

System	Date of Issue	Type of Service Information
G2V2 & Newer	4/18/17	<input checked="" type="checkbox"/> Troubleshooting <input type="checkbox"/> Procedure

Title: Troubleshoot High Voltage (HV) Isolation Faults

Special Tools or Software Required:

Where Available	Description	Part Number
Odyne Systems, LLC	Yazaki Test Resistor Connector	9XXXX
Odyne Systems, LLC	Raptor-Cal Adapter	90017
Odyne Systems, LLC	Raptor-Cal Software & License	90016

Procedure:

There are three areas to address when troubleshooting high voltage isolation faults. Instructions follow for each of the three areas:

- checking battery packs,
- inspecting high voltage wiring, and
- testing components.

Check Battery Packs

1. Key "ON" and check display for diagnostic codes 233 and 597. Make note of the code(s) displayed.

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2. Follow the steps below to check RESS (Rechargeable Energy Storage System) Batteries.
 - a. KEY "OFF" and wait one minute or until the Hybrid system shuts down.
 - b. Remove the High Voltage cable from the Pack 1 / Pack A (driver's side / street side) pack.
 - c. Note the resistance value that appears on the Yazaki Test Resistor Connector.
 - d. Install Yazaki Test Resistor Connector into Pack 1.
 - e. Seal the harness side of the connector with tape or cover with plastic shipping plug.



Yazaki Test Resistor Connector



Shipping Plug

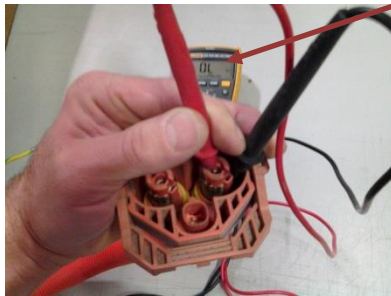
- f. Connect laptop to Odyne Diagnostic Connector and open Raptor-Cal software.
- g. KEY "ON" and check if isolation fault is displayed on the Main tab of the Raptor-Cal screen. It may take a few minutes for faults to display.
- h. Go to the JCI Packs tab and check the Isolation Level.
 - i. If the isolation level on Pack 1 is close to the value printed on the Yazaki Test Resistor Connector, Pack A is GOOD.
 - ii. If the isolation level on Pack 1 is not close to the value printed on the Yazaki Test Resistor, Pack A is BAD. Please contact Odyne Support at 262-953-6723.
- i. Reconnect High Voltage connector to Pack 1 / Pack A.
- j. Remove the High Voltage cable from Pack 2 / Pack B (passenger / curb-side) pack.
- k. Install Yazaki Test Resistor Connector into Pack 2.
- l. Seal the harness side of the connector with tape or cover with plastic shipping plug.
- m. KEY "ON" and check if isolation fault is present. It may take a few minutes for faults to display.
- n. Go to the JCI Packs tab and check the Isolation Level.
 - i. If the Isolation Level on Pack 1 is 1000, Pack 2 is BAD. Contact Odyne Support at 262-953-6723.
 - ii. If the isolation value on Pack 1 is not 1000, Pack 2 is GOOD and the issue is in the High Voltage wiring.

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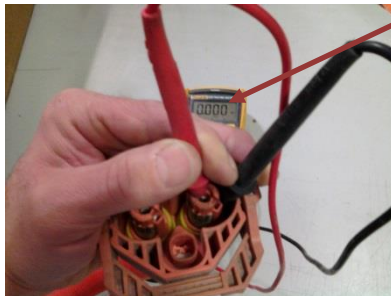


Inspect High Voltage Wiring

1. Key "Off".
2. **Before Starting Procedure: Un-plug both High Voltage connectors from both battery packs.**
3. Using a Multi-meter check continuity for a short on the High voltage lead (center) to the shield wire (outer) of the connector on both positive and negative for Battery Packs A/B of High voltage connector from HVJB.
 - If the continuity test passes open circuit "OL" then the HV battery leads are GOOD.
 - If the continuity test failed $<1M \Omega$ on HV battery leads/connector, then the short is in HV wiring harness.



Open (GOOD)



Shorted to Shield (BAD)

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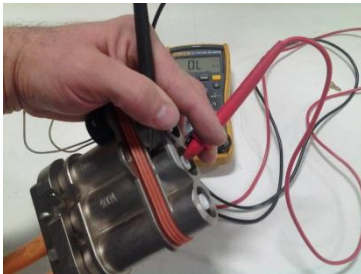
Test Component HV Cables / Lead for A/C Compressor, DC-DC, Exportable Power Inverter, and Current Ways Charger

1. Key "Off".
2. **Before Starting Procedure: Un-plug both High Voltage connectors from both battery packs.**
3. With the multi-meter connected to the shorted side of RESS HV connector (positive or negative leads to shielding), complete the following.
 - a. Locate the A/C control box inside passenger compartment mounted on the back wall or floor.
 - b. Remove the four Philips screws to open A/C control box and disconnect the positive and negative HV wires from the HVJB on control panel.
 - i. If short or continuity is present then reattach power conductors and skip to step C.
 - ii. If short or continuity is not present on the A/C side, short is from the control panel to the A/C compressor.
 - iii. Reconnect Power connectors positive and negative.
 - iv. Disconnect Orange HV A/C harness connector.
 - v. Recheck continuity at RESS HV connector.
 - vi. If continuity is present then failure is in A/C output harness or the A/C controller. Remove the three wires for the A/C output harness from the controller. Then, re-check continuity at RESS HV connector.
 - If continuity is present then failure is in the A/C controller.
 - If continuity is not present then the failure is in the A/C output harness.
 - vii. If continuity is absent then failure is compressor harness.
 - c. Unplug DC-DC HV connector.
 - If short or continuity is present DC-DC is GOOD.
 - If OL or OPEN continuity is not present the DC-DC is BAD or suspect.
 - d. Unplug Exportable Power Inverter.
 - If short or continuity is present Exportable power is GOOD.
 - If OL or Open continuity is not present Exportable power is BAD or suspect.
 - e. Unplug Current Ways Charger.
 - If short or continuity is present Current Ways Charger is GOOD.
 - If OL or Open continuity is not present Current Ways is BAD or suspect.

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4. Check the HVJB HV cable to Phoenix motor inverter and inverter to Remy motor for continuity using the following steps.
 - a. Remove the HV cable from Phoenix Inverter by removing the two M6 Hex head cap screws using a 5mm Hex wrench.
 - b. With the multi-meter connected to the shorted side of the RESS HV connector (positive or negative leads to shielding), unplug the HV connector to Phoenix Motor Inverter (2-wire) from the HVJB. If short or continuity is present Inverter and Motor are GOOD. If not, continue with step c.
 - c. If OL or Open continuity is not present, Phoenix Motor Inverter and Motor are suspect or BAD
 - i. Reattach the HV connector to Phoenix Inverter install two 6m hex cap screws with 5mm hex wrench.
 - ii. Remove the two M6 Hex cap screws using a 5mm Hex wrench for the 3-phase HV 3-wire connector from Motor inverter to the motor, check for continuity. If continuity is present then fault is within Phoenix inverter. If not, continue with step iii.
 - iii. If continuity is not present then the short / faults are within the wiring to the motor or the motor.
 - iv. With the multi-meter check the continuity between the connector body (ground) to the 3-phase HV leads in connector to check each of the phases in the connector.
 - v. If continuity is present. Remove the cover on the junction box for motor connections. Check Inspect wire/cable for damage to outer jacket or shield wire.
 - vi. If necessary check motor to case short isolation fault is within the motor. Contact Odyne Systems LLC for further assistance.



Phoenix Connector from HVJB

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5. Test HVJB internal HV cables/wires using the steps below.
 - a. Remove cover on HVJB. Using 3mm hex wrench remove 14 cover screws and using a 3mm hex wrench remove the lock pin from side of box next to the HVIL (High Voltage Inter-Lock) connector.



High Voltage Junction Box (HVJB)



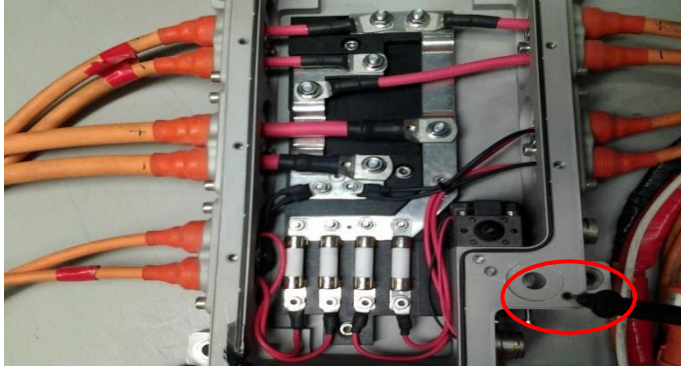
HVJB – Cover Removed

- b. Unplug all HV connectors from the RESS packs 1 and 2, Charger, Exportable Power Inverter, DC-DC, Air Conditioning Controller, and Motor Inverter.

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- c. Connect the multi-meter Black lead to the HVJB box / enclosure.



HVJB – Black Lead Connected

- d. Use the Red lead of the multi-meter to probe the center contact of the positive or negative on RESS 1 HV connector. Determine if short is on the positive or negative side.
- If continuity is present from the Positive or Negative contact on HV connector to ground, remove the 10mm or 3mm hex nut or screw on the positive or negative leads one at a time in HVJB Buss and check each lead for continuity.
 - If continuity is present, short is in the HV cable/wire. Inspect cable/wire for damage.
 - Reattach the 10mm or 3mm Hex nut or screw on the Positive or negative leads of HVJB Buss.
 - Check continuity on the RESS 2 HV connector, Exportable Power Inverter, Charger, DC to DC Inverter and the A/C. Remove and reattach the positive or negative wires on the HVJB Buss, repeating steps i.-ii., until continuity is not present.
 - Once continuity is not present, inspect the wire/cable on the RESS 2 HV connector, Exportable Power Inverter, Charger, DC to DC Inverter and A/C for cuts, damage to insulation exposing the shielding wire and conductor wire.
 - Repair or replace HV conductor.
- e. If continuity is still present contact Odyne Systems LLC.

Odyne Service Support Resources:

To request technical assistance, contact ServiceSupport@Odyne.com.

To request parts, contact Parts@Odyne.com.

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