

 **TOYOTA**
HIGHLANDER

Gasoline-Electric

Hybrid Synergy Drive

HYBRID VEHICLE
DISMANTLING
MANUAL



Revised

MHU48/GVU48 Series

Foreword

This guide was developed to educate and assist dismantlers in the safe handling of Toyota Highlander gasoline-electric hybrid vehicles. Highlander hybrid dismantling procedures are similar to other non-hybrid Toyota vehicles with the exception of the high voltage electrical system. It is important to recognize and understand the high voltage electrical system features and specifications of the Toyota Highlander hybrid, as they may not be familiar to dismantlers.

High voltage electricity powers the A/C compressor, electric motors, generator, and inverter/converter. All other conventional automotive electrical devices such as the headlights, radio, and gauges are powered from a separate 12 Volt auxiliary battery. Numerous safeguards have been designed into the Highlander hybrid to help ensure the high voltage, approximately 288 Volt, Nickel Metal Hydride (NiMH) Hybrid Vehicle (HV) battery pack is kept safe and secure in an accident.

The NiMH HV battery pack contains sealed batteries that are similar to rechargeable batteries used in some battery operated power tools and other consumer products. The electrolyte is absorbed in the cell plates and will not normally leak out even if the battery is cracked. In the unlikely event the electrolyte does leak, it can be easily neutralized with a dilute boric acid solution or vinegar.

High voltage cables, identifiable by orange insulation and connectors, are isolated from the metal chassis of the vehicle.

Additional topics contained in the guide include:

- Toyota Highlander hybrid identification.
- Major hybrid component locations and descriptions.

By following the information in this guide, dismantlers will be able to handle Highlander hybrid-electric vehicles as safely as the dismantling of a conventional non-hybrid automobile.

© 2011 Toyota Motor Corporation

All rights reserved. This book may not be reproduced or copied, in whole or in part, without the written permission of Toyota Motor Corporation.

Table of Contents

<u>About the Highlander Hybrid</u>	<u>1</u>
<u>Highlander Hybrid Identification</u>	<u>2</u>
Exterior	3
<u>Highlander Hybrid Identification (Continued)</u>	<u>5</u>
Interior.....	5
Engine Compartment	6
<u>Hybrid Component Locations & Descriptions</u>	<u>7</u>
Specifications	8
<u>Hybrid Synergy Drive Operation</u>	<u>10</u>
Vehicle Operation.....	10
<u>Hybrid Vehicle (HV) Battery Pack and Auxiliary Battery</u>	<u>11</u>
HV Battery Pack.....	11
Components Powered by the HV Battery Pack.....	11
HV Battery Pack Recycling	12
Auxiliary Battery	12
<u>High Voltage Safety</u>	<u>13</u>
High Voltage Safety System.....	13
Service Plug Grip	14
<u>Precaution to be observed when dismantling the vehicle</u>	<u>15</u>
Necessary Items	15
<u>Spills</u>	<u>16</u>
<u>Dismantling the vehicle</u>	<u>17</u>
<u>Removal of HV battery</u>	<u>21</u>
HV Battery Caution Label	37

About the Highlander Hybrid

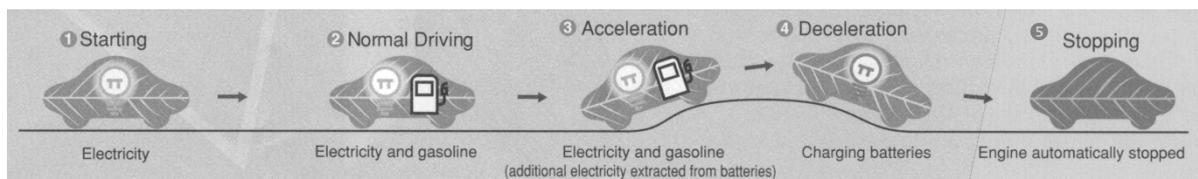
The Highlander hybrid continues into its 2nd generation as a gasoline-electric hybrid vehicle. Hybrid Synergy Drive means that the vehicle contains a gasoline engine and electric motors for power. The two hybrid power sources are stored on board the vehicle:

1. Gasoline stored in the fuel tank for the gasoline engine.
2. Electricity stored in a high voltage Hybrid Vehicle (HV) battery pack for the electric motor.

The result of combining these two power sources is improved fuel economy and reduced emissions. The gasoline engine also powers an electric generator to recharge the battery pack; unlike a pure all electric vehicle, the Highlander hybrid never needs to be recharged from an external electric power source.

Depending on the driving conditions one or both sources are used to power the vehicle. The following illustration demonstrates how the Highlander hybrid operates in various driving modes.

- ❶ During light acceleration at low speeds, the vehicle is powered by the electric motor. The gasoline engine is shut off.
- ❷ During normal driving, the vehicle is powered mainly by the gasoline engine. The gasoline engine also powers the generator to recharge the battery pack.
- ❸ During full acceleration, such as climbing a hill, both the gasoline engine and the electric motor power the vehicle.
- ❹ During deceleration, such as when braking, the vehicle regenerates the kinetic energy from the wheels to produce electricity that recharges the battery pack.
- ❺ While the vehicle is stopped, the gasoline engine and electric motor are off, however the vehicle remains on and operational.



Highlander Hybrid Identification

In appearance, the 2008 model year Highlander hybrid is nearly identical to the conventional, non-hybrid Toyota Highlander. The Highlander hybrid is a 5-door SUV. Exterior, interior, and engine compartment illustrations are provided to assist in identification.

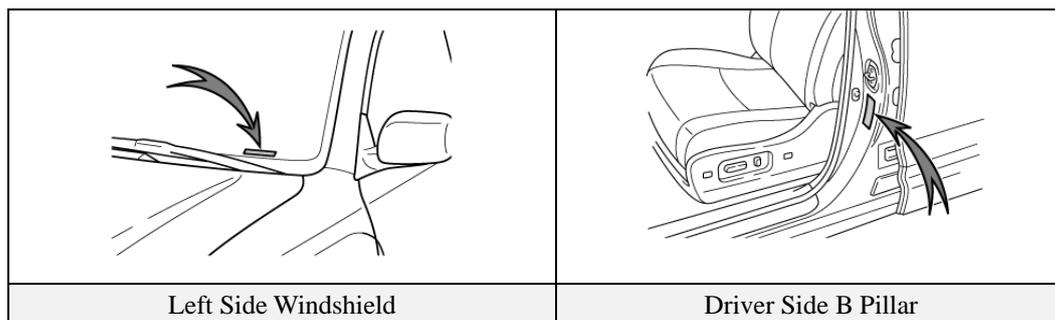
The alphanumeric 17 character Vehicle Identification Number (VIN) is provided in the front windshield cowl, driver door pillar, and engine compartment.

Example VIN: JTEEW41AF82020211 (2008 - 2010 Models)

JTEBC3EHF82020211 (2011 Model)

JTEBD3EHF82020211 (2011 Model)

A Highlander hybrid is identified by the first 6 alphanumeric characters **JTEEW4**, **JTEBC3** or **JTEBD3**.

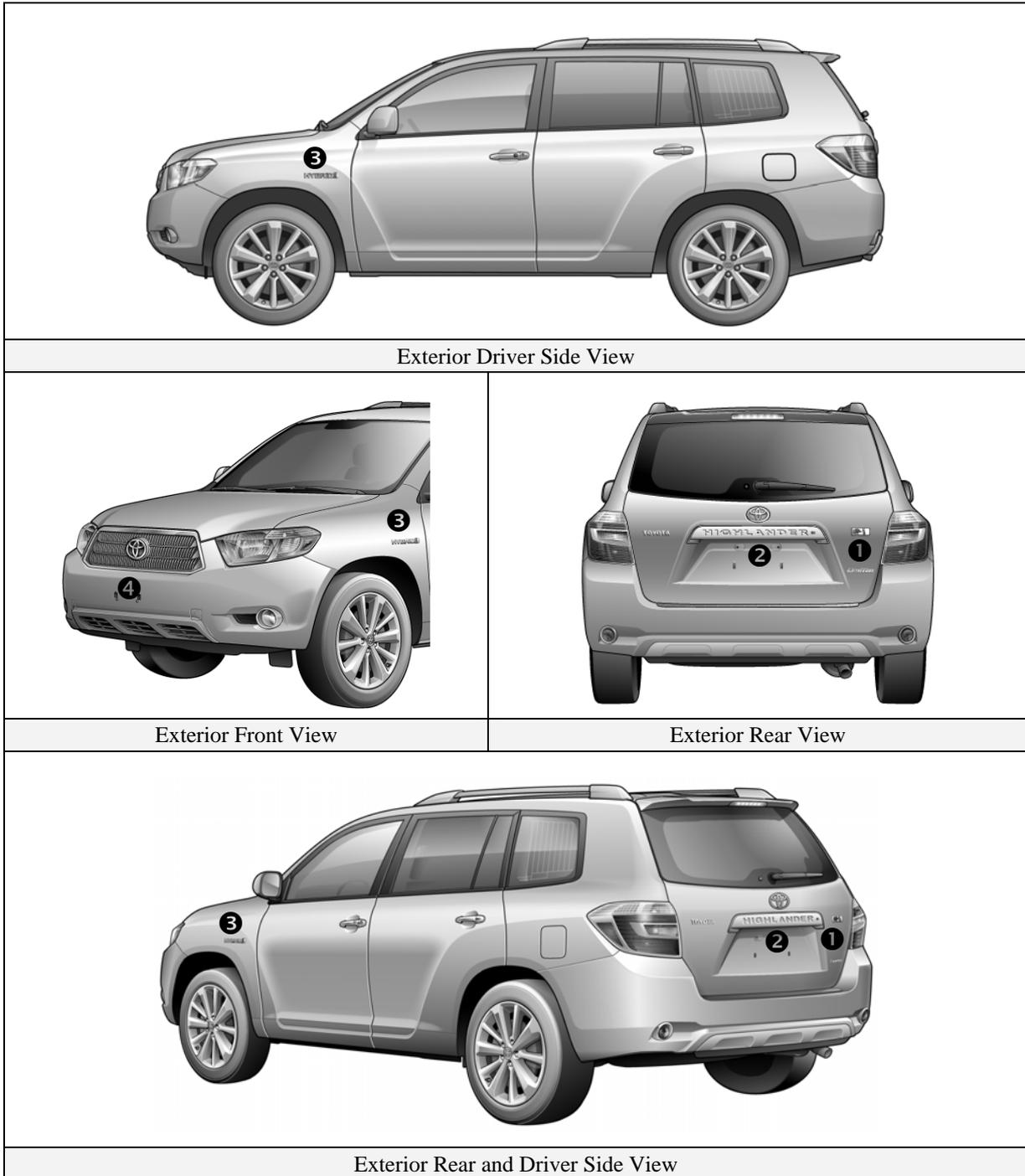


Highlander Hybrid Identification (Continued)

Exterior

- ①  logo on the back door.
- ② Highlander logo on the back door panel garnish.
- ③  logo on each front fender.
- ④ A radiator grill that is unique to the hybrid model.(2008 – 2010 Models)

2008 – 2010 Models:



2011 Model:



Exterior Driver Side View



Exterior Front View



Exterior Rear View



Exterior Rear and Driver Side View

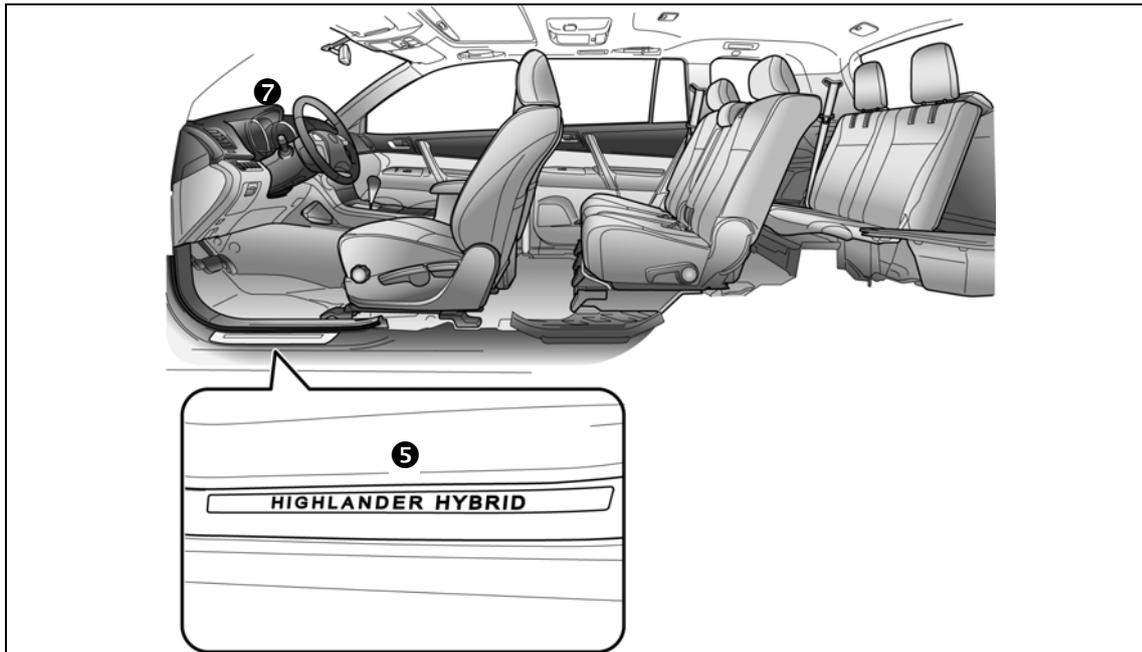
Highlander Hybrid Identification (Continued)

Interior

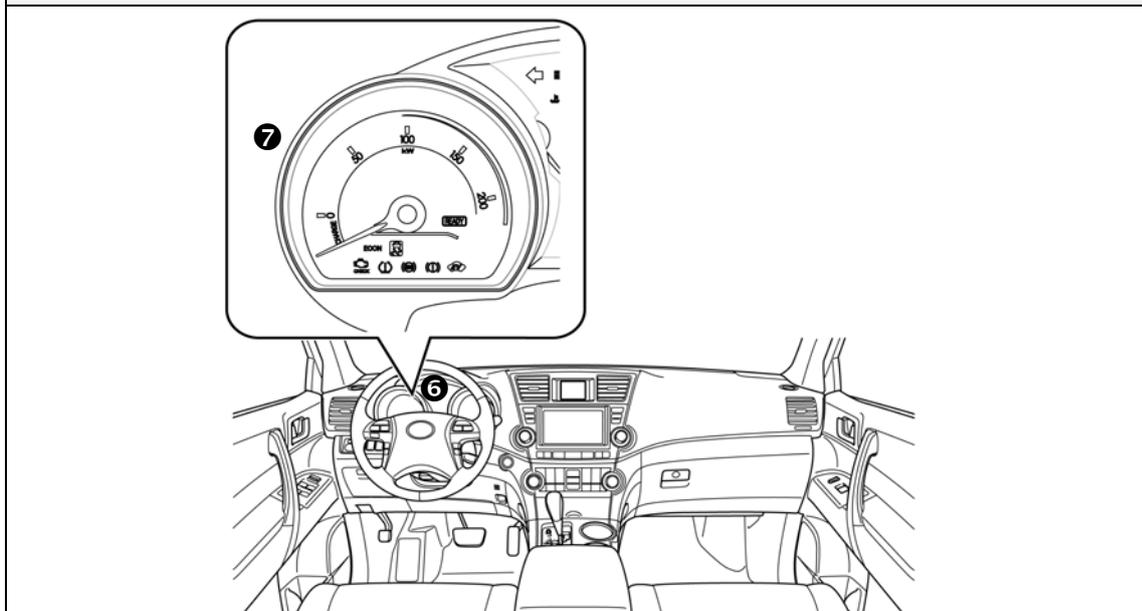
- ⑤ Highlander Hybrid front door sill/scuff plate. (Standard on 2008 - 2010 Models and optional on 2011 Model)
- ⑥ The instrument cluster (speedometer, fuel gauge, warning lights) located in the dash behind the steering wheel, is different than the one on the conventional, non-hybrid Highlander.
- ⑦ In place of a tachometer, a power meter showing kW output is used.

Hint:

If the vehicle is shut off, the instrument cluster gauges will be “blacked out”, not illuminated.



Interior View of Front Door Sill/Scuff Plate

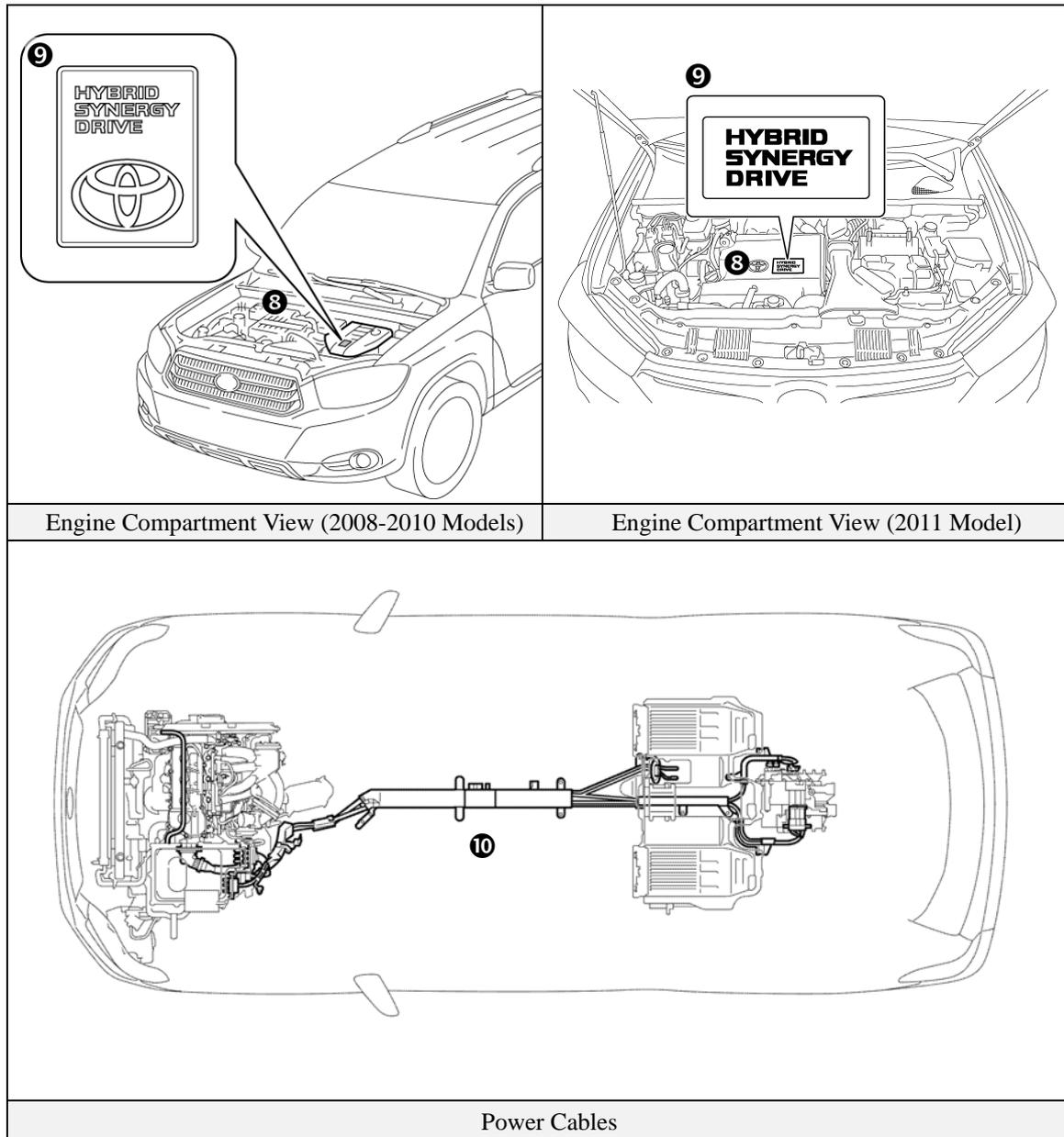


Instrument Cluster View

Highlander Hybrid Identification (Continued)

Engine Compartment

- ⑧ 3.3-liter aluminum alloy gasoline engine. (2008-2010 Models)
3.5-liter aluminum alloy gasoline engine. (2011 Model)
- ⑨ High voltage inverter/converter assembly with logo on the cover. (2008-2010 Models)
Engine with logo on the cover. (2011 Model)
- ⑩ Orange colored high voltage power cables.



Hybrid Component Locations & Descriptions

Component	Location	Description
12 Volt ❶ Auxiliary Battery	Engine Compartment (2008 – 2010 Models) Cargo Area (2011 Model)	A lead-acid battery that supplies power to the low voltage devices.
Hybrid ❷ Vehicle (HV) Battery Pack	Cabin Area, Mounted to Cross Member under Second Row Seat	288 Volt Nickel Metal Hydride (NiMH) battery pack consisting of 30 low voltage (9.6 Volt) modules connected in series.
Power ❸ Cables	Undercarriage and Engine Compartment	Orange colored power cables carry high voltage Direct Current (DC) between the HV battery pack, inverter/converter, and A/C compressor. These cables also carry 3-phase Alternating Current (AC) between the inverter/converter, electric motors, and generator.
Inverter/ Converter ❹	Engine Compartment	Boosts and inverts the high voltage electricity from the HV battery pack to 3-phase AC electricity that drives the electric motors. The inverter/converter also converts AC electricity from the electric generator and electric motors (regenerative braking) to DC that recharges the HV battery pack.
Gasoline ❺ Engine	Engine Compartment	Provides two functions: 1) Powers vehicle. 2) Powers generator to recharge the HV battery pack. The engine is started and stopped under control of the vehicle computer.
Front Electric ❻ Motor	Engine Compartment	3-phase high voltage AC permanent magnet electric motor contained in the front transaxle. It is used to power the front wheels.
Electric ❼ Generator	Engine Compartment	3-phase high voltage AC generator that is contained in the transaxle and recharges the HV battery pack.
A/C Compressor (with Inverter) ❸	Engine Compartment	3-phase high voltage AC electrically driven motor compressor.
Fuel Tank and Fuel Line ❾	Undercarriage and Center	The fuel tank provides gasoline via a fuel line to the engine. The fuel line is routed under the center of vehicle.
Rear Electric Motor ❿	Rear Sub-Frame	3-phase high voltage AC permanent magnet electric motor contained in the rear transaxle. It is used to power the rear wheels.

*Numbers in the component column apply to the illustrations on the following page.

Hybrid Component Locations & Descriptions (Continued)

Specifications

Gasoline Engine: 208 hp (156 kW), 3.3-liter Aluminum Alloy Engine (2008-2010 Models)
245 hp (183 kW), 3.5-liter Aluminum Alloy Engine (2011 Model)

Electric Motors

Front: 165 hp (123 kW), Permanent Magnet Motor

Rear: 67 hp (50 kW), Permanent Magnet Motor

Transmission: Automatic Only (electrically controlled continuously variable transaxle)

HV Battery: 288 Volt Sealed NiMH-Battery

Curb Weight: 4,641 lbs/2,105 kg (2008-2010 Models)
4,762 lbs/ 2,160 kg (2011 Model)

Fuel Tank: 17.2 gals/65.0 liters

Fuel Economy

Ratings: 27/25 (City/Hwy) miles/gal

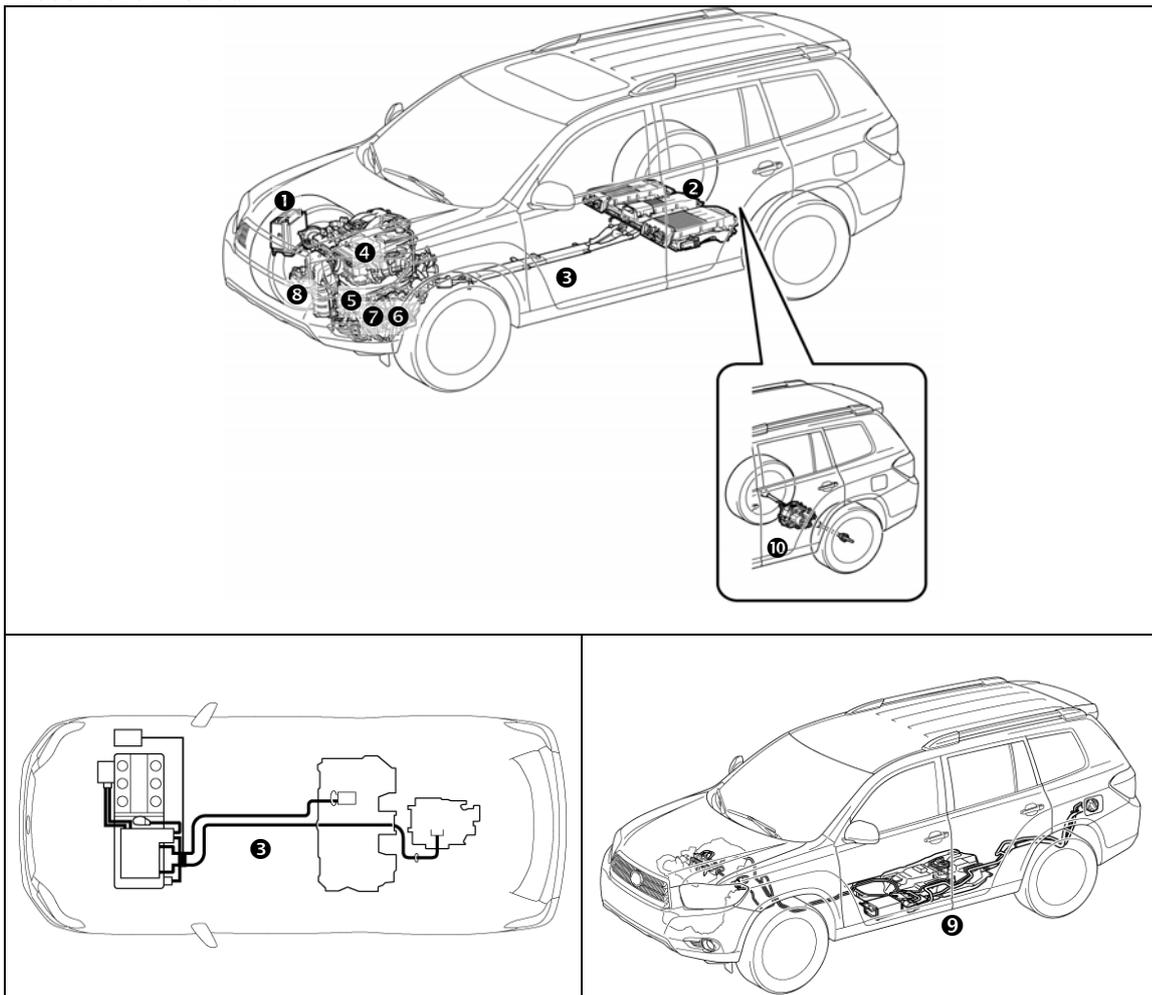
8.6/9.4 (City/Hwy) liters/100 km

Frame Material: Steel Unibody

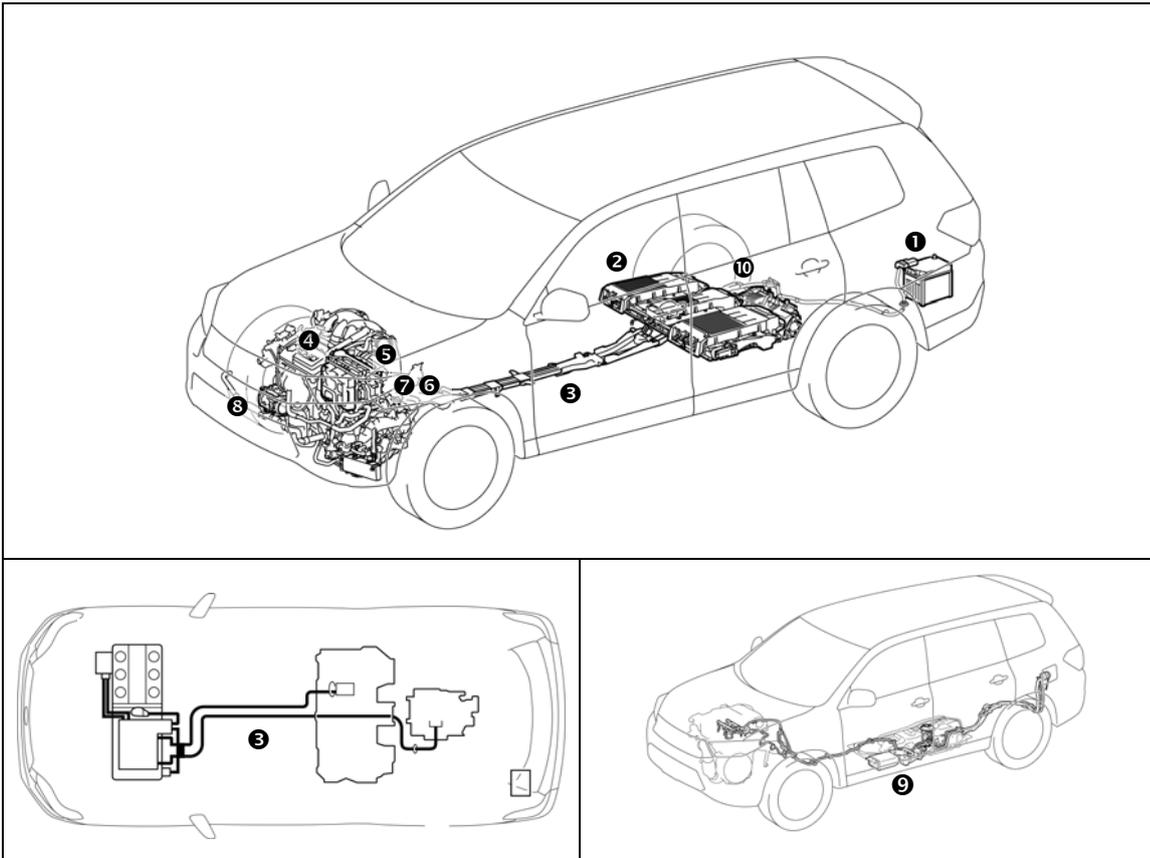
Body Material: Steel Panels

Seating Capacity: 5 standard/7 with optional 3rd row seating (2008-2010 Models)
7 passengers (2011 Model)

2008-2010 Models:



2011 Models



Hybrid Synergy Drive Operation

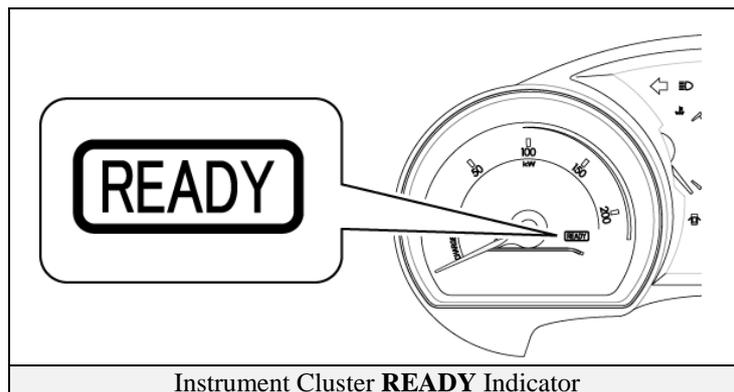
Once the **READY** indicator is illuminated in the instrument cluster, the vehicle may be driven. However, the gasoline engine does not idle like a typical automobile and will start and stop automatically. It is important to recognize and understand the **READY** indicator provided in the instrument cluster. When illuminated, it informs the driver that the vehicle is on and operational even though the gasoline engine may be off and the engine compartment is silent.

Vehicle Operation

- With the Highlander hybrid, the gasoline engine may stop and start at any time while the **READY** indicator is on.
- Never assume that the vehicle is shut off just because the engine is off. Always look for the **READY** indicator status. The vehicle is shut off when the **READY** indicator is off.

The vehicle may be powered by:

1. The electric motor only.
2. The gasoline engine only.
3. A combination of both the electric motor and the gasoline engine.



Hybrid Vehicle (HV) Battery Pack and Auxiliary Battery

The Highlander hybrid features a high voltage Hybrid Vehicle (HV) battery pack that contains sealed Nickel Metal Hydride (NiMH) battery modules.

HV Battery Pack

- The HV battery pack is enclosed in a metal case and is rigidly mounted to the cabin area floor pan cross member under the second row rear seat. The metal case is isolated from high voltage and concealed by carpet in the cabin area.
- The HV battery pack consists of 30 low voltage (9.6 Volt) NiMH battery modules connected in series to produce approximately 288 Volts. Each NiMH battery module is non-spillable and sealed in a metal case.
- The electrolyte used in the NiMH battery module is an alkaline mixture of potassium and sodium hydroxide. The electrolyte is absorbed into the battery cell plates and will not normally leak, even in a collision.
- In the unlikely event that the battery pack is overcharged, the modules vent gases directly outside the vehicle through a vent hose.

HV Battery Pack	
Battery pack voltage	288 V
Number of NiMH battery modules in the pack	30
NiMH battery module voltage	9.6 V
NiMH battery module dimensions	1 x 15 x 3.3 in (18.5 x 382 x 86 mm)
NiMH module weight	3.3 lbs (1.5 kg)
NiMH battery pack dimensions	25 x 43 x 7 in (630 x 1080 x 180 mm)
NiMH battery pack weight	152.1 lbs (69 kg)

Components Powered by the HV Battery Pack

- Front Electric Motor
- Inverter/Converter
- A/C Compressor
- Rear Electric Motor
- Power Cables
- Electric Generator

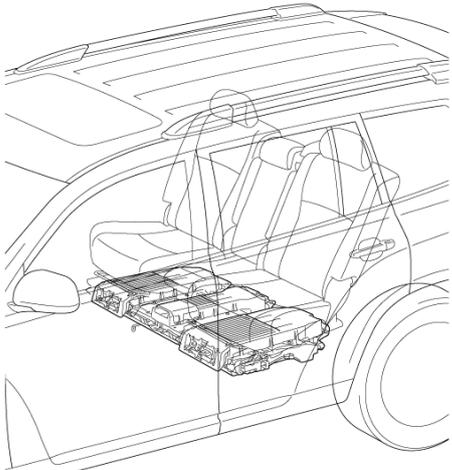
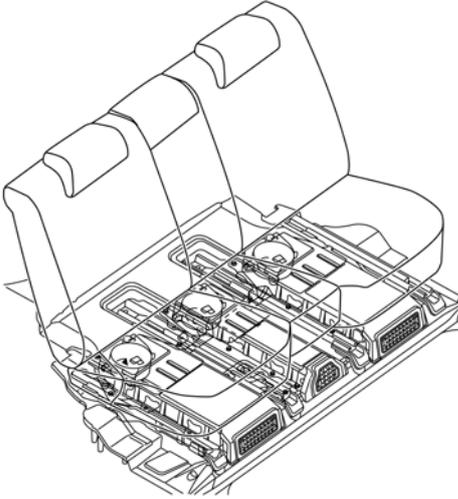
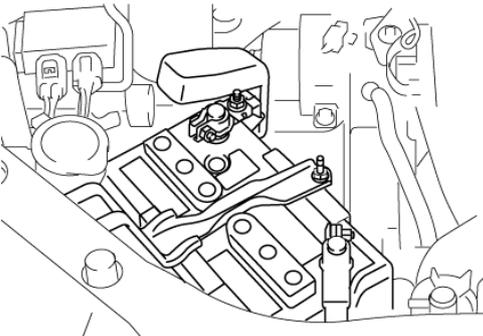
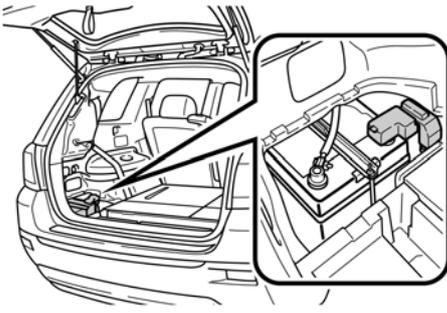
Hybrid Vehicle (HV) Battery Pack and Auxiliary Battery (Continued)

HV Battery Pack Recycling

- The HV battery pack is recyclable. Contact either your Toyota Distributor as mentioned on HV battery Caution Label (see page 36) or the nearest Toyota dealer.

Auxiliary Battery

- The Highlander hybrid also contains a lead-acid 12 Volt battery. This 12 Volt auxiliary battery powers the vehicle electrical system similar to a conventional vehicle. As with other conventional vehicles, the auxiliary battery is grounded to the metal chassis of the vehicle.
- The auxiliary battery is located in the engine compartment.

 <p>A line drawing showing the 288 Volt HV Battery Pack installed in the rear of a vehicle. The battery is a large, rectangular unit with a complex internal structure, mounted in a recessed area of the chassis.</p>	 <p>A line drawing showing the HV Battery Pack mounted in the cabin area of a vehicle. The battery is a large, rectangular unit with a complex internal structure, mounted in a recessed area of the chassis.</p>
<p>288 Volt HV Battery Pack</p>	<p>HV Battery Pack Mounted in Cabin Area</p>
<p>2008 – 2010 Models</p>  <p>A line drawing showing the 12 Volt Auxiliary Battery in the engine compartment of a vehicle. The battery is a lead-acid battery with a rectangular shape and a complex internal structure, mounted in a recessed area of the chassis.</p>	<p>2011 Model</p>  <p>A line drawing showing the 12 Volt Auxiliary Battery in the cabin area of a vehicle. The battery is a lead-acid battery with a rectangular shape and a complex internal structure, mounted in a recessed area of the chassis.</p>
<p>12 Volt Auxiliary Battery in Engine Compartment</p>	<p>12 Volt Auxiliary Battery in Cabin Area</p>

High Voltage Safety

The HV battery pack powers the high voltage electrical system with DC electricity. Positive and negative orange colored high voltage power cables are routed from the battery pack, under the vehicle floor pan, to the inverter/converter. The inverter/converter contains a circuit that boosts the HV battery voltage from 288 to 650 Volts DC. The inverter/converter creates 3-phase AC to power the motors. Power cables are routed from the inverter/converter to each high voltage motor (front and rear electric motors, electric generator, and A/C compressor). The following systems are intended to help keep occupants in the vehicle and emergency responders safe from high voltage electricity:

High Voltage Safety System

- A high voltage fuse ❶* provides short circuit protection in the HV battery pack.
- Positive and negative high voltage power cables ❷* connected to the HV battery pack are controlled by 12 Volt normally open relays ❸*. When the vehicle is shut off, the relays stop electricity flow from leaving the HV battery pack.



WARNING:

- ***The high voltage system may remain powered for up to 10 minutes after the vehicle is shut off or disabled. To prevent serious injury or death from severe burns or electric shock, avoid touching, cutting, or opening any orange high voltage power cable or high voltage component.***

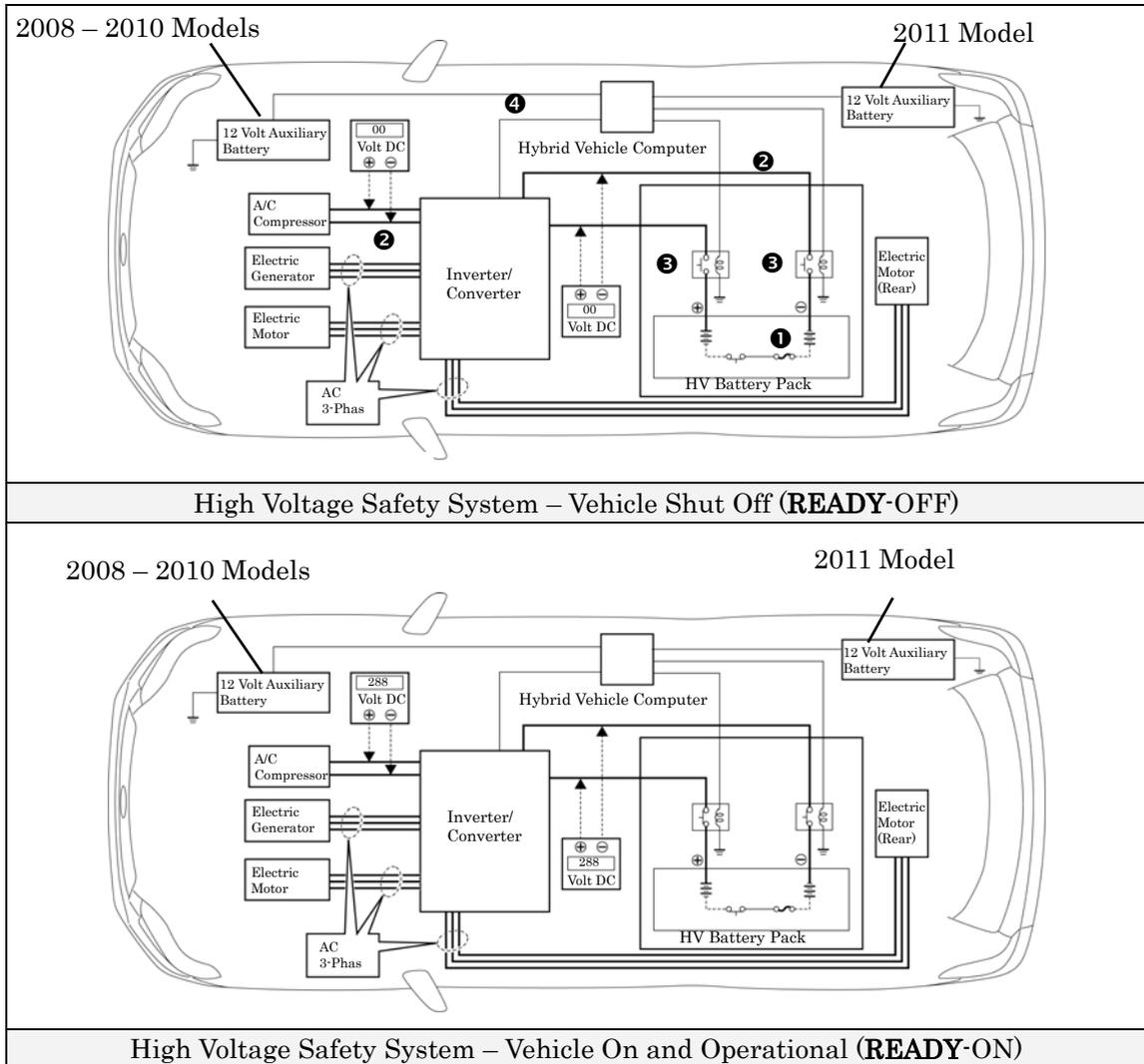
- Both positive and negative power cables ❷* are insulated from the metal chassis, so there is no possibility of electric shock when touching the metal chassis.
- A ground-fault monitor continuously monitors for high voltage leakage to the metal chassis while the vehicle is running. If a malfunction is detected, the hybrid vehicle computer ❹* will illuminate the master warning light  in the instrument cluster and indicate “CHECK HYBRID SYSTEM” on the multi-information display.
- The HV battery pack relays will automatically open to stop electricity flow in a collision sufficient to activate the SRS.

*Numbers apply to the illustration on the following page.

High Voltage Safety (Continued)

Service Plug Grip

- The high-voltage circuit is cut by removing the service plug grip (see page 15).



Precaution to be observed when dismantling the vehicle



WARNING:

- *The high voltage system may remain powered for up to 10 minutes after the vehicle is shut off or disabled. To prevent serious injury or death from severe burns or electric shock, avoid touching, cutting, or opening any orange high voltage power cable or high voltage component.*

Necessary Items

- Protective clothing such as insulated gloves (electrically insulated), rubber gloves, safety goggles, and safety shoes.
- Insulating tape such as electrical tape that has a suitable electrical insulation rating.
- Before wearing insulated gloves, make sure that they are not cracked, ruptured, torn, or damaged in any way. Do not wear wet insulated gloves.
- An electrical tester that is capable of measuring DC 750 Volts or more.

Spills

The Highlander hybrid contains the same common automotive fluids used in other non-hybrid Toyota vehicles, with the exception of the NiMH electrolyte used in the HV battery pack. The NiMH battery electrolyte is a caustic alkaline (pH 13.5) that is damaging to human tissues. The electrolyte, however, is absorbed in the cell plates and will not normally spill or leak out even if a battery module is cracked. A catastrophic crash that would breach both the metal battery pack case and a metal battery module would be a rare occurrence.

A caustic alkaline is at the opposite end of the pH scale from a strong acid. A safe (neutral) substance is approximately in the middle of this scale. Adding a weak acidic mixture, such as a dilute boric acid solution or vinegar, to the caustic alkaline electrolyte will cause the electrolyte to be neutralized. This is similar but opposite to the use of baking soda to neutralize a lead-acid battery electrolyte spill.

A Toyota Material Safety Data Sheets (MSDS) is attached to this document.

- Handle NiMH electrolyte spills using the following Personal Protective Equipment (PPE):
 - Splash shield or safety goggles. A fold down face shield is not acceptable for acid or electrolyte spills.
 - Rubber, latex or nitrile gloves.
 - Apron suitable for alkaline.
 - Rubber boots.

- Neutralize NiMH electrolyte.
 - Use a boric acid solution or vinegar.
 - Boric acid solution - 800 grams boric acid to 20 liters water or 5.5 ounces boric acid to 1 gallon of water.

Dismantling the vehicle

The following 2 pages contain general instructions for use when working on an Highlander hybrid. Read these instructions before proceeding to the HV battery removal instructions on page 18.



WARNING:

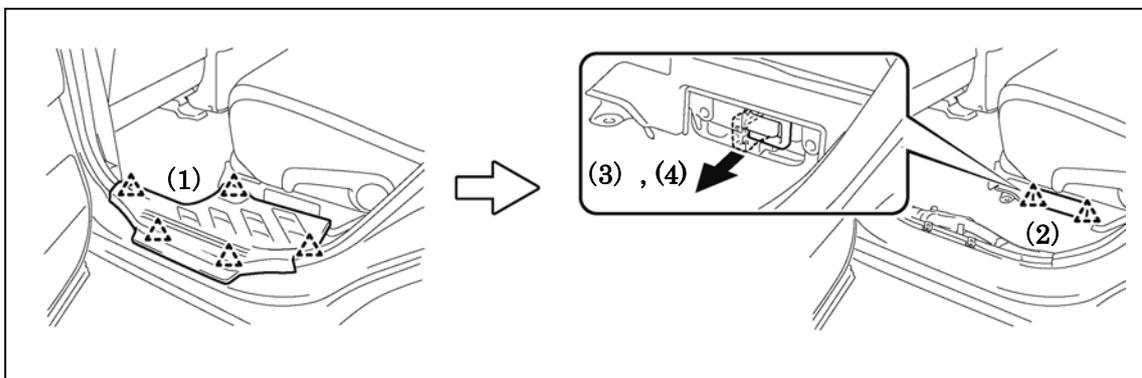
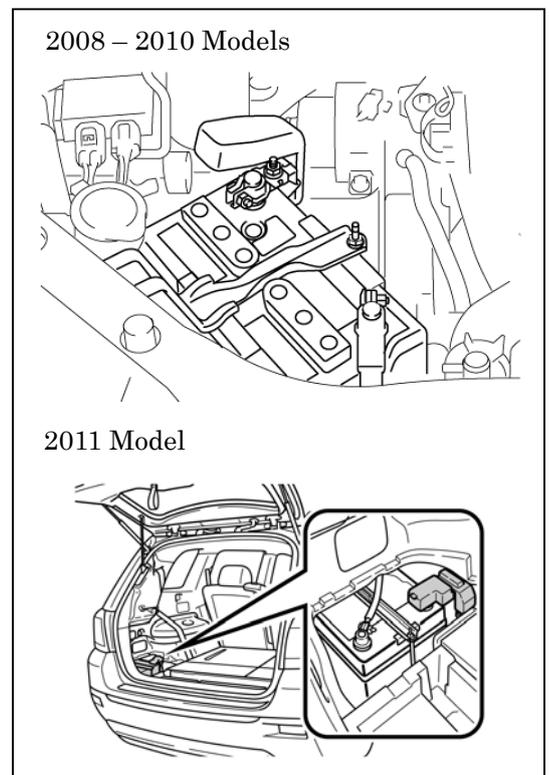
- **The high voltage system may remain powered for up to 10 minutes after the vehicle is shut off or disabled. To prevent serious injury or death from severe burns or electric shock, avoid touching, cutting, or opening any orange high voltage power cable or any high voltage component.**

1. Shut off the ignition (**READY** indicator is off). Then disconnect the cable from the auxiliary battery negative (-) terminal.
2. Remove the service plug grip.
 - (1) Remove the 5 clips and door scuff plate LH.
 - (2) Remove the 2 clips and reclining hinge cover.

Caution:

Wear insulated gloves for the following 3 steps.

- (3) Raise the release handle of the service plug grip.
- (4) Remove the service plug grip.
- (5) Apply insulating tape to the socket of the service plug grip to insulate it.

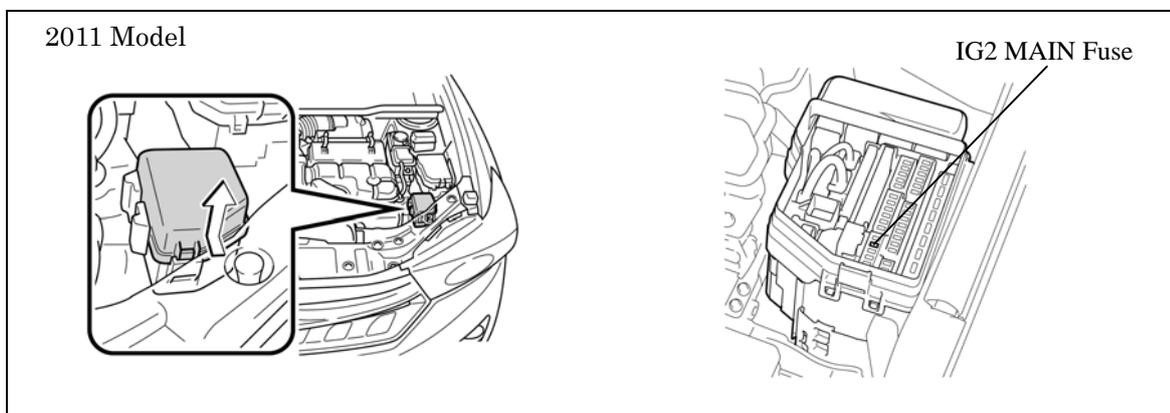
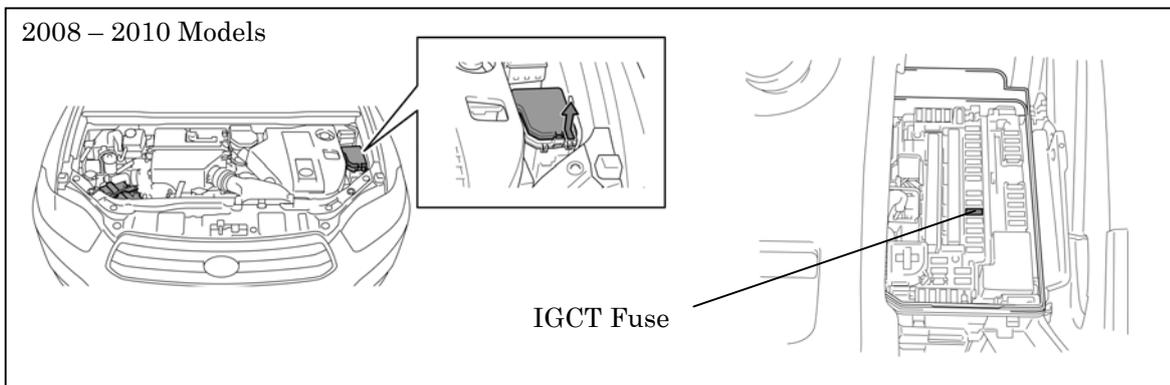


3. Carry the removed service plug grip in your pocket to prevent other staff from accidentally reinstalling it while you are dismantling the vehicle.
4. Make other staff aware that a high-voltage system is being dismantled by using the following sign: CAUTION: HIGH-VOLTAGE. DO NOT TOUCH (see page 17).
5. If the service plug grip cannot be removed due to damage to the vehicle, remove the **IGCT** fuse (30A). (2008-2010 Models)

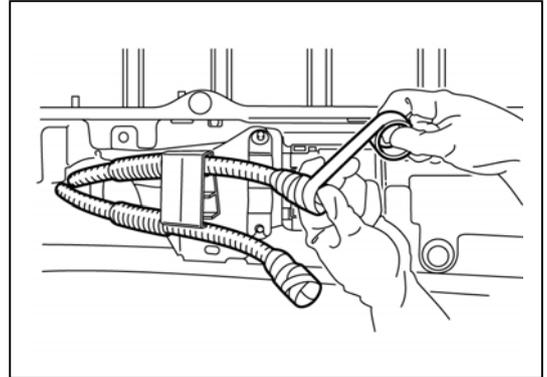
If the service plug grip cannot be removed due to damage to the vehicle, remove the **IG2 MAIN** fuse (30A). (2008-2010 Models)

Caution:

This operation shuts off the HV system. Be sure to wear insulated gloves because high voltage is not shut off inside the HV battery. When it is possible to remove the service plug grip, remove it and continue the procedure.



6. After disconnecting or exposing a high-voltage connector or terminal, insulate it immediately using insulating tape. Before disconnecting or touching a bare high-voltage terminal, wear insulated gloves.
7. Check the HV battery and nearby area for leakage. If you find any liquid, it may be strong alkaline electrolyte. Wear rubber gloves and goggles and neutralize the liquid using a saturated boric acid solution or vinegar. Then wipe up the liquid using waste rags etc.
8. If the electrolyte comes into contact with your skin, wash the skin immediately using a saturated boric acid solution or a large amount of water. If the electrolyte adheres to any article of clothing, take the clothing off immediately.
9. If the electrolyte comes into contact with your eye(s), call out loudly for help. Do not rub your eye(s). Instead, wash the eye(s) with a dilute boric acid solution or a large amount of water and seek medical care.
10. With the exception of the HV battery, remove parts by following procedures which are similar to conventional Lexus vehicles. For the removal of the HV battery, refer to the following pages.



Person in charge: _____

CAUTION:
HIGH-VOLTAGE.
DO NOT TOUCH.

CAUTION:
HIGH-VOLTAGE.
DO NOT TOUCH.

Person in charge: _____

When performing work on the HV system, fold this sign and put it on the roof of the vehicle.

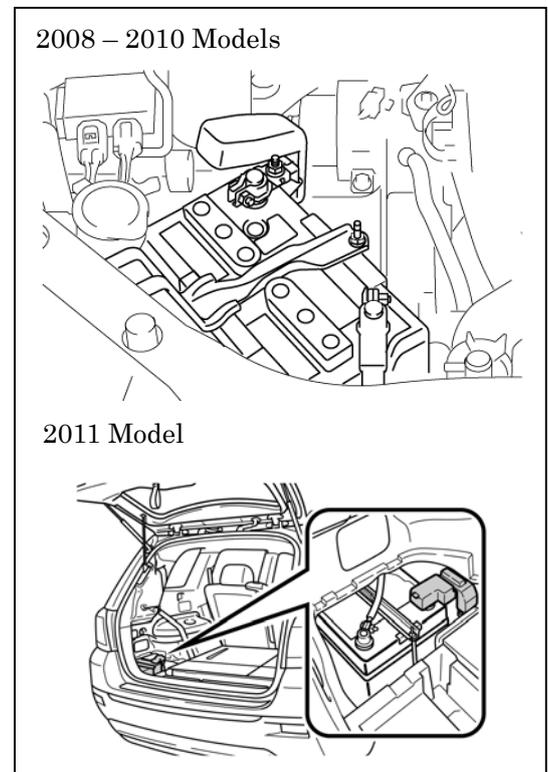
Removal of HV battery



WARNING:

- *Be sure to wear insulated gloves when handling high-voltage parts.*
- *Even if the vehicle is shut off and the relays are off, be sure to remove the service plug grip before performing any further work.*
- *Power remains in the high voltage electrical system for 10 minutes even after the HV battery pack is shut off because the circuit has a condenser that stores power.*
- *Make sure that the tester reading is 0 V before touching any high-voltage terminals which are not insulated.*
- *The SRS may remain powered for up to 90 seconds after the vehicle is shut off or disabled. To prevent serious injury or death from unintentional SRS deployment, avoid cutting the SRS components.*

1. Shut off the ignition (**READY** indicator is off).
2. Disconnect the cable from the auxiliary battery negative (-) terminal.
3. Disconnect the cable from the auxiliary battery positive (+) terminal.
4. Remove the 12volt auxiliary battery.
- 5.



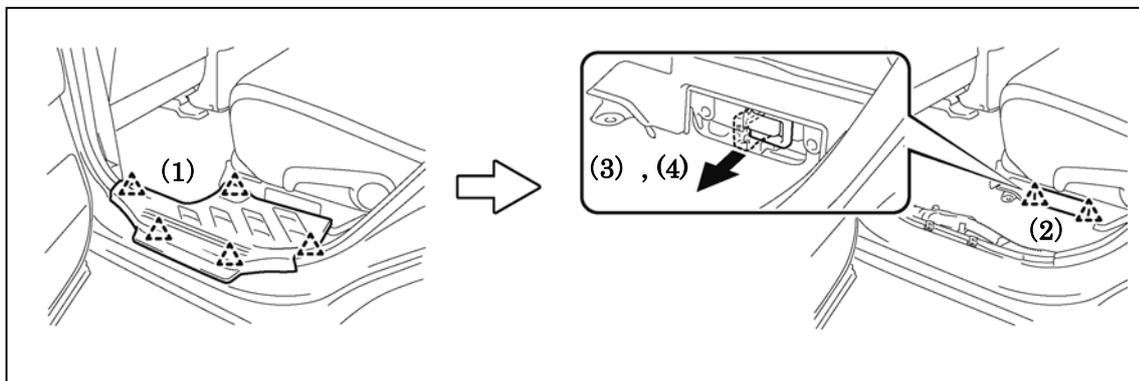
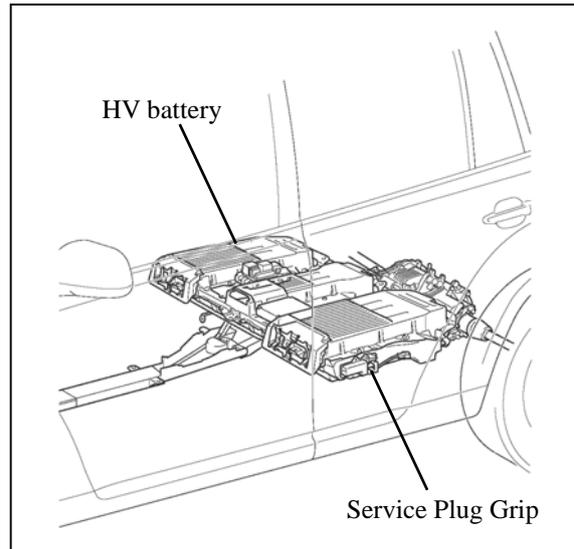
Remove the service plug grip.

- (1) Remove the 5 clips and rear door scuff plate LH.
- (2) Remove the 2 clips and reclining hinge cover.

Caution:

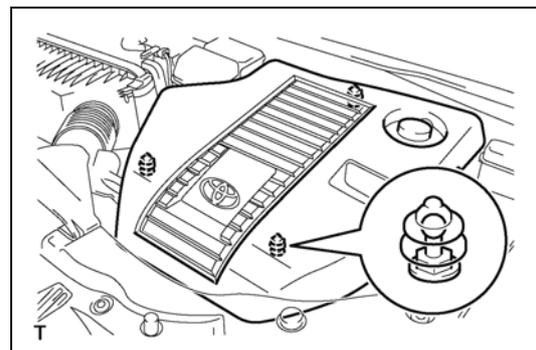
Wear insulated gloves for the following 3 steps.

- (3) Raise the release handle of the service plug grip as shown in the illustration below.
- (4) Remove the service plug grip.
- (5) Apply insulating tape to the socket of the service plug grip to insulate it.

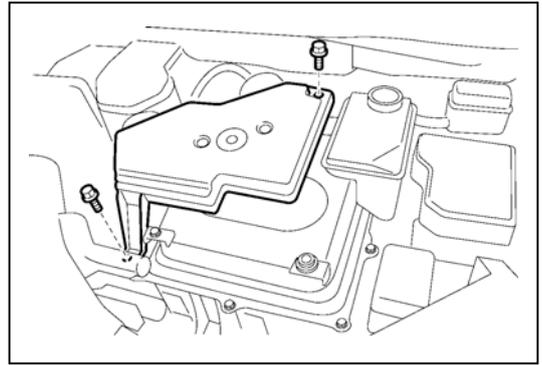


6. Check the voltage at the terminals in the inspection point in the power control unit.
(2008 – 2010 Models)

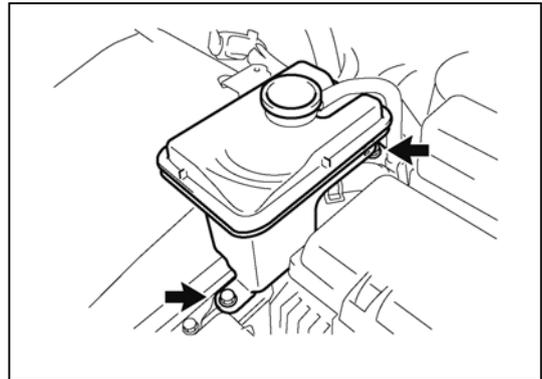
- (1) Remove the No. 2 engine room side cover LH.



- (2) Remove the 2 bolts.
- (3) Loosen the hose clamp and remove the intake air resonator.



- (4) Remove the 2 bolts and inverter reserve tank sub-assembly.



- (5) Remove the inverter cover 10 minutes or more after removal of the service plug grip.

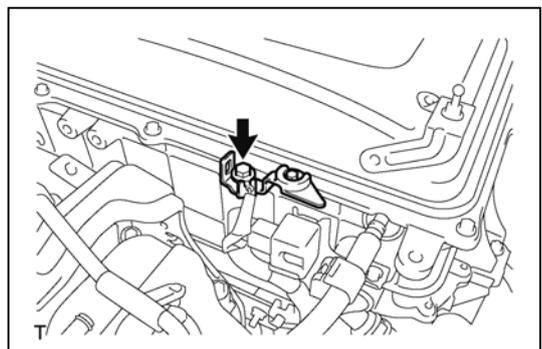
Caution:

Wear insulated gloves.

Notice:

Do not touch the high voltage connectors or terminals for 10 minutes after the service plug grip is removed.

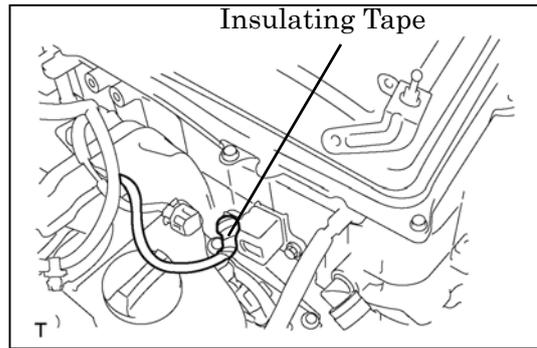
- (6) Remove the bolt and interlock bracket.



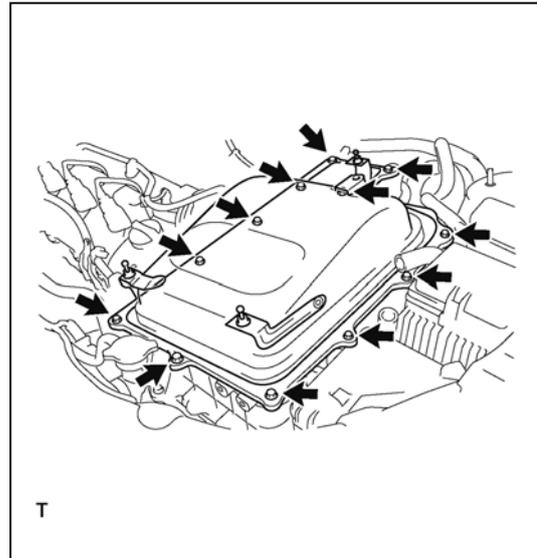
(7) Insulate the removed terminal with insulating tape.

Notice:

Make sure that the terminal does not stick out from the insulating tape.



(8) Remove the 12 bolts and inverter cover.



(9) Check the voltage at the terminals in the inspection point in the power control unit.

Caution:

Wear insulated gloves.

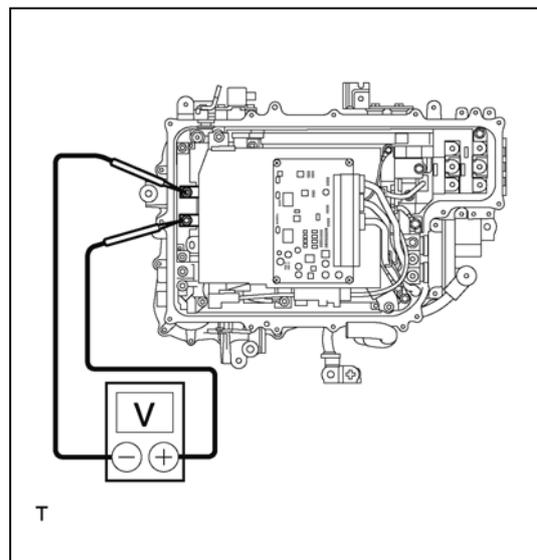
To prevent serious injury or death, do not proceed with dismantling of the HV system until the voltage at the terminals in the inspection point is 0 V.

Standard voltage: 0 V

Hint:

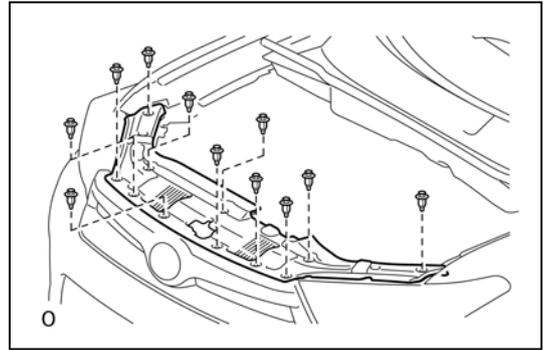
Set the tester to DC 750 Volts measure the voltage.

This inspection is performed to verify that it is safe to remove the HV battery.



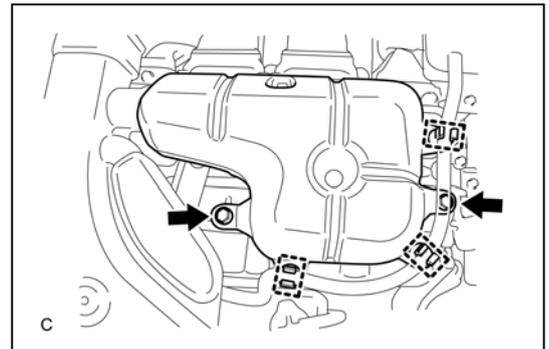
7. Check the voltage at the terminals in the inspection point in the power control unit.
(2011 Model)

(1) Remove the 11 clips and cool air intake duct seal.

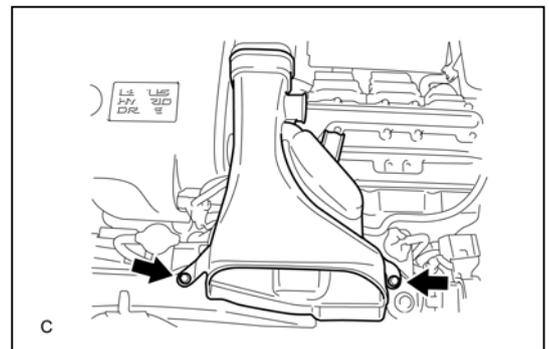


(2) Remove the 2 bolts and disconnect 3 hose clamp.

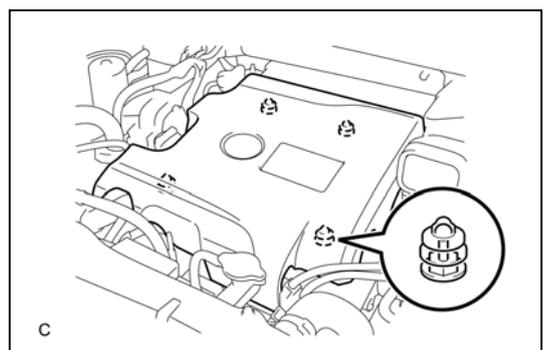
(3) Remove the intake air resonator sub-assembly.



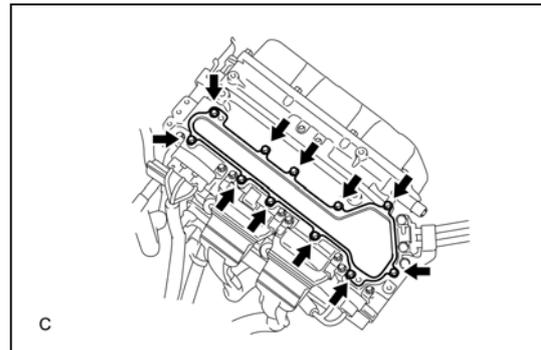
(4) Remove the 2 bolts and No. 2 air cleaner inlet.



(5) Remove the V-bank cover sub-assembly.



- (6) Remove the 11 bolts and inverter terminal cover.



- (7) Check the voltage at the terminals in the inspection point in the power control unit.

Caution:

Wear insulated gloves.

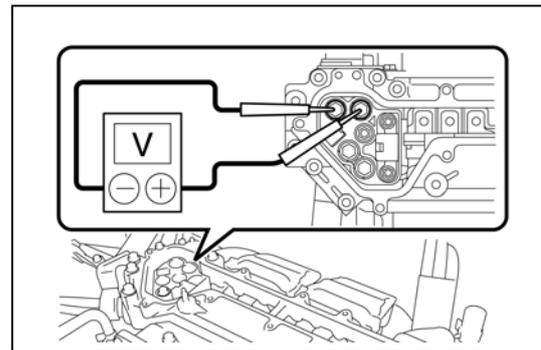
To prevent serious injury or death, do not proceed with dismantling of the HV system until the voltage at the terminals in the inspection point is 0 V.

Standard voltage: 0 V

Hint:

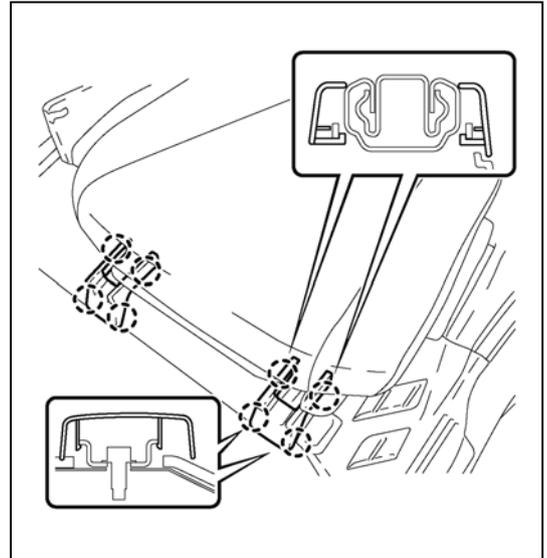
Set the tester to DC 750 Volts measure the voltage.

This inspection is performed to verify that it is safe to remove the HV battery.

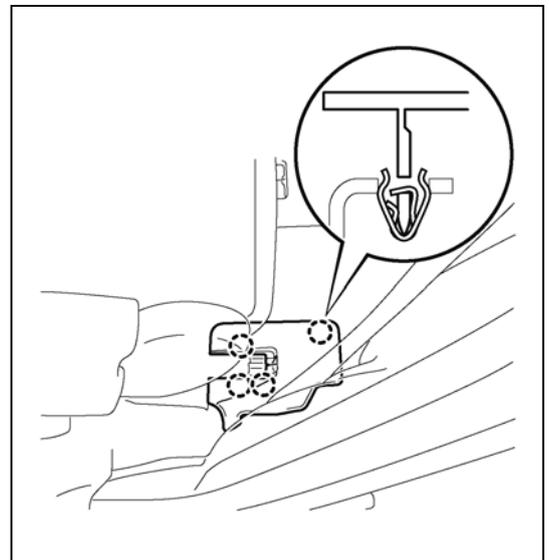


11. Remove the left rear seat for the second row.

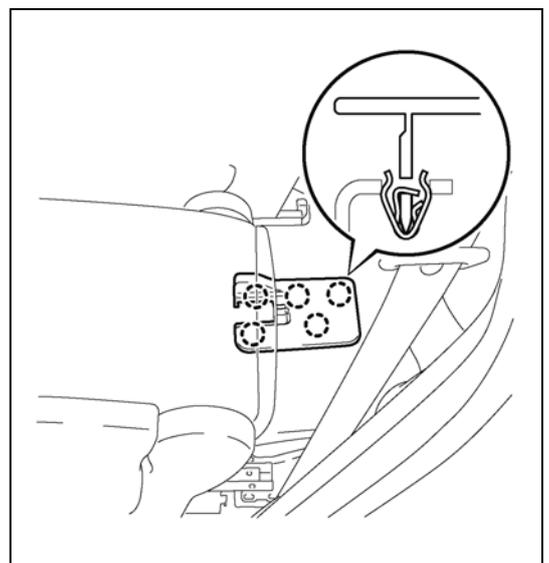
- (1) Disengage the 8 claws and remove the 2 rear seat track bracket covers.



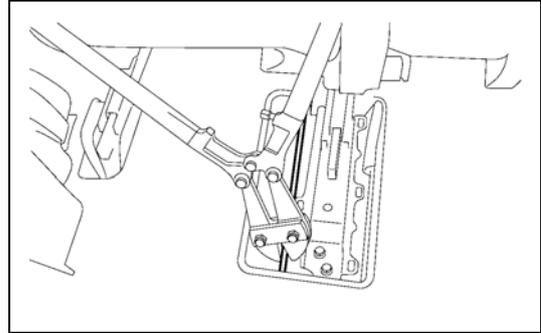
- (2) Disengage the 4 claws and remove the rear outer track bracket cover.



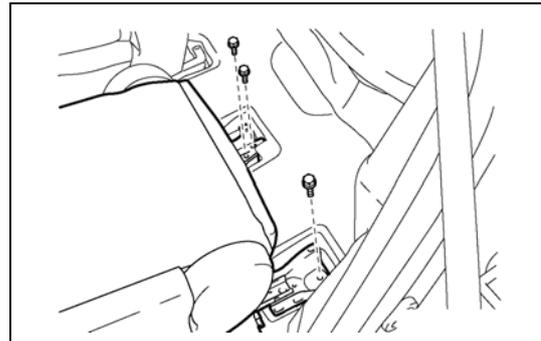
- (3) Disengage the 5 claws and remove the rear inner track bracket cover.



- (4) Cut the seat lock cable assembly (with remote folding function).

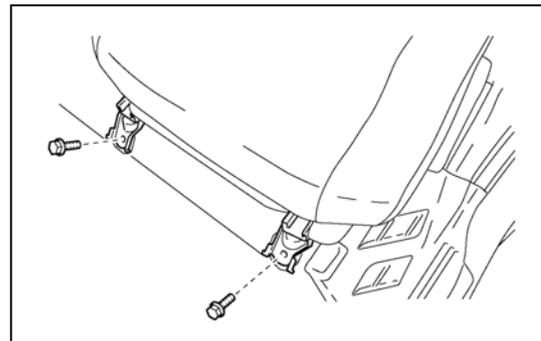


- (5) Remove the 3 bolts on the rear side of the seat.



- (6) Remove the 2 bolts on the front side of the seat.

- (7) Remove the seat assembly.



Caution:

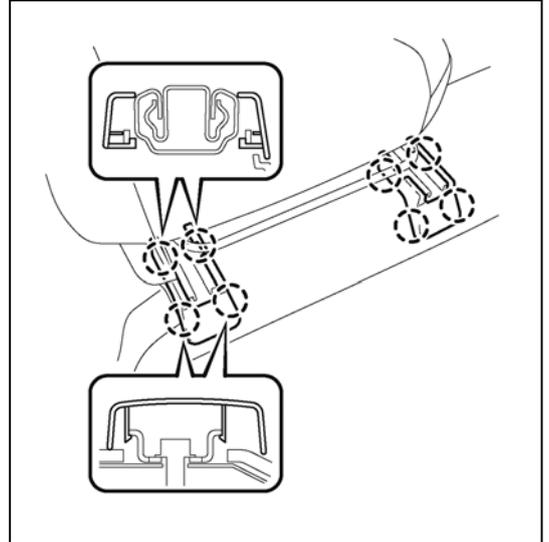
Do not cut wiring or wire harnesses when removing vehicle components. Always disconnect components at the connector.

Hint:

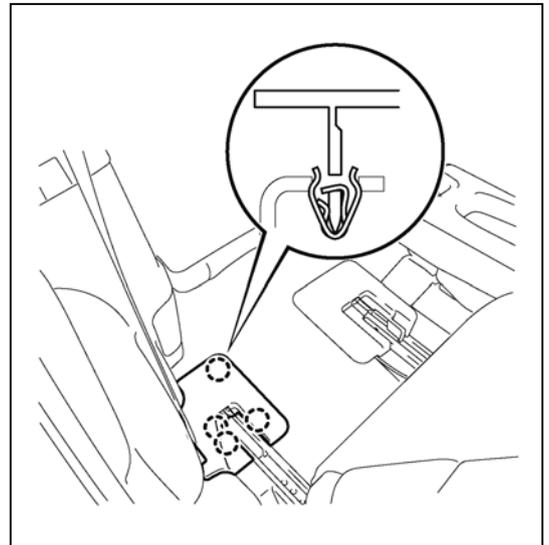
When removing rear seat components, it may be necessary to unbolt or move other components in order to access connectors for components.

13. Remove the right rear seat for the second row.

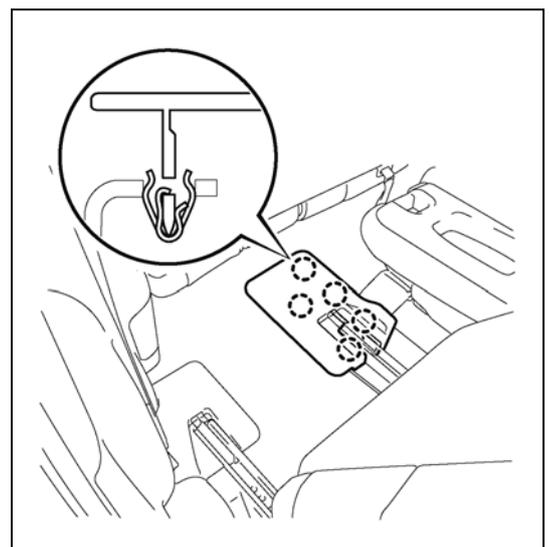
- (1) Disengage the 8 claws and remove the 2 rear seat track bracket covers.



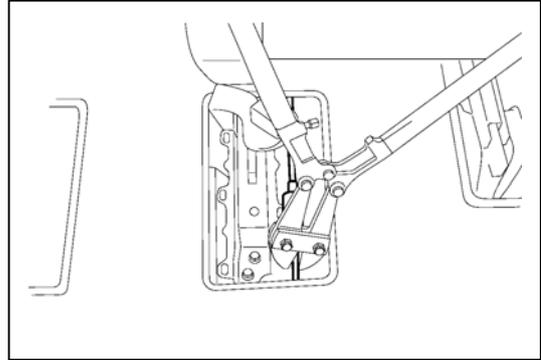
- (2) Disengage the 4 claws and remove the rear outer track bracket cover.



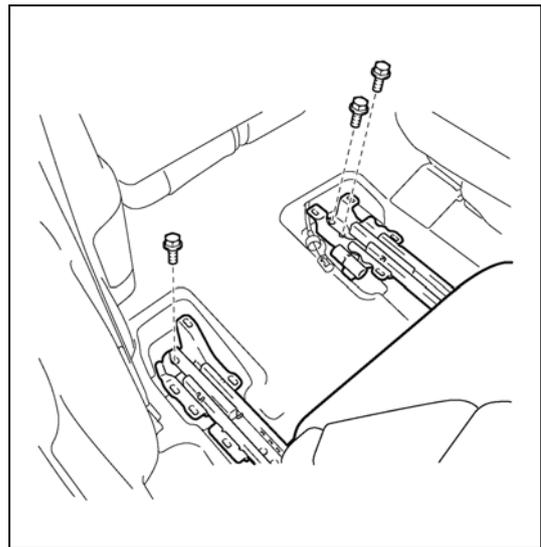
- (3) Disengage the 5 claws and remove the rear inner track bracket cover.



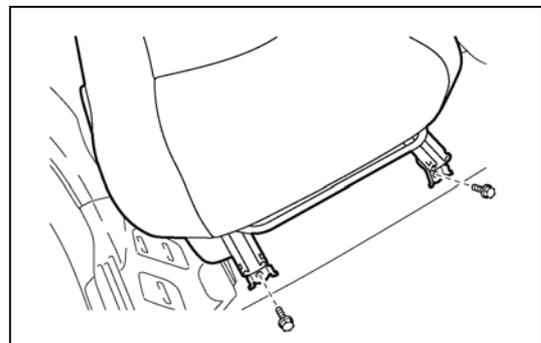
- (4) Cut the seat lock cable assembly (with remote folding function).



- (5) Remove the 3 bolts on the rear side of the seat.



- (6) Remove the 2 bolts on the front side of the seat.
(7) Remove the seat assembly.



Caution:

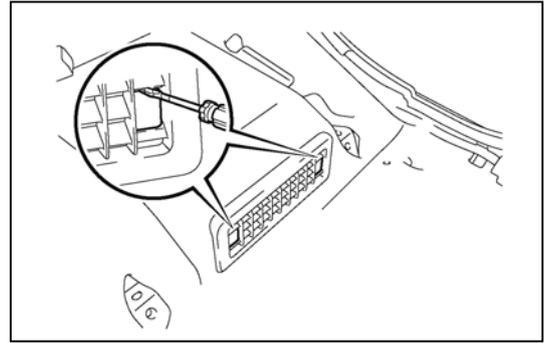
Do not cut wiring or wire harnesses when removing vehicle components. Always disconnect components at the connector.

Hint:

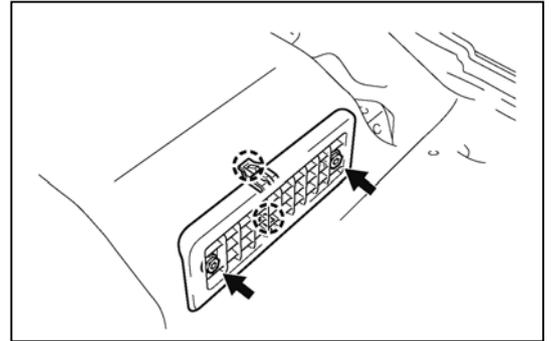
When removing rear seat components, it may be necessary to unbolt or move other components in order to access connectors for components.

14. Remove the air intake cover LH.

- (1) Release the claws using a screwdriver, and remove the 2 hole covers.

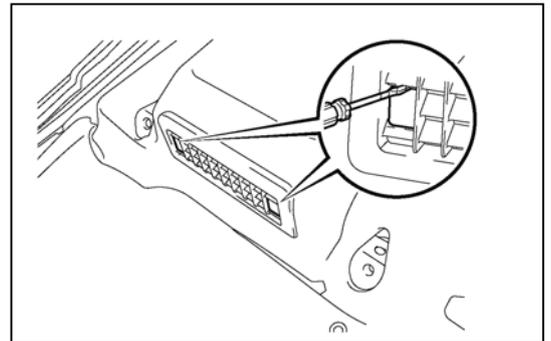


- (2) Remove the 2 screws, then release the 2 claws and remove the air intake cover LH.

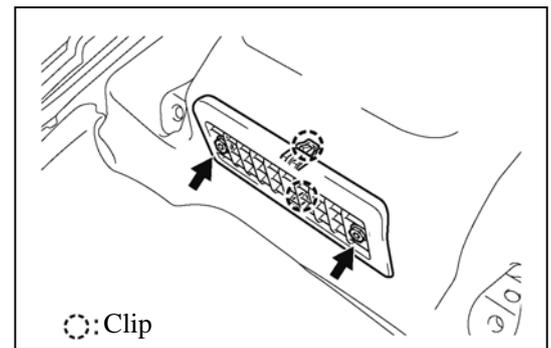


15. Remove the air intake cover RH.

- (1) Release the claws using a screwdriver, and remove the 2 hole covers.

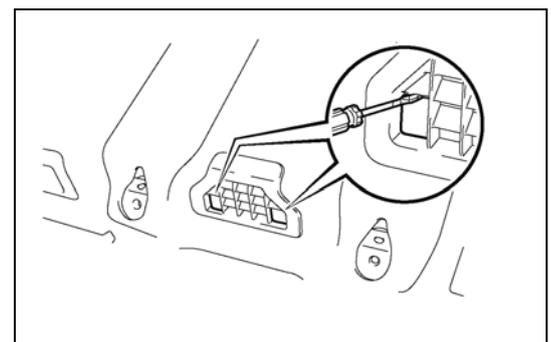


- (2) Remove the 2 screws, then release the 2 claws and remove the air intake cover RH.

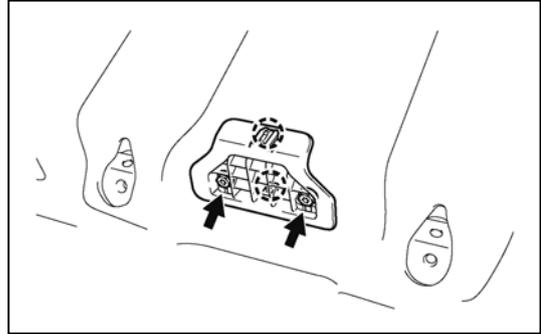


16. Remove the center air intake cover.

- (1) Release the claws using a screwdriver, and remove the 2 hole covers.

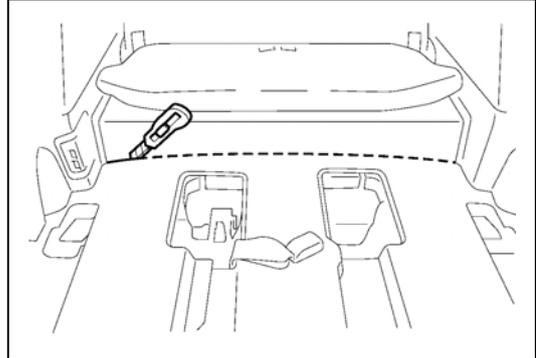


- (2) Remove the 2 screws, then release the 2 claws and remove the center air intake cover.



17. Cut the floor carpe.

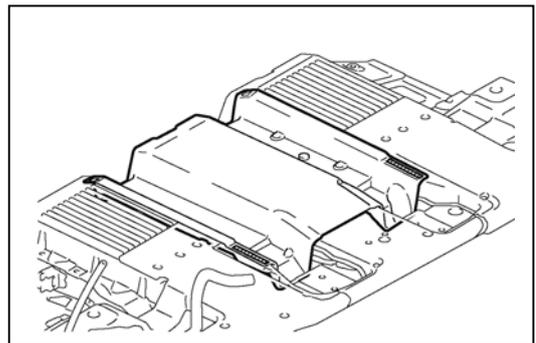
18. Turn back the floor carpe.



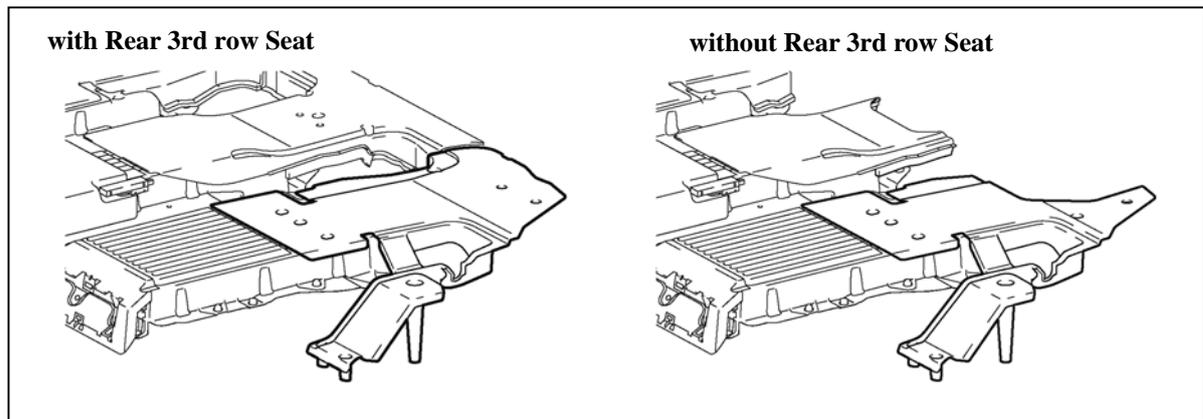
19. Remove the No. 1 HV battery tray.

Hint:

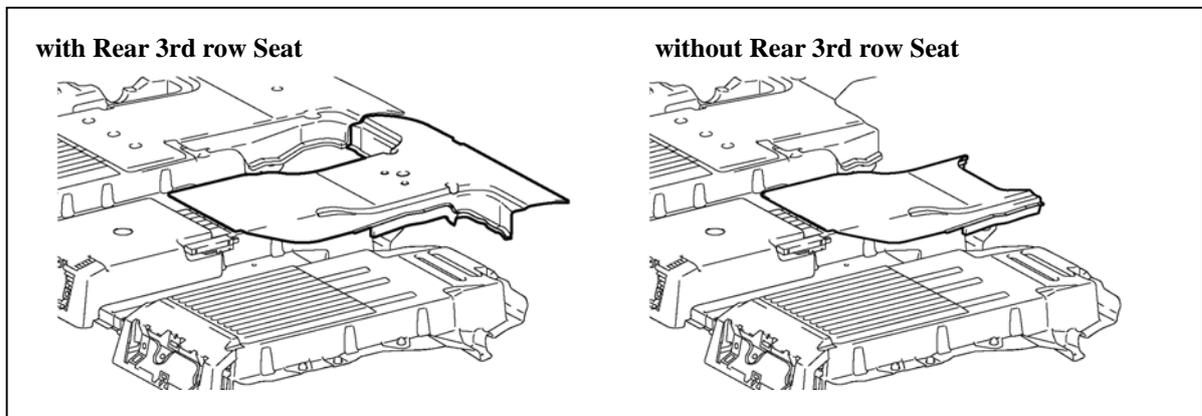
Remove any remaining butyl tape on the No. 1 HV battery tray and HV battery.



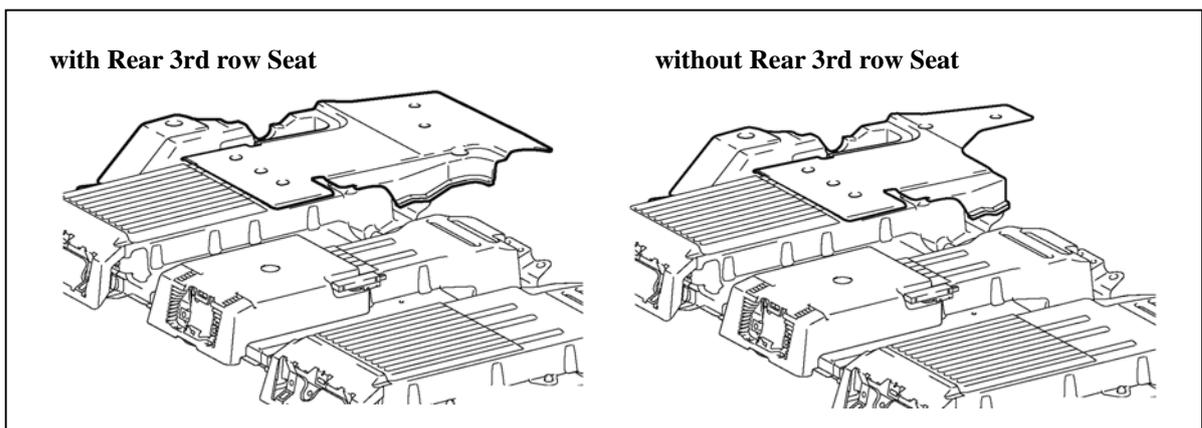
20. Remove the No. 1 floor board.



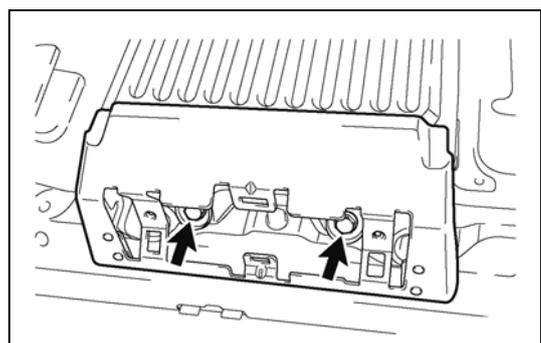
21. Remove the No. 2 floor board.



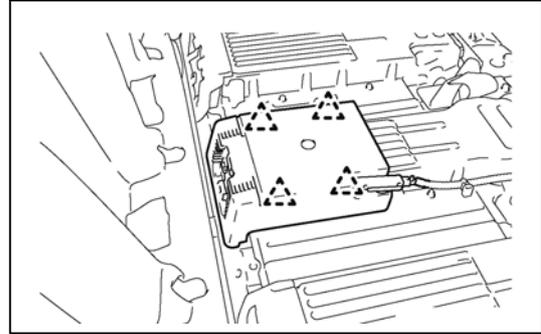
22. Remove the No. 3 floor board.



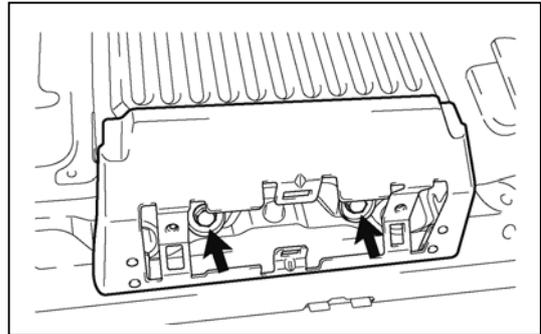
23. Remove the 2 bolts and battery carrier duct
LH.



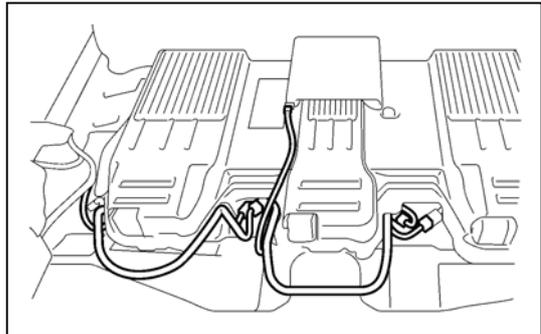
24. Remove the 4 clips and floor spacer board.



25. Remove the 2 bolts and battery carrier duct RH.



26. Disconnect the wire harness from the HV battery.



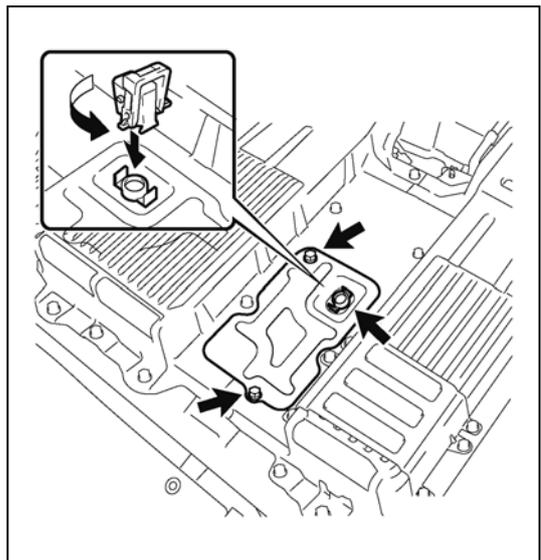
27. Remove the battery service hole cover.

- (1) Using the service plug grip, remove the battery cover lock striker.

Hint:

Insert the projecting part of the service plug grip and turn the button of the battery cover lock striker counterclockwise to release the lock .

- (2) Remove the 2 bolts and battery service hole cover.



28. Disconnect the 2 frame wires.

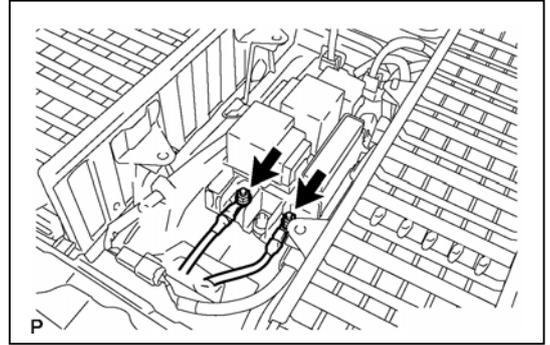
- (1) Remove the 2 nuts to remove the 2 frame wires from the SMR.

Caution:

Wear insulated gloves.

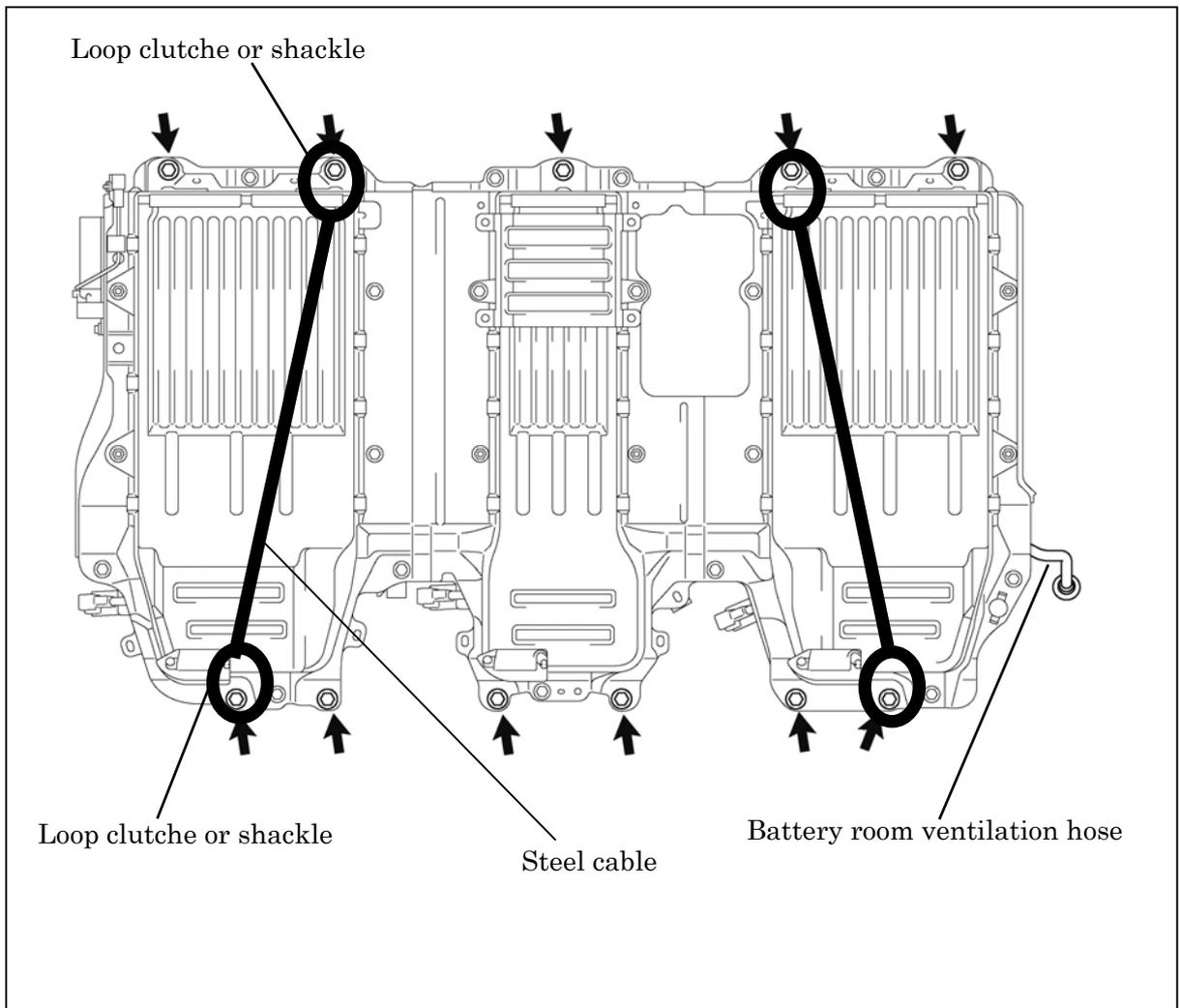
Notice:

Insulate the terminals of the removed frame wire with insulating tape.



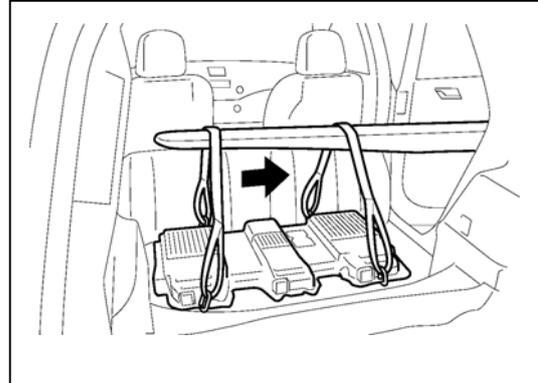
29. Remove the 11 bolts and battery room ventilation hose.

30. Attach loop clutches or similar devices to the holes of the HV battery to connect the steel cables as shown in the illustration (load capacity: more than 70 kg).



31. Pry either of the rear doors by operating the forklift to secure an opening for taking out the battery.

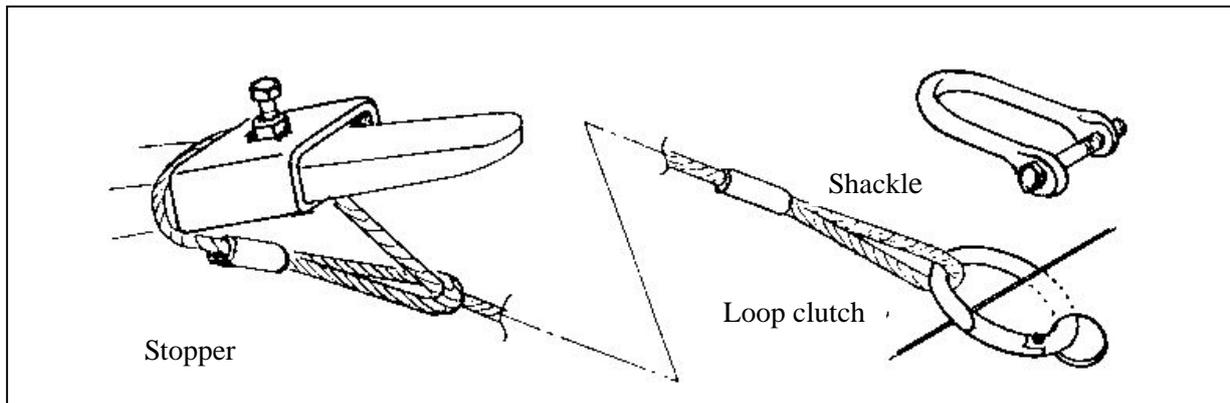
32. Insert the fork into the cabin to hang the HV battery unit. While maintaining clearance between the battery unit and the vehicle interior, take out the battery unit from the vehicle.



Caution:

Set a stopper on the end of the fork to prevent the battery unit from sliding down.

33. The HV battery pack is recyclable. Contact your Lexus distributor (if included on the HV



battery caution label) or contact the nearest Lexus dealer (see the next 2 pages for samples of the HV battery caution label).

Caution:

After removing the HV battery, do not reinstall the service plug grip to the HV battery.

HV Battery Caution Label

1. For U.S.A.

⚠ DANGER		      	
High Voltage Inside / Alkaline Electrolyte			
<p>To avoid injuries, burns or electric shocks:</p> <ul style="list-style-type: none"> ● Never disassemble this battery unit or remove its covers. –Service by Qualified Technician. – ● Avoid contact alkaline electrolyte with eyes, skin or clothes. In event of accident, flush with water and get medical help immediately. ● Keep children away from this unit. ● Do not puncture or impact on this unit when operating forklift, or expose to open flame or incinerate, or expose to liquids when storing this unit, as excessive heat may generate fire and electrolyte may leak out. 			
To the Qualified EV Technicians:			
Be sure to read the Repair Manual when servicing or replacing the battery.			
HV Battery Recycling Information			
<ul style="list-style-type: none"> ● Please transport this battery in accordance with all applicable laws. ● Be sure to consult your dealer or the following address for replacing and disposing of this battery. 			
Residents in U.S.A. ● TOYOTA MOTOR SALES U.S.A. INC. TORRANCE CAL. 90501 Phone: 1-800-331-4331	● SERVCO PACIFIC INC. HONOLULU HAWAII 96813 Phone: 808-839-2273	Residents in PUERTO RICO ● TOYOTA DE PUERTO RICO HATO REY, PUERTO RICO Phone: 787-751-1000	B

⚠ DANGER		      	
High Voltage Inside/Alkaline Electrolyte		Ni-MH	
<p>Observe the following precautions when you handle this battery unit. If you do not conform to those, it may result in a fire, an electrical shock and death in the worst case. Leakage of alkaline electrolyte may cause blindness or skin problems, if alkaline electrolyte comes into contact with your eyes, skins or clothes. In event of accident, flush with water and get medical help immediately.</p> <p>● Never disassemble, convert or divert this battery unit or remove its covers. (Please have the battery serviced by your dealer or a Qualified Technician.) ● Do not dump this unit illegally. It may result in pollution, death or serious injury. ● Do not puncture or expose this unit to impact. ● Keep this unit away from a fire. ● Do not water this unit. ● Keep children away from this unit.</p>			
To Qualified Technicians, Haulers, Dismantlers			
<p>Be sure to read the Repair Manual when servicing or replacing this unit. Please consult your dealer or your national distributor when hauling or dismantling this unit.</p>			
HV Battery Recycling Information			
<ul style="list-style-type: none"> ● Please transport this unit in accordance with all applicable laws. ● Consultations about replacing and disposing this unit are accepted in your dealer or the following address. 			
Residents in U.S.A. ● TOYOTA MOTOR SALES U.S.A. , INC. TORRANCE CAL. 90501 Phone : 1-800-331-4331	● SERVCO PACIFIC INC. HONOLULU, HAWAII 96813 Phone : 808-839-2273	Residents in PUERTO RICO ● TOYOTA DE PUERTO RICO HATO REY, PUERTO RICO Phone : 787-751-1000	B

2. For CANADA

⚠ DANGER		      	
High Voltage Inside / Alkaline Electrolyte		Haute tension à l' intérieur / Electrolyte alcalin	
<p>To avoid injuries, burns or electric shocks:</p> <ul style="list-style-type: none"> ● Never disassemble this battery unit or remove its covers. –Service by Qualified Technician. – ● Avoid contact alkaline electrolyte with eyes, skin or clothes. In event of accident, flush with water and get medical help immediately. ● Keep children away from this unit. ● Do not puncture or impact on this unit when operating forklift, or expose to open flame or incinerate, or expose to liquids when storing this unit, as excessive heat may generate fire and electrolyte may leak out. 			
<p>Afin d' éviter des blessures et brûlures et tout choc électriques:</p> <ul style="list-style-type: none"> ● Ne jamais démonter cet ensemble batterie ni enlever ses couvercles. –Confier l' entretien à un technicien qualifié. – ● Eviter tout contact de l' électrolyte alcalin avec les yeux la peau ou les vêtements. En cas d' accident, rincer à l' eau et contacter un médecin immédiatement. ● Garder cet ensemble hors de portée des enfants. ● Ne pas percer cet ensemble et ne pas lui faire subir d' impact lors de l' utilisation du chariot élévateur. Ne pas l' exposer à une flamme vive ni l' incinérer. Ne pas l' exposer à un liquide lors du stockage. Une chaleur excessive pourrait provoquer un incendie et l' électrolyte pourrait fuir. 			
To the Qualified EV Technicians:			
Be sure to read the Repair Manual when servicing or replacing the battery.		A l' attention des techniciens spécialistes en véhicules électriques:	
Be sure to read the Repair Manual when servicing or replacing the battery.		Veiller à lire le manuel de réparation lors de l' entretien ou du remplacement de la batterie.	
HV Battery Recycling Information			
<ul style="list-style-type: none"> ● Please transport this battery in accordance with all applicable laws. ● Be sure to consult your dealer or the following address for replacing and disposing of this battery. 			
<ul style="list-style-type: none"> ● Prière de transporter cette batterie conformément à toutes les lois applicables. ● Pour le remplacement et la mise au rebut de cette batterie, veiller à consulter un votre concessionnaire ou se renseigner à adresse suivante. 			
TOYOTA CANADA INC. ONE TOYOTA PLACE SCARBOROUGH ONTARIO M1H 1H8 Phone: 1-888 TOYOTA 1-888-869-6828 URL: www.toyota.ca			C

⚠ DANGER		      	
High Voltage Inside / Alkaline Electrolyte		Haute tension à l'intérieur / Electrolyte alcalin	
<p>Observe the following precautions when you handle this battery unit. If you do not conform to those, it may result in a fire, an electrical shock and death in the worst case. Leakage of alkaline electrolyte may cause blindness or skin problems, if alkaline electrolyte comes into contact with your eyes, skins or clothes. In event of accident, flush with water and get medical help immediately. ● Never disassemble, convert, or divert this battery unit or remove its covers. (Please have the battery serviced by your dealer or a Qualified Technician.) ● Do not dump this unit illegally. It may result in pollution, death or serious injury. ● Do not puncture or expose this unit to impact. ● Keep this unit away from a fire. ● Do not water this unit. ● Keep children away from this unit.</p>			
<p>Observez les précautions suivantes lors de la manipulation de cette batterie. Le défaut de s'y conformer pourrait entraîner un incendie, un décharge électrique et dans le pire des cas, la mort. Une fuite d'électrolyte alcalin peut provoquer la cécité ou des problèmes de peau, en cas de contact avec les yeux, la peau ou les vêtements. En cas d'accident, rincer la partie touchée avec de l'eau et consulter immédiatement un médecin. ● Ne jamais déssassembler ou transonner cette batterie, ni l'employer à un autre usage ou en retirer le couvercle. (En confier l'entretien à votre concessionnaire ou à un technicien qualifié). ● Ne pas jeter cette batterie illégalement. Cela pourrait engendrer de la pollution, ou provoquer des blessures graves, voire mortelles. ● Ne pas percer cette batterie ni l'exposer à des chocs. ● Garder cette batterie à l'écart des flammes. ● Ne pas arroser cette batterie. ● Garder les enfants éloignés de cette batterie.</p>			
To Qualified Technicians, Haulers, Dismantlers			
<p>Be sure to read the Repair Manual when servicing or replacing this unit. Please consult your dealer or your national distributor when hauling or dismantling this unit.</p>			
HV Battery Recycling Information			
<ul style="list-style-type: none"> ● Please transport this unit in accordance with all applicable laws. ● Consultations about replacing and disposing this unit are accepted in your dealer or the following address. 			
<ul style="list-style-type: none"> ● Prière de se conformer à toutes les lois applicables lors du transport de cette batterie. ● Les demandes de consultation relatives au remplacement et à la mise au rebut de cette batterie sont acceptées chez votre concessionnaire ou à l'adresse suivante. 			
TOYOTA CANADA INC. ONE TOYOTA PLACE SCARBOROUGH, ONTARIO M1H 1H8 Phone 1-888-TOYOTA-6 (1-888-869-6828) URL: www.toyota.ca			C

3. For ECUADOR

 <p>DANGER</p>        <p>Ni-MH</p>	<p>High Voltage Inside / Alkaline Electrolyte</p> <p>To avoid injuries, burns or electric shocks:</p> <ul style="list-style-type: none"> ● Never disassemble this battery unit or remove its covers. <p>-Service by Qualified Technician-</p> <ul style="list-style-type: none"> ● Avoid contact alkaline electrolyte with eyes, skin or clothes. In event of accident, flush with water and get medical help immediately. ● Keep children away from this unit. ● Do not puncture or impact on this unit when operating forklift, or expose to open flame or incinerate, or expose to liquids when storing this unit, as excessive heat may generate fire and electrolyte may leak out. <p>To the Qualified EV Technicians:</p> <p>Be sure to read the Repair Manual when servicing or replacing the battery.</p> <p>HV Battery Recycling Information</p> <ul style="list-style-type: none"> ● Please transport this battery in accordance with all applicable laws. ● Be sure to consult your dealer or your national distributor as mentioned in your Dealer Guide-Book for replacing and disposing of this battery. 	<p>Haute tension à l'intérieur / Electrolyte alcalin</p> <p>Afin d'éviter des blessures et brûlures et tout chocs électriques:</p> <ul style="list-style-type: none"> ● Ne jamais démonter cet ensemble batterie ni enlever ses couvercles. <p>-Confier l'entretien à un technicien qualifié-</p> <ul style="list-style-type: none"> ● Eviter tout contact de l'électrolyte alcalin avec les yeux, la peau ou les vêtements. En cas d'accident, rincer à l'eau et contacter un médecin immédiatement. ● Garder cet ensemble hors de portée des enfants. ● Ne pas percer cet ensemble et ne pas lui faire subir d'impact lors de l'utilisation du chariot élévateur. Ne pas l'exposer à une flamme vive ni l'incinérer. Ne pas l'exposer à un liquide lors du stockage. Une chaleur excessive pourrait provoquer un incendie et l'électrolyte pourrait fuir. <p>A l'attention des techniciens spécialistes en véhicules électriques:</p> <p>Veiller à lire le manuel de réparation lors de l'entretien ou du remplacement de la batterie.</p> <p>Information sur le recyclage de batterie de véhicule hybride</p> <ul style="list-style-type: none"> ● Prière de transporter cette batterie conformément à toutes les lois applicables. ● Pour le remplacement et la disposition de cette batterie, se rassurer de consulter un votre concessionnaire ou distributeur national comme mentionnées dans le guide des concessionnaires.
	<p>D</p>	