

TEST PROCEDURE 1 – BATTERIES / VOLTAGE CHECK

See General Warning, Section 10, Page 10-1.

NOTE: The batteries must be properly maintained and fully charged in order to perform the following test procedures. Battery maintenance procedures, including watering information and allowable mineral content, can be found in Section 14 of this manual. See **Battery Care, Section 14, Page 14-3.**

The battery voltage can be displayed with the IQDM handset (CCI P/N 102241804). If an IQDM handset is not available, proceed to Batteries / Voltage Check without the IQDM Handset on page 11-15.

Batteries / Voltage Check with the IQDM Handset

1. Connect the IQDM to the vehicle. See **Plugging the Handset into the Vehicle, Section 12, Page 12-1.**
2. Access the Test menu and select BATT VOLTAGE by using the SCROLL DISPLAY buttons. The IQDM should indicate at least 48 volts with the batteries fully charged. If not, check for loose battery connections or a battery installed in reverse polarity. Refer to **Section 14 – Batteries**, for further details on battery testing.

Batteries / Voltage Check without the IQDM Handset

1. With batteries connected and using a multimeter set to 200 volts DC, place red (+) probe on the positive (+) post of battery no. 1 and the black (–) probe on the negative (–) post of battery no. 8 (**Figure 11-7, Page 11-15**). The multimeter should indicate at least 48 volts with the batteries fully charged. If not, check for loose battery connections or a battery installed in reverse polarity. Refer to Section 14 – Batteries, for further details on battery testing.

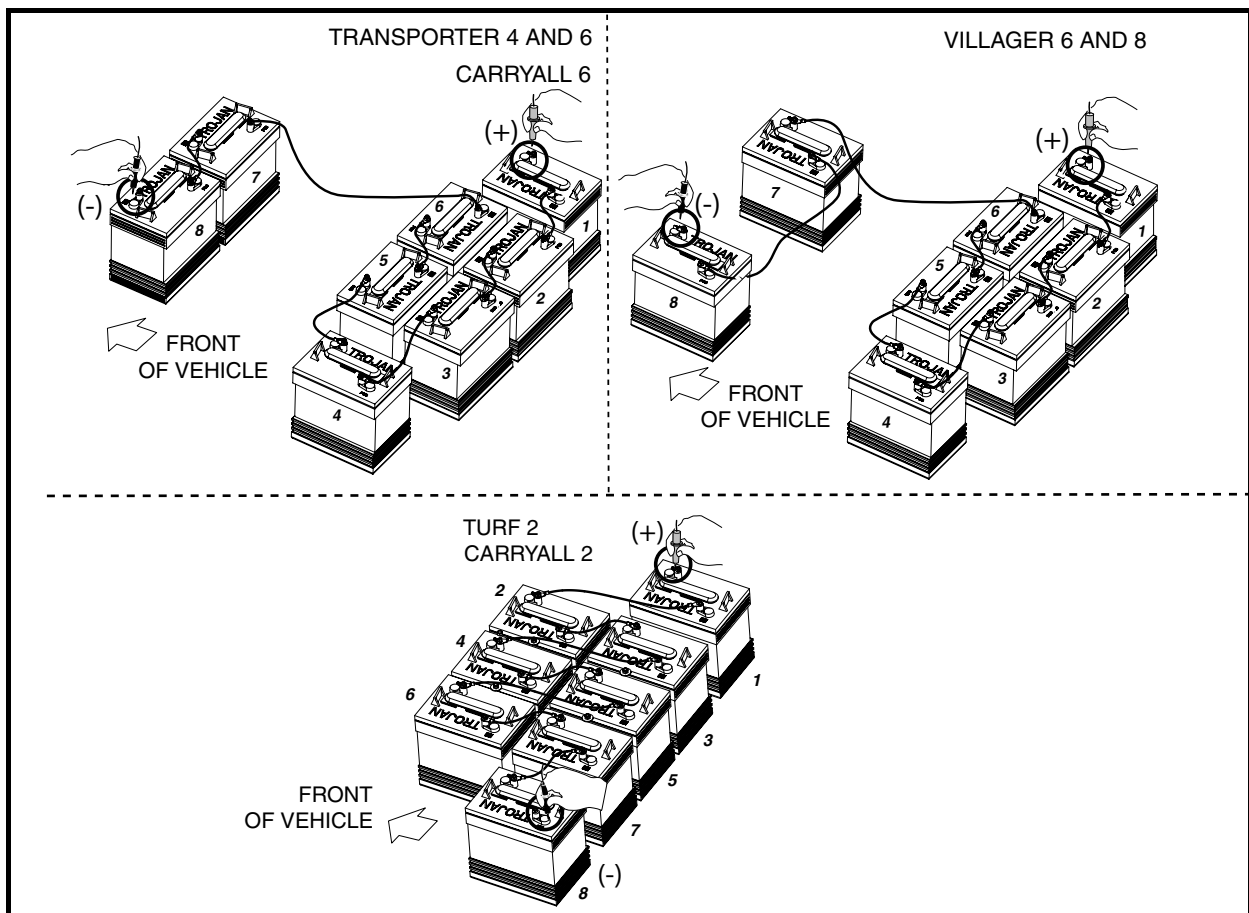


Figure 11-7 IQ Plus Battery Configurations

TEST PROCEDURE 2 – ONBOARD COMPUTER SOLENOID LOCKOUT CIRCUIT

See General Warning, Section 10, Page 10-1.

The solenoid lockout circuit disables the vehicle when the battery charger is plugged into the vehicle. Use the following procedure to test the solenoid lockout circuit:

1. With batteries connected, place the Tow/Run switch in the RUN position.
2. Set a multimeter to 200 volts DC. Place black (–) probe on battery no. 8 negative post and red (+) probe (with insulation-piercing probe) on the blue onboard computer wire (1) at a point between the OBC and the six-pin connector (**Figure 11-8**). The reading should be approximately 40-43 volts. If the reading is not 40-43 volts, proceed to step 4. If the reading is 40-43 volts, proceed to Test Procedure 3 – Solenoid Activating Coil on page 11-17.
3. On the other side of the six-pin connector, the blue onboard computer wire (1) changes to a light blue 18-gauge wire. Place insulation-piercing probe on the light blue 18-gauge wire at a point between OBC six-pin connector and main wire harness. If reading is not 40-43 volts, check the wire terminal connectors inside the six-pin connector. Make sure pins are properly aligned inside housing. Make sure wire colors match and are connected to the correct terminals.
4. Place insulation-piercing probe on the light blue 18-gauge wire (2) at a point between speed controller 24-pin connector and main wire harness (**Figure 11-9**). If reading is not 40-43 volts, check the wire terminal connectors inside the 24-pin connector or for possible broken wires. Make sure pins are properly aligned inside housing. Make sure wire colors match and are connected to the correct terminals.
5. If reading is zero volts, plug the charger DC cord into the vehicle charger receptacle. If the dash light illuminates for 10 seconds, the OBC is now powered-up. Unplug the DC cord; the reading at the OBC blue wire should be approximately 40-43 volts. If the vehicle now operates normally, the DC cord has powered up the electrical system. The electrical system should also power-up when the accelerator pedal is pressed. To check the accelerator pedal function, **see Test Procedure 4 – MCOR Voltage on page 11-18**.
6. If the dash light illuminates for 3 seconds and the vehicle does not operate, proceed to Test Procedure 4 – MCOR Voltage on page 11-18.
7. If the dash light does not illuminate and the vehicle does not operate, check the OBC activation circuit.
 - 7.1. Set a multimeter to 200 volts DC. Place the black (–) probe on the battery no. 8 negative post and place the red (+) probe (with insulation-piercing probe) on the red 18-gauge wire located on the OBC side of the six-pin connector. The reading should be approximately 48 volts. If the reading is incorrect, test the continuity from the pink wire on the solenoid to the red pin on the OBC harness.
 - 7.2. Set a multimeter to 200 volts DC. Place the black (–) probe on the battery no. 8 negative post and place the red (+) probe (with insulation-piercing probe) on the blue 18-gauge wire (harness side of six-pin connector). Multimeter should indicate 40-43 volts. If voltage is not correct, check connections in the six-pin connector. If connections are correct, OBC activation circuit has failed. Replace OBC.

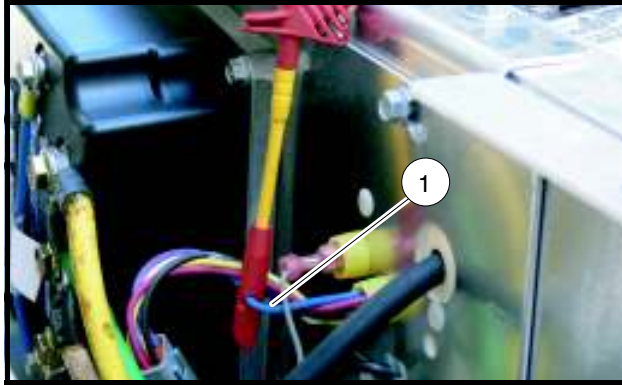


Figure 11-8 Test Blue OBC Wire (+)

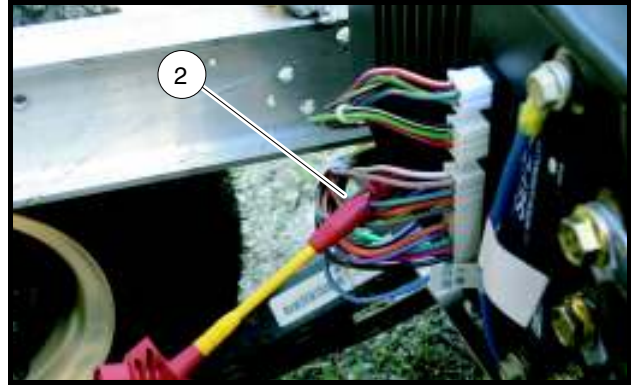


Figure 11-9 Test Light Blue 18-Gauge Wire at 24-pin Connector (+)

TEST PROCEDURE 3 – SOLENOID ACTIVATING COIL

See General Warning, Section 10, Page 10-1.

1. Disconnect the battery cables as instructed. See **WARNING** “To avoid unintentionally starting...” in **General Warning, Section 10, Page 10-1**.
2. Remove the two small wire terminals from the solenoid. See following **NOTE**.
3. Place red (+) probe of the multimeter on the positive (+) solenoid terminal. Place the black (–) probe on the other small solenoid terminal. A reading of 180 to 190 ohms should be obtained (**Figure 11-10**). If not, replace the solenoid.
4. If a failed diode was removed, replacement of the diode is not necessary because a diode that serves the same function is located within the speed controller.

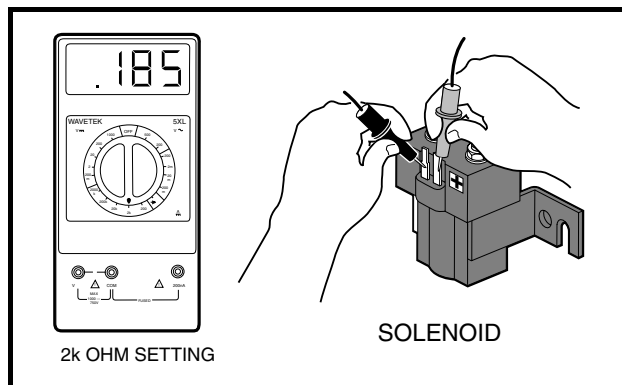


Figure 11-10 Activating Coil Test

TEST PROCEDURE 4 – MCOR VOLTAGE

See General Warning, Section 10, Page 10-1.

The accelerator position, which is proportional to the MCOR voltage, can be displayed with the IQDM handset. If an IQDM handset is not available, proceed to MCOR Voltage Test without the IQDM Handset on page 11-18.

MCOR Voltage Test with the IQDM Handset

1. Place chocks at the front wheels and lift the rear of the vehicle with a chain hoist or floor jack. Position jack stands under the frame crossmember between the spring mount and side stringer, just forward of each rear wheel. **See WARNING “Lift only one end...” in General Warning, Section 10, Page 10-1. See following NOTE.**

NOTE: The key switch should be placed in the OFF position and left in the OFF position for the duration of this test.

2. Connect the IQDM to the vehicle. **See Plugging the Handset into the Vehicle, Section 12, Page 12-1.**
3. Access the Monitor menu and select THROTTLE % by using the SCROLL DISPLAY buttons.
4. The IQDM should indicate 0 % with the pedal not pressed. While monitoring the IQDM display screen, slowly press the accelerator pedal. As the pedal is pressed, the IQDM should indicate a rise from 0 % (pedal not pressed) to 100 % (pedal fully pressed).
5. If the MCOR does not operate as described in step 4, proceed to **MCOR Voltage Test without the IQDM Handset on page 11-18.**

MCOR Voltage Test without the IQDM Handset

1. Place chocks at the front wheels and lift the rear of the vehicle with a chain hoist or floor jack. Position jack stands under the frame crossmember between the spring mount and side stringer, just forward of each rear wheel. **See WARNING “Lift only one end...” in General Warning, Section 10, Page 10-1. See following NOTE.**

NOTE: The key switch should be placed in the OFF position and left in the OFF position for the duration of this test.

2. With the batteries connected, place Tow/Run switch in RUN. Using a multimeter set to 200 volts DC, place red (+) probe on battery no. 1 positive post and place black (–) probe (with insulation-piercing probe) on the purple/white wire (1) at a point close to the three-pin connector at the MCOR (**Figure 11-11**). The reading should be approximately 48-50 volts (full battery voltage).



Figure 11-11 Test MCOR: Purple/White Wire (+)

3. If reading is zero volts, check the purple/white wire continuity from the three-pin connector at the MCOR to the 24-pin connector at the speed controller. Check terminal positions in three-pin connector at the MCOR and the 24-pin connector. If all of the continuity readings are correct and the connectors are wired correctly, replace the speed controller.
4. With multimeter set to 20 volts DC, place the black (–) probe on battery no. 8 negative post and the red (+) probe (with insulation-piercing probe) on the white wire (2) at a point close to the three-pin connector at the MCOR (**Figure 11-12**). The reading should be approximately 4.65 volts.



Figure 11-12 Test MCOR: White Wire (+)

5. If reading is zero volts, check the white wire continuity from the three-pin connector at the MCOR to the 24-pin connector at the speed controller. Check terminal positions in three-pin connector at the MCOR and the 24-pin connector. If all of the continuity readings are correct and the connectors are wired correctly, replace the speed controller.
6. With multimeter set to 20 volts DC, place the black (–) probe on battery no. 8 negative post and the red (+) probe (with insulation-piercing probe) on the yellow wire (3) at a point close to three-pin connector at the MCOR (**Figure 11-13**). The reading should be approximately 0.32 volts with the pedal up. Slowly press the accelerator pedal and note the readings on the multimeter. As the pedal is pressed, the reading should increase until it reaches 4.65 volts when the pedal is fully pressed.

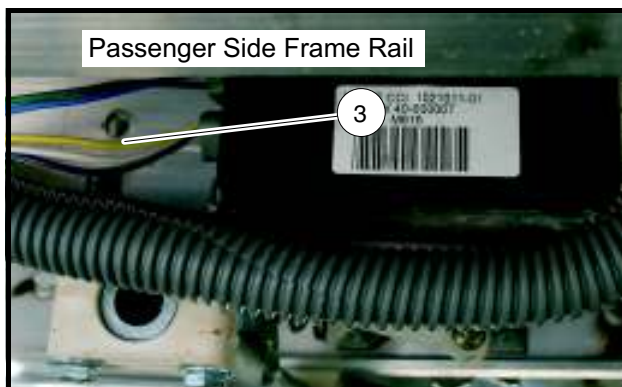


Figure 11-13 Test MCOR: Yellow Wire (+)

7. If reading does not increase as the pedal is pressed, replace the MCOR.
8. If the reading is not approximately 4.60 volts with the pedal fully pressed, the vehicle will not operate at rated top speed. Check the MCOR resistance.
 - 8.1. Disconnect the battery cables as instructed. **See WARNING “To avoid unintentionally start-**

ing...” in General Warning, Section 10, Page 10-1.

- 8.2. Disconnect the 24-pin connector at the speed controller.
- 8.3. Set a multimeter to 20k ohms. Connect the red (+) probe of the multimeter to the yellow wire at the MCOR three-pin connector with an insulation piercing probe. Connect black (-) probe to the purple/white wire with an insulation-piercing probe.
- 8.4. With the accelerator pedal fully up (not pressed), the multimeter should read approximately 1k ohms.
- 8.5. Slowly press the accelerator pedal while monitoring the multimeter. The resistance should rise as the pedal is pressed. When the pedal is all the way to the floor, the multimeter should indicate between 5.67k ohms and 7.43k ohms.
- 8.6. Using a multimeter set for 20k ohms, connect the red (+) probe of the multimeter to the yellow wire at the MCOR three-pin connector with an insulation piercing probe. Connect black (-) probe to the white wire with an insulation-piercing probe.
- 8.7. With the accelerator pedal fully up (not pressed), the multimeter should indicate between 5.67k ohms and 7.43k ohms.
- 8.8. Slowly press the accelerator pedal while monitoring the multimeter. The resistance should drop as the pedal is pressed. When the pedal is all the way to the floor, the multimeter should indicate approximately 1k ohms.
- 8.9. If the MCOR does not operate as described, replace the MCOR.

TEST PROCEDURE 5 – A1 AND A2 MOTOR VOLTAGE

See General Warning, Section 10, Page 10-1.

1. Place chocks at the front wheels and lift the rear of the vehicle with a chain hoist or floor jack. Position jack stands under the frame crossmember between the spring mount and side stringer, just forward of each rear wheel. **See WARNING “Lift only one end...” in General Warning, Section 10, Page 10-1.**
2. With the batteries connected and using a multimeter set to 200 volts DC, place the black (–) probe on the A2 (1) motor terminal (white wire) and connect the red (+) probe to the A1 (2) motor terminal (green wire) (**Figure 11-14**).
3. With Tow/Run switch in the RUN position, place the Forward/Reverse switch in the FORWARD position, turn key switch to the ON position and slowly press accelerator pedal.
4. As the accelerator pedal is pressed, the voltage reading should increase from approximately 5 volts when the MCOR limit switch closes, to approximately 32-37 volts with the accelerator pedal fully pressed.
 - 4.1. If there is no voltage reading or if there is no increase in voltage as the pedal is pressed, check the MCOR. **See Test Procedure 4 – MCOR Voltage on page 11-18.** Also check the continuity of the large posts of the solenoid. **See Test Procedure 15 – Solenoid Contacts on page 11-41.**
 - 4.2. Disconnect the battery cables as instructed. **See WARNING “To avoid unintentionally starting...” in General Warning, Section 10, Page 10-1.**
 - 4.3. Check continuity on A1 and A2 motor terminal posts and continuity of the F1 and F2 motor terminal posts. Also, check continuity of all motor wires. **See Section 16 – Motor (Model DA5-4006).**

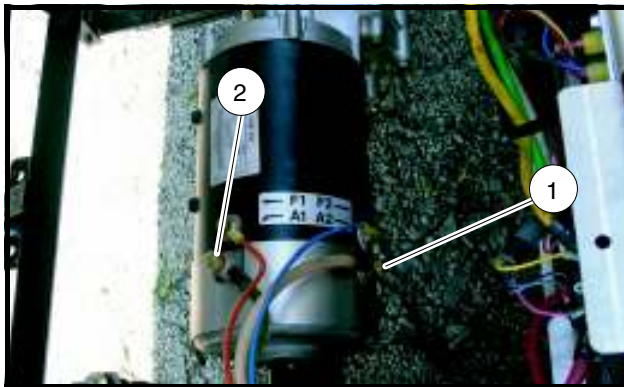


Figure 11-14 Test A1 and A2 Motor Voltage

TEST PROCEDURE 6 – TOW/RUN SWITCH

See General Warning, Section 10, Page 10-1.

Tow/Run Switch Test with the IQDM Handset

1. With the Tow/Run switch in the RUN position, connect the IQDM to the vehicle. **See Plugging the Handset into the Vehicle, Section 12, Page 12-1.**
2. Immediately after the IQDM is connected to the vehicle, the screen should display a copyright notice and the IQDM model number.
3. If the IQDM display screen is blank, drive the vehicle a short distance to activate the onboard computer.
4. If the vehicle will not operate, proceed to Tow/Run Switch Test without the IQDM Handset.
5. If the IQDM display screen begins to work after the vehicle has been driven, turn the key switch to the OFF position and proceed to step 6; otherwise, perform the following procedure, Tow/Run Switch Test without the IQDM Handset.

6. With the IQDM still connected to the vehicle, place the Tow/Run Switch in the TOW position and wait 90 seconds.
7. If the IQDM display screen goes blank, the Tow/Run switch and connecting wires are operating correctly.
8. If the IQDM display screen is still active after 90 seconds, the switch has failed closed. Replace the Tow/Run switch. **See Key Switch Removal, Section 13, Page 13-1.**

Tow/Run Switch Test without the IQDM Handset

1. Set a multimeter to 200 volts DC. With the batteries connected, and the Tow/Run switch in either the TOW or RUN position, connect the black (–) probe to the negative post of battery no. 8 and connect red (+) probe (with insulation-piercing probe) on the pink wire close to the two-pin connector on the Tow/Run switch (**Figure 11-15**).
2. If the reading is 48-50 volts, proceed to Step 3. If the voltage reading is 0 volts, check the continuity of the pink 18-gauge wire from the large post of the solenoid (2) (**Figure 11-16**) to the two-pin connector (3) (**Figure 11-17**) at the Tow/Run switch.

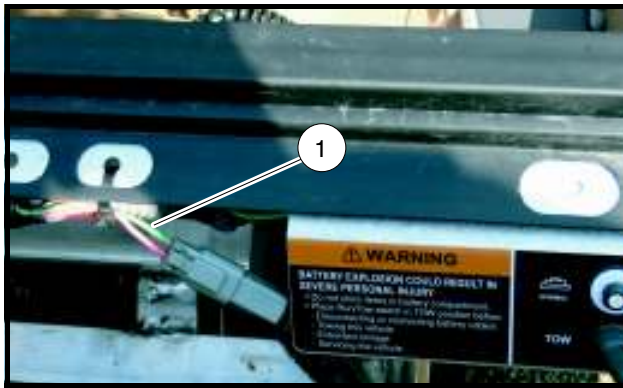


Figure 11-15 Test Tow/Run Switch

3. Set a multimeter to 200 volts DC and with the batteries connected, connect the black (–) probe to the negative post of battery no. 8 and connect red (+) probe (with insulation-piercing probe) on the light green wire (1) close to the two-pin connector on the Tow/Run switch (**Figure 11-15**).
4. With the Tow/Run switch in the RUN position, the reading should be approximately 48-50 volts. With the switch in the TOW position, the reading should be approximately 0 volts.
5. If the two-pin connector and pink wire continuity readings are correct, replace the Tow/Run switch.



Figure 11-16 Test Continuity: Pink Wire on Solenoid Post

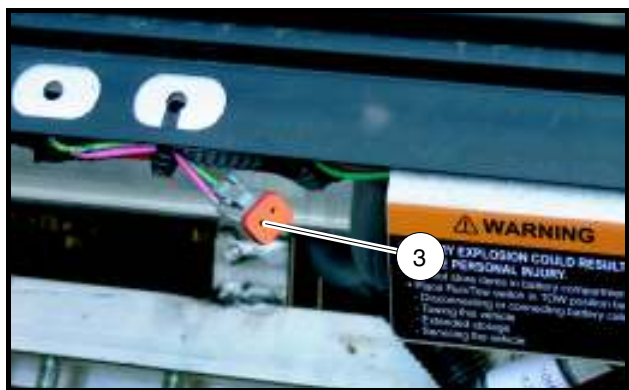


Figure 11-17 Test Continuity: Two-pin Connector

TEST PROCEDURE 7 – CIRCUIT BREAKER

See General Warning, Section 10, Page 10-1.

1. Place the key switch on the OFF position, the Tow/Run switch in the TOW position, and the Forward/Reverse switch in the NEUTRAL position.
2. Set a multimeter on 200 volts DC. With the batteries connected, connect the negative (–) lead to battery no. 8 negative post. With an insulation-piercing probe, connect the positive (+) lead to the tan wire on the back of the circuit breaker.
3. The reading should be 48 volts. If the reading is 0 volts, replace the circuit breaker.

TEST PROCEDURE 8 – BATTERY PACK VOLTAGE (UNDER LOAD)

See General Warning, Section 10, Page 10-1.

1. Before proceeding with this test procedure, the batteries must be connected and fully charged. Connect the positive (+) lead of a 36 to 48-volt battery discharge machine (CCI P/N 101831901), to battery no. 1 positive post and connect the negative (–) lead to battery no. 8 negative post. Record the voltage reading from discharge machine.
2. Turn the discharge machine on and record the voltage reading of battery pack while under load.
3. A fully charged set of batteries in good condition should read between 47-49 volts while under load.
4. A reading of 32-46 volts indicates discharged or failed batteries. Each battery should be checked with a multimeter while under load.
5. A reading of 32 volts or less will not activate discharge machine. If the voltage of the batteries is below 32 volts, the batteries are deeply discharged or have failed.
6. Recording the battery pack voltage reading while under load provides a more accurate diagnosis of the condition of the batteries. When the discharge machine is ON, it places the battery pack under load and many times can help determine if one or more batteries in the set have failed. Testing battery voltage while the batteries are not under load will not always indicate the true condition of the batteries. For more information about the batteries, refer to **Section 14 – Batteries**.

TEST PROCEDURE 9 – KEY SWITCH AND MCOR LIMIT SWITCH CIRCUIT

See General Warning, Section 10, Page 10-1.

Key Switch and MCOR Limit Switch Circuit Test with the IQDM Handset

1. Place chocks at the front wheels and lift the rear of the vehicle with a chain hoist or floor jack. Position jack stands under the frame crossmember between the spring mount and side stringer, just forward of each rear wheel. **See WARNING “Lift only one end...” in General Warning, Section 10, Page 10-1.**
2. Turn the key switch to the OFF position and place the Forward/Reverse switch in the NEUTRAL position.
3. Connect the IQDM to the vehicle. **See Plugging the Handset into the Vehicle, Section 12, Page 12-1.**
4. Test the key switch.
 - 4.1. Access the Monitor menu, and select KEY INPUT by using the SCROLL DISPLAY buttons. The IQDM should indicate OFF when the key switch is in the OFF position.
 - 4.2. While monitoring the IQDM display screen, turn the key switch to the ON position. The IQDM should indicate ON.
 - 4.3. If the IQDM does not indicate that KEY INPUT is ON when the key switch is in the ON position, proceed to the following procedure, Key Switch and MCOR Limit Switch Circuit Test without the IQDM Handset. If the key switch functions as described, proceed to the following step. **See following NOTE.**

NOTE: The key switch *MUST* function properly in order to test the MCOR limit switch with the IQDM handset.

5. Test the MCOR limit switch.
 - 5.1. Select FOOT INPUT on the Monitor menu by using the SCROLL DISPLAY buttons on the IQDM.
 - 5.2. The IQDM should indicate that FOOT INPUT is OFF when the accelerator pedal is not pressed, regardless of the key switch position.
 - 5.3. With the key switch in the ON position, press the accelerator pedal. The IQDM should indicate that FOOT INPUT is ON when the accelerator pedal is pressed.
6. If any reading is obtained that is not described in steps 4 and 5, perform the following steps:
 - 6.1. Check the pedal group for proper adjustment. **See Section 5 – Accelerator and Brake Pedal Group in the appropriate maintenance and service manual.**
 - 6.2. Check the wiring of the key switch and MCOR. **See Wiring Diagrams on page 11-2.**
 - 6.3. Check the continuity of the key switch wires and the MCOR limit switch wires.
7. If the problem was not found, proceed to the following procedure, Key Switch and MCOR Limit Switch Circuit Test without the IQDM Handset on page 11-24.

Key Switch and MCOR Limit Switch Circuit Test without the IQDM Handset

1. Disconnect the battery cables as instructed. **See WARNING “To avoid unintentionally starting...” in General Warning, Section 10, Page 10-1.**
2. Place chocks at the front wheels and lift the rear of the vehicle with a chain hoist or floor jack. Position jack stands under the frame crossmember between the spring mount and side stringer, just forward of each rear wheel. **See WARNING “Lift only one end...” in General Warning, Section 10, Page 10-1**
3. Turn the key switch to the OFF position and place the Forward/Reverse switch in the NEUTRAL position.
4. Test the key switch.
 - 4.1. Remove the center dash panel. **See step 2 of Key Switch Removal, Section 13, Page 13-1.**
 - 4.2. Set a multimeter to 200 ohms. Place the red (+) probe on the key switch terminal with the blue wire. Place the black (–) probe on the key switch terminal with the green wire.
 - 4.3. With the key switch in the OFF position, the multimeter should indicate that continuity is not present.
 - 4.4. With the key switch in the ON position, the multimeter should indicate that continuity is present.
 - 4.5. If any other reading is obtained, replace the key switch. **See Key Switch Removal, Section 13, Page 13-1.**
 - 4.6. If the key switch operates as described in the previous steps, install the dash panel in the reverse order of removal and proceed to the following step.
5. Test the MCOR limit switch. **See following NOTE.**

NOTE: Make sure that the key switch is operating correctly and that the key switch and dash panel are properly installed before proceeding.

- 5.1. With batteries connected and using a multimeter set to 200 volts DC, place the black (–) probe on the battery no. 8 negative post and place the red (+) probe (with insulation-piercing probe) on the green wire close to the two-pin connector on the MCOR.
- 5.2. With Tow/Run switch in the RUN position, key switch in the ON position, and Forward/Reverse rocker switch in the NEUTRAL position, the voltage reading should be zero volts. When the accelerator pedal is pressed, the voltage reading should be approximately 48 volts (full battery voltage).
- 5.3. If the voltage reading is 48 volts when the accelerator pedal is not pressed, check the pedal group

for proper adjustment. **See Section 5 – Accelerator and Brake Pedal Group in the appropriate maintenance and service manual.**

- 5.4. If the voltage reading is zero volts when the accelerator pedal is pressed, check the key switch circuit using the following test procedures.
 - 5.4.1. Set a multimeter to 200 volts DC. Place black (–) probe on battery no. 8 negative post and the place red (+) probe (with insulation-piercing probe) on the blue wire where it connects to the MCOR. With the key switch ON, the reading should be approximately 48 volts (full battery voltage).
 - 5.4.2. If the reading is zero volts, check the continuity of the blue wire that goes from the key switch to the MCOR.
 - 5.4.3. If the reading is approximately 48 volts, proceed to the following step.
 - 5.4.4. Set a multimeter to 200 volts DC. Place the black (–) probe on the battery no. 8 negative post and place the red (+) probe (with insulation-piercing probe) on the green wire where it connects to the MCOR. With the Tow/Run switch in the RUN position, the key switch ON, the Forward/Reverse rocker switch in NEUTRAL and the accelerator pedal pressed, the reading should be approximately 48 volts (full battery voltage).
 - 5.4.5. If the reading is zero volts, test the continuity of the MCOR limit switch. If the limit switch does not pass the continuity test, replace the MCOR. **See MCOR Removal, Section 13, Page 13-6.**

TEST PROCEDURE 10 – 24-PIN CONNECTOR

See General Warning, Section 10, Page 10-1.

1. Disconnect the battery cables as instructed. **See WARNING “To avoid unintentionally starting...” in General Warning, Section 10, Page 10-1.**
2. Disconnect the 24-pin connector from the speed controller. Inspect terminal ends inside plug to ensure they are in position and seated in plug housing. If any terminals look like they are not pushed all the way into the connector, gently push the terminals until they are firmly seated in the 24-pin connector. After each terminal has been pushed into the housing, gently pull on the wire to ensure it is locked into place.
3. Check wires in the plug to make sure none are broken at the terminal pin crimp. Repair or replace as required.
4. Check the wire colors of each wire and make sure that the colors for each pin position match the wire colors in the wiring diagram. **See Wiring Diagrams beginning on page 11-2.**
5. When connecting the 24-pin connector to the controller, push plug into controller receptacle with enough force to lock plug into place. An audible click will be heard when plug is properly seated to the controller.

A procedure is provided for testing each of the wires in the 24-pin connector. Refer to the following chart for the appropriate procedure for each pin in the 24-pin connector.

If the results of any of the referenced procedures are different from those described in the procedure, check the continuity of the wires in the wire harness and test the connected components with the appropriate test procedures. **See Index of Test Procedures on page 11-14.**

SPEED CONTROLLER 24-PIN CONNECTOR WIRE	TEST PROCEDURE
Pin 1 – Tan (18-gauge)	Test Procedure 10F – Pin 1 on page 11-33
Pin 2 – Light Blue (18-gauge)	Test Procedure 2 – Onboard Computer Solenoid Lockout Circuit on page 11-16
Pin 3 – Orange (18-gauge)	Test Procedure 10H – Pin 3 on page 11-35
Pin 4 – Grey (18-gauge)	Test Continuity of wire
Pin 5 – Open (no wire)	Test Procedure 10B – Pin 2 on page 11-28
Pin 6 – Open (no wire)	Test Procedure 10C – Pin 8 on page 11-30
Pin 7 – Open (no wire)	Test Procedure 10D – Pin 19 on page 11-31
Pin 8 – Green (18-gauge)	Test Procedure 10C – Pin 8 on page 11-30
Pin 9 – Pink (18-gauge)	Test continuity of wire
Pin 10 – Brown (18-gauge)	Test Procedure 10E – Pins 10 and 11 on page 11-32
Pin 11 – Blue (18-gauge)	
Pin 12 – Open (no wire)	Test Procedure 10G – Pin 17 on page 11-35
Pin 13 – White (18-gauge)	Test continuity of each wire and perform Test Procedure 10A – Pins 13, 14, and 15 on page 11-26
Pin 14 – Purple/White (18-gauge)	
Pin 15 – Yellow (18-gauge)	
Pin 16 – Open (no wire)	
Pin 17 – Blue/White (18-gauge)	Test Procedure 10G – Pin 17 on page 11-35
Pin 18 – Open (no wire)	
Pin 19 – Orange/White (18-gauge)	Test Procedure 10D – Pin 19 on page 11-31
Pin 20 – Purple (18-gauge)	Test Procedure 10I – Pin 20 (Smart-Key Switch Only) on page 11-35
Pin 21 – Open (no wire)	
Pin 22 – Open (no wire)	
Pin 23 – Green/White (18-gauge)	Test Procedure 10J – Pin 23 on page 11-36
Pin 24 – Open (no wire)	

Test Procedure 10A – Pins 13, 14, and 15

See General Warning, Section 10, Page 10-1.

Pins 13, 14, and 15 in the 24-pin connector provide a connection point from the MCOR potentiometer to the speed controller.

1. Disconnect the battery cables as instructed. **See WARNING “To avoid unintentionally starting...” in General Warning, Section 10, Page 10-1.**
2. Place chocks at the front wheels and lift the rear of the vehicle with a chain hoist or floor jack. Position jack stands under the frame crossmember between the spring mount and side stringer, just forward of each rear wheel. **See WARNING “Lift only one end...” in General Warning, Section 10, Page 10-1.**
3. Disconnect the 24-pin connector at the speed controller.
4. Set a multimeter to 20k ohms. Insert the red (+) probe of the multimeter into pin 15 (yellow wire) of the 24-pin connector. **See following CAUTION.** Insert the black (–) probe into pin 14 (purple/white wire) of the 24-pin connector (**Figure 11-13, Page 11-19**).

CAUTION

- Do not fully insert probes into the 24-pin plug. Doing so can result in a poor connection.
5. With the accelerator pedal fully up (not pressed), the multimeter should read approximately 1k ohms.
 6. Slowly press the accelerator pedal while monitoring the multimeter. The resistance should rise as the pedal is pressed. When the pedal is all the way to the floor, the multimeter should indicate between 5.67k ohms and 7.43k ohms.
 7. Set a multimeter to 20k ohms. Insert the red (+) probe of the multimeter into pin 15 (yellow wire) at the 24-pin connector. Connect the black (-) probe into pin 13 (white wire). **See previous CAUTION.**
 8. With the accelerator pedal fully up (not pressed), the multimeter should indicate between 5.67k ohms and 7.43k ohms.
 9. Slowly press the accelerator pedal while monitoring the multimeter. The resistance should drop as the pedal is pressed. When the pedal is all the way to the floor, the multimeter should indicate approximately 1k ohms.
 10. If any other reading is observed, check the continuity of the wires in the wire harness.

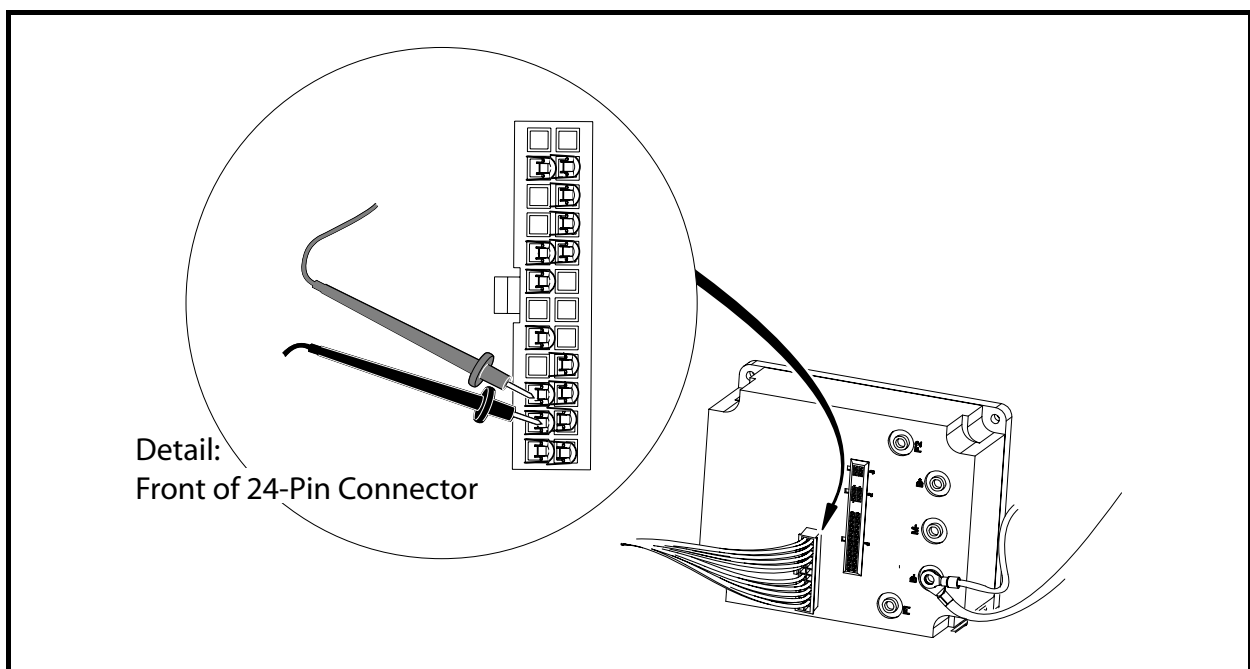


Figure 11-18 Test: Pins 14 and 15 (Purple/White and Yellow wires)

Test Procedure 10B – Pin 2

See General Warning, Section 10, Page 10-1.

Pin 2 in the 24-pin connector provides a connection point for the solenoid lockout circuit from the onboard computer to the speed controller.

1. Disconnect the battery cables as instructed. **See WARNING “To avoid unintentionally starting...” in General Warning, Section 10, Page 10-1.**
2. Place chocks at the front wheels and lift the rear of the vehicle with a chain hoist or floor jack. Position jack stands under the frame crossmember between the spring mount and side stringer, just forward of each rear wheel. **See WARNING “Lift only one end...” in General Warning, Section 10, Page 10-1.**
3. Disconnect the 24-pin connector at the speed controller.
4. Set a multimeter to 200 volts DC. Insert the red (+) probe of the multimeter into pin 2 (light blue wire) of the 24-pin connector. **See following CAUTION.** Using an alligator clip, connect the black (–) probe to the B– terminal of the speed controller (**Figure 11-19, Page 11-29**).

CAUTION

- **Do not fully insert probes into the 24-pin plug. Doing so can result in a poor connection.**
5. Place the Tow/Run switch in the TOW position and connect the battery cables, positive (+) cable first. Tighten battery terminals to 110 in-lb (12.4 N·m).
 6. Place the Tow/Run switch in the RUN position.
 7. The multimeter should indicate zero volts DC at this time.
 8. While monitoring the multimeter, plug the battery charger into the vehicle charger receptacle.
 9. After a short delay, the onboard computer should power-up (come out of sleep mode), charger relay should click, and the ammeter on the charger should indicate that the vehicle batteries are being charged.
 10. The multimeter should indicate zero volts DC while the charger is connected to the vehicle.
 11. While observing the multimeter, disconnect the DC plug from the vehicle charger receptacle.
 12. The multimeter should indicate full battery voltage when the charger is not connected to the vehicle.
 13. If any other reading is obtained, check the following items:
 - Continuity of the wires in the wire harness
 - Onboard computer for proper operation. **See Test Procedure 12 – Onboard Computer Gray Wire and Fuse on page 11-37.**
 - Tow/Run switch for proper operation. **See Test Procedure 6 – Tow/Run Switch on page 11-21.**

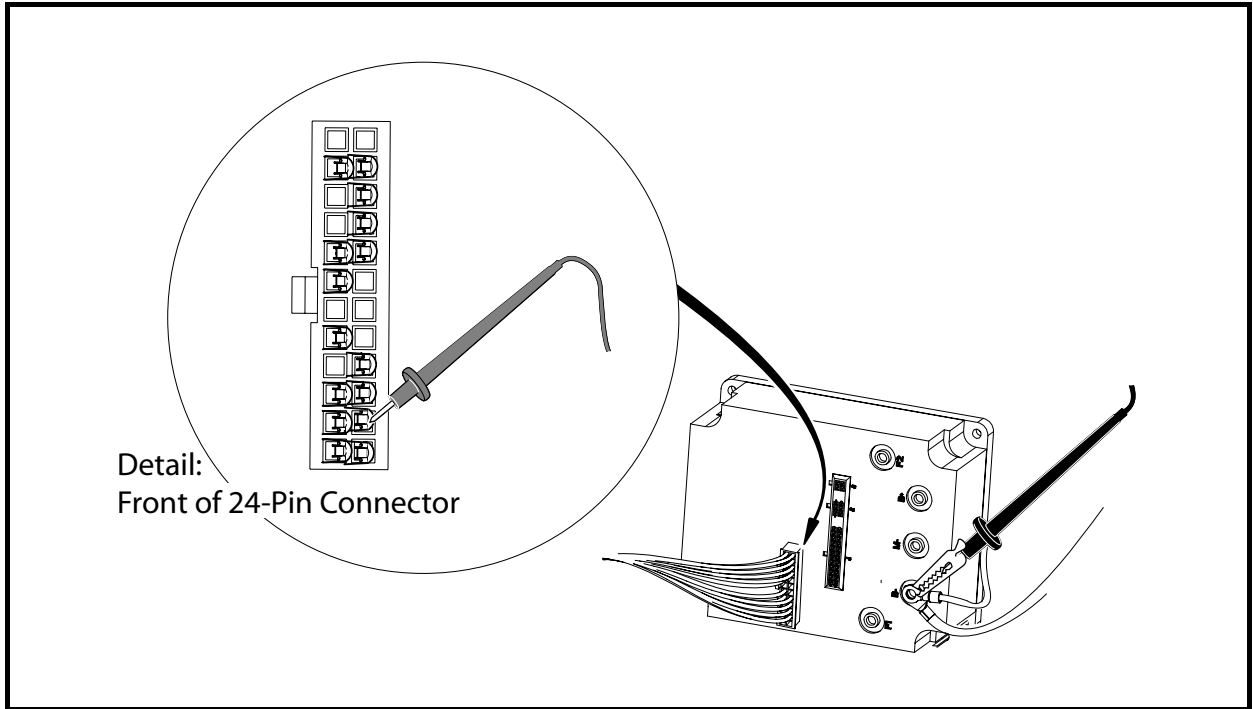


Figure 11-19 Test: Pin 2 (Light Blue Wire)

Test Procedure 10C – Pin 8

See General Warning, Section 10, Page 10-1.

Pin 8 in the 24-pin connector provides a connection point for the MCOR limit switch to the speed controller.

1. Disconnect the battery cables as instructed. See **WARNING “To avoid unintentionally starting...”** in **General Warning, Section 10, Page 10-1.**
2. Place chocks at the front wheels and lift the rear of the vehicle with a chain hoist or floor jack. Position jack stands under the frame crossmember between the spring mount and side stringer, just forward of each rear wheel. See **WARNING “Lift only one end...”** in **General Warning, Section 10, Page 10-1**
3. Disconnect the 24-pin connector at the speed controller.
4. Set a multimeter to 200 volts DC, insert the red (+) probe of the multimeter into pin 8 (green wire) of the 24-pin connector. See following **CAUTION.** Using an alligator clip, connect the black (-) probe to the B-terminal of the speed controller (**Figure 11-20, Page 11-30**).

CAUTION

- Do not fully insert probes into the 24-pin plug. Doing so can result in a poor connection.

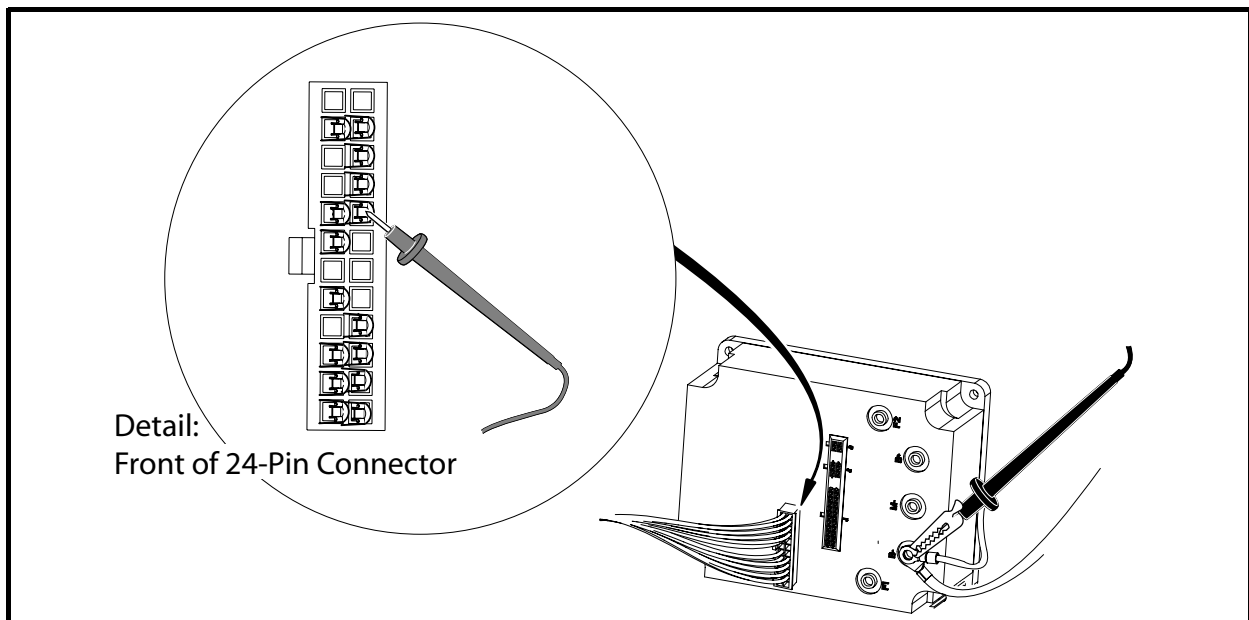


Figure 11-20 Test: Pin 8 (Green Wire)

5. Place the Tow/Run switch in the TOW position and connect the battery cables, positive (+) cable first. Tighten battery terminals to 110 in-lb (12.4 N·m).
6. Place the Tow/Run switch in the RUN position, key switch in the ON position, and Forward/Reverse switch in the FORWARD or NEUTRAL position.
7. The multimeter should indicate zero volts DC at this time.
8. While monitoring the multimeter, slowly press the accelerator pedal and hold the pedal at approximately 20% of full travel.
9. After a short delay, the onboard computer should power-up (come out of sleep mode).
10. The multimeter should indicate full battery voltage (approximately 48 volts) when the accelerator pedal is pressed.

11. While observing the multimeter, release the accelerator pedal.
12. The multimeter should indicate zero volts when the accelerator pedal is not pressed.
13. If any other reading is obtained, check the following items:
 - Continuity of the wires in the wire harness
 - Onboard computer for proper operation. **See Test Procedure 12 – Onboard Computer Gray Wire and Fuse on page 11-37.**
 - Tow/Run switch for proper operation. **See Test Procedure 6 – Tow/Run Switch on page 11-21.**
 - Key switch and MCOR limit switch for proper operation. **See Test Procedure 9 – Key Switch and MCOR Limit Switch Circuit on page 11-23.**
 - Ensure that the pedal group is adjusted correctly. **See Section 5 – Accelerator and Brake Pedal Group in the appropriate maintenance and service manual.**

Test Procedure 10D – Pin 19

See General Warning, Section 10, Page 10-1.

Pin 19 in the 24-pin connector provides a connection point for the reverse buzzer to the speed controller.

1. Disconnect the battery cables as instructed. **See WARNING “To avoid unintentionally starting...” in General Warning, Section 10, Page 10-1.**
2. Place chocks at the front wheels and lift the rear of the vehicle with a chain hoist or floor jack. Position jack stands under the frame crossmember between the spring mount and side stringer, just forward of each rear wheel. **See WARNING “Lift only one end...” in General Warning, Section 10, Page 10-1.**
3. Disconnect the 24-pin connector at the speed controller.
4. Place a jumper wire with an alligator clip between the B– terminal of the speed controller (use alligator clip for this connection) and pin 19 (orange/white wire) of the 24-pin connector (**Figure 11-21, Page 11-32**). **See following CAUTION.**

CAUTION

- **Do not fully insert probes into the 24-pin plug. Doing so can result in a poor connection.**
5. Place the Tow/Run switch in the TOW position and connect the battery cables, positive (+) cable first. Tighten battery terminals to 110 in-lb (12.4 N·m).
 6. Place the Tow/Run switch in the RUN position.
 7. The reverse buzzer should sound when the Tow/Run switch is in the RUN position.
 8. If any other activity is observed, check the following items:
 - Continuity of the wires in the wire harness
 - Reverse buzzer for proper operation. **See Test Procedure 17 – Reverse Buzzer on page 11-42.**
 - Tow/Run switch for proper operation. **See Test Procedure 6 – Tow/Run Switch on page 11-21.**

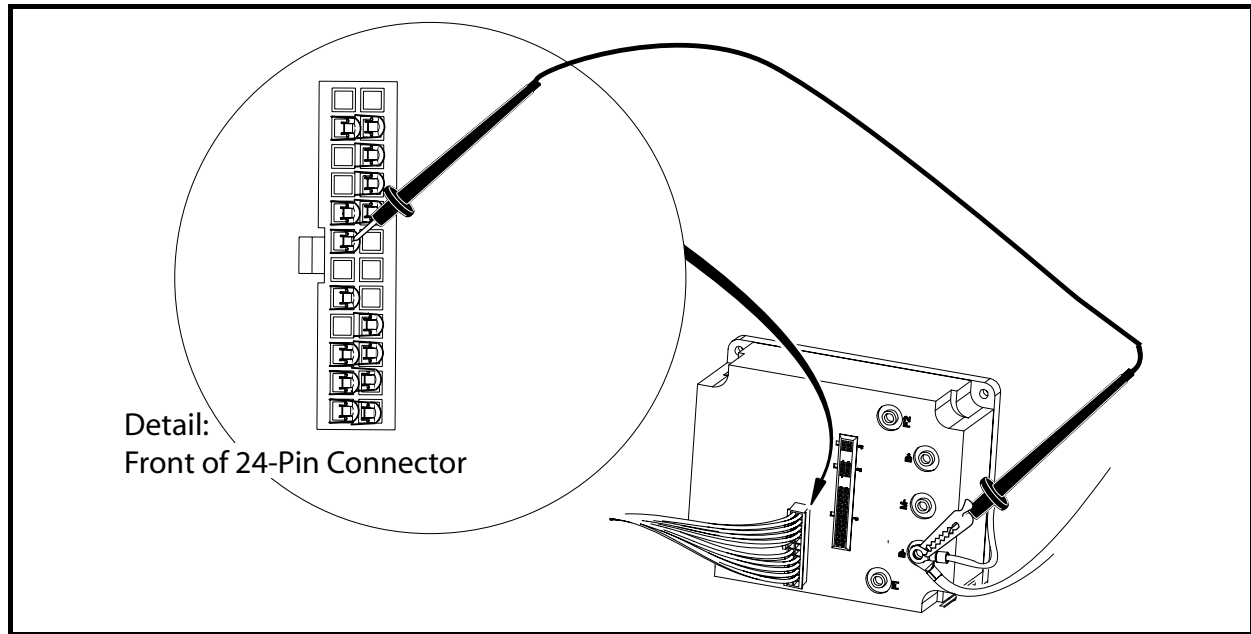


Figure 11-21 Test: Pin 19 (Orange/White Wire)

Test Procedure 10E – Pins 10 and 11

See General Warning, Section 10, Page 10-1.

Pins 10 and 11 in the 24-pin connector provide a connection point for the Forward/Reverse rocker switch to the speed controller. The switch provides a +48 volt signal to the speed controller through pin 10 when the Forward/Reverse switch is in the FORWARD position and provides a +48 volt signal on pin 11 when the Forward/Reverse switch is in the REVERSE position.

1. Disconnect the battery cables as instructed. **See WARNING “To avoid unintentionally starting...” in General Warning, Section 10, Page 10-1.**
2. Place chocks at the front wheels and lift the rear of the vehicle with a chain hoist or floor jack. Position jack stands under the frame crossmember between the spring mount and side stringer, just forward of each rear wheel. **See WARNING “Lift only one end...” in General Warning, Section 10, Page 10-1.**
3. Disconnect the 24-pin connector at the speed controller.
4. Set a multimeter to 200 volts DC, insert the red (+) probe of the multimeter into pin 10 (brown wire) of the 24-pin connector. **See following CAUTION.** Using an alligator clip, connect the black (–) probe to the B–terminal of the speed controller (**Figure 11-22, Page 11-33**).

CAUTION

- **Do not fully insert probes into the 24-pin plug. Doing so can result in a poor connection.**
5. Place the Tow/Run switch in the TOW position and connect the battery cables, positive (+) cable first. Tighten battery terminals to 110 in-lb (12.4 N·m).
 6. Place the Tow/Run switch in the RUN position and the Forward/Reverse switch in the NEUTRAL position. The multimeter should indicate zero volts DC at this time.
 7. While monitoring the multimeter, place the Forward/Reverse switch in the REVERSE position. The multimeter should still indicate zero volts.

Test Procedure 10E – Pins 10 and 11, Continued:

8. Place the Forward/Reverse switch in the FORWARD position. The multimeter should indicate full battery voltage (approximately 48 volts).
9. Insert the red (+) probe of the multimeter into pin 11 (blue wire) of the 24-pin connector. Leave the black (–) probe (alligator clip) connected to the B– terminal of the speed controller. **See previous CAUTION.**
10. Place the Forward/Reverse switch in the NEUTRAL position. The multimeter should indicate zero volts DC at this time.
11. While monitoring the multimeter, place the Forward/Reverse switch in the FORWARD position. The multimeter should still indicate zero volts.
12. Place the Forward/Reverse switch in the REVERSE position. The multimeter should indicate full battery voltage (approximately 48 volts).
13. If any other reading is obtained, check the following items:
 - Continuity of the wires in the wire harness
 - Forward/Reverse switch for proper operation. **See Test Procedure 16 – Forward/Reverse Rocker Switch on page 11-41.**
 - Tow/Run switch for proper operation. **See Test Procedure 6 – Tow/Run Switch on page 11-21.**

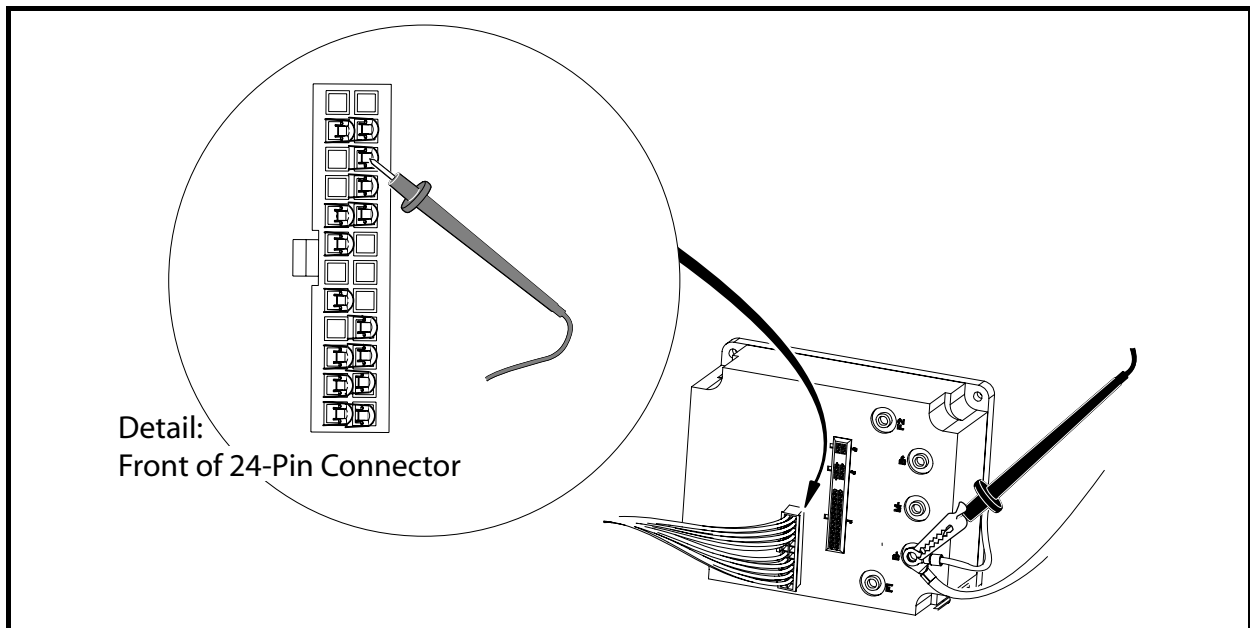


Figure 11-22 Test: Pin 10 (Black Wires)

Test Procedure 10F – Pin 1**See General Warning, Section 10, Page 10-1.**

Pin 1 in the 24-pin connector provides a connection point for the key switch to the speed controller. The key switch provides a +48 volt signal to the speed controller through pin 1 (tan wire) when the key switch is in the ON position.

1. Disconnect the battery cables as instructed. **See WARNING “To avoid unintentionally starting...” in General Warning, Section 10, Page 10-1.**

2. Place chocks at the front wheels and lift the rear of the vehicle with a chain hoist or floor jack. Position jack stands under the frame crossmember between the spring mount and side stringer, just forward of each rear wheel. **See WARNING “Lift only one end...” in General Warning, Section 10, Page 10-1.**
3. Disconnect the 24-pin connector at the speed controller.
4. With a multimeter set for 200 volts DC, insert the red (+) probe of the multimeter into pin 1 (tan wire) of the 24-pin connector. **See following CAUTION.** With an alligator clip, connect the black (-) probe to the B- terminal of the speed controller (**Figure 11-23, Page 11-34**).

CAUTION

- Do not fully insert probes into the 24-pin plug. Doing so can result in a poor connection.

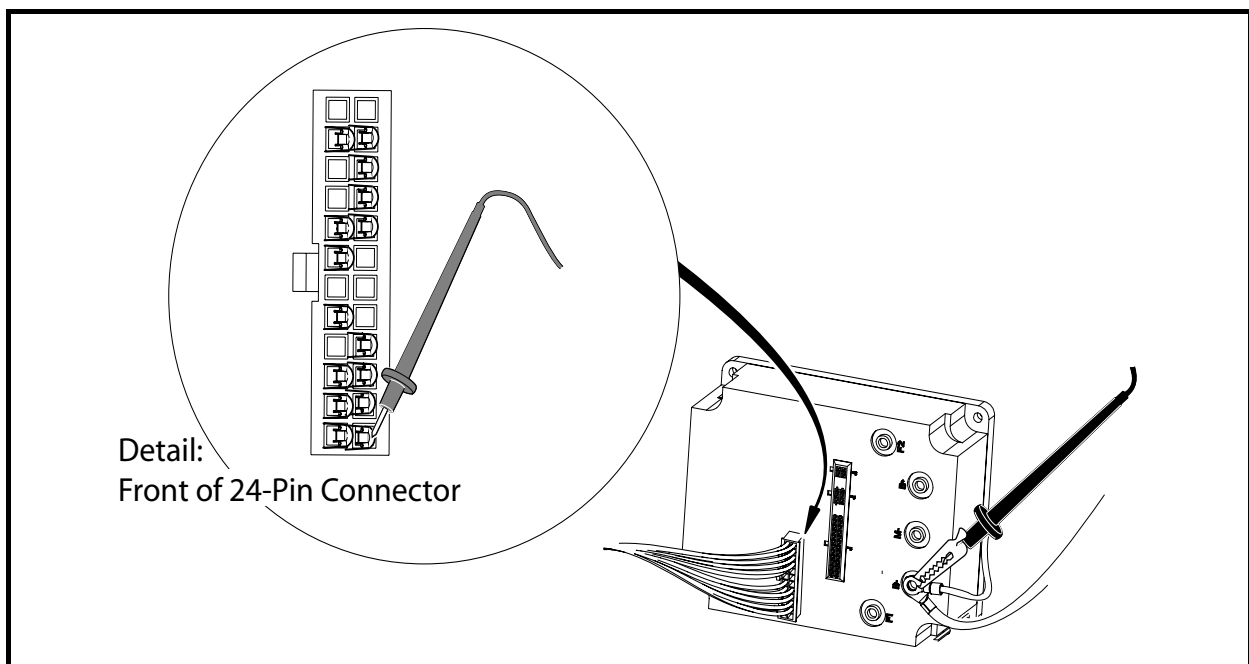


Figure 11-23 Test: Pin 1 (Tan Wire)

5. Place the Tow/Run switch in the TOW position and connect the battery cables, positive (+) cable first. Tighten battery terminals to 110 in-lb (12.4 N·m).
6. With the Tow/Run switch in the TOW position, the multimeter should indicate zero volts.
7. Place the Tow/Run switch in the RUN position and the key switch in the ON position.
8. With the key switch in the ON position, the multimeter should indicate full battery voltage (approximately 48 volts). With the key switch in the OFF position, the reading should be zero volts.
9. If any other reading is obtained, check the following items:
 - Continuity of the wires in the wire harness
 - Tow/Run switch for proper operation. **See Test Procedure 6 – Tow/Run Switch on page 11-21.**
 - Key switch for proper operation. **See Test Procedure 9 – Key Switch and MCOR Limit Switch Circuit on page 11-23.**

Test Procedure 10G – Pin 17

See General Warning, Section 10, Page 10-1.

Pin 17 in the 24-pin connector provides a connection point for the solenoid coil to the speed controller. The speed controller activates the solenoid coil by providing a ground to the solenoid coil at the appropriate time.

1. Place chocks at the front wheels and lift the rear of the vehicle with a chain hoist or floor jack. Position jack stands under the frame crossmember between the spring mount and side stringer, just forward of each rear wheel. **See WARNING “Lift only one end...” in General Warning, Section 10, Page 10-1.**
2. Set a multimeter to 200 volts DC. Use an alligator clip to connect the red (+) probe to the positive terminal on battery no. 1. With an insulation-piercing probe, connect the black (–) probe to the blue/white wire attached to pin 17 of the 24-pin connector.
3. Place the Tow/Run switch in the RUN position, the Forward/Reverse switch in the FORWARD position, and the key switch in the ON position.
4. With the accelerator pedal pressed, the multimeter should read 48 volts DC. With the pedal up, the multimeter should read 0 volts DC.
5. If the voltage reading is less than 40 with the accelerator pedal pressed, replace the controller.
6. If any other activity is observed, check the following items:
 - Continuity of the wires in the wire harness.
 - Reverse buzzer for proper operation. **See Test Procedure 17 – Reverse Buzzer on page 11-42.**
 - Tow/Run switch for proper operation. **See Test Procedure 6 – Tow/Run Switch on page 11-21.**
 - Key switch for proper operation. **See Test Procedure 9 – Key Switch and MCOR Limit Switch Circuit on page 11-23.**
 - Solenoid for proper operation. **See Test Procedure 15 – Solenoid Contacts on page 11-41.**

Test Procedure 10H – Pin 3

Voltage is supplied to Pin 3 through the walk away braking circuit breaker:

1. Disconnect the 24-pin connector at the speed controller.
2. With a multimeter set for 200 volts DC, insert the red (+) probe of the multimeter into pin 3 (orange wire) of the 24-pin connector. **See following CAUTION.** With an alligator clip, connect the black (–) probe to the negative terminal of battery # 8.

CAUTION

- **Do not fully insert probes into the 24-pin plug. Doing so can result in a poor connection.**

3. The reading should be 48 volts. If the reading is zero volts, replace the circuit breaker.

Test Procedure 10I – Pin 20 (Smart-Key Switch Only)

Voltage is supplied to Pin 20 when it is in the Mode position.

1. With a multimeter set for 200 volts DC, insert the red (+) probe of the multimeter into pin 20 (purple wire) of the 24-pin connector. **See following CAUTION.** With an alligator clip, connect the black (–) probe to the negative terminal of battery # 8.
2. The reading should be 48 volts. If the reading is zero volts, check the purple wire continuity from the key switch to the 24 pin connector. If there is no continuity, replace the keyswitch.

Test Procedure 10J – Pin 23

1. Place the Tow/Run switch in the RUN position, the Forward/Reverse switch in the NEUTRAL position, and the key switch in the OFF position.
2. Set the multimeter for 200 volts DC. With an alligator clip, connect the red (+) probe of the multimeter to the positive terminal of battery # 1. With an insulation-piercing probe, connect the black (–) probe to the green/white wire at Pin 23.
3. Push the car to activate walk away braking. When braking activates and reverse buzzer sounds, the reading should be 48 volts.
4. If the reading is zero volts, check the continuity of the green/white wire. If the continuity is good, replace the speed controller.

TEST PROCEDURE 11 – ONBOARD COMPUTER SILICON-CONTROLLED RECTIFIER (SCR) CIRCUIT

See General Warning, Section 10, Page 10-1.

The silicon controlled rectifier (SCR), located inside the onboard computer, acts as a switch on the negative side of the circuit.

This allows the onboard computer (OBC) to control the battery charging current.

Use the following procedure to test the SCR:

1. With batteries connected and a multimeter set to 200 volts DC, place the red (+) probe on the positive post of battery no. 1 and place the black (–) probe on the charger receptacle fuse terminal that has the black 10-gauge OBC wire attached to it. The reading should be approximately 36-42 volts.
2. If the reading is zero volts, check the black 10-gauge wire connections at the controller and receptacle. Check the continuity of the black 10-gauge wires. If the wires and connections are okay, the SCR has failed. Replace the OBC. If the reading is correct, proceed to the following step.
3. Plug in AC and DC cords. When the battery charger relay clicks on, reading should be approximately 48 volts (full battery voltage). If the reading does not rise from approximately 40 volts to full battery voltage when the DC cord is plugged in and the relay clicks on, check the following items:
 - Charger receptacle fuse and black wire terminal socket in the charger receptacle.
 - Onboard computer gray wire and fuse. See Test Procedure 12 – Onboard Computer Gray Wire and Fuse on page 11-37.
 - Red wire at the charger receptacle. See Test Procedure 13 – Voltage at Charger Receptacle Red Wire Socket on page 11-37.

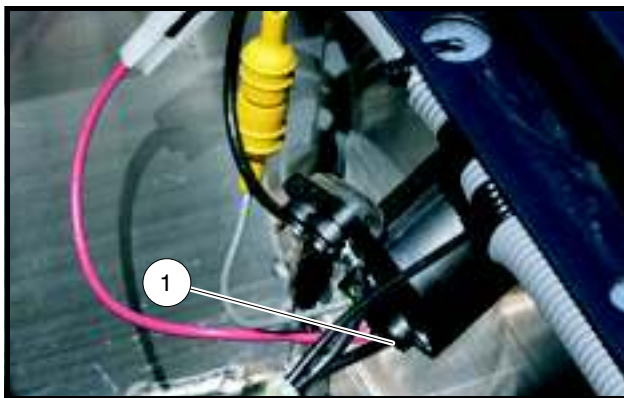


Figure 11-24 Test 11: OBC Silicon-Controlled Rectifier Circuit

TEST PROCEDURE 12 – ONBOARD COMPUTER GRAY WIRE AND FUSE

See General Warning, Section 10, Page 10-1.

1. With batteries connected and a multimeter set to 200 volts DC, connect the red (+) probe to the positive post of battery no. 1 and black (–) probe (with insulation-piercing probe) to gray 16-gauge wire at a point between fuse and receptacle (1). Reading should be approximately 40-45 volts. If reading is zero volts, check gray wire fuse and fuse holder for continuity.
2. If the reading in step 1 is 48 volts, plug the DC cord into the vehicle's charger receptacle. The voltage reading should drop to approximately less than 5 volts before the charger relay clicks on.
3. When the charger relay is activated, the reading should rise to approximately 48 volts.
4. If voltage does not drop to less than 5 volts when the DC cord is plugged in and then rise to approximately 48 volts when the charger relay clicks on, the gray wire circuit in the OBC has failed. Replace the OBC.

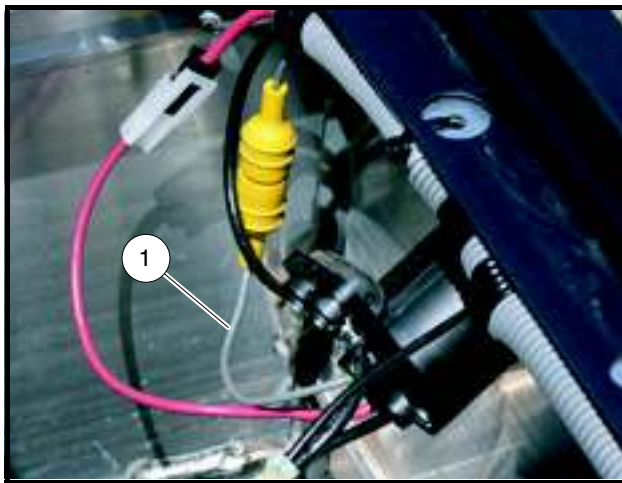


Figure 11-25 Test 12: OBC Grey Wire - External Charger

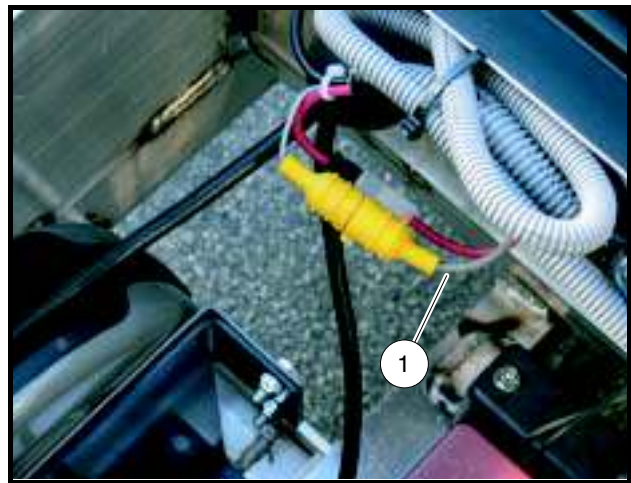


Figure 11-26 Test 12: OBC Grey Wire - Onboard Charger

TEST PROCEDURE 13 – VOLTAGE AT CHARGER RECEPTACLE RED WIRE SOCKET

See General Warning, Section 10, Page 10-1.

(This procedure will determine if the 10-gauge red wire used to charge the batteries has continuity.)

1. With batteries connected and a multimeter set to 200 volts DC, place the black (–) probe on the negative post of battery no. 8 and place the red (+) probe on the charger receptacle socket connected to the red 10-gauge wire. The reading should be 48-50 volts (full battery voltage).
2. If the reading is zero volts, check the continuity of the 10-gauge red wire from the positive post of battery no. 1 to the receptacle socket.

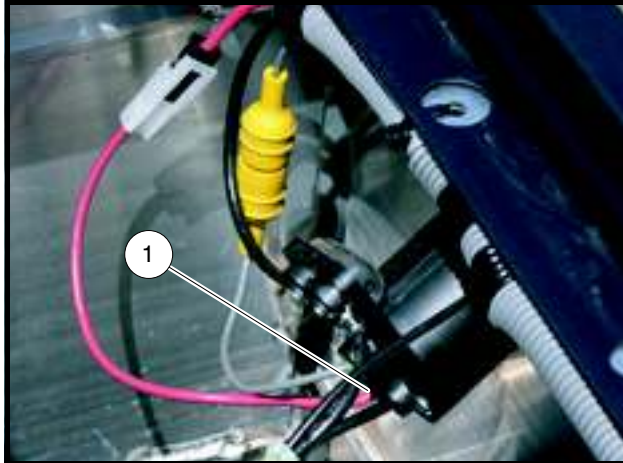


Figure 11-27 Test 12: Charger Receptacle Red Wire

TEST PROCEDURE 14 – MOTOR SPEED SENSOR

See General Warning, Section 10, Page 10-1.

Motor Speed Sensor Test with the IQDM Handset

⚠ CAUTION

- Perform the following procedure only on a level surface. To avoid injury or property damage, ensure that the path of the vehicle is clear before pushing vehicle.

1. Turn the key switch to the OFF position and place the Forward/Reverse switch in the NEUTRAL position.
2. Connect the IQDM to the vehicle. See **Plugging the Handset into the Vehicle, Section 12, Page 12-1.**
3. Access the Monitor menu and select SPEED PULSES by using the SCROLL DISPLAY buttons. The IQDM should indicate OFF when the vehicle is at rest.
4. While monitoring the IQDM display screen, slowly push the vehicle a short distance (about 3 feet (1 meter)). The IQDM should indicate ON for speed sensor pulses while the wheels are in motion.
5. If the IQDM does not indicate ON while the wheels are in motion, proceed to the following procedure, Motor Speed Sensor Test without the IQDM Handset.

Motor Speed Sensor Test without the IQDM Handset

1. Turn the key switch to the OFF position and place the Forward/Reverse switch in the NEUTRAL position.
2. With batteries connected, disconnect the three-pin connector at the motor speed sensor.
3. Check voltage at black/white wire:
 - 3.1. Set a multimeter to 200 volts DC. Place the red (+) probe on the battery no. 1 positive post and place the black (–) probe on the black/white wire terminal socket in the three-pin connector. The voltage reading should be 48 to 50 volts (full battery voltage).
 - 3.2. If the reading is zero volts, check the continuity of the black/white wire from the 24-pin connector at the speed controller to the three-pin connector at the motor speed sensor. If the continuity is correct, replace the speed controller.

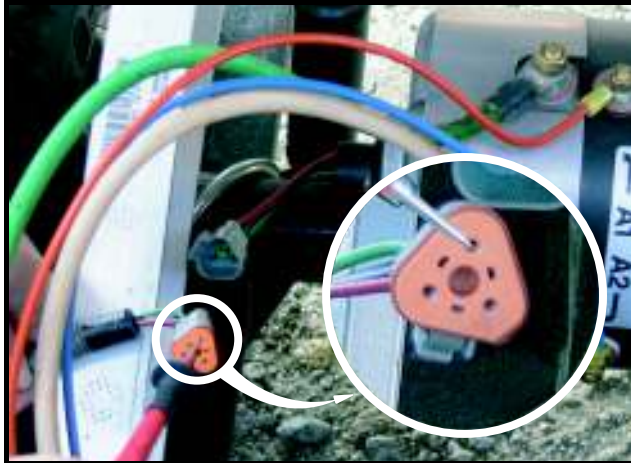


Figure 11-28 Test 13: Speed Sensor Black/White Wire

4. Check voltage at the red motor speed sensor wire:
 - 4.1. With Tow/Run switch in the RUN position and using a multimeter set to 20 volts DC, place the black (–) probe on the battery no. 8 negative post and place red (+) probe on red wire terminal socket in three-pin connector. The voltage reading should be approximately 15-16 volts.
 - 4.2. If the voltage reading is zero volts, check the continuity of the red wire from the 24-pin connector at the speed controller to the three-pin connector at the motor speed sensor. If the wire continuity is correct, replace the speed controller.
 - 4.3. If the reading is below 14 volts, replace the speed controller.
 - 4.4. If the voltage reading is correct, proceed to the following step.

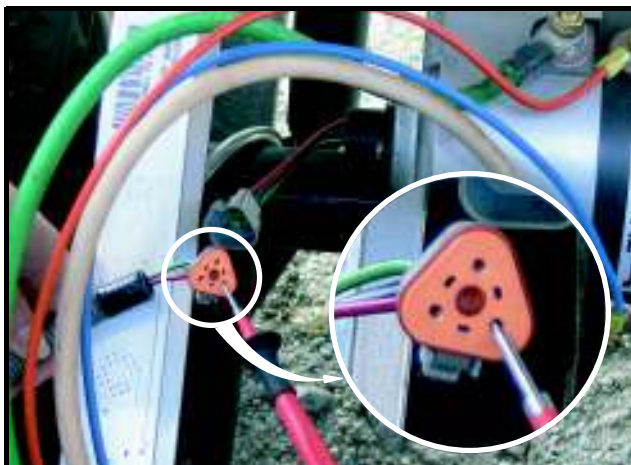


Figure 11-29 Test 13: Speed Sensor Red Wire

5. Check voltage at the light green wire:
 - 5.1. Set a multimeter to 20 volts DC. Place the black (–) probe on the battery no. 8 negative post and place the red (+) probe on the light green wire female terminal in the three-pin connector at the motor speed sensor. The voltage reading should be from 4.60 to 5.00 volts.
 - 5.2. If the voltage is zero volts, check the continuity of the light green wire from the 24-pin connector at the speed controller to the three-pin connector at the motor speed sensor. If the continuity is correct, replace the speed controller.
 - 5.3. If reading is below 3.50 volts, check the continuity of the wires and plug and replace the speed con-

troller if necessary.

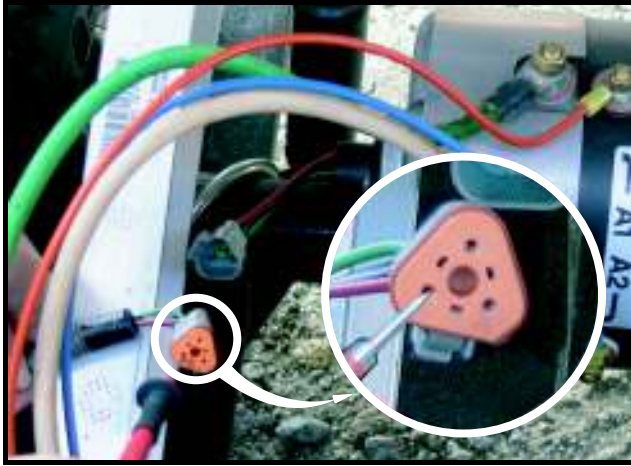


Figure 11-30 Test 13: Speed Sensor Light Green Wire

6. Reconnect the three-pin connector at the motor speed sensor. Using a multimeter set to 20 volts DC, place the black (–) probe on the battery no. 8 negative post and place the red (+) probe (with insulation-piercing probe) on the green wire between the three-pin connector and the motor speed sensor.



Figure 11-31 Test 13: Speed Sensor Green Wire

- 6.1. Raise one rear wheel off ground. Slowly turn the rear wheel to rotate the motor armature. As the armature rotates, the voltage reading should alternate from zero to approximately 4.85 volts. The voltage reading will fluctuate from zero to 4.85 volts and back to zero four times for each revolution of the motor armature. **See following NOTE.**

NOTE: The voltage reading of 4.85 is an approximate reading. The actual reading may vary from 4.50 to 5.00 volts.

- 6.2. Replace the speed sensor if
 - there is no voltage reading.
 - the voltage reading is not above 3.50.
 - the voltage reading does not fluctuate as the motor is turned.

TEST PROCEDURE 15 – SOLENOID CONTACTS

See **General Warning, Section 10, Page 10-1.**

1. Place chocks at the front wheels and lift the rear of the vehicle with a chain hoist or floor jack. Position jack stands under the frame crossmember between the spring mount and side stringer, just forward of each rear wheel. **See WARNING “Lift only one end...” in General Warning, Section 10, Page 10-1.**
2. Turn the key switch to the ON position and place the Forward/Reverse switch in the FORWARD position.
3. Set a multimeter to 200 volts. Place the black (–) probe on the battery no. 8 negative post and place the red (+) probe on the large post with the 6-gauge yellow wire.
4. With the pedal up, the reading should be 9.5 to 10.5 volts. If the voltage is higher, let the car sit for 5-10 minutes to allow the capacitors to discharge to 9.5 to 10.5 volts.
5. Press the accelerator pedal. The voltage should read 48-50 volts with the pedal pressed. If the voltage does not increase or goes to 0 volts with the pedal pressed, replace the solenoid.

TEST PROCEDURE 16 – FORWARD/REVERSE ROCKER SWITCH

See **General Warning, Section 10, Page 10-1.**

Forward/Reverse Rocker Switch Test with the IQDM Handset

1. Turn the key switch to the OFF position and place the Forward/Reverse switch in the NEUTRAL position.
2. Connect the IQDM to the vehicle. **See Plugging the Handset into the Vehicle, Section 12, Page 12-1.**
3. Test FORWARD INPUT.
 - 3.1. Access the Monitor menu and select FORWARD INPUT by using the SCROLL DISPLAY buttons. The IQDM should indicate OFF when the Forward/Reverse switch is in the NEUTRAL or REVERSE position.
 - 3.2. Place the Forward/Reverse switch in the FORWARD position. The IQDM should indicate that FORWARD INPUT is ON. If the IQDM indicates any other reading, check vehicle wiring. **See Wiring Diagrams beginning on page 11-2.** Also check the 24-pin connector at the speed controller. **See Test Procedure 10 – 24-Pin Connector on page 11-25.**
4. Test REVERSE INPUT.
 - 4.1. Access the Monitor menu and select REVERSE INPUT by using the SCROLL DISPLAY buttons. The IQDM should indicate OFF when the Forward/Reverse switch is in the NEUTRAL or FORWARD position.
 - 4.2. Place the Forward/Reverse switch in the REVERSE position. The IQDM should indicate that REVERSE INPUT is ON. If the IQDM indicates any other reading, check vehicle wiring. **See Wiring Diagrams on page 11-2.** Also check the 24-pin connector at the speed controller. **See Test Procedure 10 – 24-Pin Connector on page 11-25.**
5. If the IQDM displays readings other than those described above and the wiring is found to be correct, proceed to the following procedure, Forward/Reverse Rocker Switch Test without the IQDM Handset.

Forward/Reverse Rocker Switch Test without the IQDM Handset

1. Disconnect the battery cables as instructed. **See WARNING “To avoid unintentionally starting...” in General Warning, Section 10, Page 10-1.**
2. Remove the center dash panel.
 - 2.1. Remove the plastic cap covering the mounting screw on each side of the center dash panel.
 - 2.2. Loosen, but do not remove, the screw on each side of the center dash panel.

- 2.3. Insert screwdriver at the top center of the dash between dash and cowl brace. Gently pry center dash out slightly from under edge of cowl brace.
- 2.4. Pull center dash out from the frame and disconnect the wires from the electrical components mounted on the dash panel. Do not allow wires to touch. **See following NOTE.**

NOTE: Take care to prevent key switch terminals and wires from touching the metal frame around the dash.

- 2.5. Slide the dash panel up the steering column by snapping the top out and then rotating the panel out and up.
3. Disconnect the three wires from the rocker switch. Set multimeter to 200 ohms, place the black (–) probe on the brown wire terminal 3 position on the rocker switch, and place the red (+) probe on the orange wire terminal 2 position. With the switch in NEUTRAL or REVERSE, there should be no continuity. With the switch in FORWARD, there should be continuity. If the readings are incorrect, replace the switch.
4. Place the black (–) probe on the blue wire terminal 1 position on the rocker switch and place the red (+) probe on the orange wire terminal. With the switch in REVERSE, there should be continuity. If the readings are incorrect, replace the switch.

TEST PROCEDURE 17 – REVERSE BUZZER

See General Warning, Section 10, Page 10-1.

1. Disconnect the battery cables as instructed. **See WARNING “To avoid unintentionally starting...” in General Warning, Section 10, Page 10-1.**
2. Remove the center dash panel.
 - 2.1. Remove the plastic cap covering the mounting screw on each side of the center dash panel.
 - 2.2. Loosen, but do not remove, the screw on each side of the center dash panel.
 - 2.3. Insert screwdriver at the top center of the dash between dash and cowl brace. Gently pry center dash out slightly from under edge of cowl brace.
 - 2.4. Pull center dash out from the frame and disconnect the wires from the electrical components mounted on the dash panel. Do not allow wires to touch. **See following NOTE.**

NOTE: Take care to prevent key switch terminals and wires from touching the metal frame around the dash.

- 2.5. Slide the dash panel up the steering column by snapping the top out and then rotating the panel out and up.
- 2.6. Disconnect the orange/white and red wires from the reverse buzzer. Make sure the wire terminals on the key switch do not touch vehicle frame.
3. Place the Tow/Run switch in the TOW position and connect the battery cables, positive (+) cable first. Tighten battery terminals to 110 in-lb (12.4 N·m).
4. Place the Tow/Run switch in the RUN position.
5. Set a multimeter to 200 volts DC. Place the black (–) probe on battery no. 8 negative post and place the red (+) probe on the red wire terminal end that was disconnected from the reverse buzzer. The reading should be approximately 48 volts (full battery voltage).
 - 5.1. If the voltage reading is correct, proceed to step 6.
 - 5.2. If reading is zero volts, check red wire continuity and Tow/Run switch. **See Test Procedure 2 – Onboard Computer Solenoid Lockout Circuit on page 11-16. See also Test Procedure 6 – Tow/Run Switch on page 11-21.**
 - 5.3. If the continuity readings are not correct, repair or replace the red wire.
 - 5.4. If the continuity readings are correct, proceed to step 6.

6. Place the Forward/Reverse switch in REVERSE. Using a multimeter set to 200 volts DC, place the black (–) probe on the orange/white wire terminal end (that was disconnected from the reverse buzzer) and place the red (+) probe on battery no. 1 positive post. The reading should be approximately 48 volts (full battery voltage).
 - 6.1. If the voltage reading is correct, replace the reverse buzzer.
 - 6.2. If reading is zero volts, check orange/white wire continuity and connection at Pin 19 in 24-Pin connector.
 - 6.3. If there is no continuity in the orange/white wire, or the Pin 19 terminal in the 24-Pin connector is not properly seated, repair or replace as required.
 - 6.4. If the orange/white wire continuity and 24-Pin connector are correct and there is no voltage at the orange wire, replace the controller.

TEST PROCEDURE 18 – REBOOTING THE ONBOARD COMPUTER

See General Warning, Section 10, Page 10-1.

It is possible the Onboard Computer (OBC) can become “locked up,” causing the OBC solenoid lockout circuit to malfunction. If this condition is suspected, restart the computer as follows:

1. Disconnect the battery cables as instructed. **See WARNING “To avoid unintentionally starting...” in General Warning, Section 10, Page 10-1. See following NOTE.**
2. With the Tow/Run switch in the TOW position, connect the battery cables, positive (+) cable first. Tighten battery terminals to 110 in-lb (12.4 N·m) and coat terminals with Battery Terminal Protector Spray (CCI P/N 1014305) to minimize corrosion.
3. Place Tow/Run switch in the RUN position.
4. Test drive the vehicle. If the problem has been fixed, the vehicle will function normally. If the problem still exists, refer to Wiring Diagrams beginning on page 11-2.

TEST PROCEDURE 19 – BATTERY WARNING LIGHT

See General Warning, Section 10, Page 10-1.

1. Reboot the OBC and drive the vehicle a short distance. When vehicle is first driven, the battery warning light should illuminate for 2-3 seconds. **See Test Procedure 18 – Rebooting the Onboard Computer on page 11-43.** If the battery warning light does not illuminate when rebooting the OBC, proceed to step 2.
2. Turn key switch OFF, place Tow/Run switch in TOW and place Forward/Reverse rocker switch in NEUTRAL.
3. Disconnect the six-pin connector at the OBC.
4. Remove the wedge lock from the six-pin connector housing that is connected to the vehicle wire harness. Remove the brown/white wire from the connector plug.
5. Use a jumper wire with an alligator clip at each end and connect one alligator clip to the negative post of battery no. 2 and the other alligator clip to the brown/white wire terminal socket that was removed from the six-pin connector plug.
6. Install the wedge lock in the six-pin connector housing and reconnect the six-pin connector plug. Place the Tow/Run switch in the RUN position and the battery light should illuminate. If the light does not illuminate, replace the battery warning light assembly.

TEST PROCEDURE 20 – WALK AWAY BRAKING RELAY

See General Warning, Section 10, Page 10-1.

Walk Away Braking Relay Test with the IQDM Handset

1. Turn the key switch to the OFF position and place the Forward/Reverse switch in the NEUTRAL position.
2. Connect the IQDM to the vehicle. **See Plugging the Handset into the Vehicle, Section 12, Page 12-1.**
3. Check the FAULTS Menu.
4. If a 15 RELAY DNC or 30 RELAY COIL FAULT is shown in the list, a walk away braking fault has occurred.

Walk Away Braking Relay Test without the IQDM Handset

1. Turn the key switch to the OFF position and place the Forward/Reverse switch in the NEUTRAL position.
2. Slowly push the vehicle a short distance (about 3 feet (1 meter)).
3. You should feel resistance as motor braking is applied. The reverse buzzer will also begin pulsing. If neither of these conditions are present, test the Motor Speed Sensor. **See Test Procedure 14 – Motor Speed Sensor on page 11-38.** If the Motor Speed Sensor is operational, replace the walk away braking relay.