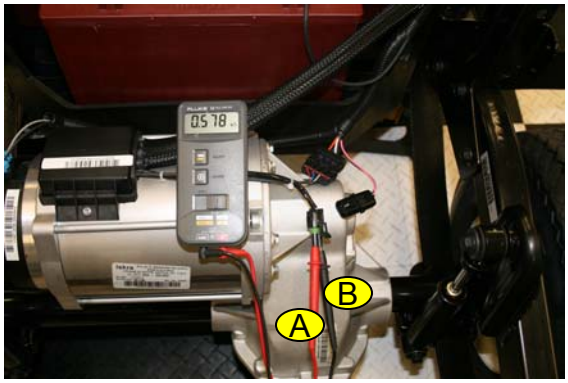
Tech Tip: V56 eliminates this feature

The RXV-E car is designed to default to the “Limp home mode” at 25% SOC. The vehicle will shut down completely at 20% SOC. If this happens in operation, perform a discharge test on the batteries and check the charge history on the hand held tool.

10. Try a known good controller if error is gone, warranty controller. Error remains, reinstall controller and contact Customer Care.

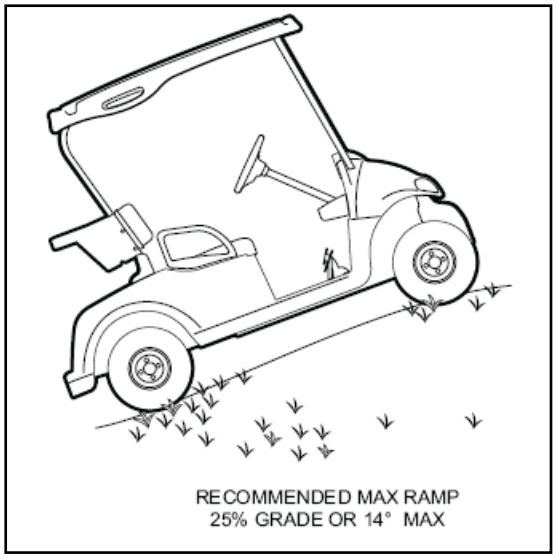
16912 Motor Temp High

Caused by: Overloaded vehicle or motor temp reaching 120 Celsius or higher.



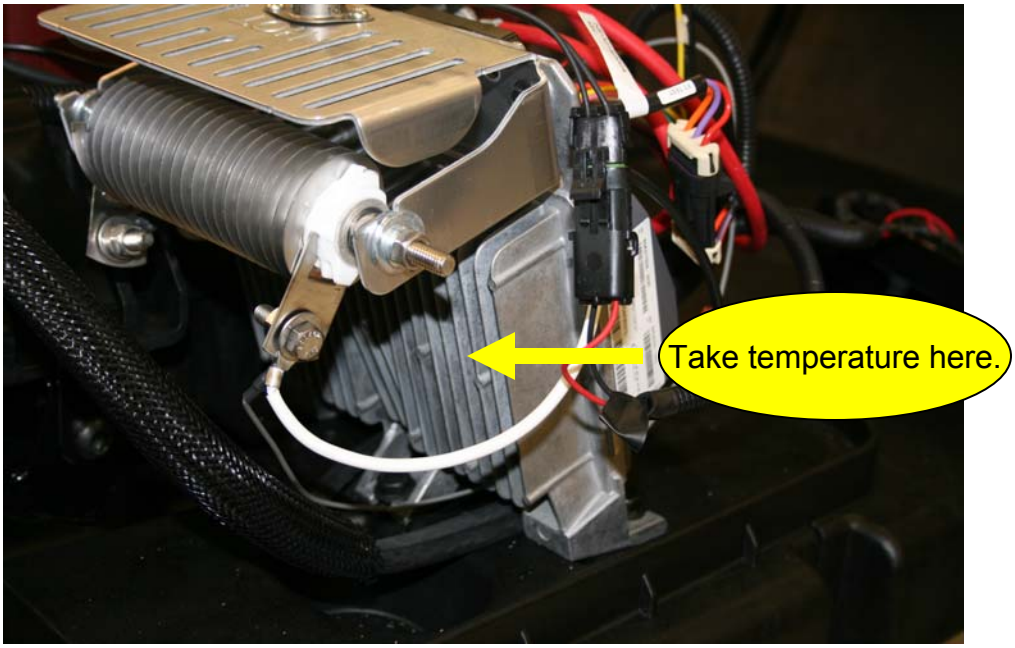
1. Check motor surface temperature for 120 Celsius. (248 Fahrenheit) If cold, go to step 2. If hot, reduce loading.

2. Verify thermo-coupler resistance. Place pos. meter probe A on the pink wire terminal. Place neg. meter probe on the green / black wire terminal. Resistance should be >400 ohms and <1300 ohms. If faulty, replace the motor. If good, and the fault still appears in Error Status, Try a known good controller, if error is gone warranty controller. Error remains, reinstall controller and contact Customer Care.

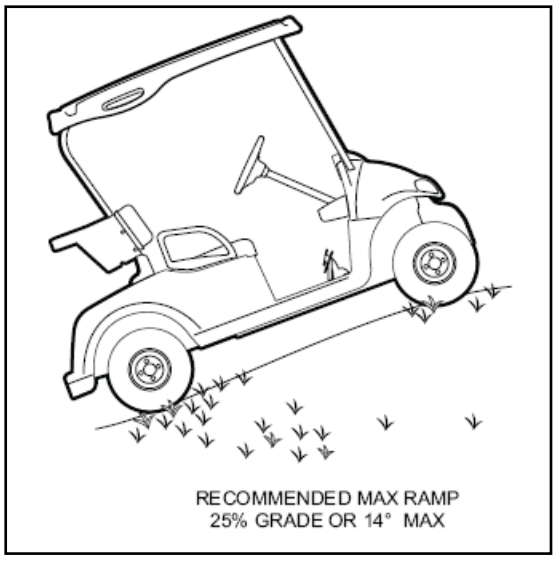


17168 Heat Sink Temp High

Caused by: Overloaded vehicle or controller reaching 100 Celsius or higher.



1. Verify controller heat sink surface temperature. The temperature should be <80 Celsius. (176 Fahrenheit)

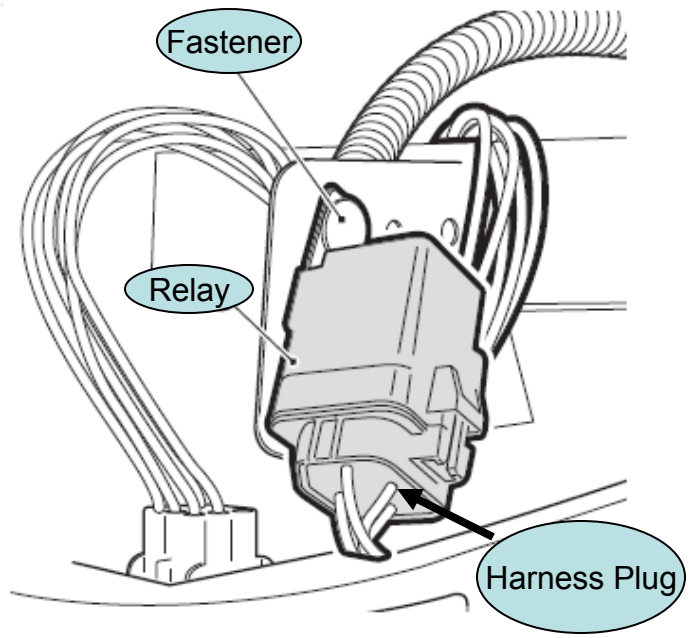


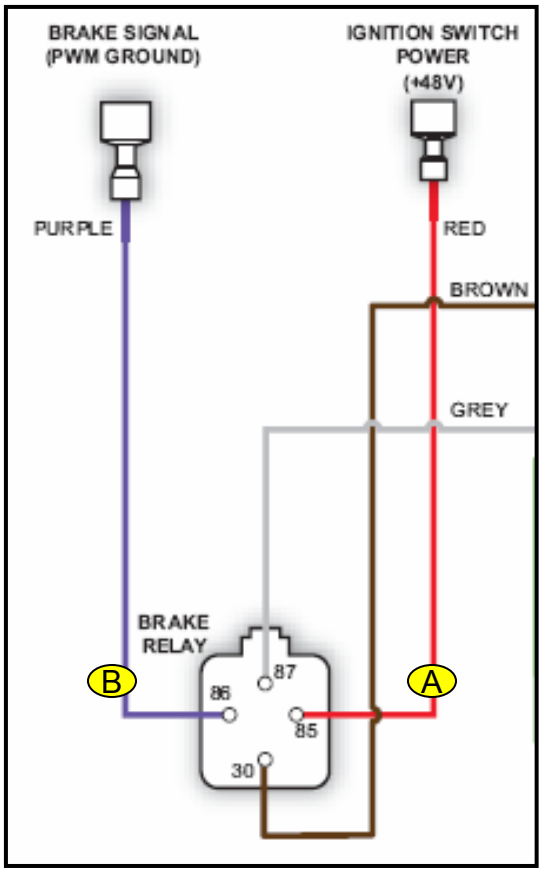
2. Reduce payload or loading.

3. Try a known good controller, if error is gone, warranty controller. Error remains, reinstall controller and contact Customer Care.

20753 15 Volt Supply Low Voltage

Caused by: Problem with the controller's internal 15V supply for brake light circuit.





1. Verify that the brake relay is properly plugged into the vehicle harness. If yes proceed to step 2.

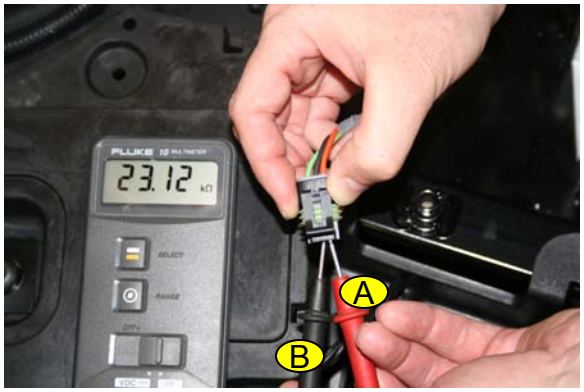
2. Unplug relay from harness. Place pos. probe of meter on the 85 terminal. Place neg. probe of meter on 86 terminal. Verify 1-50 ohms resistance. If not replace the relay. (Shorted) If good, go to step 3.

3. Place pos. probe of meter on the red wire terminal of the relay harness. Place neg. probe on the purple wire terminal. Depress brake pedal. Should observe 12 – 15 VDC. If good, replace relay. If bad go to step 4.

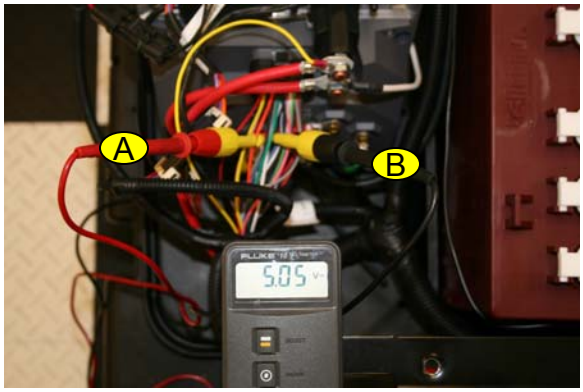
4. Check continuity between the 86 terminal on the harness and pin #22 (Purple wire) of the controller 23 pin connector 1st. Check continuity between 85 terminal of harness and pin #1 (Red wire) of the controller 23 pin connector 2nd. If continuity is not found, replace the harness. If a short is found between 85 and 86 with the controller 23 pin connector unplugged, replace the harness. If continuity is good in the harness; Try a known good controller if error is gone, warranty controller. Error remains, reinstall controller and contact Customer Care.

20755 5 Volt Supply Low or High Voltage

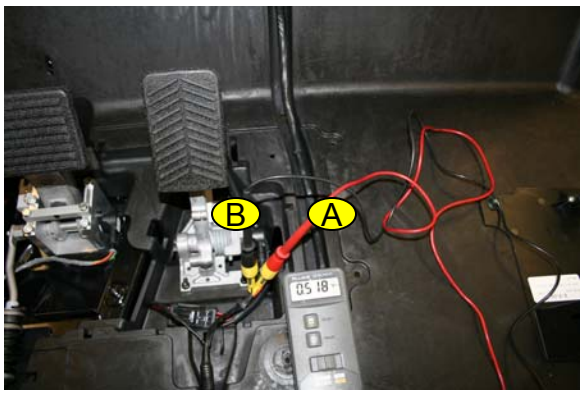
Caused by: Short in the 5V wire harness, malfunction in the 5V sensor supply, shorted SOC meter, or a shorted resistor control module.



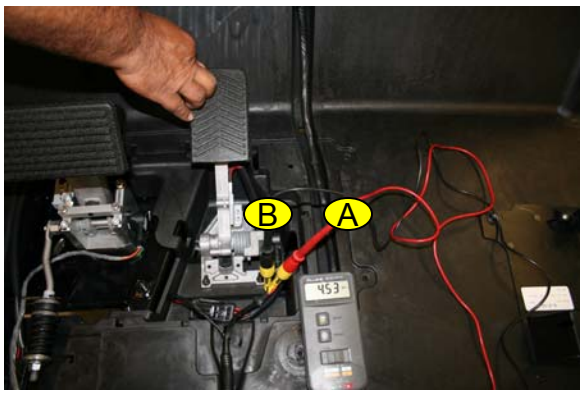
1. Disconnect the 23 pin controller connector. Place pos meter probe A on orange wire terminal of either sensor connector. (Throttle or Brake position) Place neg. meter probe B on the black wire terminal. The reading should be >10K ohms. If bad, replace the control harness. If good, go to step 2.



2. Plug all connectors back in. Place pos. meter probe A on the orange wire at the #3 position on the controller plug. Place neg. probe B on the black wire at the #4 position on the controller 23 pin connector. 5V should be observed. If bad, check all 5V components first, then try a known good controller. If good, go to step 3.



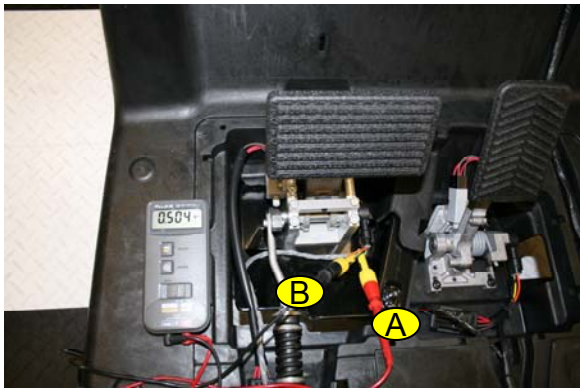
3. Place pos. meter probe A on the yellow wire of the accel sensor and place neg. meter probe B on the black wire at the pedal position sensor. Leave harness connected to the sensor. Voltage value should be between 0.38V and 0.56V. If good, go to step 4. If bad, verify harness.



4. Leave meter probes in place. slowly depress the pedal to the floor. Voltage value should increase from .5v to between 4.5V and 4.8V. Above 4.8v is a fault. If good, go to step 5. If bad, replace sensor.

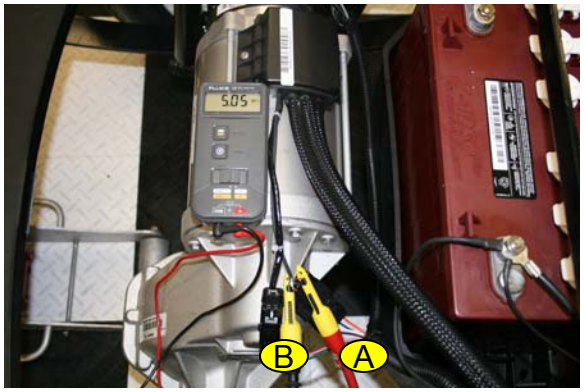
20755 5 Volt Supply Low or High Voltage

Continued



5. Place pos. meter probe A on the green wire of the brake sensor. Place neg. meter probe B on the black wire at the pedal position sensor. Leave harness connected to the sensor. Voltage value should be between 0.38V and 0.56V. If good, go to step 6. If bad, verify harness.

6. Leave meter probes in place. Slowly depress the pedal to the floor. Voltage should steadily increase from .5v to between 4.5V and 4.8V. If good, go to step 7. If bad, replace sensor.



7. Place the pos. probe A on the small red wire of the encoder harness. Place the neg. probe on the small black wire of the encoder harness. 5V should be observed. If bad, replace harness. If good, go to step 8.

8. Place the pos. meter probe on the small red encoder wire. Place the neg. probe on the white or blue wire. Rotate the back tires with the car in neutral and the tow switch in tow. Close to 0V should be observed. Go to step 9.

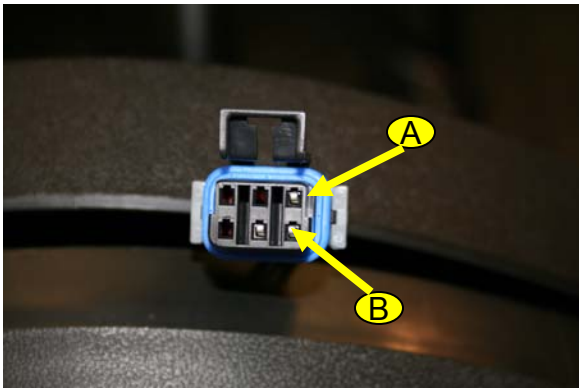
Tech Tip: The motor encoder can be tested with an encoder tester available through Customer Care. The only other accurate test is with a multimeter that has "hertz" test capability.

20755 5 Volt Supply Low or High Voltage

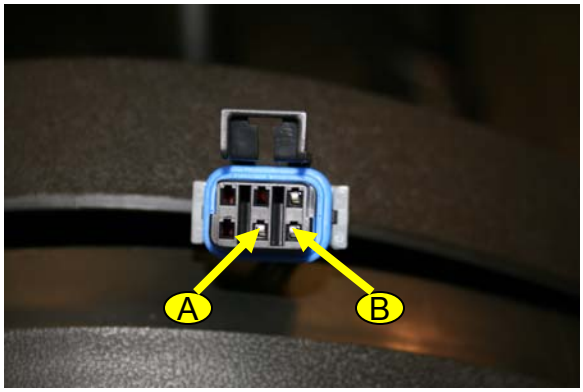
Continued

9. Leave probes in position. Continue to rotate the tires until around 5V is observed. If bad, replace the motor. If good, go to step 10.

10. Inspect SOC meter plug for damage or tampering. If damaged, replace the SOC meter. If good, go to step 11.



11. Check SOC harness plug for voltage. Place pos. meter probe A on the red wire terminal. Place neg. meter probe B on the black wire terminal. 48V should be observed with the key on. If bad, replace the harness. If good, go to step 12.

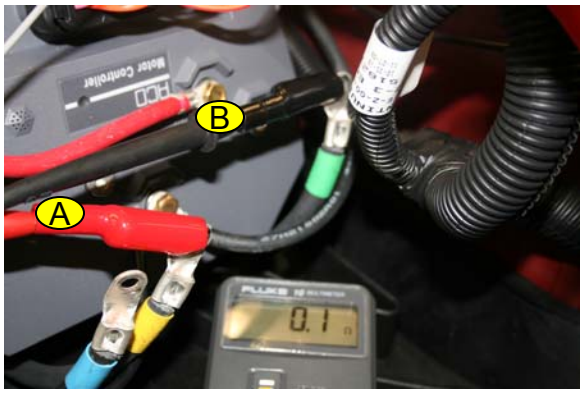


12. Check 5V circuit. Place pos. meter probe A on the gray wire terminal. Place the neg. probe B on the black wire terminal. .5V at empty and 4.5v at full should be observed based on state of charge. If good, replace the SOC meter. If bad, go back to step 2.

Caution: Do not short any 5V circuit wire to any 48V circuit wire or component. The controller and/or sensors will be destroyed!

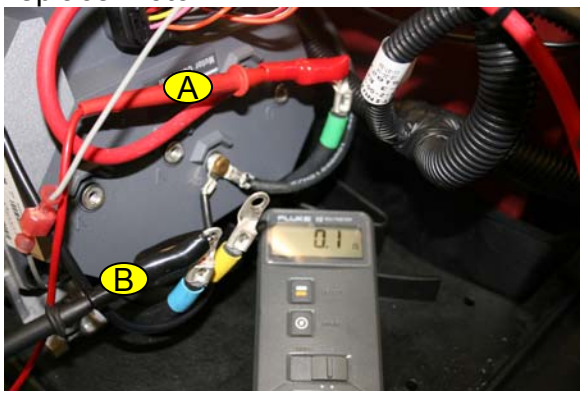
21008 Current Sensor Offset Calibration Error

Caused by: Error detected in the controller current measurement hardware.



1. Disconnect all three motor wires. Contact the V wire lug to the pos. meter terminal A. Contact the U lug to the negative terminal B. Meter ohm resistance should be 0.0 – 0.2. If not, replace motor.

2. Contact the V wire lug to the pos. meter terminal A. Contact the W lug to the negative terminal B. Meter ohm resistance should be 0.0 – 0.2. If not, replace motor.

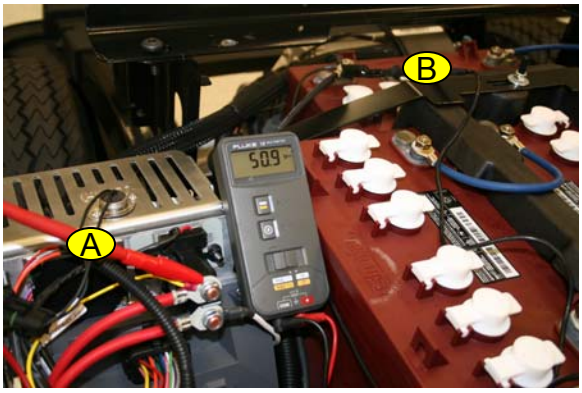


3. Contact the U wire lug to the pos. meter terminal A. Contact the W lug to the negative terminal B. Meter ohm resistance should be 0.0 – 0.2. If not, replace motor.

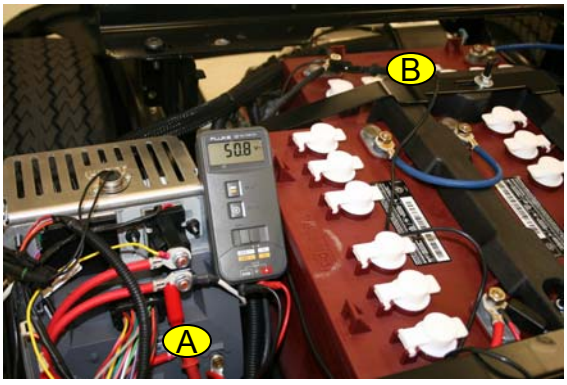
4. Try a known good controller if error is gone, warranty controller. Error remains, reinstall controller and contact Customer Care.

21520 Open Drain Outputs Current High

Caused by: Open drains (stuck closed or shorted) reverse buzzer, solenoid, park brake, resistor control module, or brake relay.



1. Place pos. meter probe A on top solenoid post. Place neg. meter probe B on -48V battery terminal. Voltage should be the same as the battery set. If not, replace battery to solenoid wire.



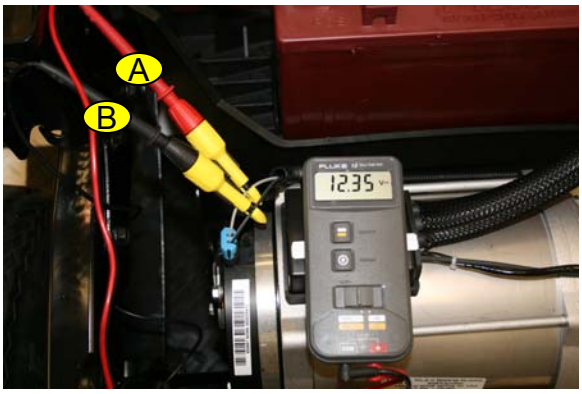
2. Turn key switch to the on position. The solenoid should click. Place pos. meter probe A on bottom solenoid post. Place neg. meter probe B on -48V battery terminal. Voltage should be the same as the top solenoid post. If voltage is less than 1V different between large posts, replace the solenoid. Voltage should bleed down slowly when the key is turned off. If not, replace solenoid.

3. Place pos. meter probe on the red wire of the buzzer. Place neg. meter probe on the black wire. Battery voltage should be observed while the car is in the reverse direction and the buzzer will sound. Voltage should diminish in the forward direction. If voltage is good and no sound, replace the buzzer. If voltage is bad, check key switch and harness.

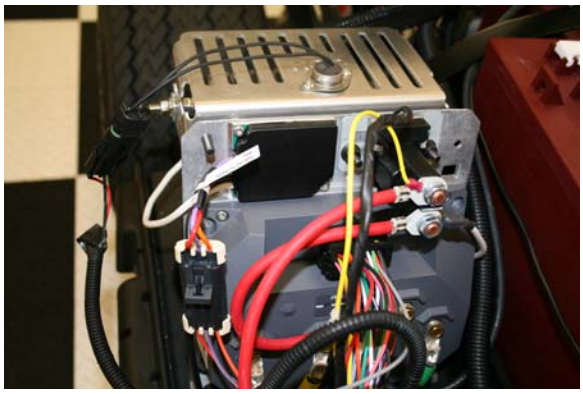
4. Check the brake coil driver for the correct ohm range. The range should be 27+/- 3ohms. If wrong, replace brake coil driver. If good, go to step 5.

21520 Open Drain Outputs Current High

Continued



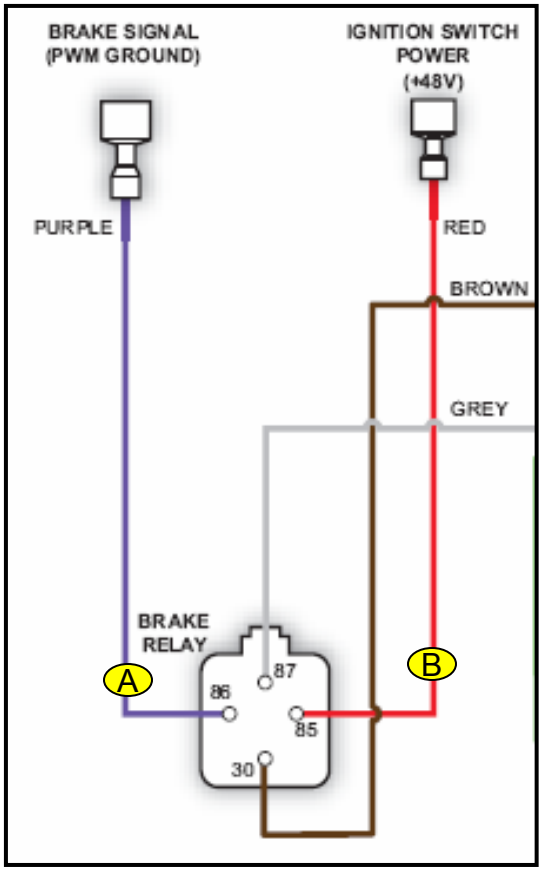
5. Place pos. meter probe A. on the gray wire of the brake coil harness. Place the neg. probe B on the black wire. Voltage should read around 12V-18V when the tow switch is in the tow position. If bad, verify harness. If good, go to step 6.



6. Disconnect resistor control module black wire from B- on the controller. If error status changes, replace the resistor module. If error continues, see step 7.

7. Unplug relay from harness. Place pos. probe of meter on the 85 terminal. Place neg. probe of meter on 86 terminal. Verify 1-50 ohms resistance. If not replace the relay. (Shorted) If good, go to step 8.

8. Check continuity between the 86 terminal on the harness and pin #22 (Purple wire) of the controller23 pin connector 1st. Check continuity between 85 terminal of harness and pin #1 (Red wire) of the controller 23 pin connector 2nd. If continuity is not found, replace the harness. If a short is found between 85 and 86 with the controller 23 pin connector unplugged, replace the harness. If continuity is good in the harness; Try a known good controller.



Attention: If all devices check out, Try a known good controller.

33024 CAN Timeout

Caused by: The controller and the hand held diagnostic tool stop communicating.

1. Turn key off and back on to reset the controller. If the hand held screen returns, continue to diagnose. If screen does not return, got to step 2.

2. Check connection to hand held tool. Verify hand held tool function with a known good unit.

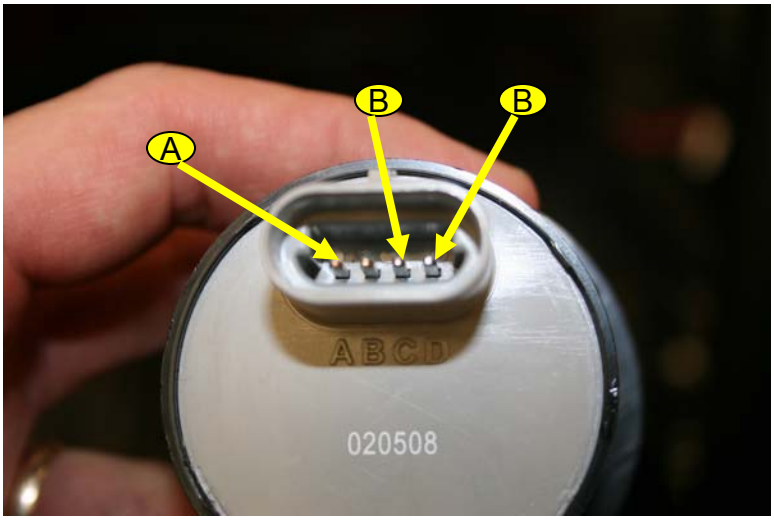
3. Check wire connections to the CAN plug be removing the cup holder and inspecting wires. If bad, re-insert or replace harness.

Tech Tip: Intermittent car operation can come from loose wire connections on the CAN plug and harness. This condition will not show a fault code on the hand held diagnostic unit.

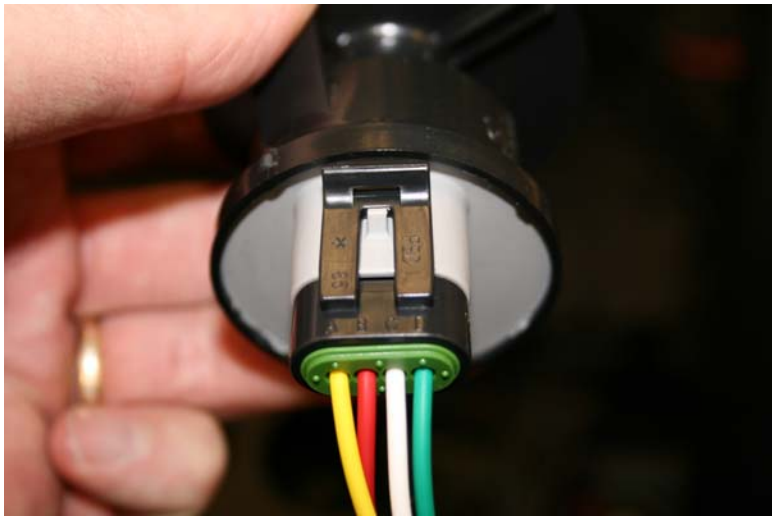
25104 Direction Error

Caused by: Shorts in the key switch or wiring. Forward and Reverse directions may be energized simultaneously.

1. Remove the key switch and turn the key to the forward position. Place pos. meter probe A on the A pin of the switch. Place the neg. meter probe B on the C pin. Full continuity should be observed on the multi-meter. Go to step 2.



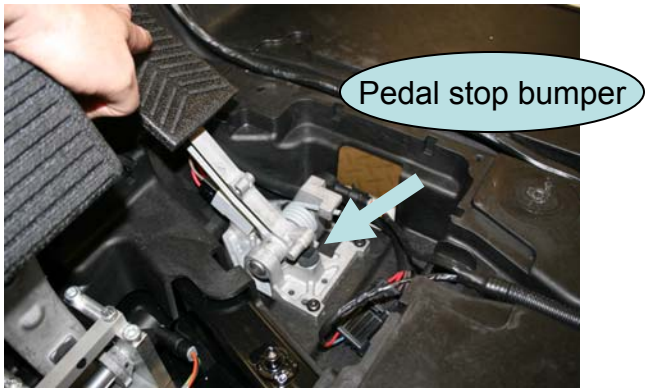
2. Now place the neg. meter probe B on the D pin of the switch. The meter should now read full continuity with the key turned in the opposite direction. If continuity can be read on all three pins in the same key direction (Forward), then replace the switch.



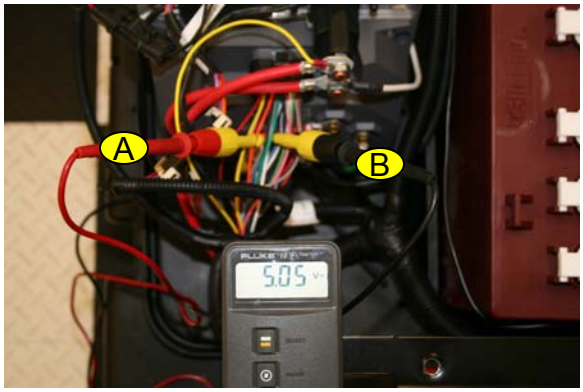
Tech Tip: This test can also be performed using the hand held tool and scrolling down to the direction functions in the Diagnostics Menu

25105 Throttle Sensor Error

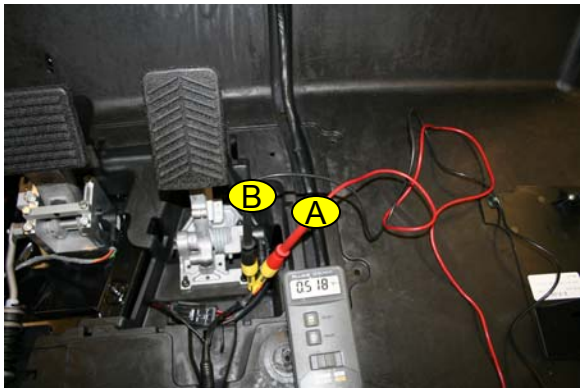
Caused by: The throttle position sensor is out of operational range.



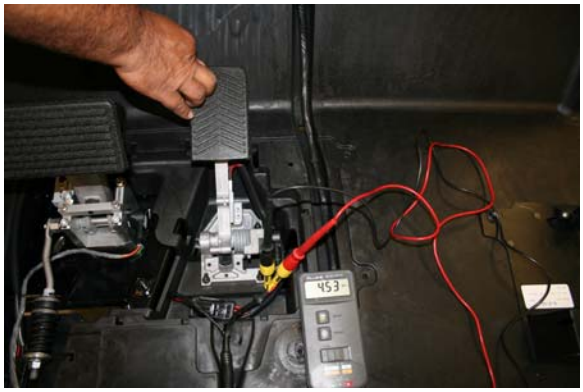
1. Verify the pedal stop bumper is in the correct position. If not, correct and secure in place.



2. Plug all connectors back in. Place pos. meter probe A on the orange wire at the #3 position on the controller plug. Place neg. probe B on the black wire at the #4 position on the controller plug. 5V should be observed. If bad, check all 5V components first, then try a known good controller. If good, go to step 3.



3. Place pos. meter probe A on the yellow wire of the accel position sensor. Place neg. meter probe B on the black wire at the pedal position sensor. Leave harness connected to the sensor. Voltage value should be between 0.38V and 0.56V. If good, go to step 4. If bad, verify harness.



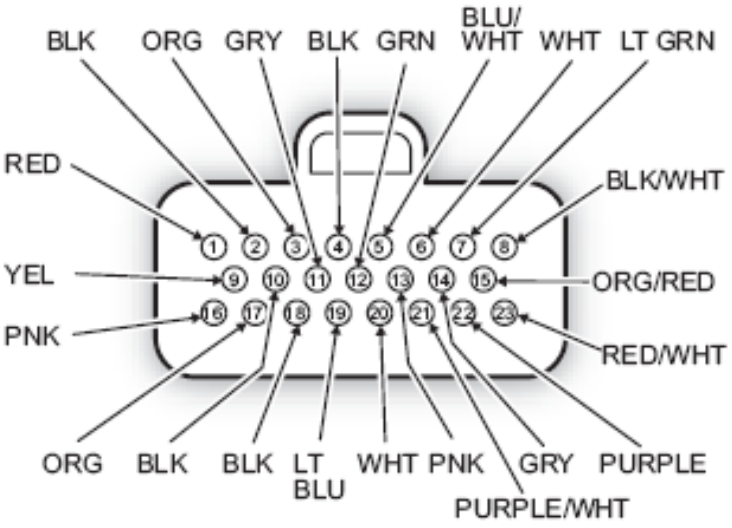
4. Leave meter probes in place. Slowly depress the pedal to the floor. Voltage should steadily increase from .5v to between 4.5V and 4.8V. Above 4.8v is a fault. If good, go to step 4. If bad, replace sensor.

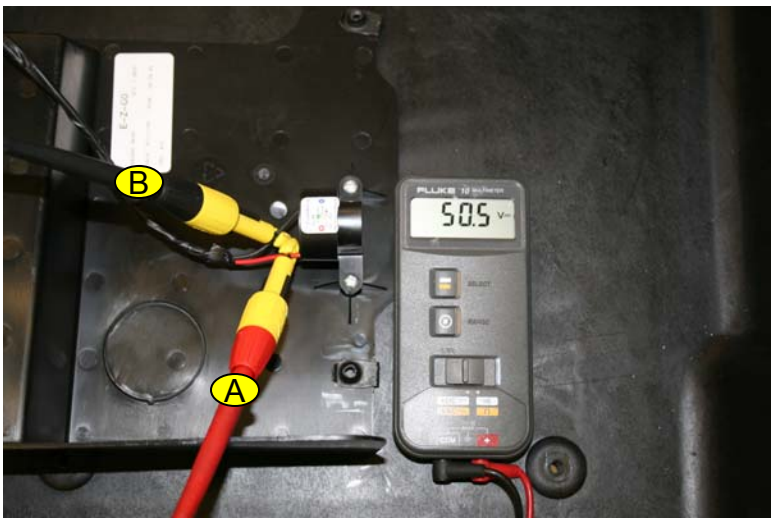
5. Try a known good controller if error is gone, warranty controller. Error remains, reinstall controller and contact Customer Care.

25106 Reverse Alarm Test Failed

Caused by: The reverse alarm failed at start up check or an incomplete reverse alarm circuit.

1. Unplug the 23 pin connector at the speed controller. Check the resistance value between pin 10 and 13. Value should be <0.01 ohms. If out of range, replace the harness or the alarm.



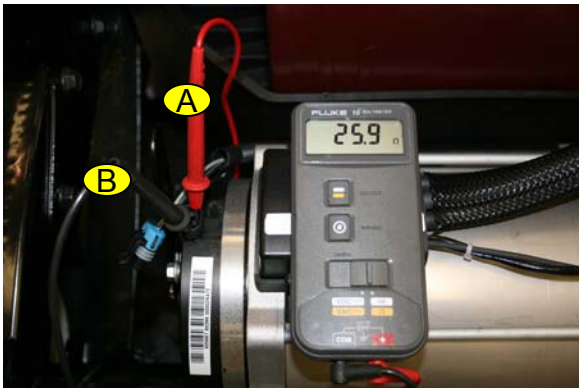


2. Place the pos. meter probe A on the red wire of the buzzer harness. Place the neg. probe B on the black wire. 48V should be present when the car is in the reverse direction. If not, verify key switch then try a known good controller. If error is gone warranty controller. Error remains reinstall controller and contact Customer Care.

25107 Mechanical Brake Test Failed

Caused by: Park brake failed to prevent the motor from rotating during the start up test. Can be caused by turning the key switch off and back to drive while the vehicle is moving.

1. Turn the key switch off and try to push the vehicle. The tow switch must be in the run position. If the car can be pushed, got to step 2.



2. Verify the brake coil driver by placing the pos. meter probe A on one driver terminal and the neg. meter probe B on the remaining terminal. Resistance should be 27 ohms +/- 3 ohms. If out of range, replace the coil driver. If good, go to step 3.

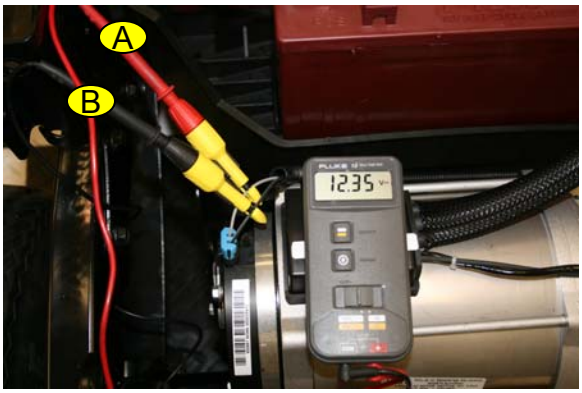
3. Verify friction disk alignment. Remove the park brake and inspect the friction disk. Go to step 4.

Tech Tip: With the key switch in the on position, flip to tow switch to tow. An audible noise should be heard and the car should roll freely. If not, check for power leaving the controller and activation of the coil driver. The handheld diagnostic tool will show this on the diagnostic report screen. Check "E Brake Cur" for .497-.501 Amps. If bad, check the harness and then try a known good controller. If good, see step 5.

25107 Mechanical Brake Test Failed

Continued

4. After inspection, reinstall the park brake and leave the bolts loose. Turn the key switch to on and the tow switch to tow. The coil driver should electronically disengage. Torque the three bolts to 53 -71 in-lbs in small equal increments. Flip the tow switch back and forth from tow to run. This will align the friction disk.



5. See the Tech tip on the previous page. Verify energy leaving the controller with the hand held diagnostic tool. Now verify voltage to the coil driver by placing the pos. meter probe A on the gray wire. Place the neg. meter probe B on the black wire. 12 – 18V should be observed in the tow position with the key on. If good, go back to step 1. If voltage appears in the tow position with the key on, replace the harness.

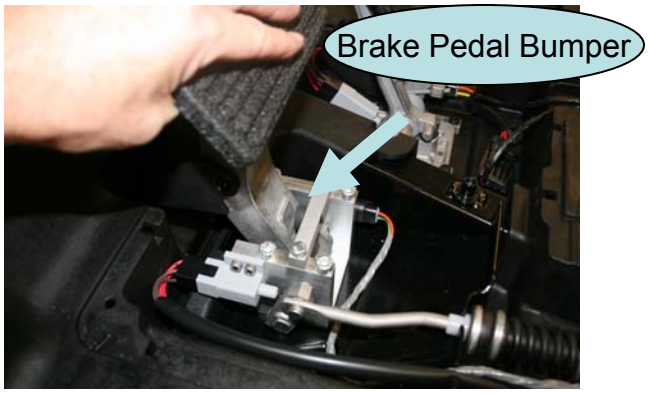
6. Turn key to the on position with the tow switch in the run position. Go to step 7.

Tech Tip: The tow switch should show full resistance in the run position and the 23 pin connector disconnected.

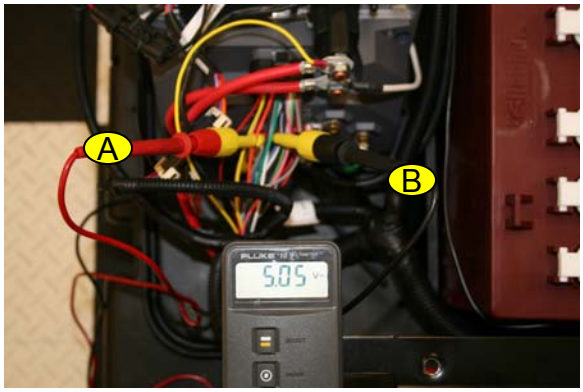
7. If the car can be pushed verify step 3. Then try a known good controller, if error is gone, warranty controller. Error remains, reinstall controller and contact Customer Care.

25108 Brake Sensor Error

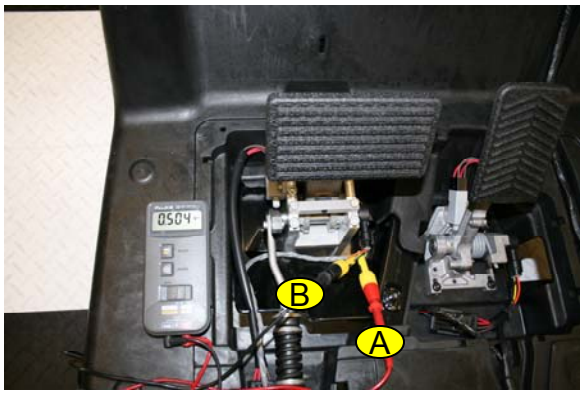
Caused by: The brake pedal position sensor is out of operating range.



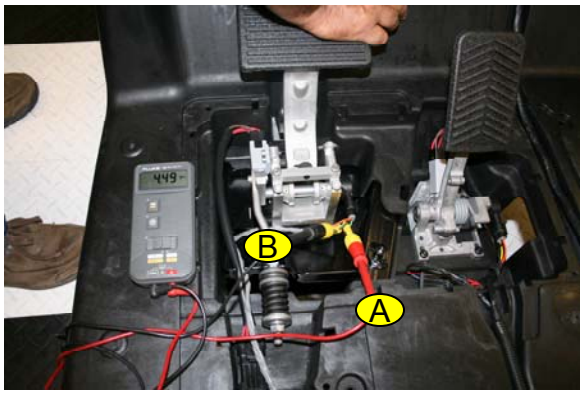
1. Verify the pedal stop bumper is in the correct position. If not, correct and secure in place.



2. Place pos. meter probe A on the orange wire at the #3 position on the controller plug. Place neg. probe B on the black wire at the #4 position on the controller plug. 5V should be observed. If bad, check all 5V components first, then try a known good controller. If good go to step 3.



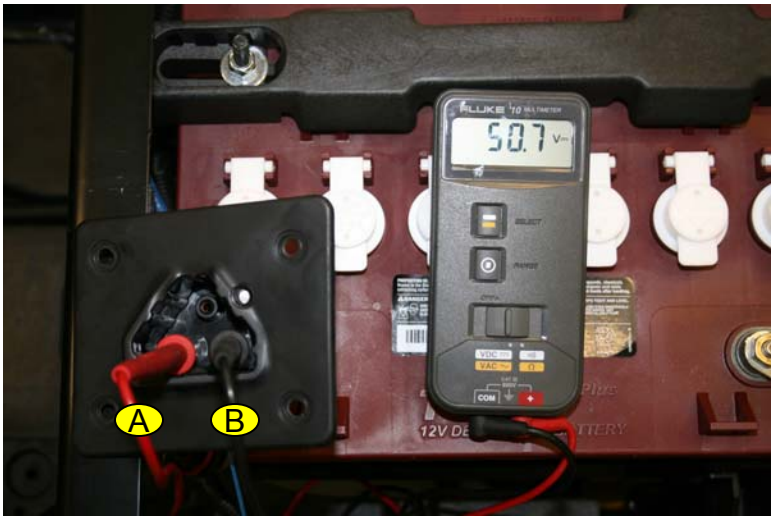
3. Place pos. meter probe A on the green wire of the brake position sensor and place neg. meter probe B on the black wire of the brake position sensor. Leave harness connected to the sensor. Voltage should be between 0.38V and 0.56V. If good, go to step 4. If bad, verify harness.



4. Leave meter probes in place. Slowly depress the pedal to the floor. Voltage should steadily increase from .5v to between 4.5V and 4.8V. Above 4.8v is a fault. If good go to step 5. If bad, replace sensor.

5. Try a known good controller if error is gone, warranty controller. Error remains, reinstall controller and contact Customer Care.

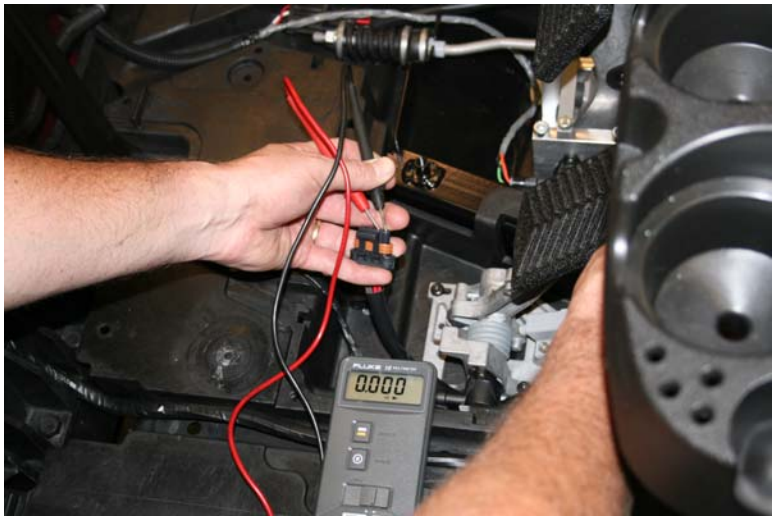
Charger Receptacle Test



1. Place the pos. meter probe A on the lower left terminal of the charge receptacle. Place the neg. probe B on the lower right terminal. Battery voltage should be observed. If not, check loaded battery pack voltage then replace the charge receptacle.

2. Place the pos. meter probe A on the lower left terminal of the charge receptacle. Place the neg. meter probe B on the upper terminal. Battery voltage should be observed. If not, replace the receptacle.

Throttle & Brake Switch Test



1. Throttle switch is normally open. Disconnect the throttle switch harness. Place the pos. meter probe on one red wire. Place the neg. meter probe on the other red wire. An open circuit should be observed when the pedal is released. Full continuity should be observed with the pedal depressed. If continuity is wrong, replace the accelerator switch.

2. Brake switch is normally closed Disconnect the brake switch harness. Place the pos. meter probe on one red wire. Place the neg. meter probe on the other red wire. An open circuit should be observed when the pedal is depressed. Full continuity should be observed with the pedal released. If continuity is wrong, replace the brake switch.

Resistor Temp Sensor Test

1. Unplug the resistor temperature sensor from the harness. Place one meter probe in one terminal and the remaining probe in the other terminal. 0.0 – 0.2 should be observed. If not, replace the sensor.

Warnings

May occur in conjunction with error codes. Warnings may not necessarily cause the vehicle to stop. Warnings may cause a loss in vehicle performance.

Warning List:

1. Drive Fault – Indicates the current error is the result of a condition internal to the controller. Trouble shoot according to the error message displayed. If no errors are displayed, replace the controller.
2. DC Bus Low – DC Bus voltage is <24 volts. See pages 17 - 19
3. DC Bus High – DC Bus voltage is >67 volts. See pages 13 - 16
4. BDI Calibration – The DC Bus measurement system is not calibrated. Replace the controller.
5. Motor Temp High – Motor temperature is >140 C but less than 150 C. See page 20
6. Motor Temp Sensor – Motor temp sensor not connected. See page 20
7. Heat Sink Temp Low – Controller heat sink temp is < - 20C. Reduced speed may go away after controller warms up.
8. Heat Sink Temp High – Measured heat sink temp is >85C but less than 115C. See page 21
9. Heat Sink Temp Sens – Heat sink temp sensor is shorted or not connected. Warm vehicle or replace the controller.
10. Default Parameter – This warning is normal when the controller is first powered up. Any time after this replace the controller.
11. Power Reduction – This warning occurs in conjunction with motor and heat sink temp warnings. This warning indicates that max torque current reduction is in affect.
12. Cur Meas Cal – The controller's AC current measurement system is not calibrated. Replace the controller.
13. Speed Sensor – Indicates sensor or wire failure. See page 31
14. OD Current High – The current in an open drain (park brake, resistor control, or brake relay) is >2.5 amps. See pages 27 - 28
15. Charger Connected – The battery charger is connected to the car preventing accidental drive away. Verify charger handle insertion. See page 36
16. Brake Slipping – The controller has detected motor rotation while the park brake is engaged. Can occur when the key is turned off while the vehicle is in motion. See pages 33 - 34
17. Throttle Switch Closed – If this warning occurs with the key switch on: The throttle switch is closed at key start. Switch must be opened briefly before driving is permitted. If this warning occurs any other time: Energy dump monitoring detects the energy dump circuit is continuously on for >30 seconds. See page 37
18. Brake Switch Open – Current in the brake circuit is <100 mamps with the park brake energized. This warning can occur in panic stop situations. See page 37
19. BDI Low – Battery pack voltage is below 25% SOC. See pages 17- 19

Notes

A Textron Company

E-Z-GO Division of Textron, Inc.,
1451 Marvin Griffin Road, Augusta, Georgia 30906 - 3852 USA

TO CONTACT US...
North America:

Technical Assistance & Warranty	Phone: 1-800-774-3946, FAX: 1-800-448-8124
Service Parts	Phone: 1-888-GET-E-Z-GO (1-888-438-3946), FAX: 1-800-752-6175
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