



# AVALON Hybrid

*Gasoline-Electric*

*Hybrid Synergy Drive*

## ***HYBRID VEHICLE DISMANTLING MANUAL***



AVX40 Series

## Foreword

This guide was developed to educate and assist dismantlers in the safe handling of Toyota AVALON Hybrid gasoline-electric hybrid vehicles. AVALON 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 AVALON Hybrid, as they may not be familiar to dismantlers. High voltage electricity powers the electric motor, generator, air conditioning (A/C) compressor and inverter/converter. All other automotive electrical devices such as the head lights, radio, and gauges are powered from a separate 12 Volt auxiliary battery. Numerous safeguards have been designed into the AVALON Hybrid to help ensure the high voltage, approximately 244.8 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 AVALON Hybrid identification.
- Major hybrid component locations and descriptions.

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

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## About the AVALON Hybrid

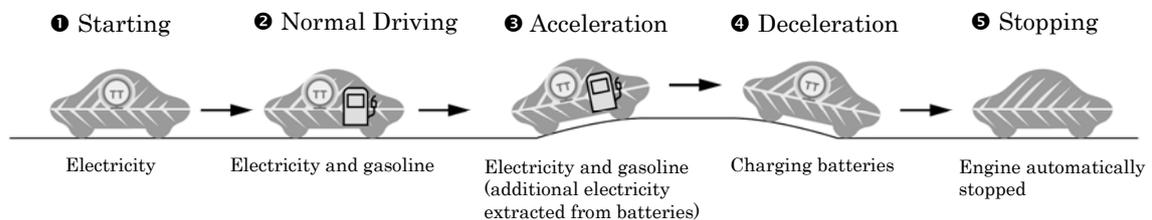
The AVALON Hybrid 4-door sedan joins the hybrid model lineup for Toyota. Hybrid Synergy Drive means that the vehicle contains a gasoline engine and an electric motor for power. The two hybrid power sources are stored on board the vehicle:

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 AVALON 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 AVALON 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 and to drive the motor.
- 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 kinetic energy from the front 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.



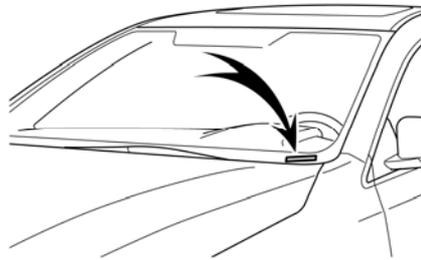
## AVALON Hybrid Identification

In appearance, the 2013 model year AVALON Hybrid is nearly identical to the conventional, non-hybrid Toyota AVALON. The AVALON Hybrid is a 4-door sedan. Exterior, interior, and engine compartment illustrations are provided to assist in identification.

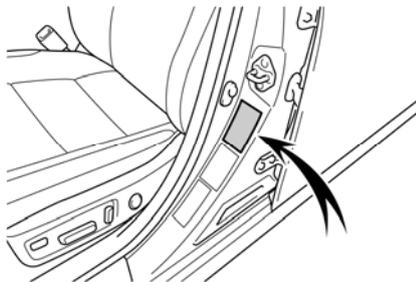
The alphanumeric 17 character Vehicle Identification Number (VIN) is provided in the front windshield cowl and on the driver side B pillar.

Example VIN: 4T1BD1EB0E2000101

An AVALON Hybrid is identified by the first 8 alphanumeric characters **4T1BD1EB**.



Driver Side Windshield Cowl

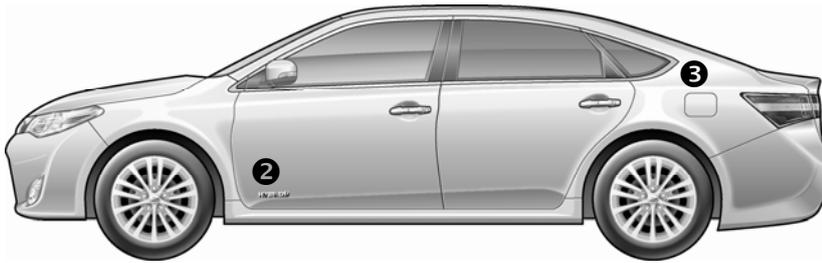


Driver Side B Pillar

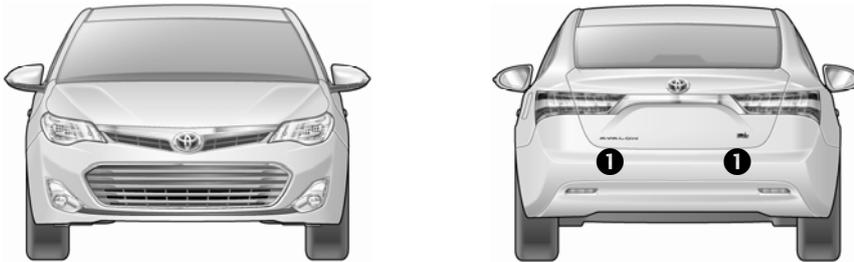
## AVALON Hybrid Identification (Continued)

### Exterior

- ❶  and **AVALON** logos on the trunk.
- ❷ **HYBRID** logo on the driver and front passenger door.
- ❸ Gasoline fuel filler door located on the driver side rear quarter panel.



Exterior Driver Side View



Exterior Front and Rear View



Exterior Rear and Driver Side View

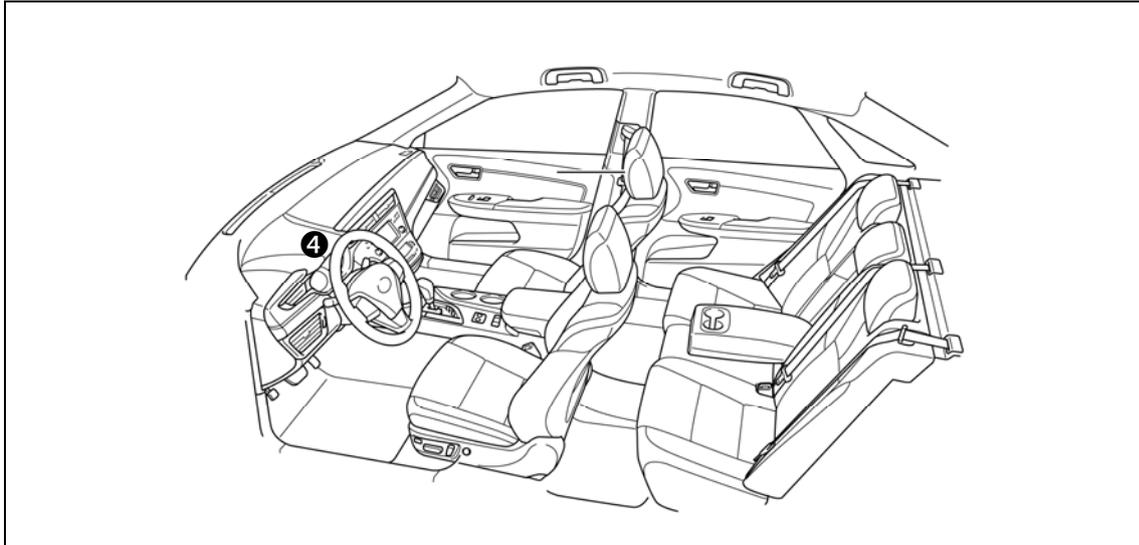
## AVALON Hybrid Identification (Continued)

### Interior

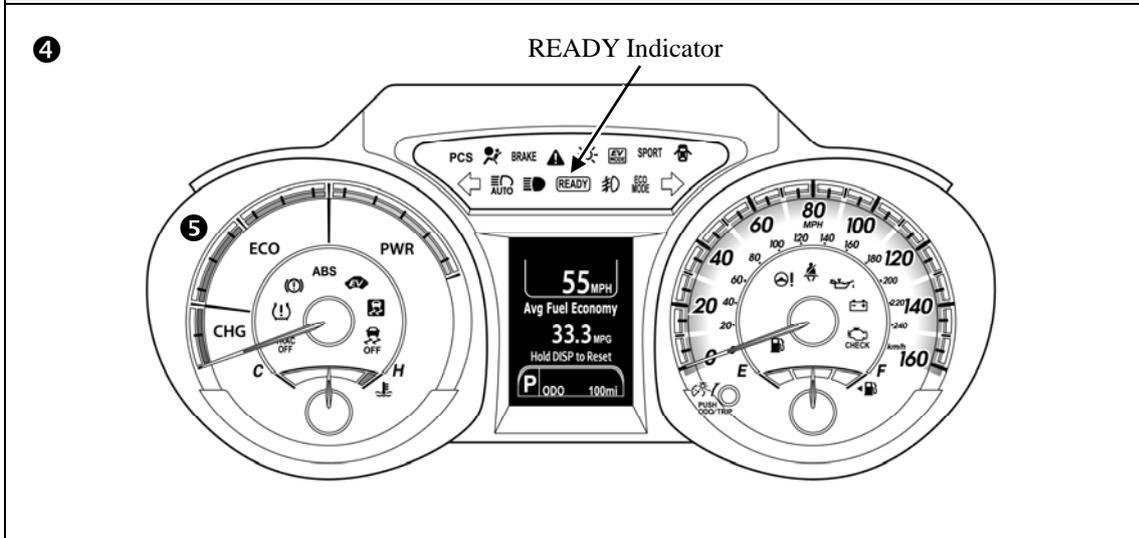
- ④ The instrument cluster (**READY** indicator, and warning lights) located in the dash behind the steering wheel, is different than the one on the conventional, non-hybrid AVALON.
- ⑤ Instead of a tachometer, a hybrid system indicator is used.

### **Hint:**

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



Interior View

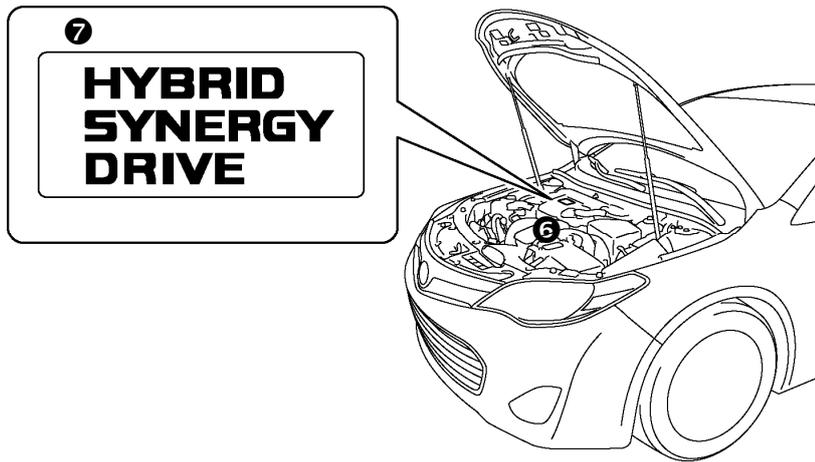


Instrument Cluster View

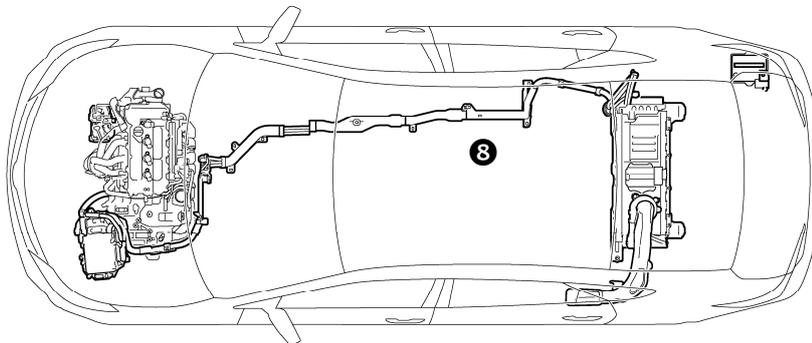
## AVALON Hybrid Identification (Continued)

### Engine Compartment

- ⑥ 2.5-liter aluminum alloy gasoline engine.
- ⑦ Logo on the plastic engine cover.
- ⑧ Orange colored high voltage power cables.



Engine Compartment View



Power Cables

## Hybrid Component Locations & Descriptions

Component	Location	Description
12 Volt Auxiliary Battery ❶	Passenger Side of Trunk	A lead-acid battery that supplies power to the low voltage devices.
Hybrid Vehicle (HV) Battery Pack ❷	Trunk Area, Mounted behind Rear Seat	244.8 Volt Nickel Metal Hydride (NiMH) battery pack consisting of 34 low voltage (7.2 Volt) modules connected in series.
Power Cables ❸	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 motor, 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 motor. The inverter/converter also converts AC electricity from the electric generator and electric motor (regenerative braking) to DC that recharges the HV battery pack.
DC-DC Converter for 12 Volt Auxiliary Battery ❺	Inverter/Converter	Converts 244.8 Volts from the HV battery pack to 12 Volts for low voltage vehicle power.
Gasoline Engine ❻	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.
Electric Motor ❼	Engine Compartment	3-phase high voltage AC motor contained in the transaxle. It is used to power the front wheels.
Electric Generator ❸	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) ❾	Engine Compartment	3-phase high voltage AC electrically driven motor compressor.
Fuel Tank and Fuel Line ❿	Undercarriage and Driver Side and Center	The fuel tank provides gasoline via a fuel line to the engine. The fuel line is routed along the driver side and center tunnel under the floor pan.

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

## Hybrid Component Locations & Descriptions (Continued)

### Specifications

Gasoline Engine: 156 hp (116 kW), 2.5-liter Aluminum Alloy Engine

Electric Motor: 141 hp (105 kW), Permanent Magnet Motor

Transmission: Automatic Only

HV Battery: 244.8 Volt Sealed NiMH-Battery

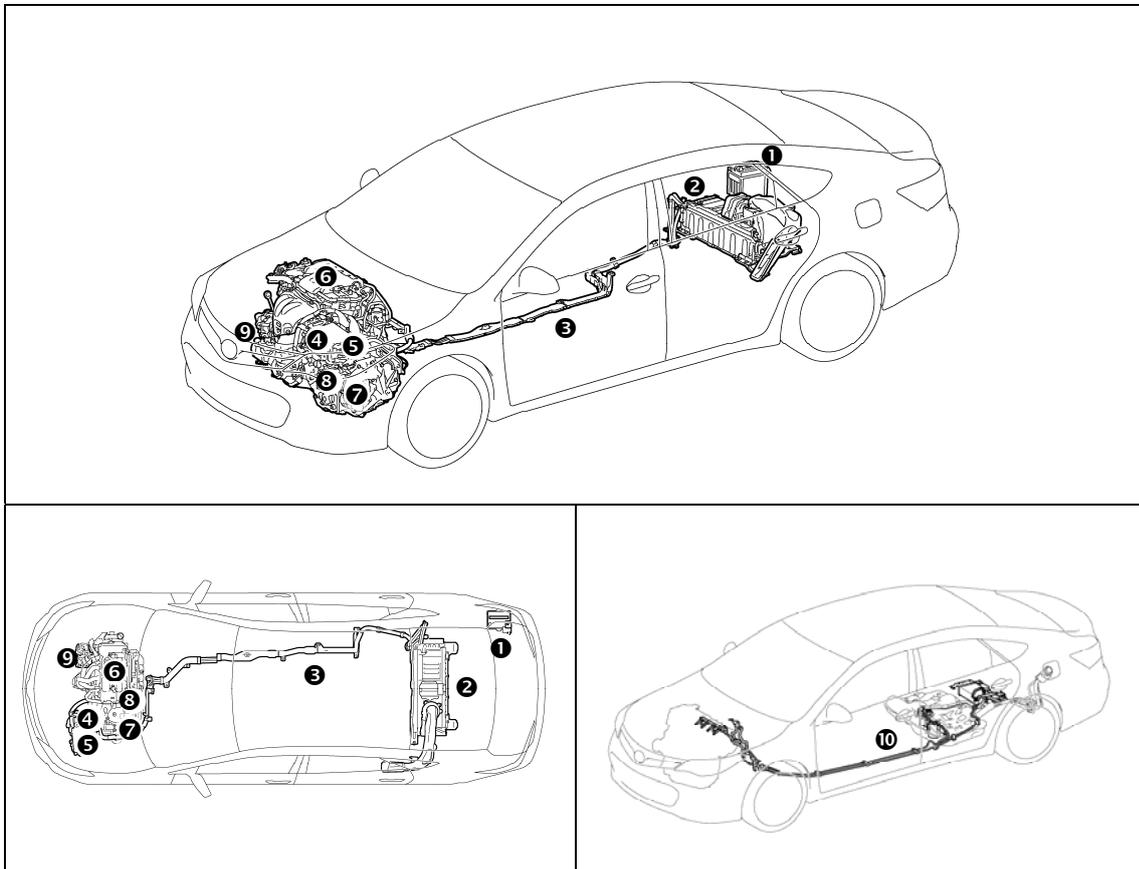
Curb Weight: 3,594 - 3,638 lbs/1,630 - 1,650 kg

Fuel Tank: 17 gals/64 liters

Frame Material: Steel Unibody

Body Material: Steel Panels

Seating Capacity: 5 passenger

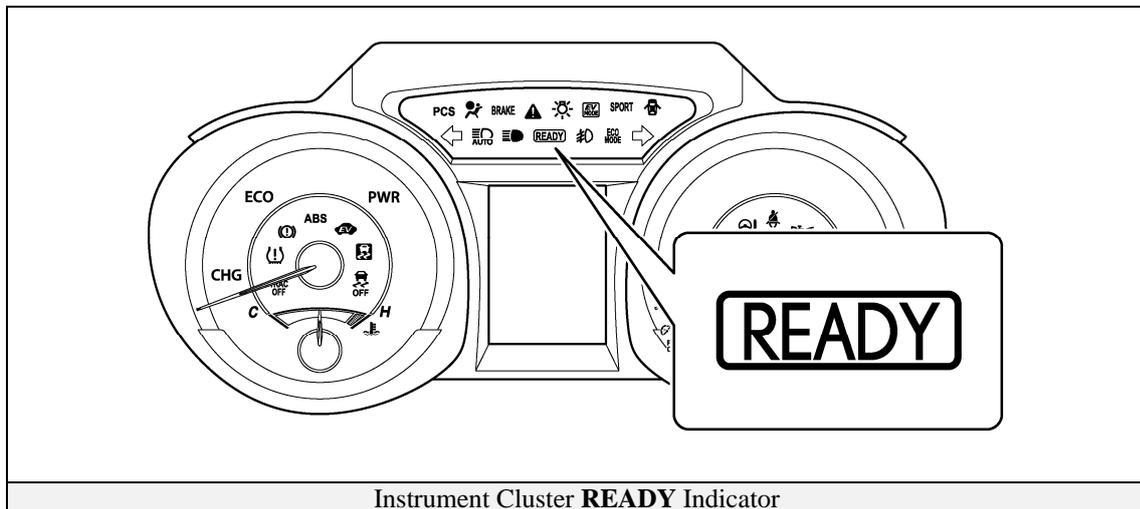


## Hybrid Synergy Drive Operation

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 lit, 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 AVALON 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. A combination of both the electric motor and the gasoline engine.



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

The AVALON 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 trunk area behind the rear seat. The metal case is isolated from high voltage and concealed by fabric covers in the trunk.
- The HV battery pack consists of 34 low voltage (7.2 Volt) NiMH battery modules connected in series to produce approximately 244.8 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.

HV Battery Pack	
Battery pack voltage	244.8 V
Number of NiMH battery modules in the pack	34
NiMH battery module voltage	7.2 V
NiMH battery module dimensions (Width x Length x Height)	10.9 x 0.8 x 4.2 in (276 x 19.6 x 106 mm)
NiMH module weight	2.2 lbs (1 kg)
NiMH battery pack dimensions (Width x Length x Height)	32.1 x 17.5 x 12.9 in (817 x 445 x 325 mm)
NiMH battery pack weight	102.5 lbs (46.5 kg)

Note: Values in inches have been rounded

### Components Powered by the HV Battery Pack

- Electric Motor
- Electric Generator
- Inverter/Converter
  - DC-DC Converter for 12 Volt Auxiliary Battery
- Power Cables
- A/C Compressor

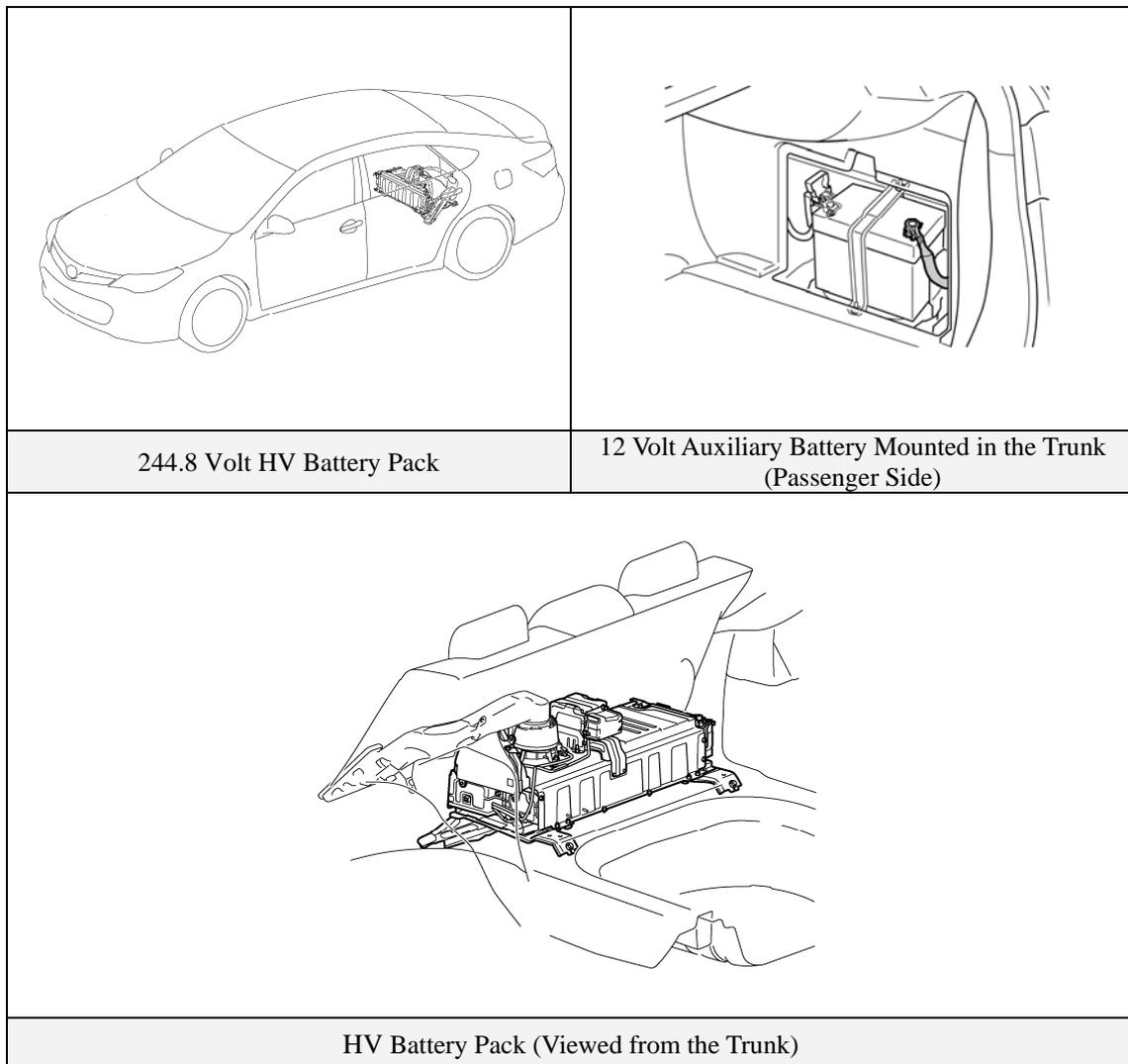
## Hybrid Vehicle (HV) Battery Pack and Auxiliary Battery (Continued)

### HV Battery Pack Recycling

- The HV battery pack is recyclable. Contact either your Toyota Distributor as mentioned on HV battery Caution Label (see page 29) or the nearest Toyota dealer.

### Auxiliary Battery

- The AVALON Hybrid contains a sealed 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 negative terminal of the auxiliary battery is grounded to the metal chassis of the vehicle.
- The auxiliary battery is located in the trunk. It is concealed by a plastic resin cover on the passenger side in the rear quarter panel well.



## 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 244.8 to 650 Volts DC. The inverter/converter creates 3-phase AC to power the motor. Power cables are routed from the inverter/converter to each high voltage motor (electric motor, 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 electrical 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.***

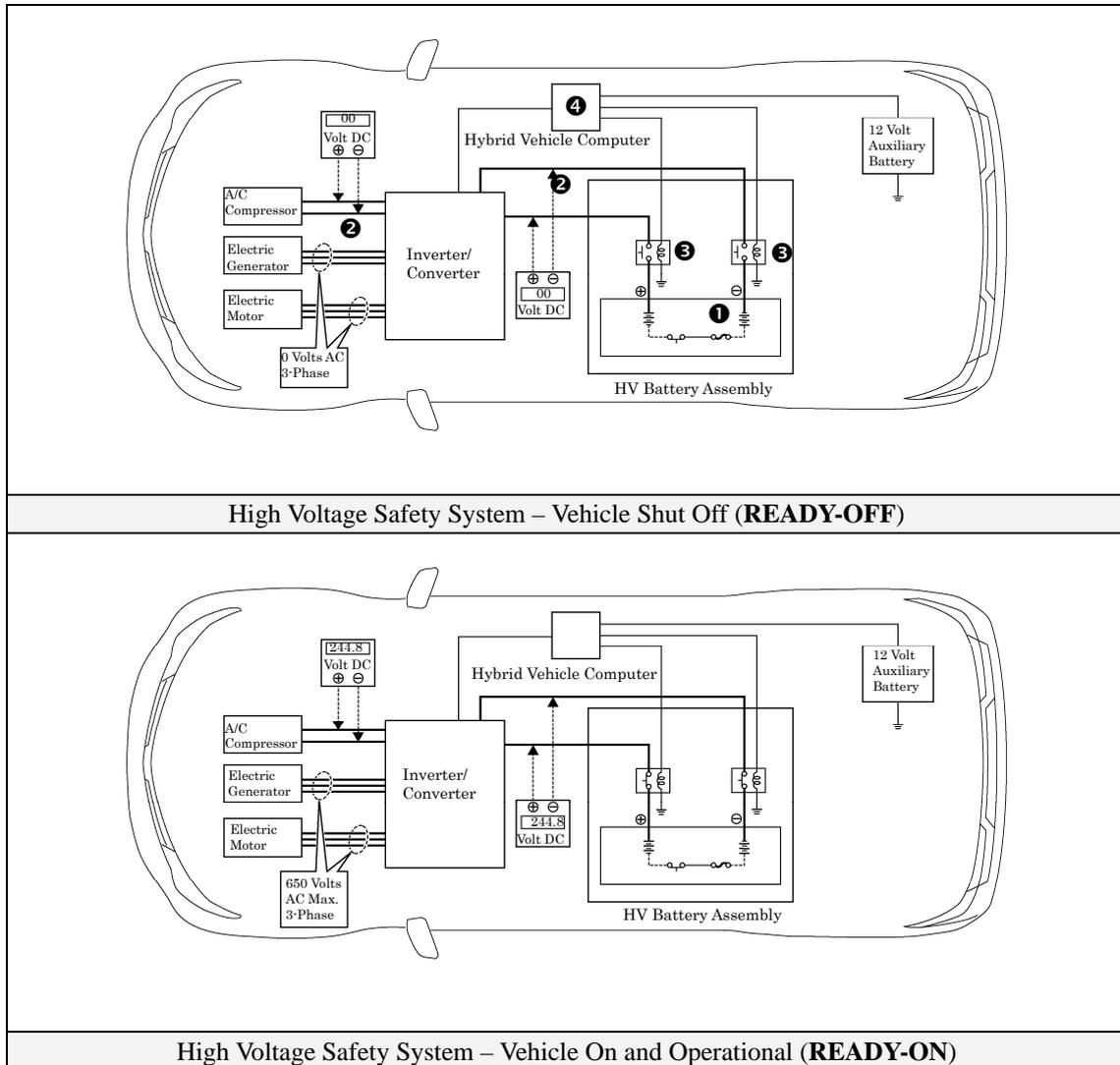
- Both positive and negative power cables ❷\* are insulated from the metal body. High voltage electricity flows through these cables and not through the metal vehicle body. The metal vehicle body is safe to touch because it is insulated from the high voltage components.
- A ground fault monitor in the hybrid vehicle computer ❹\* 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 AVALON 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 Product Safety Data Sheets (PSDS) 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 3 pages contain general instructions for use when working on an AVALON Hybrid. Read these instructions before proceeding to the HV battery removal instructions on page 18.

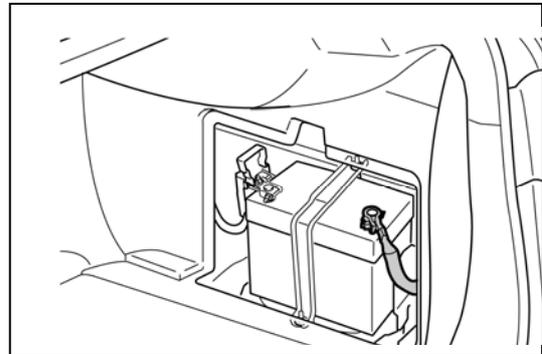


### **WARNING:**

- **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.**

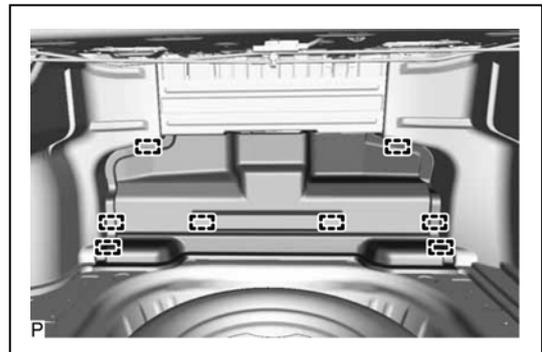
1. Shut off the ignition (**READY** indicator is off). Then disconnect the cable from the auxiliary battery negative (-) terminal.

- (1) Remove the 3 deck boards.
- (2) Remove the auxiliary boxes.
- (3) Disconnect the battery negative terminal.



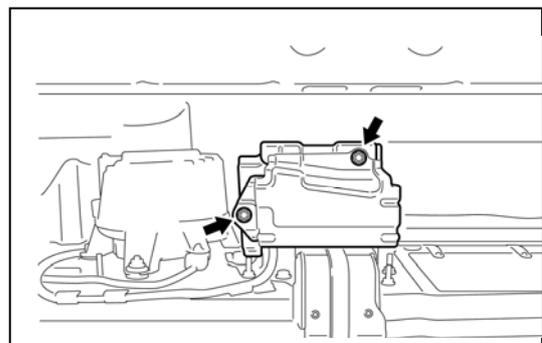
2. Remove luggage compartment front trim cover.

- (1) Disengage the 8 fasteners to remove the luggage compartment front trim cover.



3. Remove No. 8 hybrid vehicle battery shield panel.

- (1) Remove the 2 nuts and No. 8 hybrid vehicle battery shield panel.

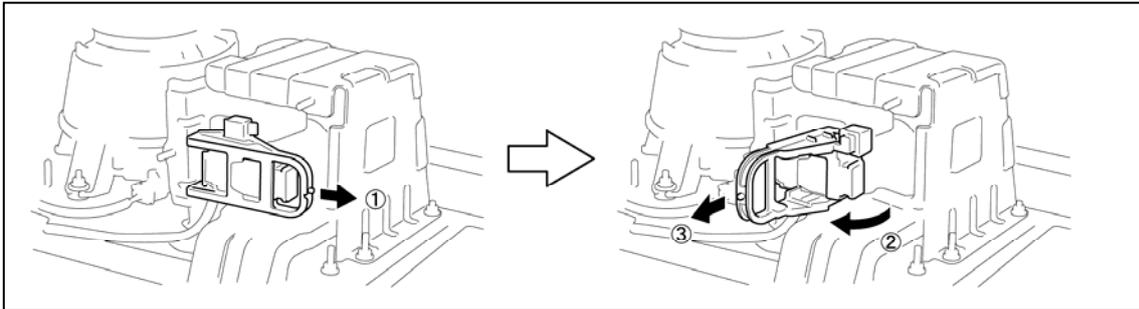


4. Remove the service plug grip.

**Caution:**

**Wear insulated gloves for the following 3 steps.**

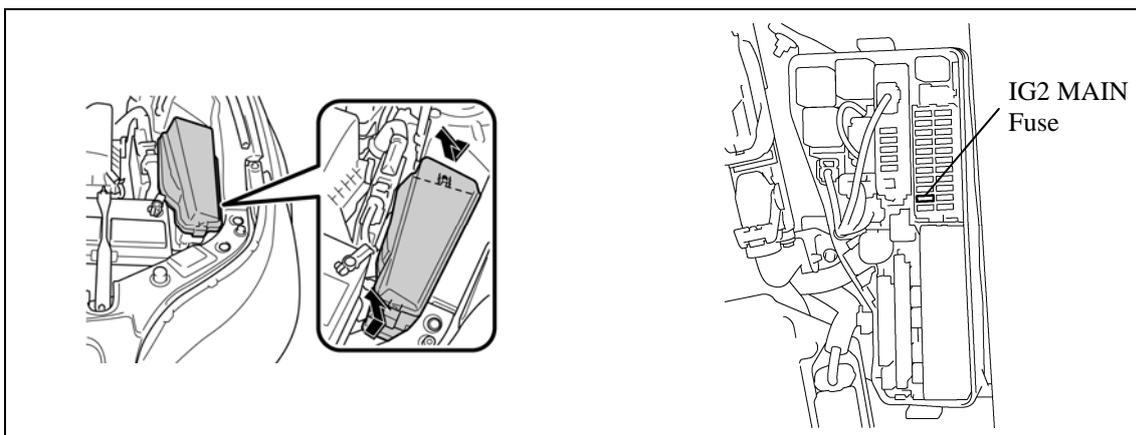
- (1) Slide the handle of the service plug grip to the right.
- (2) Raise the release handle of the service plug grip.
- (3) Remove the service plug grip.
- (4) Apply insulating tape to the socket of the service plug grip to insulate it.



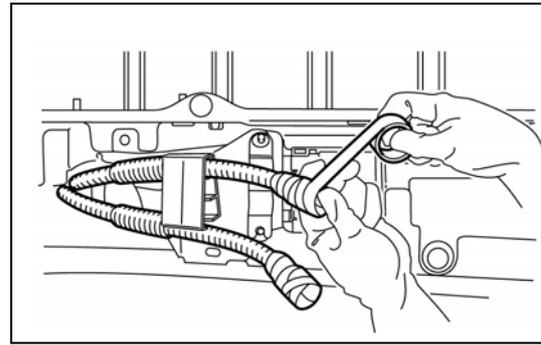
5. Carry the removed service plug grip in your pocket to prevent other staff from accidentally reinstalling it while you are dismantling the vehicle.
6. Make other staff aware that a high-voltage system is being dismantled by using the following sign: CAUTION: HIGH-VOLTAGE. DO NOT TOUCH. (see page 18).
7. If the service plug grip cannot be removed due to damage to the vehicle, remove the **IG2 MAIN** fuse (25A).

**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.**



8. 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.



9. 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.

10. 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.

11. 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.

12. With the exception of the HV battery, remove parts by following procedures which are similar to conventional Toyota 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.

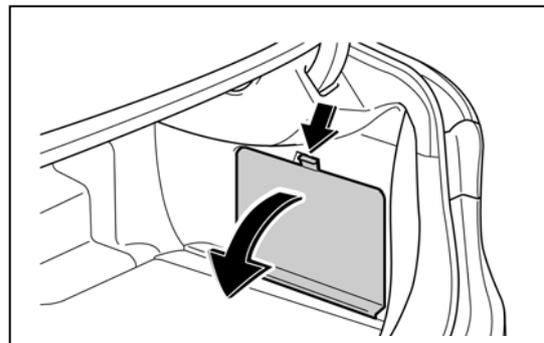
## Removal of HV battery



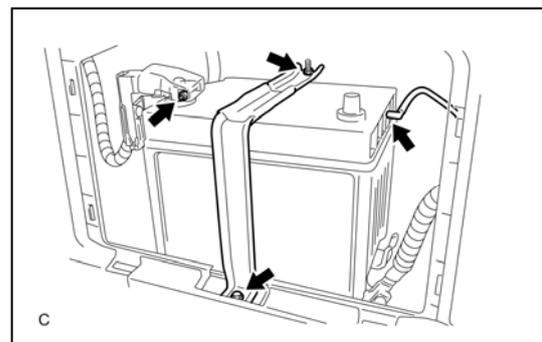
### **WARNING:**

- **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 IGNITION (READY indicator is off)
2. REMOVE LUGGAGE TRIM SERVICE HOLE COVER



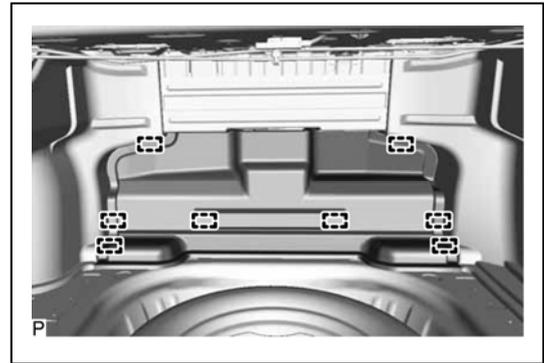
3. REMOVE 12 V AUXILIARY BATTERY
  - (1) Open the auxiliary battery terminal cap.
  - (2) Loosen the nut, and disconnect the cable from the positive (+) auxiliary battery terminal.
  - (3) Disconnect the auxiliary battery hose.
  - (4) Loosen the nut and remove the bolt.
  - (5) Remove the auxiliary battery clamp.
  - (6) Remove the auxiliary battery.



4. REMOVE LUGGAGE COMPARTMENT FLOOR MAT

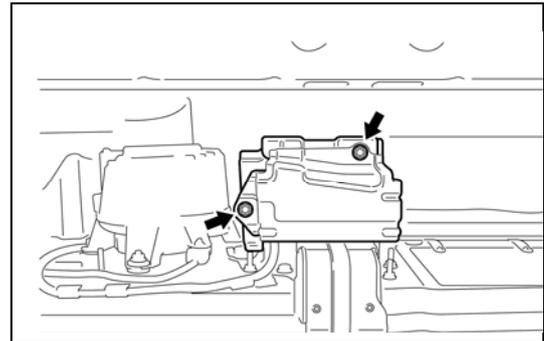
5. REMOVE LUGGAGE COMPARTMENT FRONT TRIM COVER

- (1) Disengage the 8 fasteners to remove the luggage compartment front trim cover.



6. REMOVE NO. 8 HYBRID VEHICLE BATTERY SHIELD PANEL

- (1) Remove the 2 nuts and No. 8 hybrid vehicle battery shield panel.

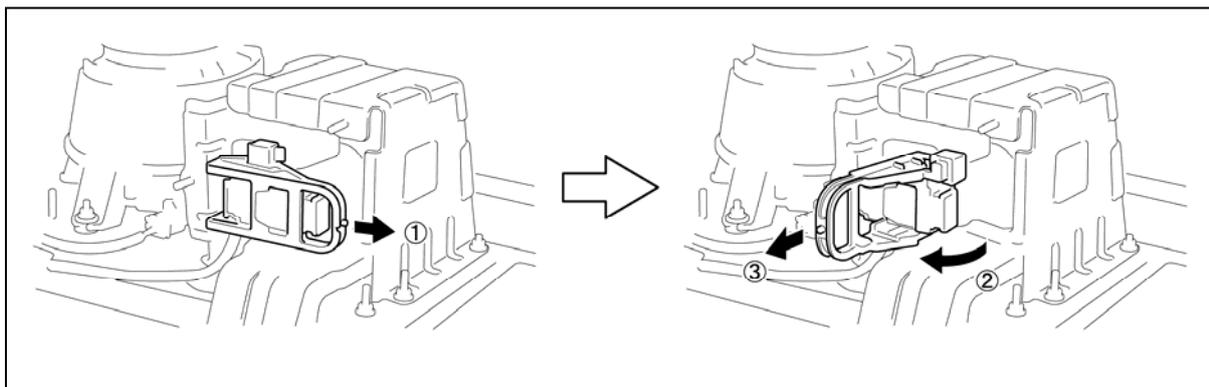


7. REMOVE SERVICE PLUG GRIP

**Caution:**

**Wear insulated gloves for the following 3 steps.**

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

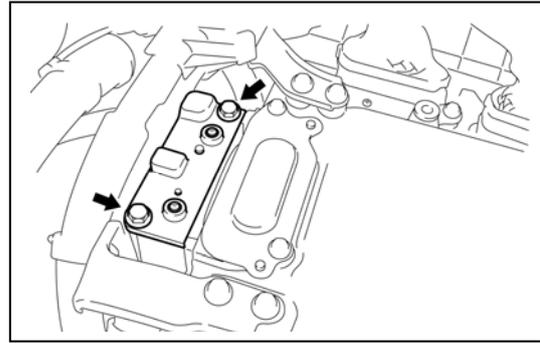


8. REMOVE CONNECTOR COVER ASSEMBLY

**Caution:**

**Wear insulated gloves.**

- (1) Remove the 2 bolts and connector cover assembly.



9. CHECK TERMINAL VOLTAGE

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

**Caution:**

**Wear insulated gloves.**

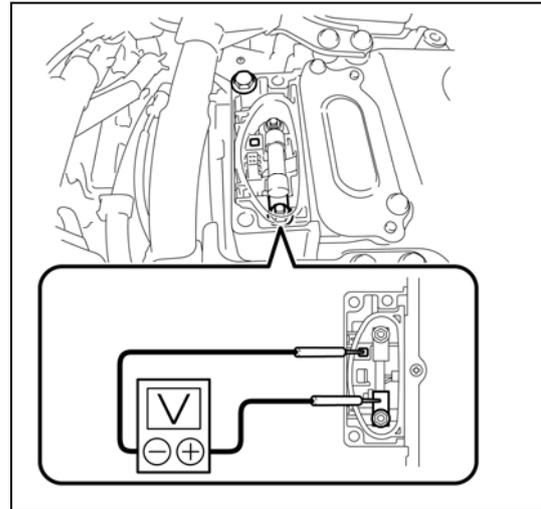
**To prevent serious injury or death, do not proceed with dismantling of the HV system until the voltage at the terminals in the inspection point is 0 V.**

**Standard voltage: 0 V**

**Hint:**

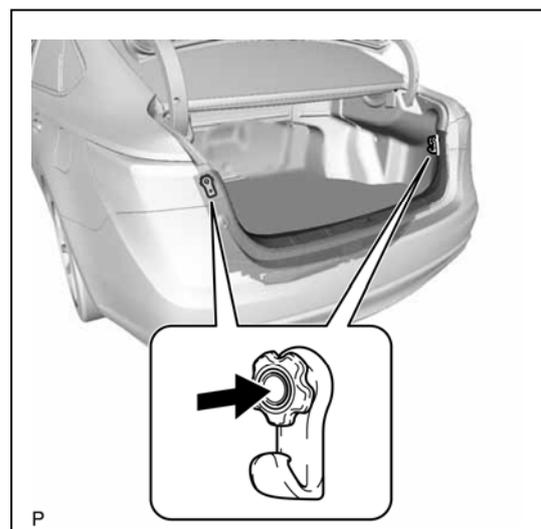
Set the tester to the DC 750 Volts range to measure the voltage.

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



10. REMOVE NO. 1 LUGGAGE COMPARTMENT TRIM HOOK

- (1) Push the 2 pins and remove the 2 No. 1 luggage compartment trim hooks.

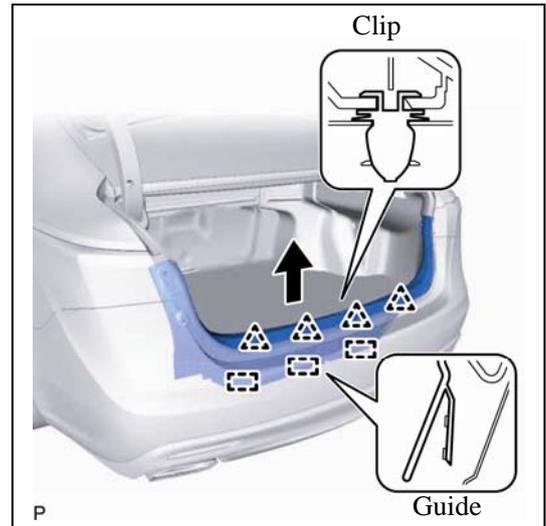


## 11. REMOVE REAR FLOOR FINISH PLATE

(1) Using a clip remover, remove the 2 clips.

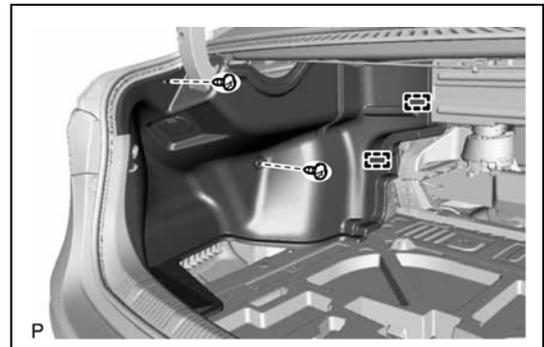


(2) Disengage the 4 clips and 3 guides to remove the rear floor finish plate as shown in the illustration.



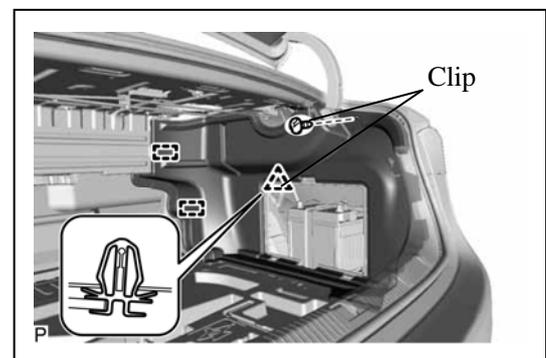
## 12. REMOVE LUGGAGE COMPARTMENT INNER TRIM COVER LH

- (1) Using a clip remover, remove the 2 clips.
- (2) Disengage the 2 fasteners to remove the luggage compartment inner trim cover LH.



## 13. REMOVE LUGGAGE COMPARTMENT INNER TRIM COVER RH

- (1) Using a clip remover, remove the 2 clips.
- (2) Disengage the 2 fasteners to remove the luggage compartment inner trim cover RH.

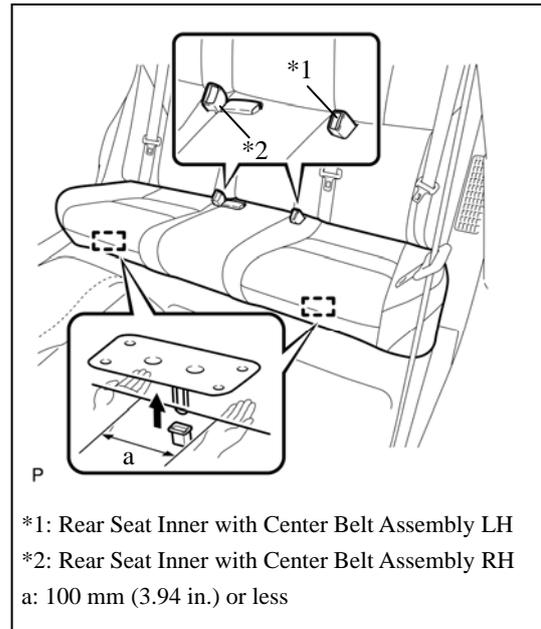


## 14. REMOVE REAR SEAT HEADREST ASSEMBLY

## 15. REMOVE REAR SEAT CUSHION

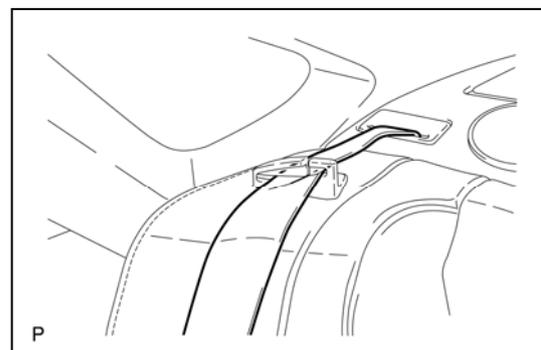
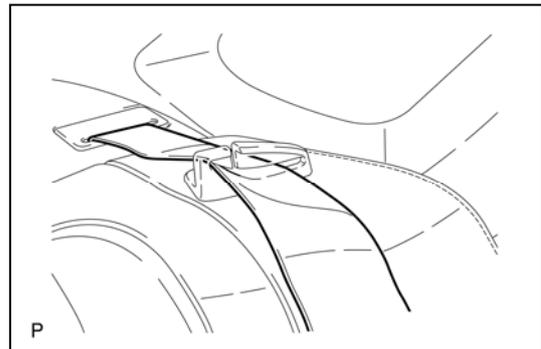
### ASSEMBLY

- (1) Disengage the 2 hooks on the front side of the rear seat cushion assembly from the vehicle body as shown in the illustration.
  - a) Choose a hook to disengage first. Place your hands near the hook as shown in the illustration. Then lift the rear seat cushion to disengage the hook.
  - b) Repeat the step above for the other hook.
- (2) Pass the buckle of the rear seat inner with center belt assembly LH and buckle of the rear seat inner with center belt assembly RH through the slit of the rear seat cushion assembly.
- (3) w/ Seat Heater System:
  - a) Disconnect the 2 seat heater assembly connectors.
- (4) Remove the rear seat cushion assembly.

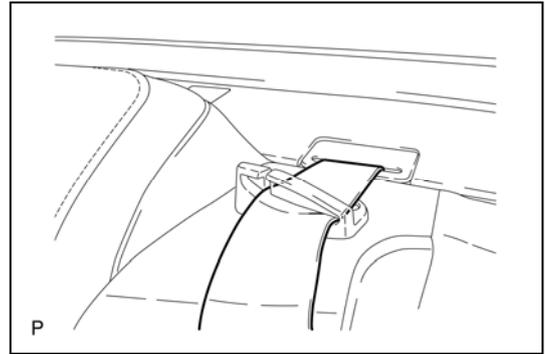


## 16. REMOVE REAR SEATBACK ASSEMBLY

- (1) Disconnect the rear seat outer belt assembly LH from the rear seat shoulder belt guide LH.
- (2) Disconnect the rear seat outer belt assembly RH from the rear seat shoulder belt guide RH.



- (3) Disconnect the rear seat inner with center belt assembly LH from the rear seat shoulder belt guide LH.

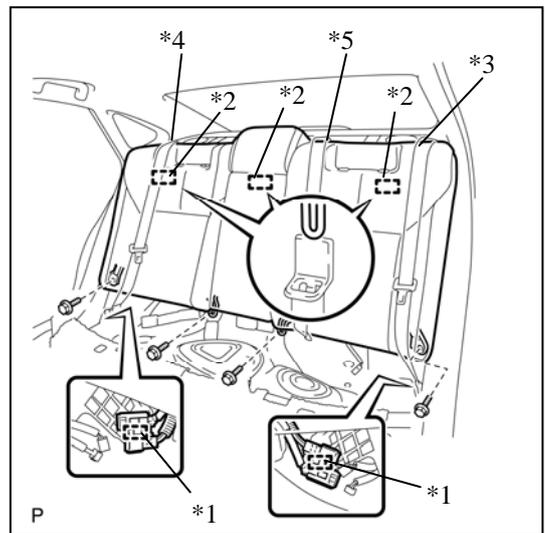


- (4) Disconnect the 2 rear seat airbag assembly connectors.  
 (5) w/ Seat Heater System:  
 a) Disconnect the 2 seat heater assembly connectors.  
 (6) Disengage the 2 clamps.

Text in Illustration

*1	Clamp
*2	Hook
*3	Rear Seat Outer Belt Assembly LH
*4	Rear Seat Outer Belt Assembly RH
*5	Rear Seat Inner with Center Belt Assembly LH

- (7) Remove the 4 bolts.  
 (8) Disconnect the rear seat outer belt assembly LH, rear seat inner with center belt assembly LH and rear seat outer belt assembly RH from the rear seatback assembly.  
 (9) Disengage the 3 hooks and remove the rear seatback assembly.

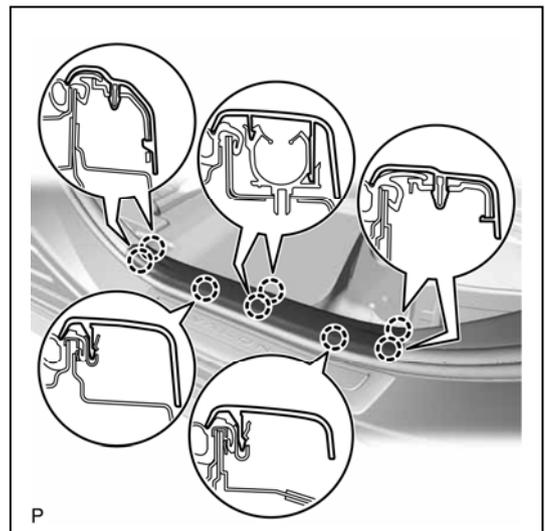


#### 17. REMOVE REAR DOOR SCUFF PLATE LH

- (1) Disengage the 8 claws and remove the rear door scuff plate LH.

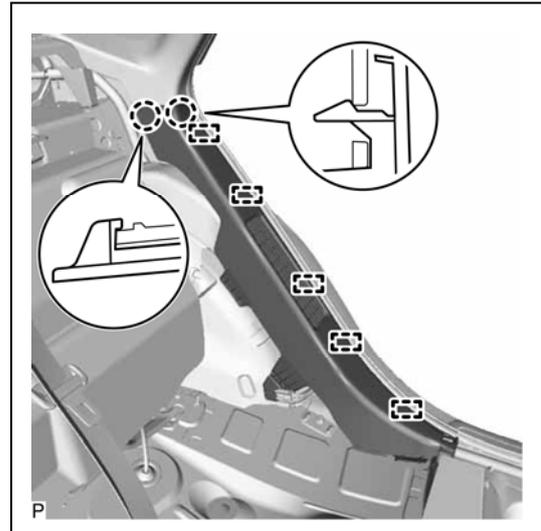
#### 18. DISCONNECT REAR DOOR OPENING TRIM WEATHERSTRIP LH

- (1) Disconnect the rear door opening trim weatherstrip LH.



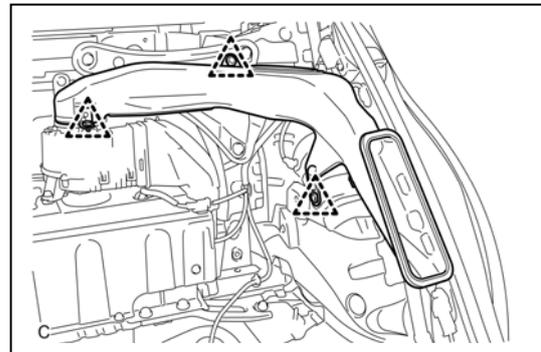
### 19. REMOVE REAR SEAT SIDE GARNISH LH

- (1) Disengage the 2 claws and 5 clamps, and remove the rear seat side garnish LH.



### 20. REMOVE NO. 1 HYBRID BATTERY INTAKE DUCT

- (1) Remove the 3 clips and No. 1 hybrid battery intake duct.



### 21. REMOVE NO. 4 HYBRID BATTERY SHIELD PANEL

**Caution:**

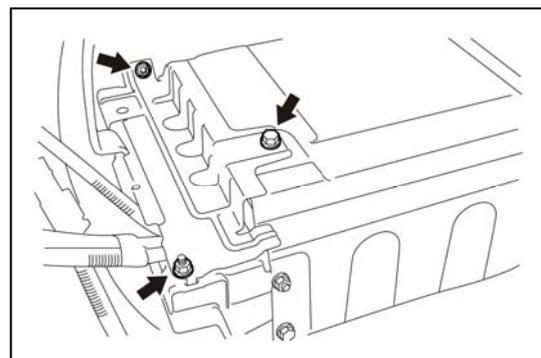
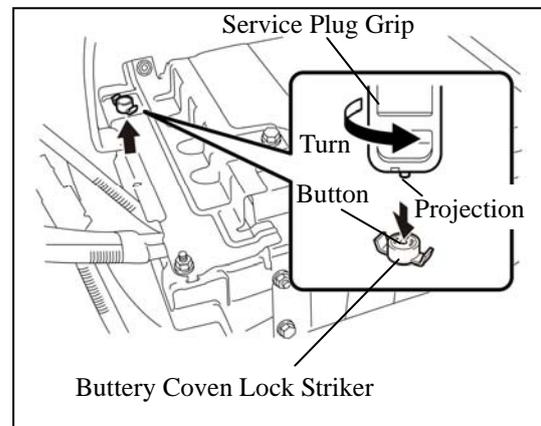
**Wear insulated gloves for the following 2 steps.**

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

**Hint:**

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

- (2) Remove the bolt, 2 nuts and No. 4 hybrid battery shield panel.



## 22. DISCONNECT NO. 4 FLOOR WIRE

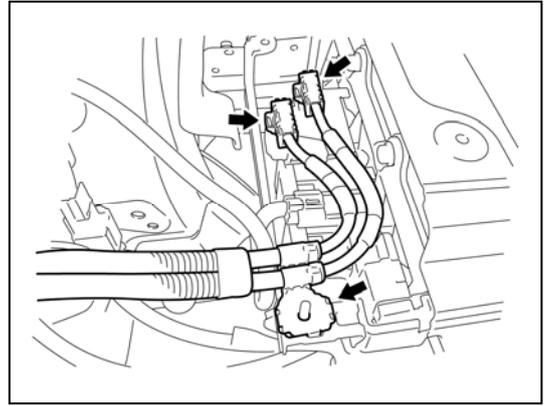
**Caution:**

**Wear insulated gloves.**

**Notice:**

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

- (1) Disconnect the 2 connectors shown in the illustration.
- (2) Disconnect the shielded wire ground and disconnect the No. 4 floor wire.

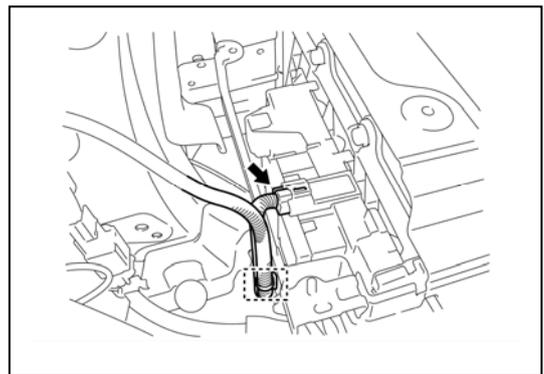


## 23. REMOVE HV BATTERY

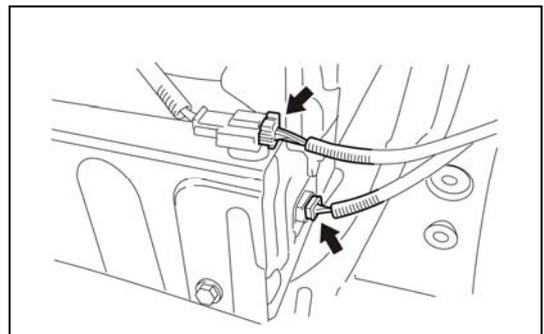
**Caution:**

**Wear insulated gloves.**

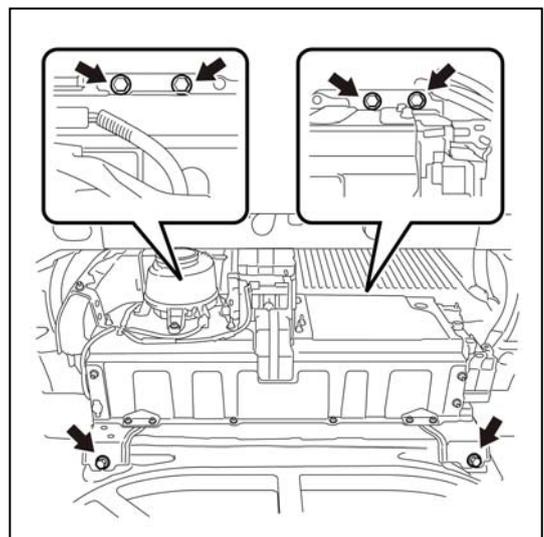
- (1) Disconnect the connector and wire harness clamp.



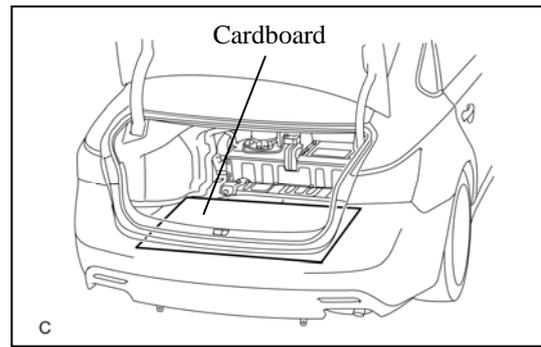
- (2) Disconnect the 2 connectors.



- (3) Remove the 6 bolts from the HV battery.



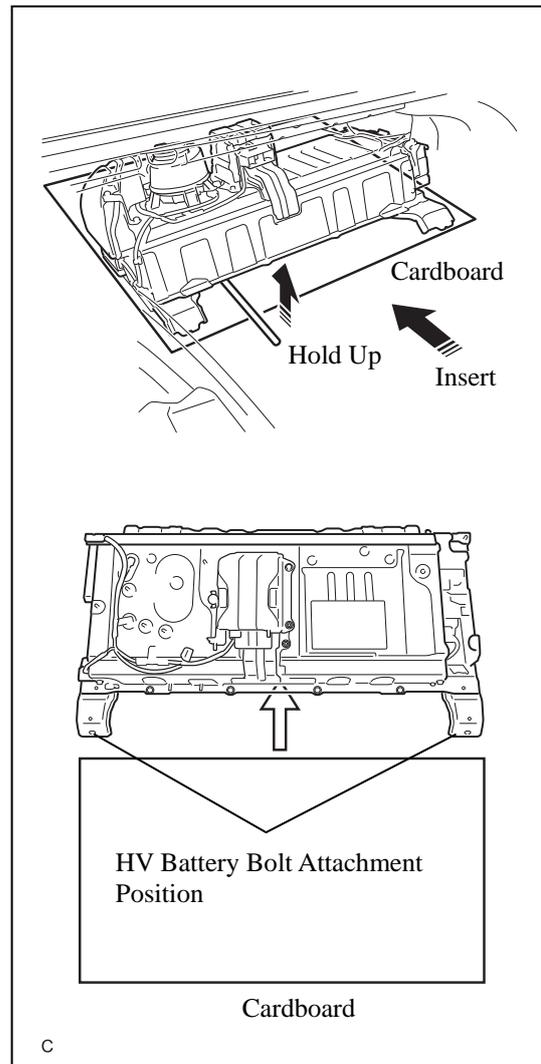
- (4) Place a piece of cardboard in the luggage compartment.



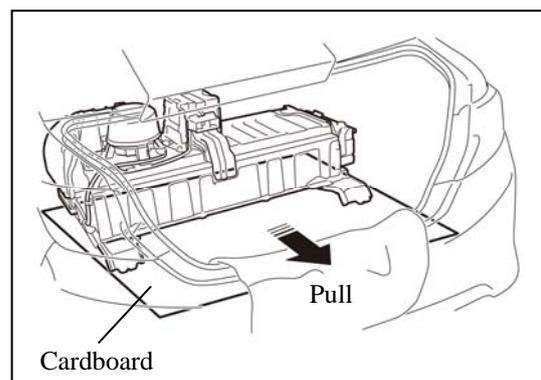
- (5) Cut and shape a piece of cardboard so that it fits the area between the HV battery bolt attachment positions, and then insert it as shown in the illustration.
- (6) Using a tire lever to hold up the HV battery, insert the cardboard until it cannot be inserted any further.

**Notice:**

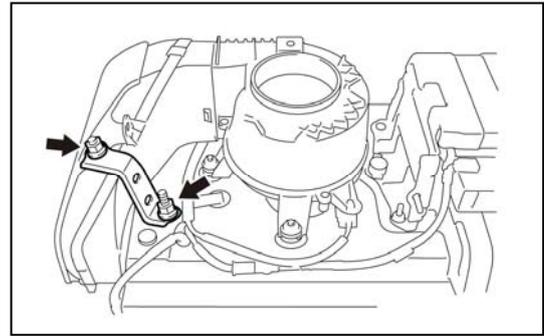
**Secure the frame wire with electrical tape to prevent it from getting caught when moving the HV battery or other parts.**



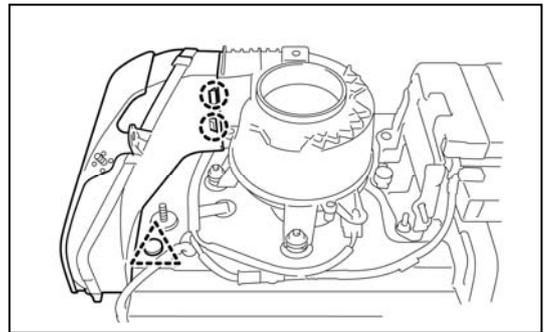
- (7) Pull the cardboard and HV battery together to the middle of the luggage compartment.



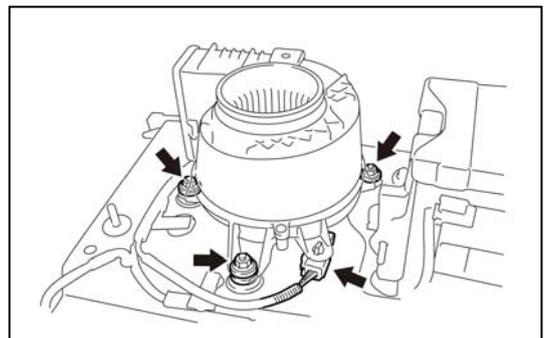
- (8) Remove the 2 nuts and No. 2 hybrid vehicle battery upper cover bracket.



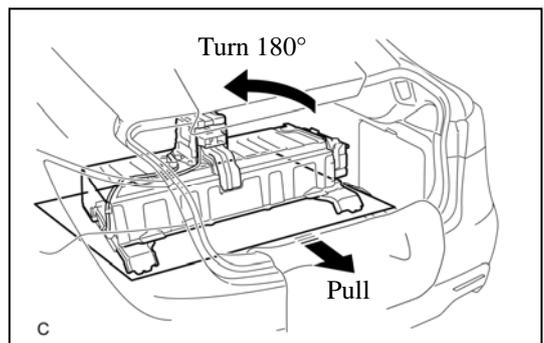
- (9) Remove the clip.  
(10) Disengage the 2 claws and remove the No. 2 hybrid battery intake duct.



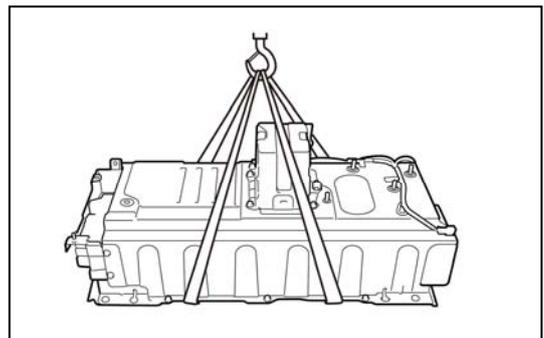
- (11) Disconnect the connector from the battery cooling blower assembly.  
(12) Remove the 3 nuts and battery cooling blower assembly.



- (13) Turn the cardboard and HV battery 180° together.  
(14) Pull the HV battery together with the cardboard toward the rear of the vehicle.



- (15) Using a suitable adaptor such as a rope, remove the HV battery while tilting the HV battery.



24. The HV battery pack is recyclable. Contact your Toyota distributor (if included on the HV battery caution label) or contact the nearest Toyota dealer (see below 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**

<b>! DANGER</b>									
<b>High Voltage Inside / Alkaline Electrolyte</b>							<b>Ni-MH</b>		
<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> <ul style="list-style-type: none"> <li>●Never disassemble, convert or divert this battery unit or remove its covers. (Please have the battery serviced by your dealer or a Qualified Technician.)</li> <li>●Do not dump this unit illegally. It may result in pollution, death or serious injury.</li> <li>●Do not puncture or expose this unit to impact. ●Keep this unit away from a fire.</li> <li>●Do not water this unit. ●Keep children away from this unit.</li> </ul>									
<b>To Qualified Technicians, Haulers, Dismantlers</b>									
<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>									
<b>HV Battery Recycling Information</b>									
<p>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.</p>									
Residents in U.S.A.					Residents in PUERTO RICO				
◆TOYOTA MOTOR SALES U.S.A., INC. TORRANCE, CAL.90501 Phone:1-800-331-4331			◆SERVCO PACIFIC INC. HONOLULU, HAWAII 96813 Phone:800-839-2273		◆TOYOTA DE PUERTO RICO HATO REY, PUERTO RICO Phone : 787-751-1000			<b>B</b>	