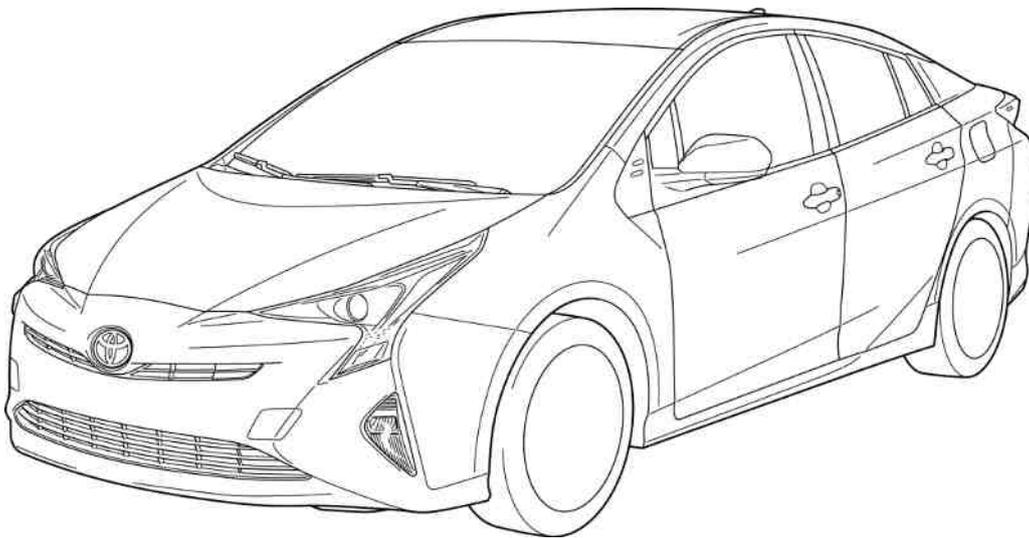




# PRIUS

*Gasoline-Electric  
Hybrid Synergy Drive*

## *HYBRID VEHICLE DISMANTLING MANUAL*



**ZVW5# Series**

This information is intended for use by professional dismantlers' only – Toyota New Zealand TNZ its officers, employees, agents, contractors, partners or suppliers accept no liability whatsoever for any loss, damage, liability or cost of any kind (whether in contract, tort (including negligence) or otherwise) arising directly or indirectly out of the use of this information.

## Foreword

This guide was developed to educate and assist dismantlers in the safe handling of Toyota PRIUS gasoline-electric hybrid vehicles. PRIUS 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 PRIUS, as they may not be familiar to dismantlers.

High voltage electricity powers the A/C compressor, electric motor, generator, and inverter/converter. All other conventional 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 PRIUS to help ensure the high voltage, approximately 201.6 Volt, Nickel Metal Hydride (NiMH) Hybrid Vehicle (HV) battery pack\*1 or Lithium-ion (Li-ion) Hybrid Vehicle (HV) battery pack\*2 is kept safe and secure in an accident.

The NiMH HV battery pack\*1 or the Lithium-ion (Li-ion) HV battery pack\*2 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.

\*1: for Nickel-Metal hydride battery

\*2: for Lithium-ion battery

Additional topics contained in the guide include:

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

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

For additional information contact 0800 TOYOTA or your local Toyota dealer.

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## About the PRIUS

The PRIUS 5-door hatchback joins the hybrid model for Toyota. Hybrid Synergy Drive means that the vehicle contains a gasoline engine, front electric motor and rear electric motor (for 4WD/AWD) for power.

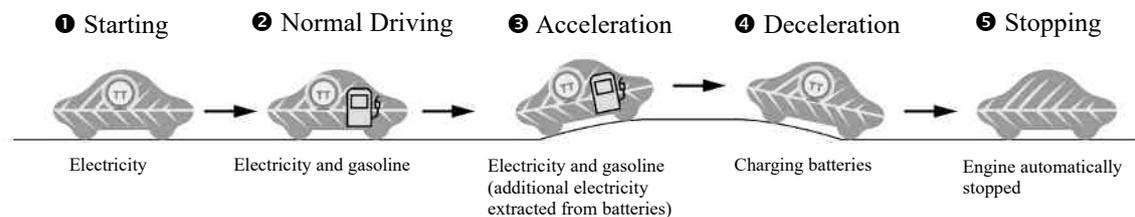
The two hybrid power sources are stored on board the vehicle:

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 front electric motor and rear 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 PRIUS 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 PRIUS operates in various driving modes.

- ❶ During light acceleration at low speeds, the vehicle is powered by the front electric motor and rear 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 electric motor.
- ❸ During full acceleration, such as climbing a hill, both the gasoline engine, the front electric motor and rear electric motor\* power the vehicle.
- ❹ During deceleration, such as when braking, the vehicle regenerates the kinetic energy from the front wheels to produce electricity that recharges the battery pack.
- ❺ While the vehicle is stopped, the gasoline engine, front electric motor and rear electric motor\* are off, however the vehicle remains on and operational.



\*: for 4WD/AWD

## PRIUS Identification

In appearance, the PRIUS is a 5-door hatchback. Exterior, interior, and engine compartment illustrations are provided to assist in identification.

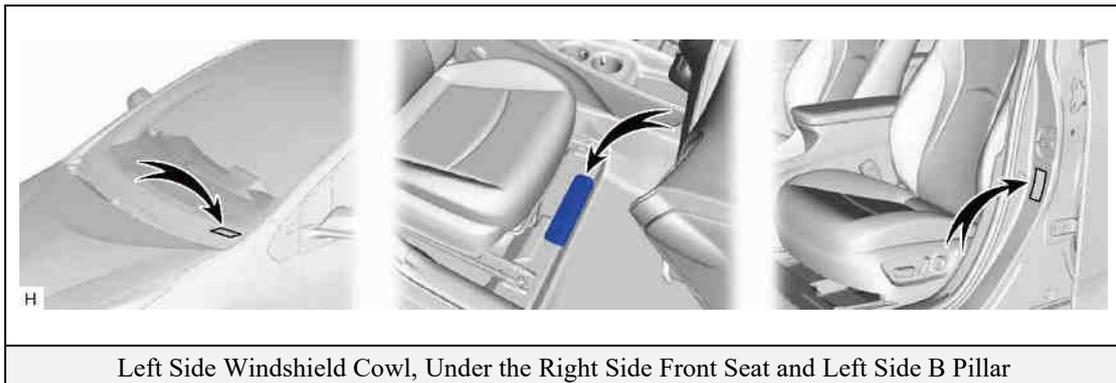
The alphanumeric 15 character Vehicle Identification Number (VIN) is provided on the floor under the right side front seat, left side windshield cowl and left side B pillar.

Example VIN:



A PRIUS is identified by the 5th alphanumeric character of the VIN.

①	Drive Type	Engine Series	Battery Type
A	2WD	2ZR-FXS	Lithium-ion battery
B	2WD	2ZR-FXS	Nickel-Metal hydride battery
9	4WD/AWD	2ZR-FXS	Nickel-Metal hydride battery

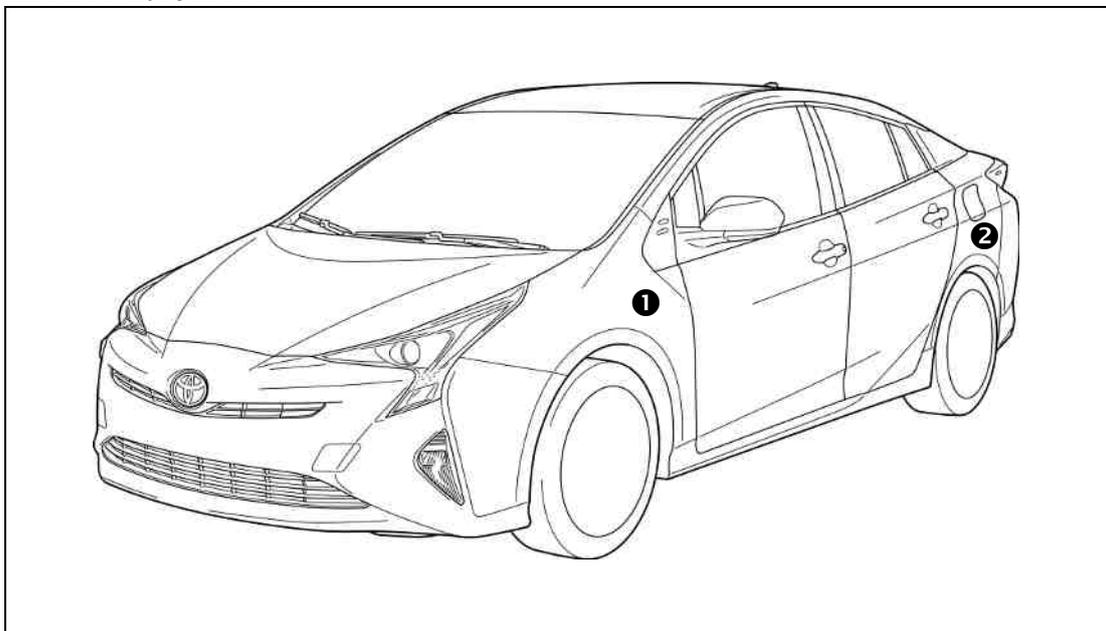


Left Side Windshield Cowl, Under the Right Side Front Seat and Left Side B Pillar

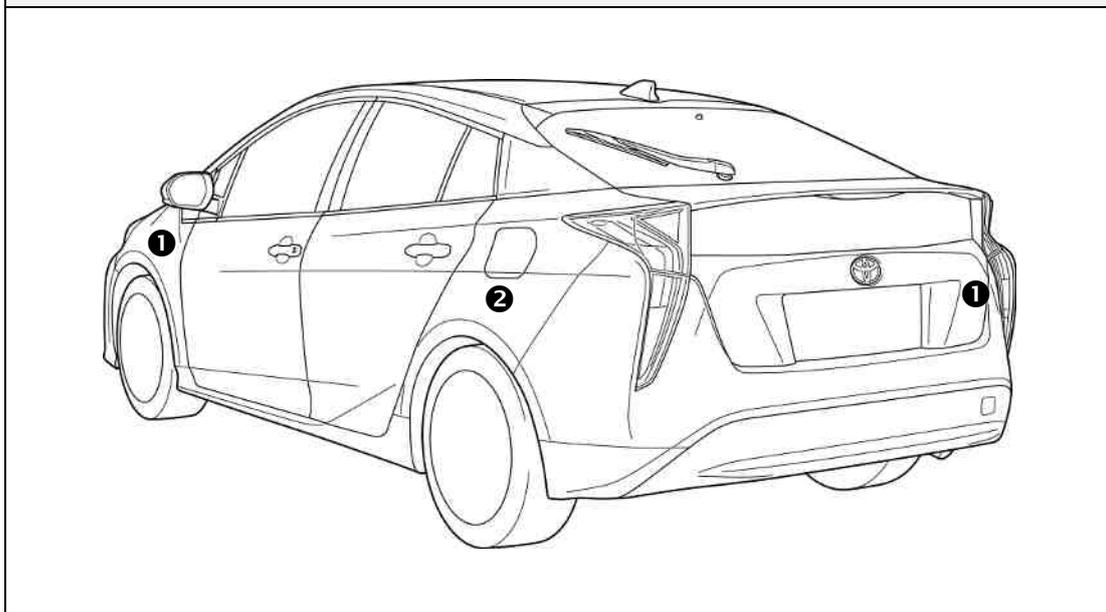
## Exterior

- 1 **HYBRID** logos on the luggage compartment door and each front fender.
- 2 Gasoline fuel filler door located on the left side rear quarter panel.

Before Dec. 2018 Production

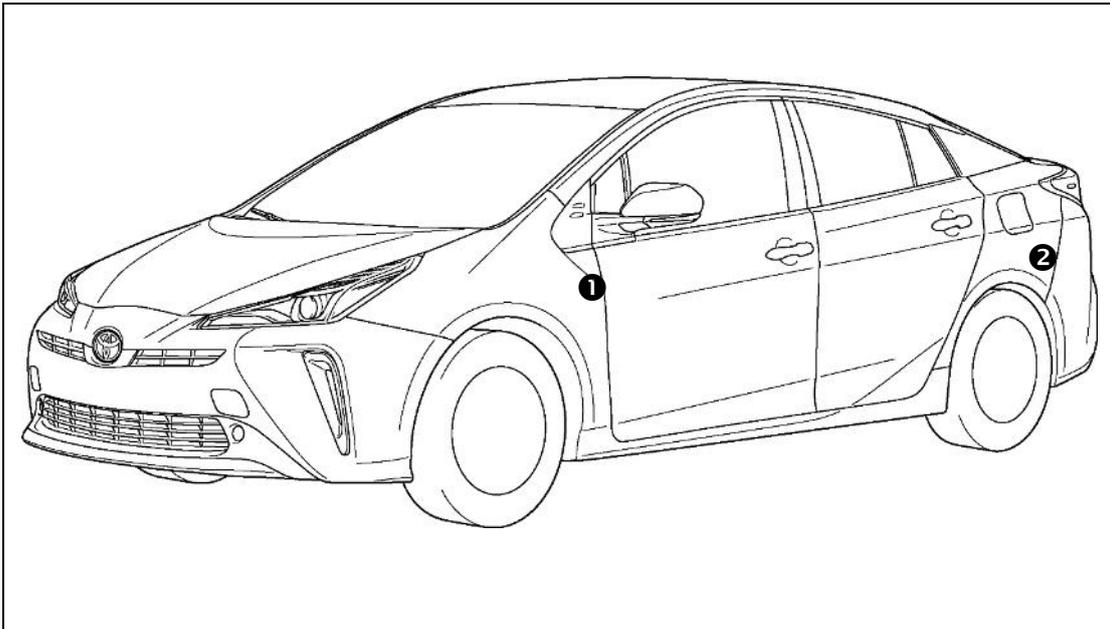


Exterior Front and Left Side View

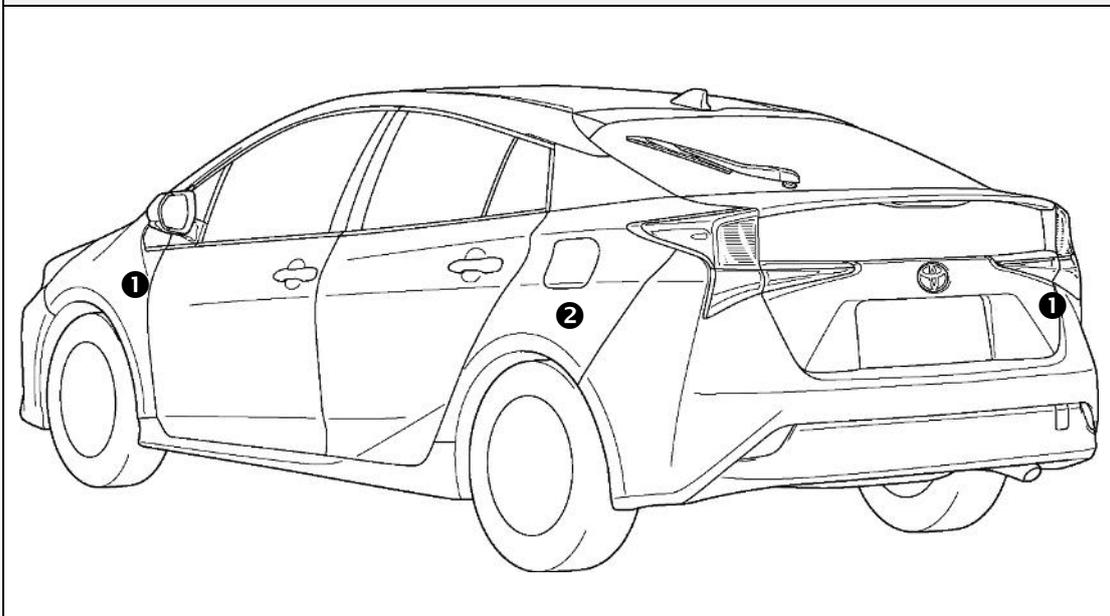


Exterior Rear and Left Side View

From Dec. 2018 Production



Exterior Front and Left Side View



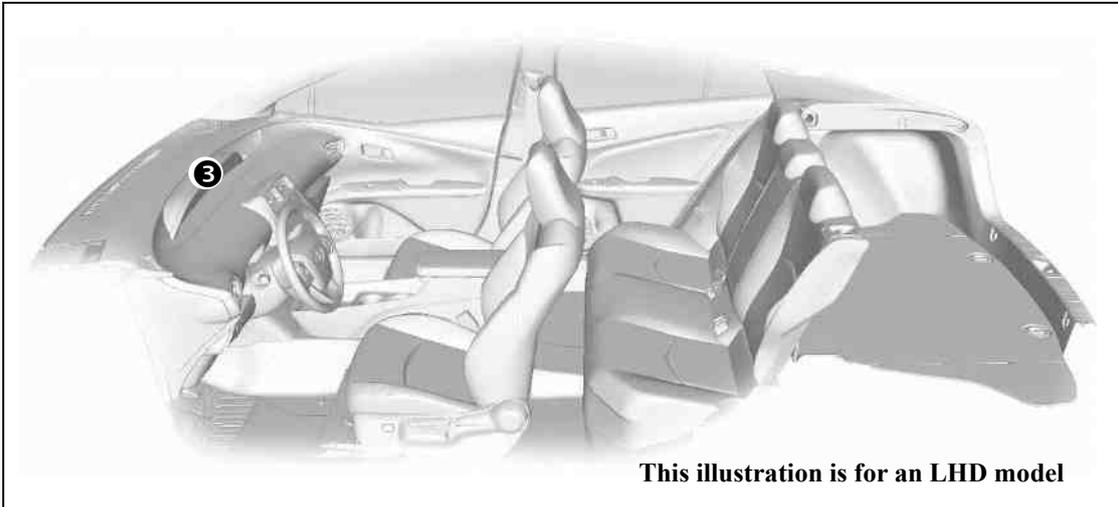
Exterior Rear and Left Side View

Interior

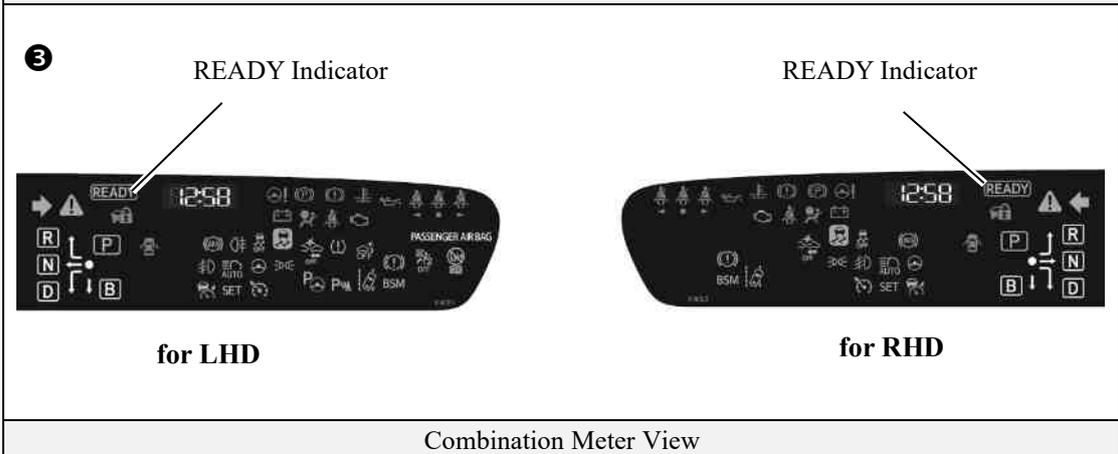
- ③ The instrument cluster (**READY** indicator, shift state indicators and warning lights) located in center of the dash and near the base of the windshield.

**Notice:**

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

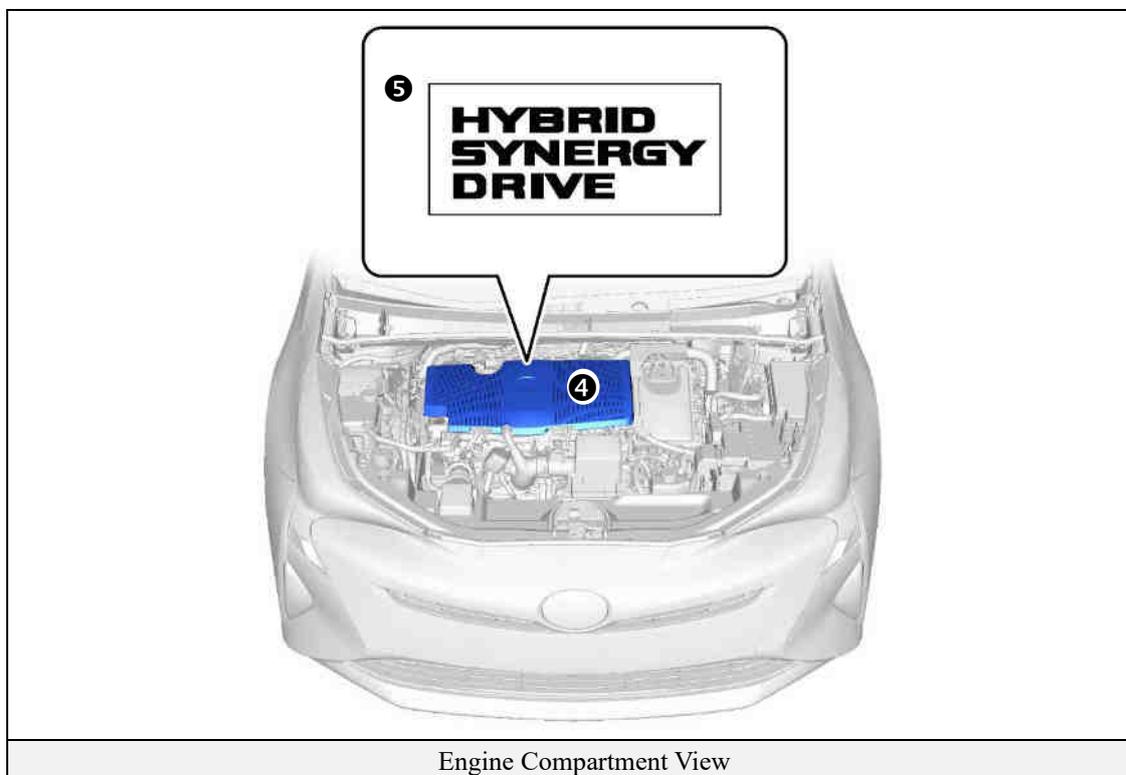


Interior View

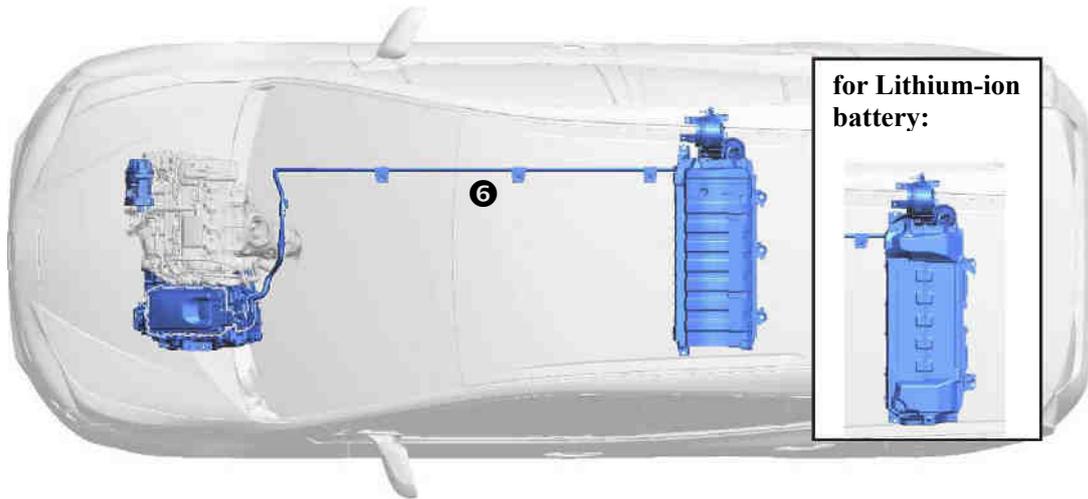


## Engine Compartment

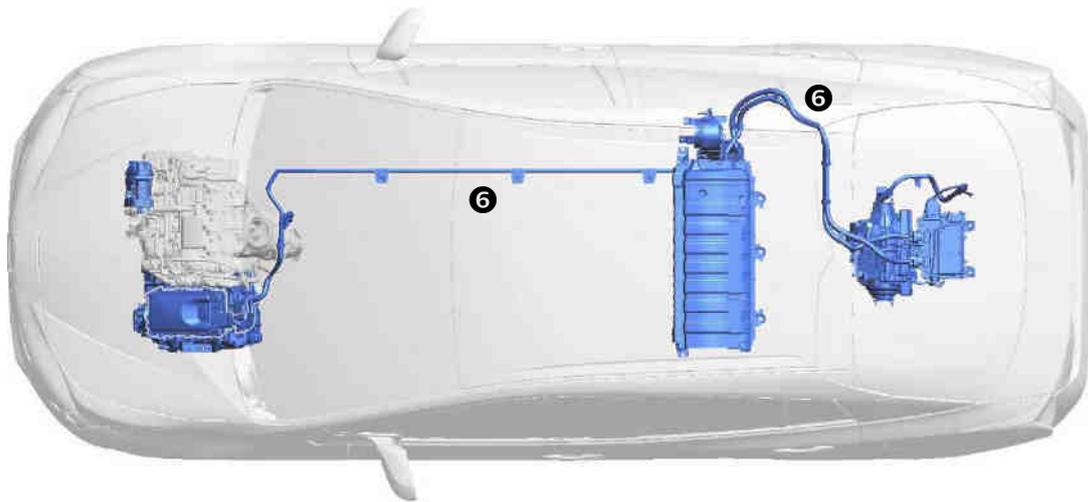
- ④ 1.8-liter aluminum alloy gasoline engine.
- ⑤ Logo on the engine cover.
- ⑥ Orange colored high voltage power cables.



**for 2WD (Nickel-Metal hydride battery)**



**for 4WD/AWD**



Power Cables

## Hybrid Component Locations & Descriptions

Component		Description
12 Volt Auxiliary Battery ❶		Supplies electricity to the electrical components.
Hybrid Vehicle (HV) Battery Pack ❷		<ul style="list-style-type: none"> <li>•Supplies electrical power to MG1, MG2 and MGR*1 in accordance with the driving conditions of the vehicle.</li> <li>•Recharged by MG1 and MG2 in accordance with the SOC and the driving conditions of the vehicle.</li> </ul>
Power Cables ❸		Connects the HV battery, inverter with converter assembly, hybrid vehicle transaxle assembly, rear drive unit (rear traction motor with transaxle assembly)*1 and compressor with motor assembly.
Inverter/ Converter ❹	DC-DC Converter ❺ for 12 Volt Auxiliary Battery	Steps down the HV battery nominal voltage of DC 201.6 V*1 / DC 207.2 V*2 to approximately DC 14 V in order to supply electricity to the electrical components, as well as to recharge the auxiliary battery.
	Motor Generator ECU	Controls the inverter and boost converter in accordance with the signals received from the hybrid vehicle control ECU, thus operating MG1 and MG2 as either a generator or motor.
	Boost Converter	Boosts the HV battery nominal voltage of DC 201.6 V*1 / DC 207.2 V*2 up to a maximum voltage of DC 600 V and vice versa (steps down DC 600 V to DC 201.6 V*1 / DC 207.2 V*2).
	Inverter	Converts the direct current from the boost converter into alternating current for MG1 and MG2, and vice versa (from AC to DC).
	Rear Inverter ❻	<ul style="list-style-type: none"> <li>•Takes current from the HV battery and branches it to the inverter with converter assembly.</li> <li>• Converts the HV battery current to 3-phase AC and supplies it to MGR.</li> </ul>
Gasoline Engine ❼		Is a high-expansion ratio Atkinson cycle engine which is compatible with the hybrid system and which generates drive force for driving and energy for electricity generation.

Component	Description
Front Electric Motor ⑧	<ul style="list-style-type: none"> <li>•MG2, which is driven by electrical power from MG1 and the HV battery, generates motive force for the drive wheels.</li> <li>•During braking, or when the accelerator pedal is not depressed, it generates high-voltage electricity to recharge the HV battery.</li> </ul>
Rear Electric Motor ⑨	MGR, which is driven by electrical power from MG1 and the HV battery, generates motive force for the drive wheels.
Electric Generator ⑩	MG1, which is driven by the engine, generates high-voltage electricity in order to operate MG2 and charge the HV battery. Also, it functions as a starter to start the engine.
A/C Compressor (with inverter) ⑪	Is driven at a speed calculated by the air conditioning amplifier assembly, receives drive requests from the hybrid vehicle control ECU and takes in, compresses and discharges refrigerant.
Fuel Tank and Fuel Line ⑫	The fuel tank provides gasoline via a fuel line to the engine. The fuel line is routed along the left side under the floor pan.

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

\*1: for Nickel-Metal hydride battery

\*2: for Lithium-ion battery

\*3: for 4WD/AWD Models

## Specifications

Gasoline Engine: 71 kW / 72 kW, 1.8-liter Aluminum Alloy Engine

Electric Motors

Front: 53 kW (71 HP), Permanent Magnet Motor

Rear: 5.3 kW (7.1 HP), Induction Motor

Transmission: Automatic Only

HV Battery: 201.6 Volt Sealed NiMH-Battery

207.2 Volt Sealed Li-ion-Battery

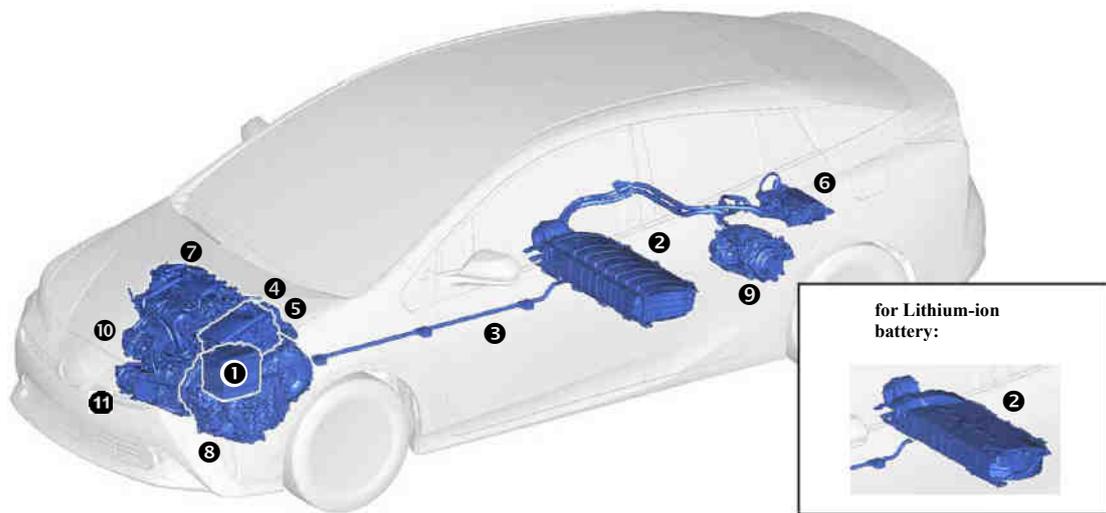
Curb Weight: 1,365 - 1,460 kg / 3010, – 3,219 lbs

Fuel Tank: 43 liters / 11.4 gals

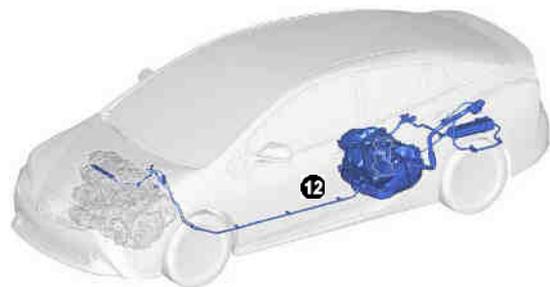
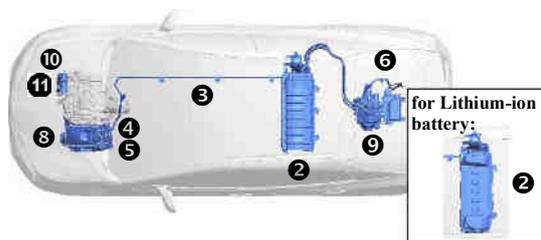
Frame Material: Steel Unibody

Body Material: Steel Panels

**for Nickel-Metal hydride battery:**



**for Nickel-Metal hydride battery:**



## Hybrid Synergy Drive Operation

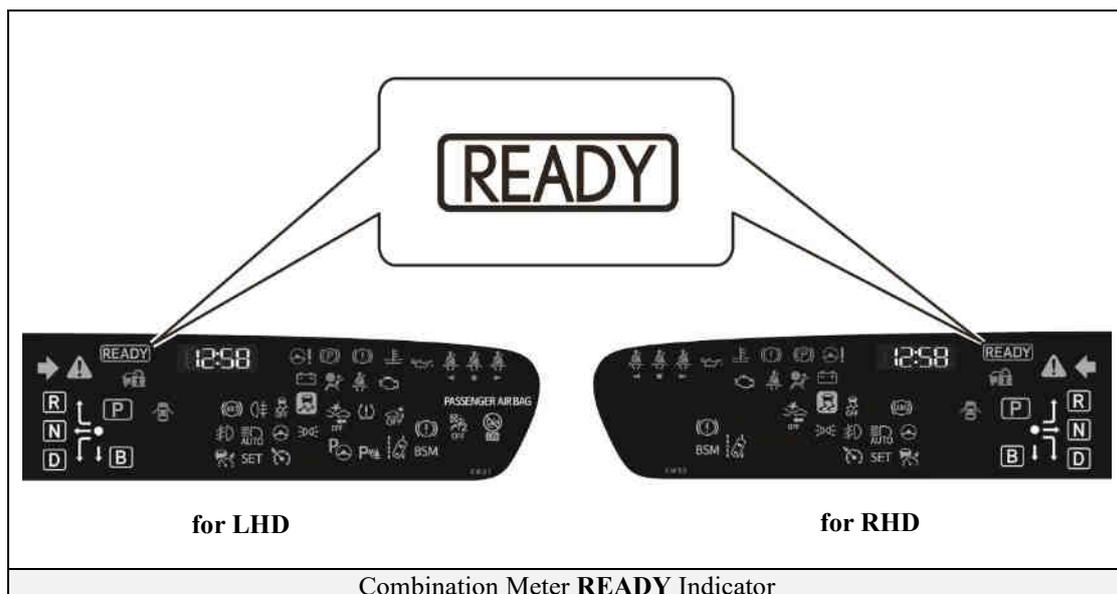
Once the **READY** indicator is illuminated in the combination meter, the vehicle may be driven. However, the gasoline engine does not idle like a typical automobile and will start and stop automatically. It is important to recognize and understand the **READY** indicator provided in the instrument cluster. 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 PRIUS, 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 PRIUS features a high voltage Hybrid Vehicle (HV) battery pack that contains sealed Nickel Metal Hydride (NiMH) battery modules\*1 or Lithium-ion (Li-ion) battery cells\*2.

\*1: for Nickel-Metal hydride battery

\*2: for Lithium-ion battery

### HV Battery Pack

#### **for Nickel-Metal hydride battery:**

- The HV battery pack is enclosed in a metal case and is rigidly mounted to the cabin area under the right side front seat. The metal case is isolated from high voltage and concealed by fabric covers in the cabin area.
- The HV battery pack consists of 28 low voltage (7.2 Volt) NiMH battery modules connected in series to produce approximately 201.6 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	201.6 V
Number of NiMH battery modules in the pack	28
NiMH battery module voltage	7.2 V

#### **for Lithium-ion battery:**

- The HV battery pack is enclosed in a metal case and is rigidly mounted to the cabin area under the right side front seat. The metal case is isolated from high voltage and concealed by fabric covers in the cabin area.
- The HV battery pack consists of 56 low voltage (3.7 Volt) Li-ion battery cells connected in series to produce approximately 207.2 Volts. Each Li-ion battery cell is non-spillable and in a sealed case.
- The electrolyte used in the Li-ion battery cells is a flammable organic electrolyte. The electrolyte is absorbed into the battery cell separator and will not normally leak, even in a collision.

HV Battery Pack	
Battery pack voltage	207.2 V
Number of Li-ion battery cells in the pack	56
Li-ion battery cell voltage	3.7 V

## Components Powered by the HV Battery Pack

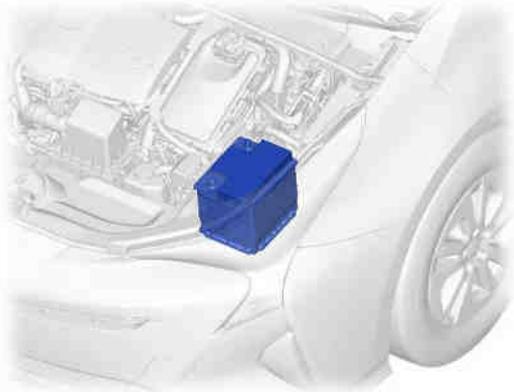
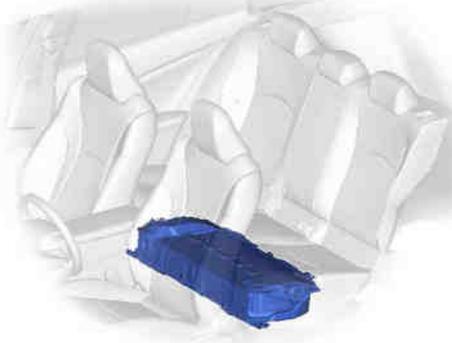
- Electric Motor
- Inverter/Converter
- A/C Compressor
- DC-DC Converter for 12 Volt Auxiliary Battery
- Rear Electric Motor (for 4WD/AWD)
- Power Cables
- Electric Generator

## HV Battery Pack Recycling

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

## Auxiliary Battery

- The PRIUS also 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 auxiliary battery is grounded to the metal chassis of the vehicle.
- The auxiliary battery is located in the luggage compartment area. It is concealed by a plastic resin cover on the right side in the battery compartment.

<p><b>for Nickel-Metal hydride battery:</b></p>  <p><b>for Lithium-ion battery:</b></p>	
<p>201.6*1 / 207.2*2 Volt HV Battery Pack</p>	<p>12 Volt Auxiliary Battery Mounted in Engine Compartment Area</p>
<p><b>for Nickel-Metal hydride battery:</b></p> 	<p><b>for Lithium-ion battery:</b></p> 
<p>HV Battery Pack Mounted in Cabin Area</p>	

\*1: for Nickel-Metal hydride battery

\*2: for Lithium-ion battery

## 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 201.6\*1, 207.2\*2 to 600 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 motors (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:

\*1: for Nickel-Metal hydride battery

\*2: for Lithium-ion battery

### 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.***

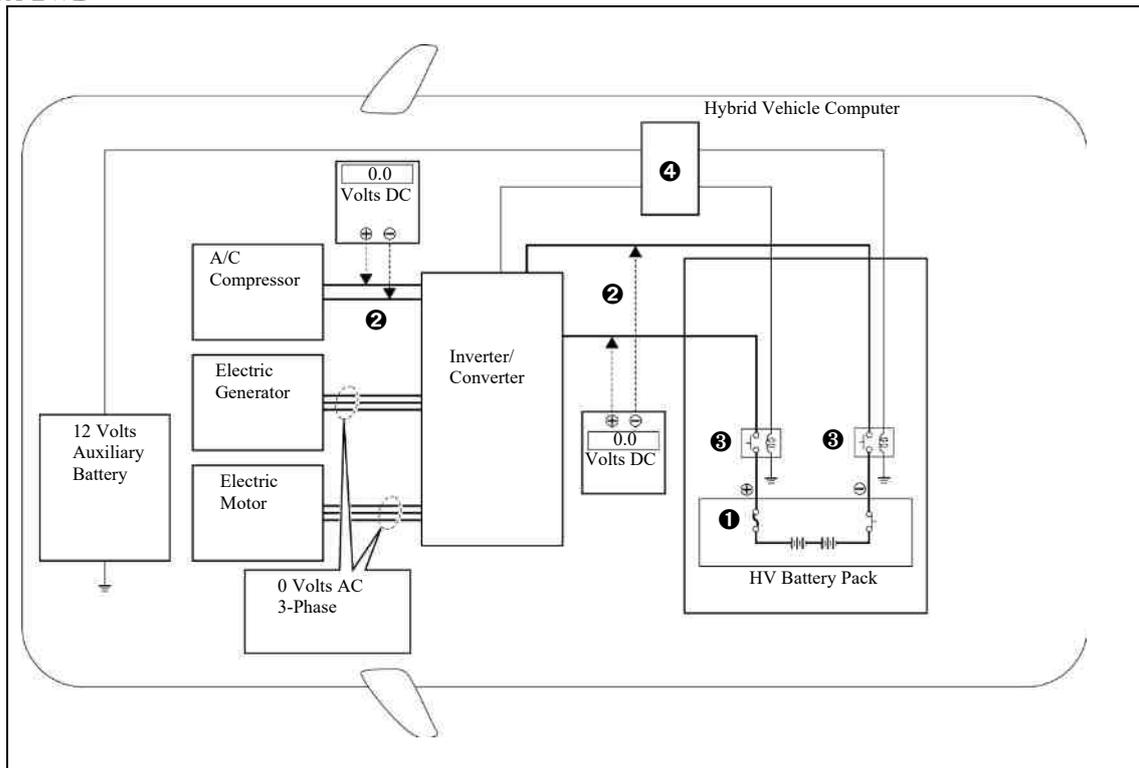
- Both positive and negative power cables ❷\* are insulated from the metal body. High voltage electricity flows through these cables and not through the metal vehicle body. The metal vehicle body is safe to touch because it is insulated from the high voltage components.
- A ground fault monitor ❹\* continuously 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 a message indicating that the hybrid system is malfunctioning will be displayed 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.

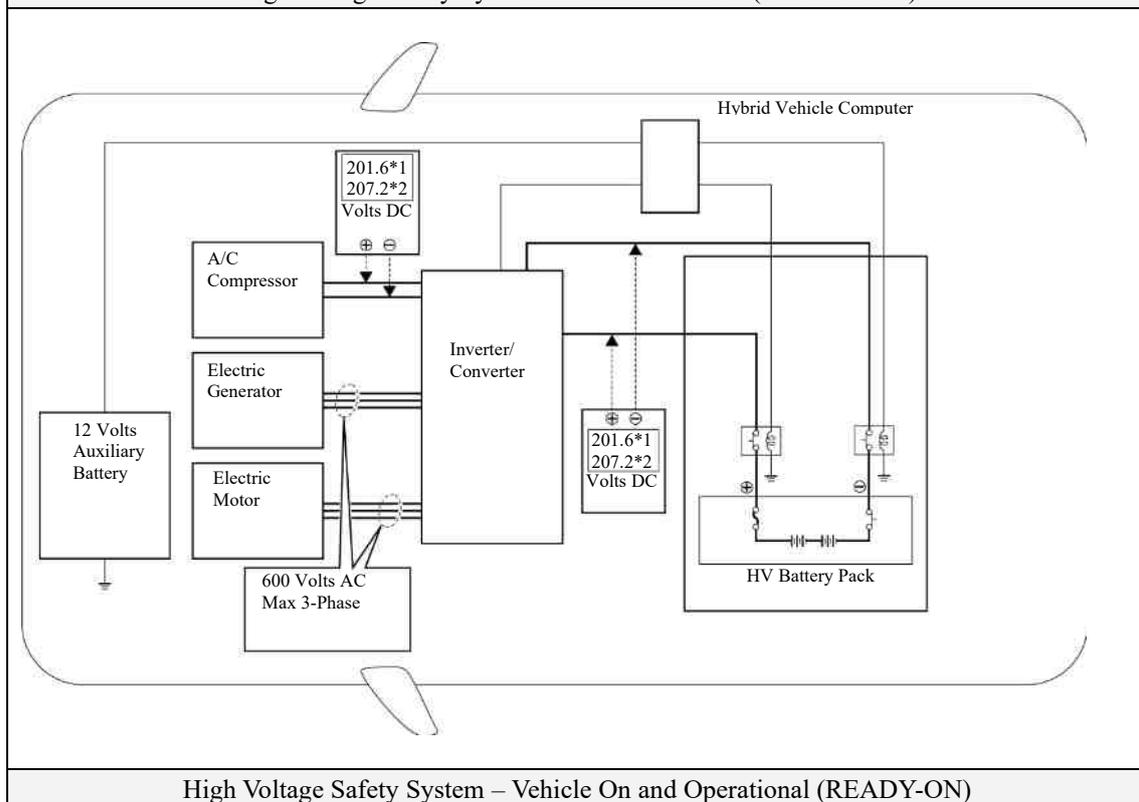
## Service Plug Grip

- The high voltage circuit is cut by removing the service plug grip (see page 24).

for 2WD

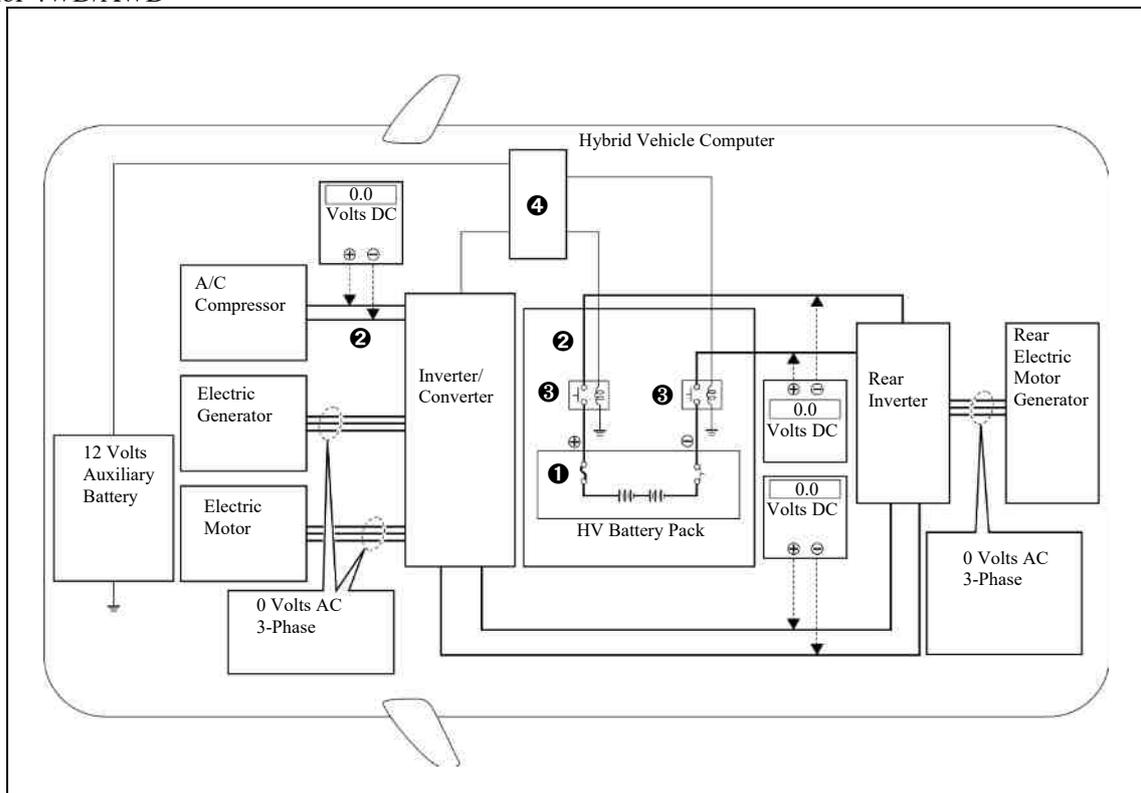


High Voltage Safety System – Vehicle Shut Off (READY-OFF)

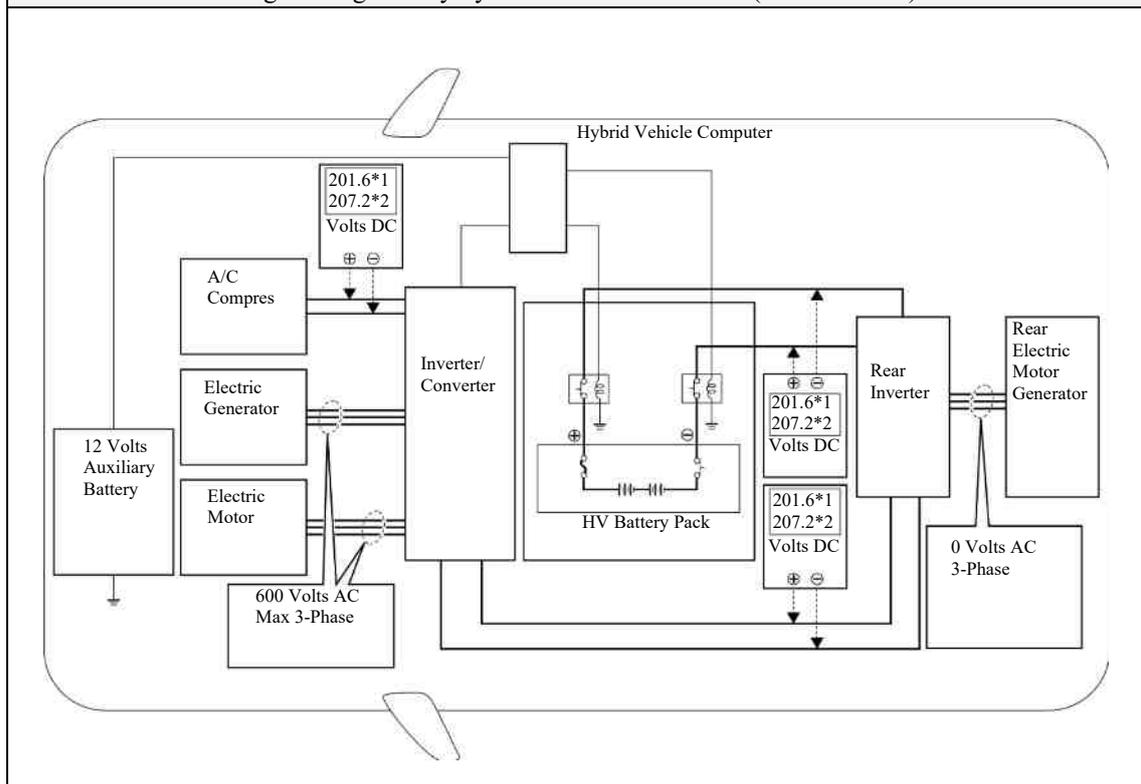


High Voltage Safety System – Vehicle On and Operational (READY-ON)

for 4WD/AWD



High Voltage Safety System – Vehicle Shut Off (READY-OFF)



High Voltage Safety System – Vehicle On and Operational (READY-ON)

- \*1: for Nickel-Metal hydride battery
- \*2: for Lithium-ion battery

## **Precaution to be observed when dismantling the vehicle**

- To prevent electric shock, wear insulated gloves when working on wire harnesses and components of the high voltage system.  
Before using insulated gloves, be sure to check them for cracks, tears and other types of damage.
- When servicing the vehicle, do not carry metal objects like mechanical pencils or rulers that can be dropped accidentally and cause a short circuit.
- To reduce the risk of electric shock, make sure to remove the service plug grip to cut off the high voltage circuit before servicing the vehicle.
- To reduce the risk of electric shock, make sure to wait at least 10 minutes after removing the service plug grip to fully discharge the high voltage capacitor inside the inverter with converter assembly.
- Do not touch any high voltage wire harnesses, connectors or parts with bare hands.
- Do not touch the terminals of the service plug grip.
- Make sure to insulate the high-voltage connectors and terminals of the HV battery with insulating tape after removing them.
- After removing the service plug grip, put it in your pocket to prevent other technicians from accidentally reconnecting it while you are working on the high-voltage system.
- Before touching a bare high-voltage terminal, wear insulated gloves and use a tester to make sure that the terminal voltage is 0 V.
- If the vehicle catches on fire, use an ABC fire extinguisher to extinguish the fire. Trying to extinguish a fire using only a small amount of water can be more dangerous than effective. Use a substantial amount of water or wait for firefighters.
- Do not allow any foreign matter or water to enter the HV battery.

**for Nickel-Metal hydride battery:**

- If the electrolyte comes in contact with your skin, use a saturated boric acid solution or a large amount of water to wash it off. If the electrolyte comes in contact with an article of clothing, take it off immediately.
- If the electrolyte comes in contact with your eyes, call out loudly for help. Do not rub your eyes. Wash them immediately with a large amount of water and seek medical care.
- If the electrolyte is swallowed, seek medical care immediately. Do not induce vomiting, unless instructed by the doctor.

**for Lithium-ion battery:**

- Electrolyte leaks may cause acute poisoning if a high concentration of the vapor from the electrolyte is inhaled. In case of inhalation, move the affected person to a place with ample fresh air and let them lie quietly. Seek medical care.
- If the electrolyte comes in contact with your skin, wash the area thoroughly with soap and plenty of water, and seek medical care. If the electrolyte comes in contact with an article of clothing, take it off immediately. Prolonged contact with the electrolyte may cause skin irritation.
- If the electrolyte comes in contact with your eyes, call out loudly for help. Do not rub your eyes. Immediately flush them with a large amount of water for at least 15 minutes and seek medical care.
- If electrolyte is swallowed, seek medical care immediately. Do not induce vomiting, unless instructed by the doctor.

Necessary Items

- Protective clothing such as insulated gloves (electrically insulated), rubber gloves, helmet, safety goggles, safety shoes and SCBA or protective mask.
- Insulating tape such as electrical tape that has a suitable electrical insulation rating and insulation tool set.
- An electrical tester that is capable of measuring DC 750 Volts or more.

## Spills

### **for Nickel-Metal hydride battery:**

The PRIUS 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 metal 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.

**for Lithium-ion battery:**

The PRIUS hybrid contains the same common automotive fluids used in other non-hybrid Toyota vehicles, with the exception of the Li-ion electrolyte used in the HV battery pack. The electrolyte used in the Li-ion battery cells is a flammable organic electrolyte. The electrolyte is absorbed into the battery cell separators, even if the battery cells are crushed or cracked, it is unlikely that liquid electrolyte will leak. Any liquid electrolyte that leaks from a Li-ion battery cell quickly evaporates.



**WARNING:**

- *The Li-ion battery contains organic electrolyte. Only a small amount may leak from the batteries which may irritate the eyes, nose, throat, and skin.*
- *Contact with the vapor produced by the electrolyte may irritate the nose and throat.*
- *To avoid injury by coming in contact with the electrolyte or vapor, wear personal protective equipment for organic electrolyte including SCBA or protective mask for organic gases.*

- Handle Li-ion 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 gloves or gloves suitable for organic solvents.
  - Apron suitable for organic solvents.
  - Rubber boots or boots suitable for organic solvents.
  - Protective mask for organic gases or SCBA.

## Dismantling the vehicle

The following 5 pages contain general instructions for use when working on a PRIUS.

Read these instructions before proceeding to the HV battery removal instructions on page 29.



### **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).

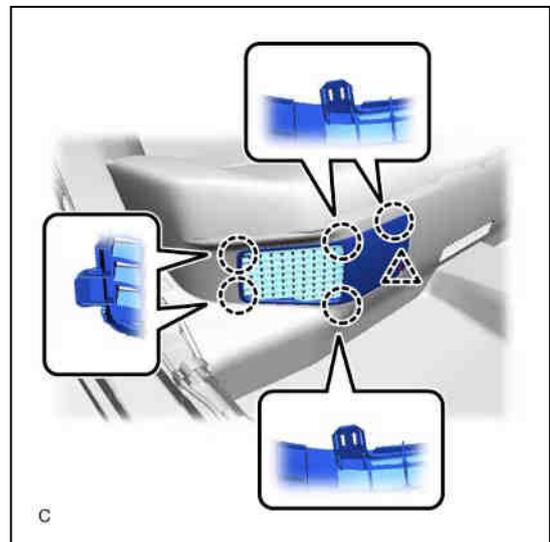
Then disconnect the cable from the auxiliary battery negative (-) terminal.

- (1) Loosen the nut, and disconnect the cable from the negative (-) auxiliary battery terminal.



2. Remove the battery service hole cover.

- (1) Remove the clip.
- (2) Disengage the 5 claws and remove the battery service hole cover.



3. Remove the service plug grip.

**Caution:**

- **Wear insulated gloves.**
- **Do not inspect or service the high voltage system with the service plug grip installed.**
- **To reduce the risk of electric shock, make sure to remove the service plug grip to cut off the high voltage circuit before servicing the vehicle.**



- **To reduce the risk of electric shock, make sure to wait at least 10 minutes after removing the service plug grip to fully discharge the high voltage capacitor inside the inverter with converter assembly.**
- **Keep the removed service plug grip in your pocket to prevent other technicians from accidentally installing it while you are servicing the vehicle.**
- **Place a "HIGH VOLTAGE WORK IN PROGRESS. DO NOT TOUCH." sign, in order to prevent other technicians from accidentally reconnecting the power while work is in progress.**



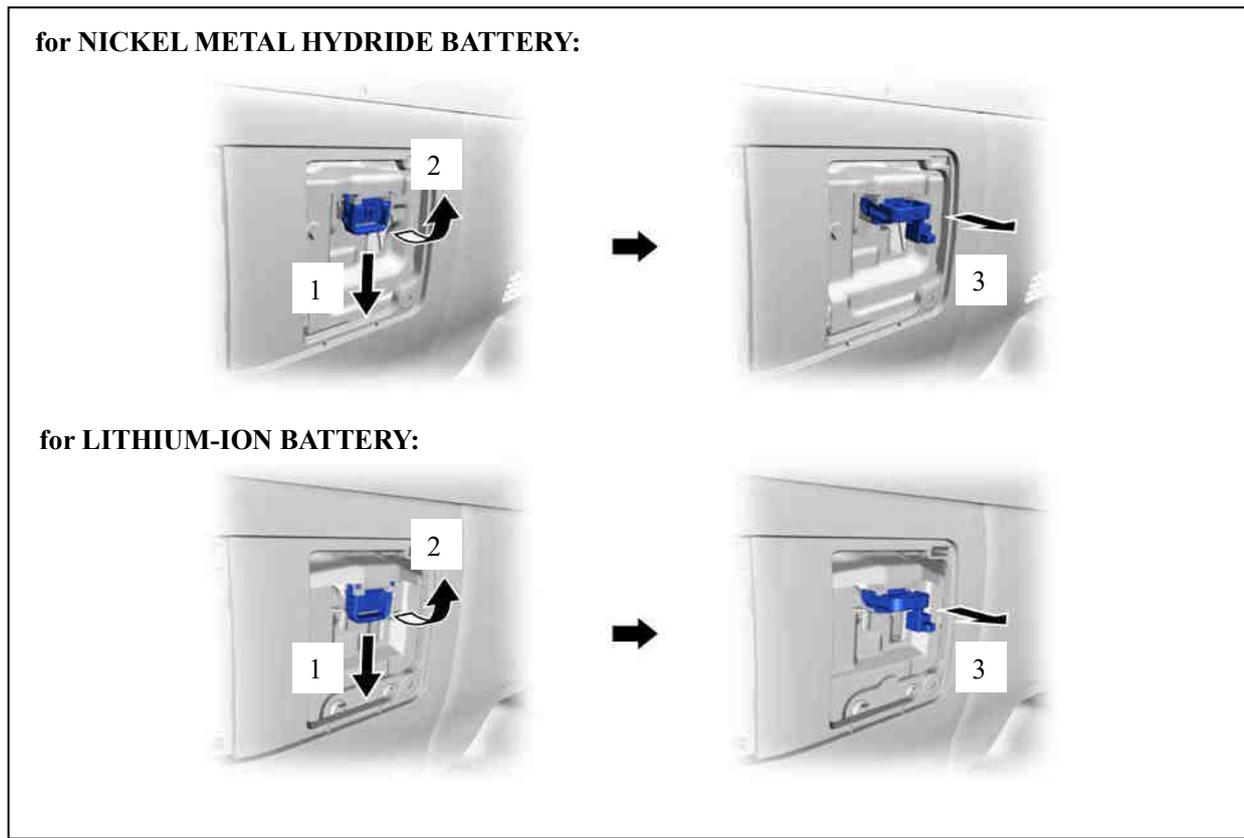
**Notice:**

- After removing the service plug grip, turning the power switch on (READY) may cause a malfunction. Do not turn the power switch on (READY) unless instructed by the repair manual.
- Do not touch the terminals of the service plug grip.

**Hint:**

Waiting for at least 10 minutes is required to discharge the high voltage capacitor inside the inverter with converter assembly.

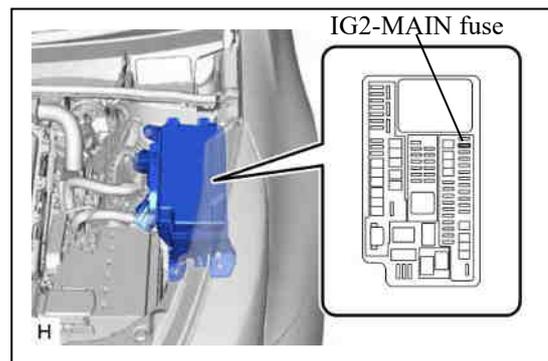
- (1) While wearing insulated gloves, rotate the handle of the service plug grip and remove the service plug grip as indicated by the arrows, in the order shown in the illustration.



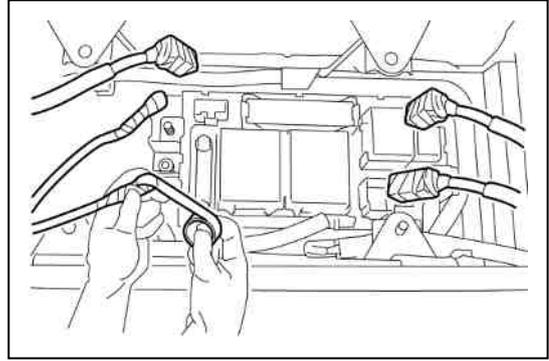
4. Carry the removed service plug grip in your pocket to prevent other staff from accidentally reinstalling it while you are dismantling the vehicle.
5. Make other staff aware that a high-voltage system is being dismantled by using the following sign: CAUTION: HIGH-VOLTAGE. DO NOT TOUCH (see page 28).
6. If the service plug grip cannot be removed due to damage to the vehicle, remove the **IG2-MAIN** fuse (25 A).

**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.**



7. After disconnecting or exposing a high-voltage using insulating tape. Before disconnecting or touching a bare high-voltage terminal, wear insulated gloves.



8. 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.
9. 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.
10. 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.
11. 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.**

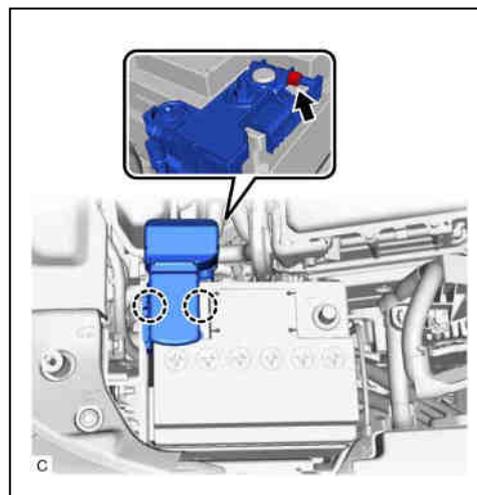
1. SHUT OFF IGINATION (**READY** indicator is off)
2. REMOVE AUXILIARY BATTERY

(1) Loosen the nut and disconnect the cable from the negative (-) auxiliary battery terminal.

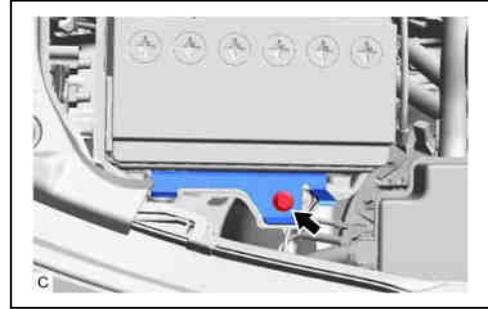


(2) Disengage the 2 claws and open the battery terminal cap.

(3) Loosen the nut and disconnect the cable from the positive (+) auxiliary battery terminal.

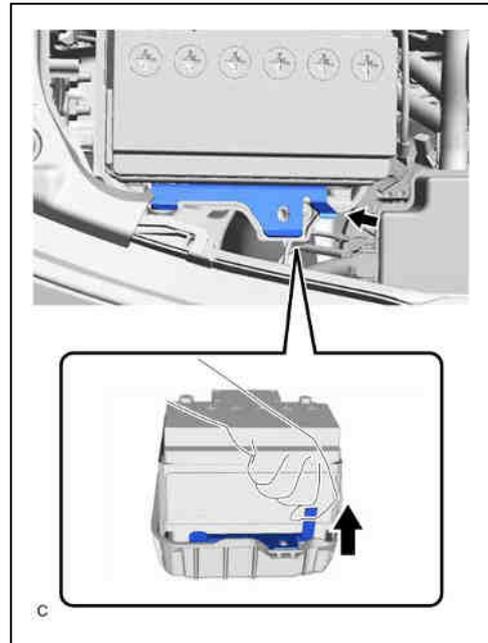


(4) Remove the bolt.



(5) Remove the No. 2 battery clamp as shown in the illustration.

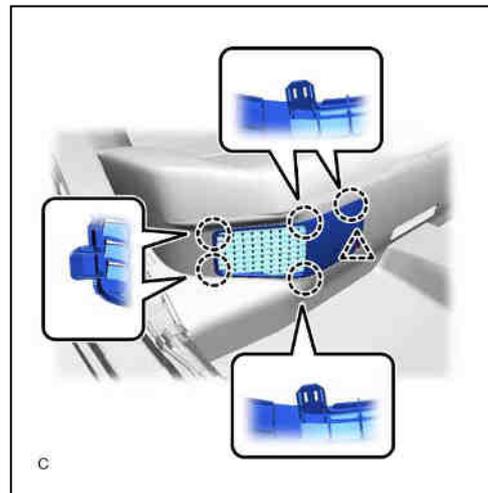
(6) Remove the auxiliary battery.



### 3. REMOVE BATTERY SERVICE HOLE COVER

(1) Remove the clip.

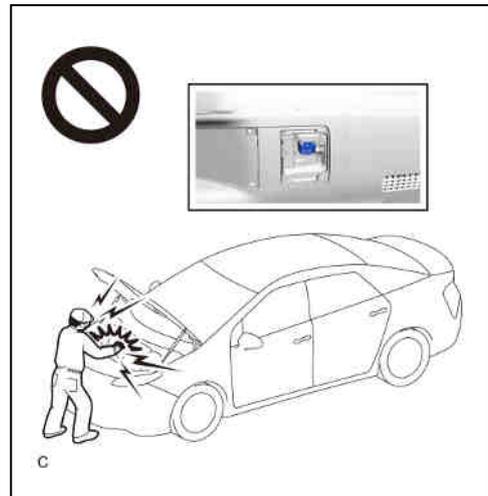
(2) Disengage the 5 claws and remove the battery service hole cover.



#### 4. REMOVE SERVICE PLUG GRIP

##### Caution:

- Wear insulated gloves.
- Do not inspect or service the high voltage system with the service plug grip installed.
- To reduce the risk of electric shock, make sure to remove the service plug grip to cut off the high voltage circuit before servicing the vehicle.



- To reduce the risk of electric shock, make sure to wait at least 10 minutes after removing the service plug grip to fully discharge the high voltage capacitor inside the inverter with converter assembly.
- Keep the removed service plug grip in your pocket to prevent other technicians from accidentally installing it while you are servicing the vehicle.
- Place a "HIGH VOLTAGE WORK IN PROGRESS. DO NOT TOUCH." sign, in order to prevent other technicians from accidentally reconnecting the power while work is in progress.



##### Notice:

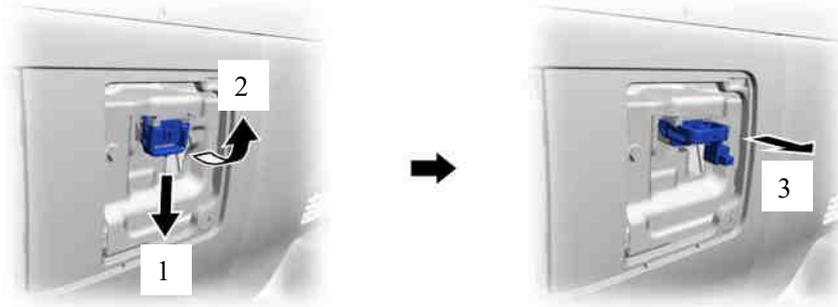
- After removing the service plug grip, turning the power switch on (READY) may cause a malfunction. Do not turn the power switch on (READY) unless instructed by the repair manual.
- Do not touch the terminals of the service plug grip.

##### Hint:

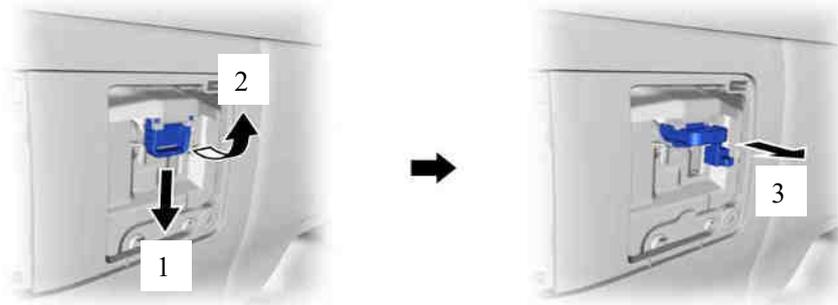
Waiting for at least 10 minutes is required to discharge the high voltage capacitor inside the inverter with converter assembly.

- (1) While wearing insulated gloves, rotate the handle of the service plug grip and remove the service plug grip as indicated by the arrows, in the order shown in the illustration.

**for NICKEL METAL HYDRIDE BATTERY:**

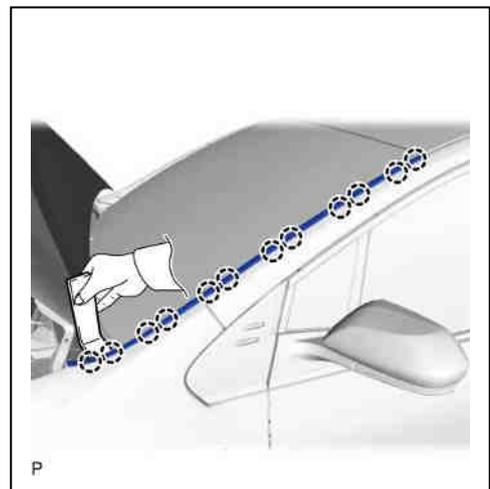


**for LITHIUM-ION BATTERY:**



## 5. REMOVE WINDSHIELD OUTSIDE MOULDING LH

- (1) Using a moulding remover, disengage the 12 claws and remove the windshield outside moulding.



## 6. REMOVE WINDSHIELD OUTSIDE MOULDING RH

**Hint:**

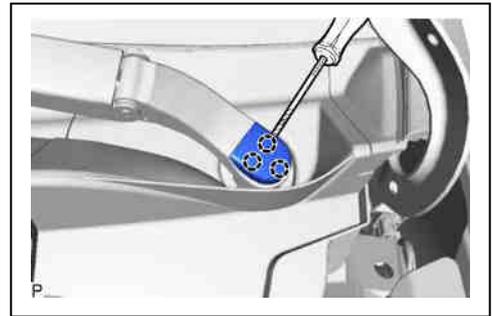
Use the same procedure as for the LH side.

7. REMOVE FRONT WIPER ARM HEAD CAP

- (1) Using a screwdriver, disengage the 3 claws to remove the front wiper arm head cap.

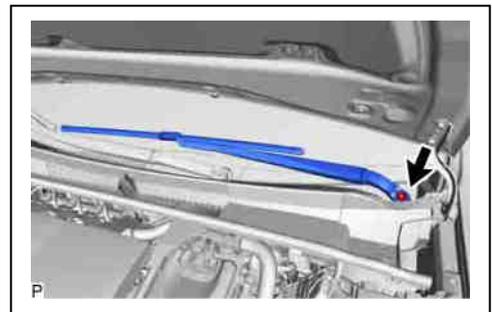
**Hint:**

Use the same procedure for the RH side and LH side.



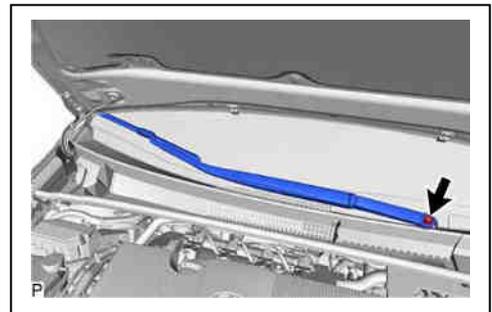
8. REMOVE FRONT WIPER ARM AND BLADE ASSEMBLY LH

- (1) Remove the nut and front wiper arm and blade assembly LH.



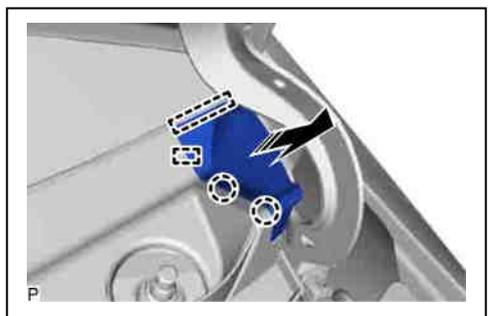
9. REMOVE FRONT WIPER ARM AND BLADE ASSEMBLY RH

- (1) Remove the nut and front wiper arm and blade assembly RH.



10. REMOVE COWL WATER EXTRACT SHIELD LH

- (1) Disengage the 2 claws and 2 guides to remove the cowl water extract shield LH as shown in the illustration.



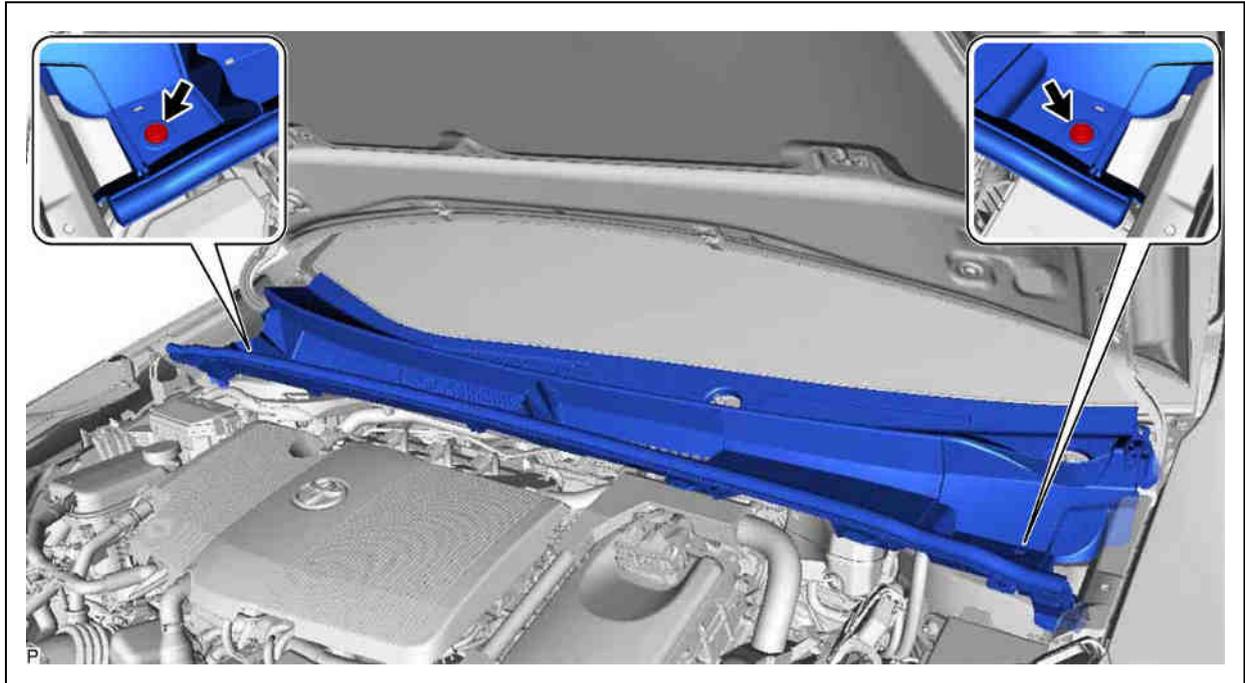
11. REMOVE COWL WATER EXTRACT SHIELD RH

**Hint:**

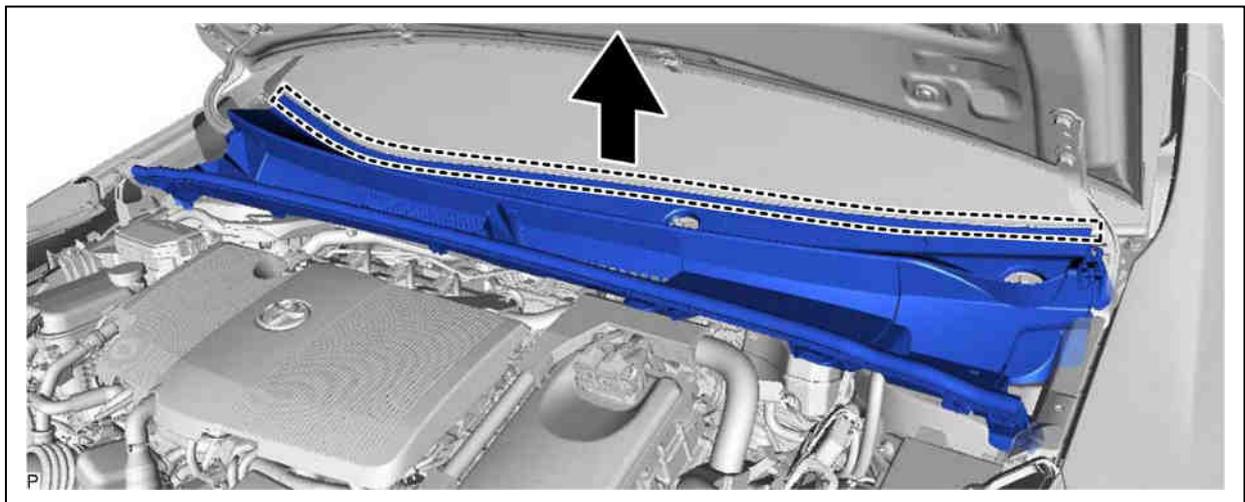
Use the same procedure as for the LH side.

## 12. REMOVE COWL TOP VENTILATOR LOUVER SUB-ASSEMBLY

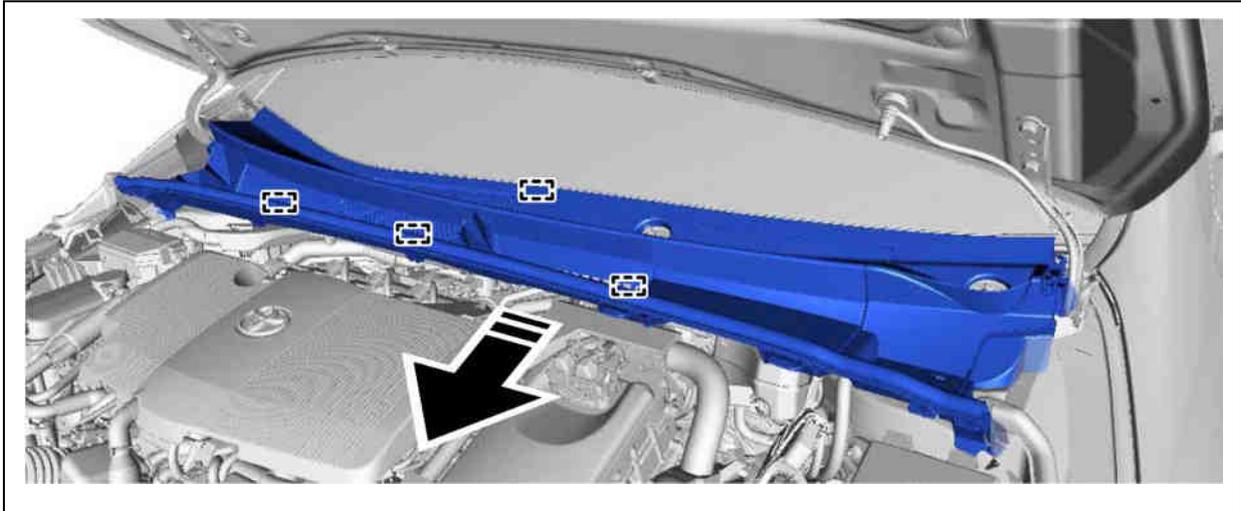
(1) Remove the 2 clips.



(2) Disengage the guide as shown in the illustration.



- (3) Disengage the 4 guides and remove the cowl top ventilator louver sub-assembly as shown in the illustration.

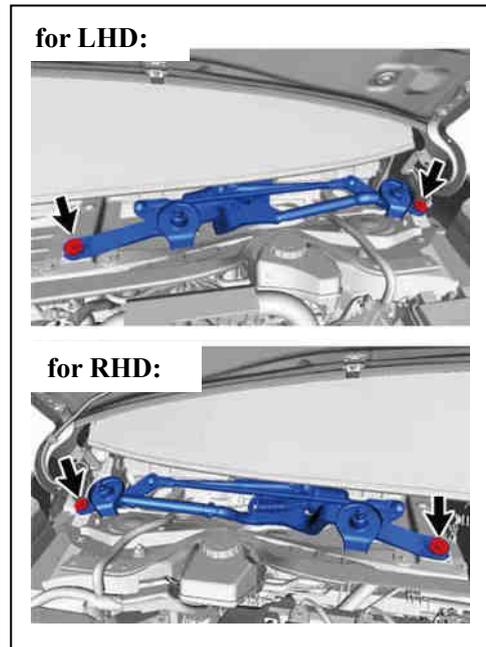


**Notice:**

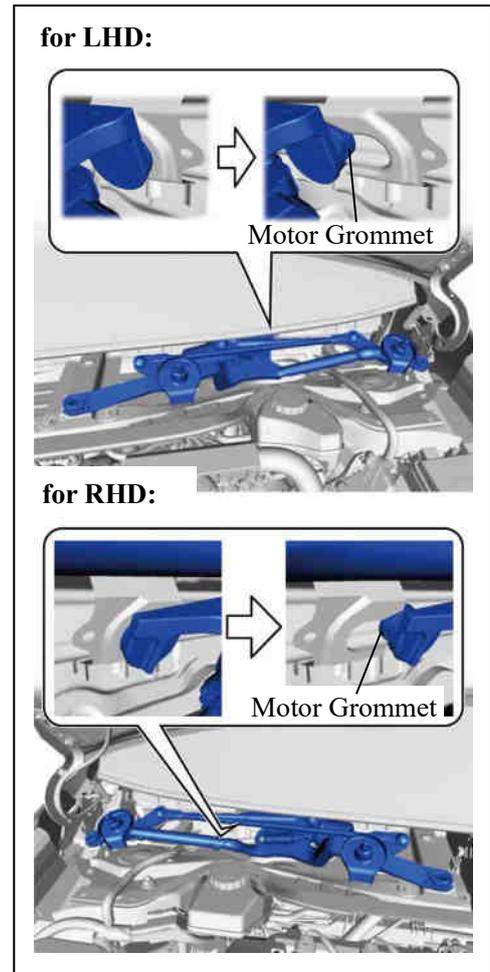
When removing the cowl top ventilator louver sub-assembly, it may contact the brake master cylinder reservoir filler cap assembly and cause it to fall off. Check the installation condition of the brake master cylinder reservoir filler cap assembly after removing the cowl top ventilator louver sub-assembly.

13. REMOVE WINDSHIELD WIPER MOTOR AND LINK ASSEMBLY

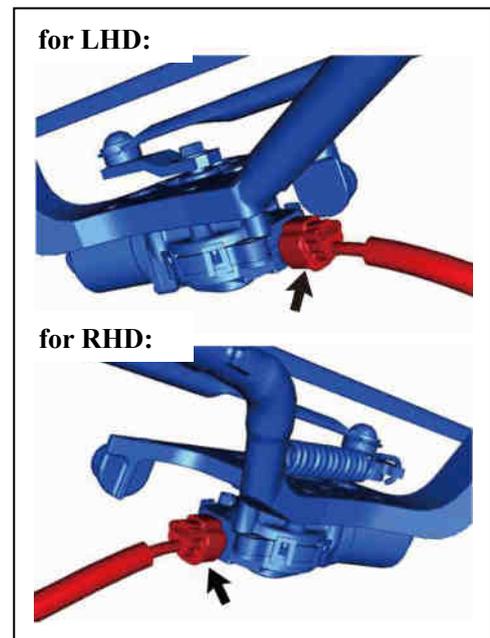
- (1) Remove the 2 bolts.



- (2) Disengage the motor grommet as shown in the illustration.

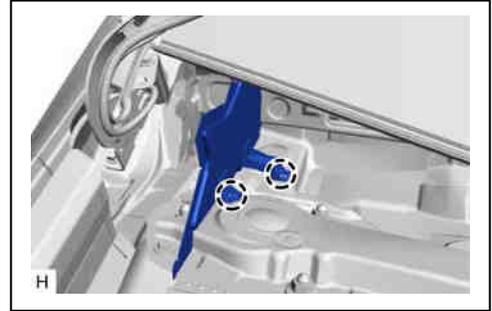


- (3) Disconnect the connector to remove the windshield wiper motor and link assembly.



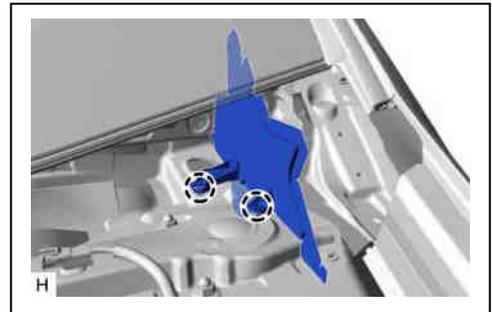
14. REMOVE NO. 1 HEATER AIR DUCT SPLASH SHIELD SEAL (for LHD)

- (1) Disengage the 2 claws and remove the No. 1 heater air duct splash shield seal from the outer cowl top panel sub-assembly.



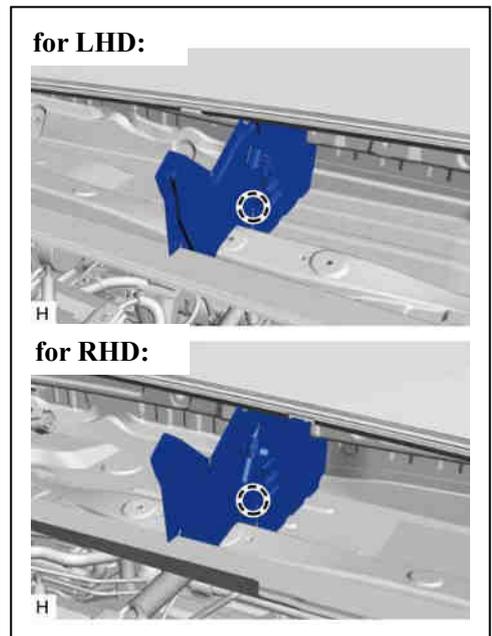
15. REMOVE NO. 2 HEATER AIR DUCT SPLASH SHIELD SEAL (for RHD)

- (1) Disengage the 2 claws and remove the No. 2 heater air duct splash shield seal from the outer cowl top panel sub-assembly.



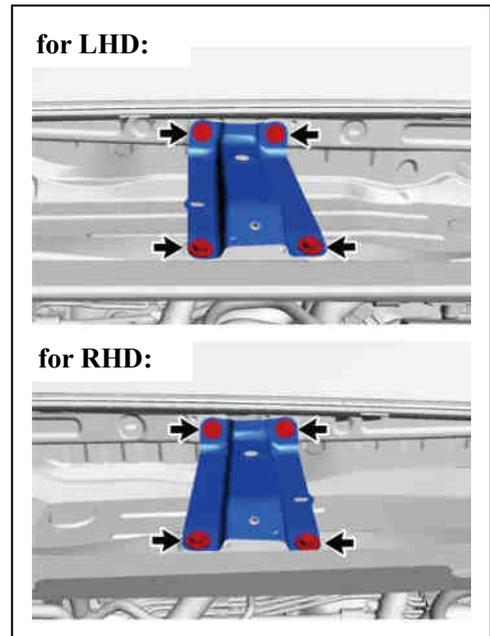
16. REMOVE WATER GUARD PLATE LH

- (1) Disengage the claw and remove the water guard plate LH.



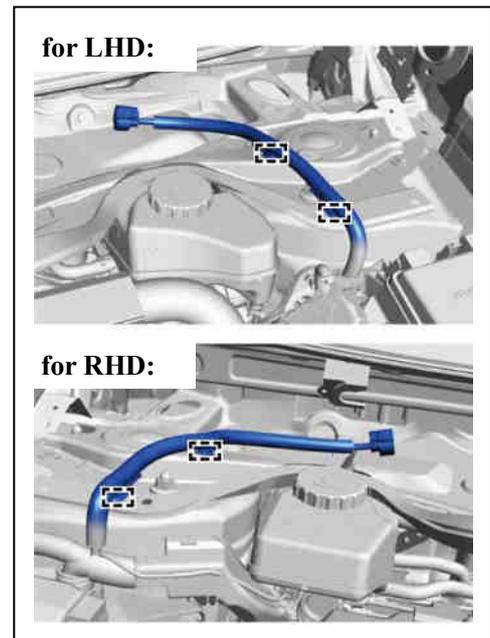
## 17. REMOVE COWL BODY MOUNTING REINFORCEMENT LH

- (1) Remove the 4 bolts and cowl body mounting reinforcement LH from the outer cowl top panel sub-assembly and vehicle body.

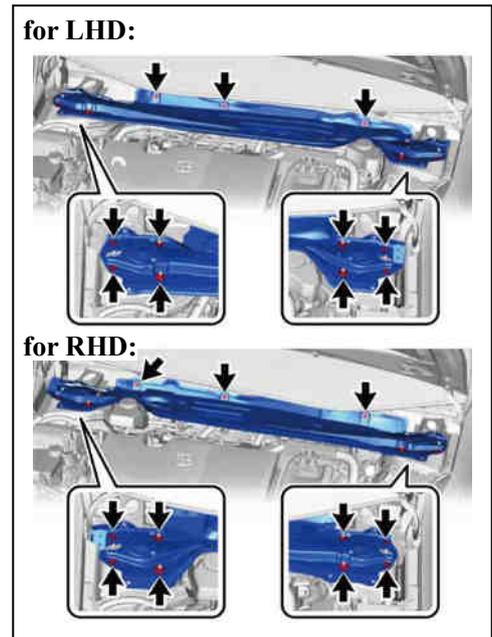


## 18. REMOVE OUTER COWL TOP PANEL SUB-ASSEMBLY

- (1) Disengage the 2 clamps and separate the wire harness from the outer cowl top panel subassembly.



- (2) Remove the 7 bolts, 4 nuts and outer cowl top panel sub-assembly.

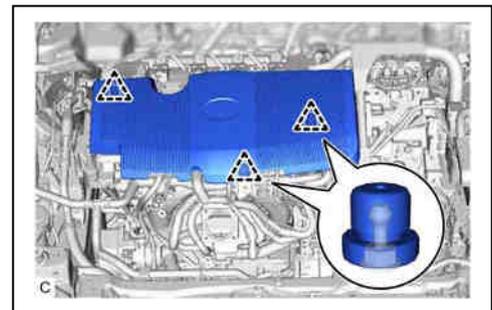


#### 19. REMOVE NO. 1 ENGINE COVER SUB-ASSEMBLY

- (1) Disengage the 3 clips and remove the No. 1 engine cover sub-assembly.

**Notice:**

Pull the No. 1 engine cover sub-assembly straight up to remove. Attempting to pull the No. 1 engine cover sub-assembly forward or attempting to pull it up by holding the left and right sides may cause the No. 1 engine cover sub-assembly to break.



## 20. DISCONNECT ENGINE WIRE

### **Caution:**

**Wear insulated gloves.**

### **Notice:**

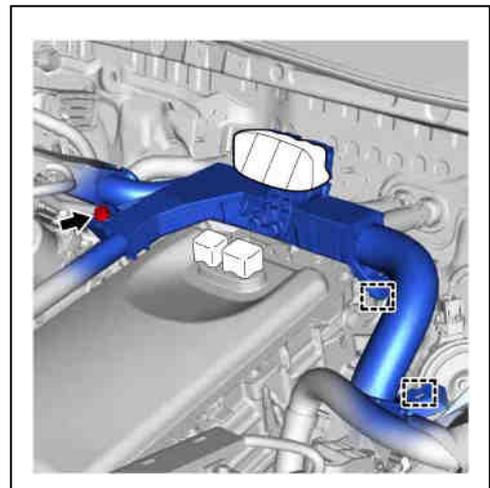
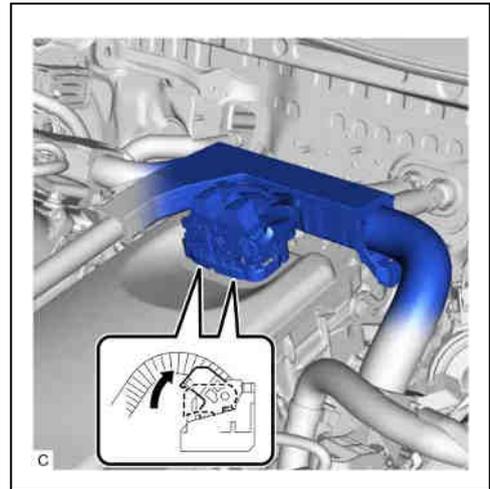
Do not allow any foreign matter or water to enter the inverter with converter assembly.

- (1) Move each lock lever as shown in the illustration and disconnect the 2 inverter with converter assembly connectors.

### **Notice:**

- Cover the hole where the cable was connected with tape (non-residue type) or equivalent to prevent entry of foreign matter.
- Insulate the disconnected terminals with insulating tape.

- (2) Remove the bolt.
- (3) Disengage the 2 clamps and disconnect the engine wire.



## 21. REMOVE CONNECTOR COVER ASSEMBLY

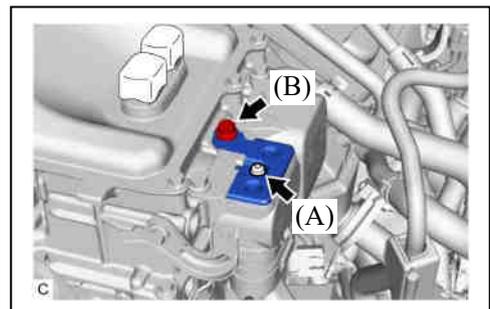
### **Caution:**

**Wear insulated gloves.**

- (1) Remove the bolt (B).
- (2) Using a T25 "TORX" socket wrench, remove the bolt (A) and connector cover assembly from the inverter with converter assembly.

### **Notice:**

Do not allow any foreign matter or water to enter the inverter with converter assembly.



## 22. CHECK TERMINAL VOLTAGE

### Caution:

**Wear insulated gloves.**

### Notice:

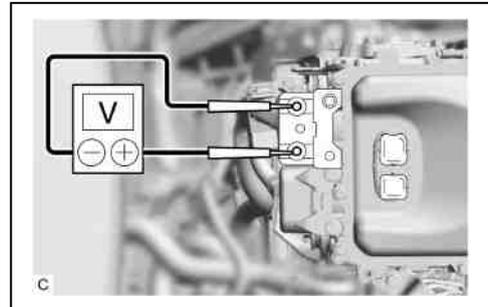
Do not allow any foreign matter or water to enter the inverter with converter assembly.

- (1) Using a voltmeter, measure the voltage between the terminals of the 2 phase connectors.

**Standard Voltage: 0 V**

### Hint:

Use a measuring range of DC 750 V or more on the voltmeter.



## 23. REMOVE REAR SEAT CUSHION ASSEMBLY

### Caution:

**Wear protective gloves. Sharp areas on the seat frame may injure your hands.**

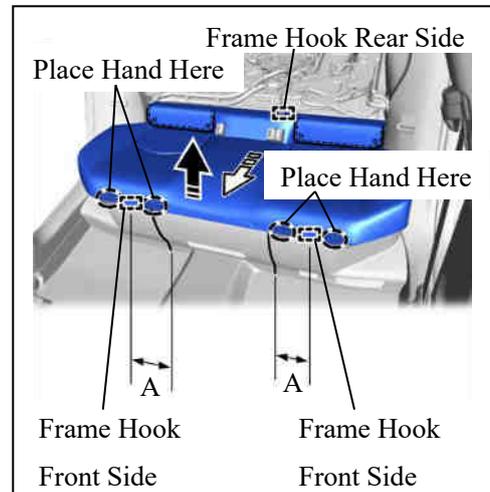
- (1) Lift the front edge of the rear seat cushion assembly as shown in the illustration and disengage the 2 rear seat cushion frame hooks on the front side of the rear seat cushion assembly from the rear seat cushion lock hooks.

### Notice:

Be sure to hold the parts of the seat cushion assembly directly next to the rear seat cushion frame hooks when lifting it. Lifting a different part of the cushion may deform the rear seat cushion frame.

### Standard Measurement:

Area	Measurement
A	135 mm (5.31 in.)



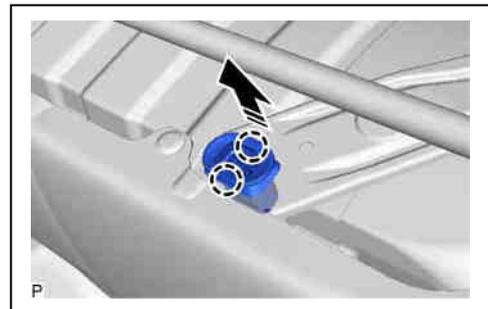
- (2) Disengage the rear seat cushion frame hook on the rear side of the rear seat cushion assembly as shown in the illustration.

## 24. REMOVE REAR SEAT CUSHION LOCK HOOK

- (1) Disengage the 2 claws to remove the rear seat cushion lock hook as shown in the illustration.

### Hint:

Use the same procedure for the RH side and LH side.

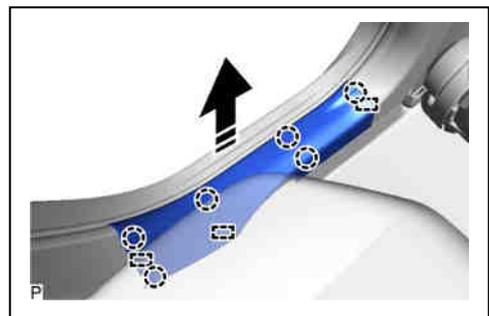


## 25. REMOVE REAR DOOR SCUFF PLATE LH

- (1) Disengage the claw as shown in the illustration.

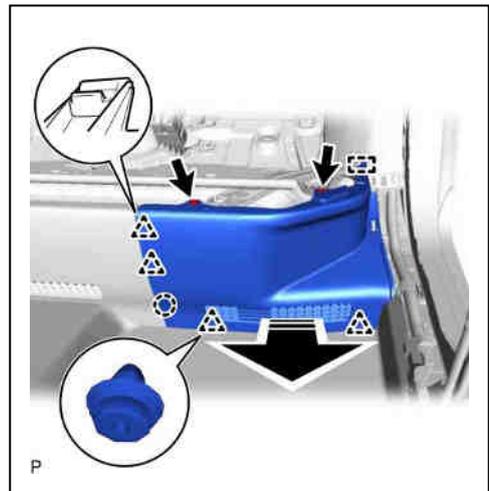


- (2) Disengage the 6 claws and 3 guides to remove the rear door scuff plate LH as shown in the illustration.



## 26. REMOVE REAR UNDER SIDE COVER LH

- (1) Remove the 2 clips.
- (2) Disengage the claw, 4 clips and guide to remove the rear under side cover LH as shown in the illustration.



## 27. REMOVE REAR DOOR SCUFF PLATE RH

Hint:

Use the same procedure as for the LH side.

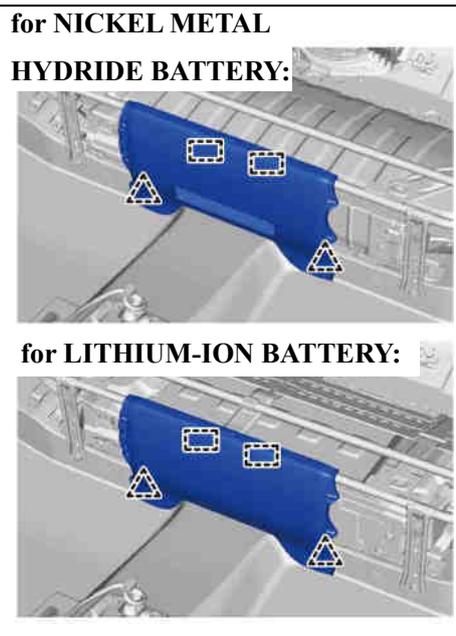
## 28. REMOVE REAR UNDER SIDE COVER RH

Hint:

Use the same procedure as for the LH side.

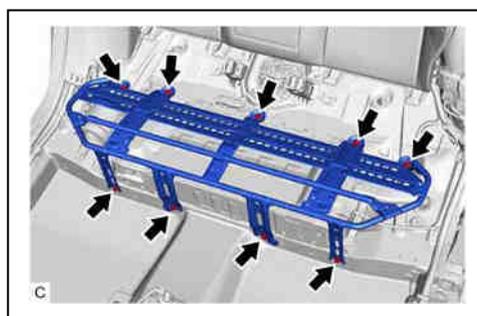
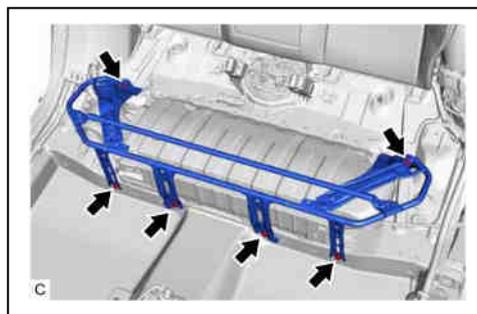
## 29. REMOVE REAR UNDER COVER

- (1) Disengage the 2 clips.
- (2) Disengage the 2 guides to remove the rear under cover from the rear seat cushion leg sub-assembly.



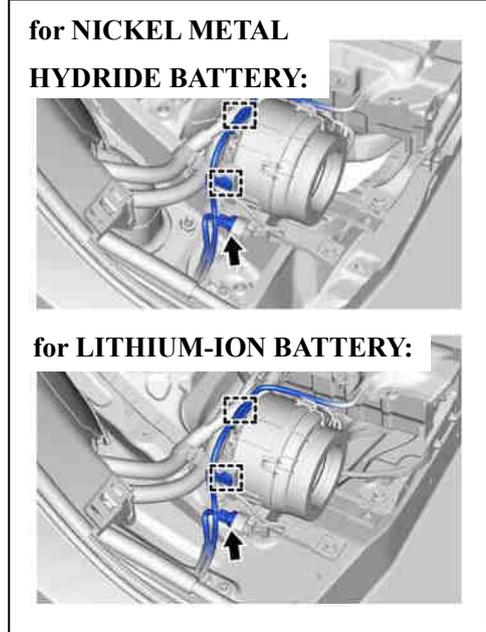
## 30. REMOVE REAR SEAT CUSHION LEG SUB-ASSEMBLY

- (1) for NICKEL METAL HYDRIDE BATTERY:
  - a) Remove the 6 bolts and rear seat cushion leg sub-assembly.
  
- (2) for LITHIUM-ION BATTERY:
  - a) Remove the 9 bolts and rear seat cushion leg sub-assembly.

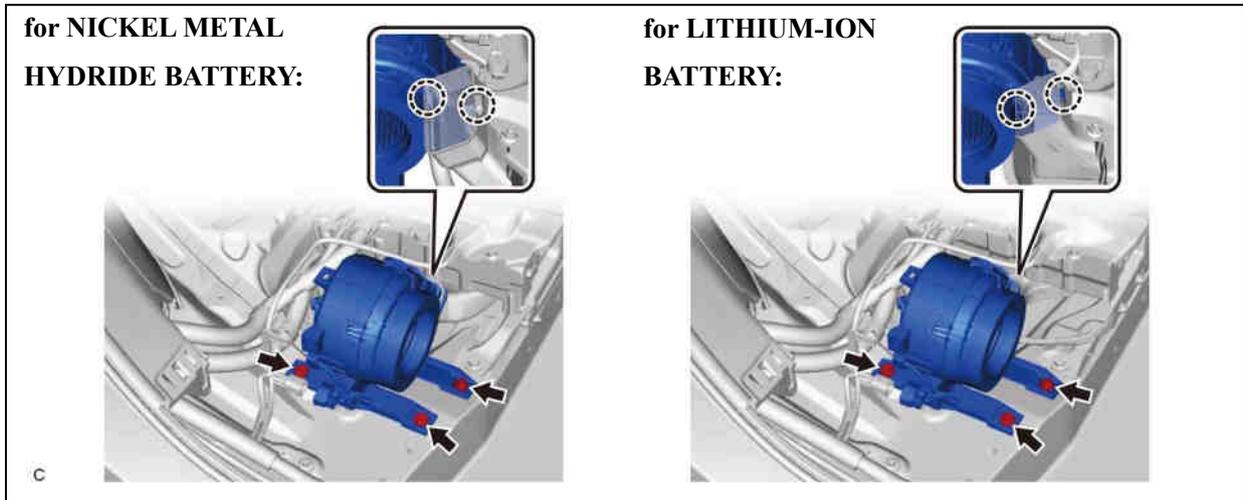


### 31. REMOVE BATTERY COOLING BLOWER ASSEMBLY

- (1) Disconnect the battery cooling blower assembly connector.
- (2) Disengage the 2 clamps.



- (3) Remove the 3 bolts.



- (4) Disengage the 2 claws to remove the battery cooling blower assembly.

**Notice:**

- Be sure not to touch the fan part of the battery cooling blower assembly.
- Do not lift the battery cooling blower assembly using the wire harness.

### 32. REMOVE NO. 1 HV BATTERY COVER PANEL RH

**Caution:**

**Wear insulated gloves.**

(1) for NICKEL METAL HYDRIDE BATTERY:

- a) 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.

- b) Remove the 3 bolts, 2 nuts and No. 1 HV battery cover panel RH from the HV battery.

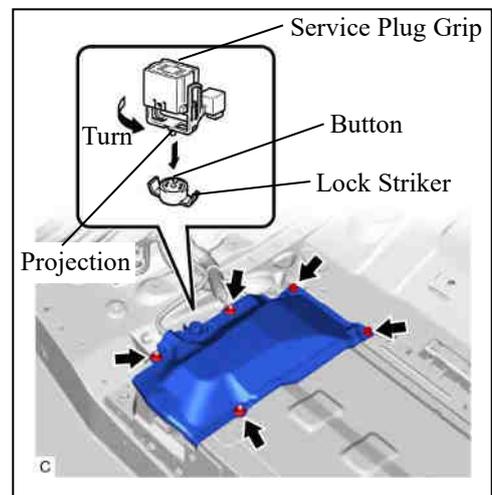
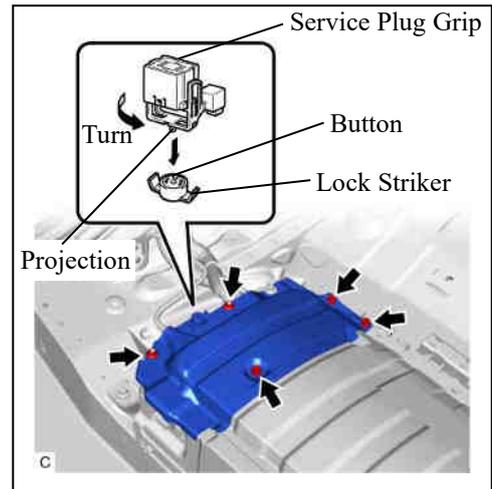
(2) for LITHIUM-ION BATTERY:

- a) 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.

- b) Remove the 2 bolts, 3 nuts and No. 1 HV battery cover panel RH from the HV battery.



### 33. DISCONNECT HV FLOOR UNDER WIRE

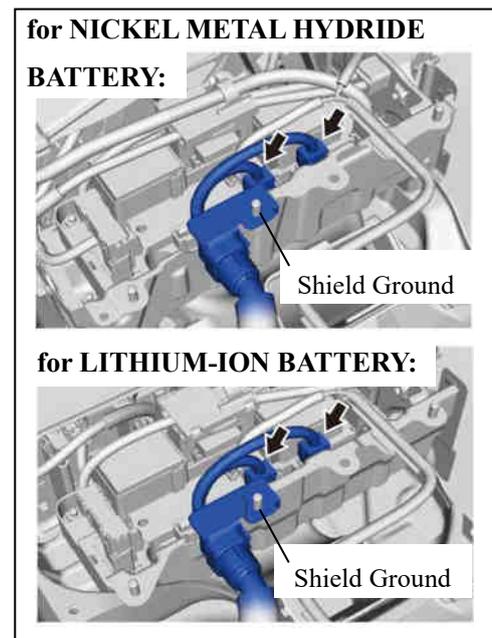
**Caution:**

**Wear insulated gloves.**

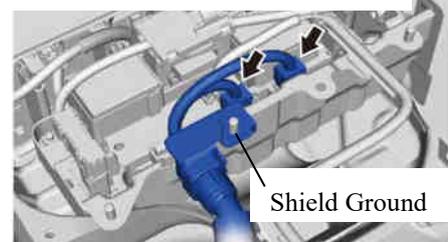
**Notice:**

Insulate each disconnected high-voltage connector with insulating tape. Wrap the connector from the wire harness side to the end of the connector.

- (1) Disconnect the 2 HV battery junction block assembly connectors.
- (2) Disconnect the shield ground from the HV battery.



**for LITHIUM-ION BATTERY:**



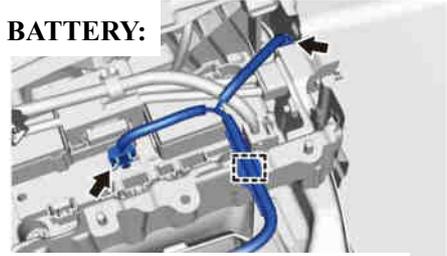
### 34. DISCONNECT FLOOR WIRE

**Caution:**

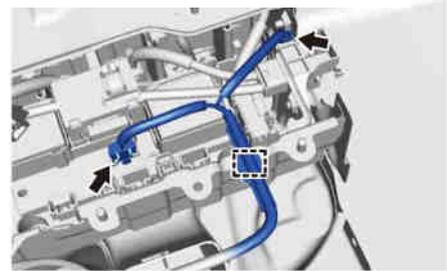
**Wear insulated gloves.**

- (1) Disengage the clamp.
- (2) Disconnect the electric vehicle battery plug assembly connector.
- (3) Disconnect the HV battery junction block assembly connector.

**for NICKEL METAL HYDRIDE BATTERY:**



**for LITHIUM-ION BATTERY:**



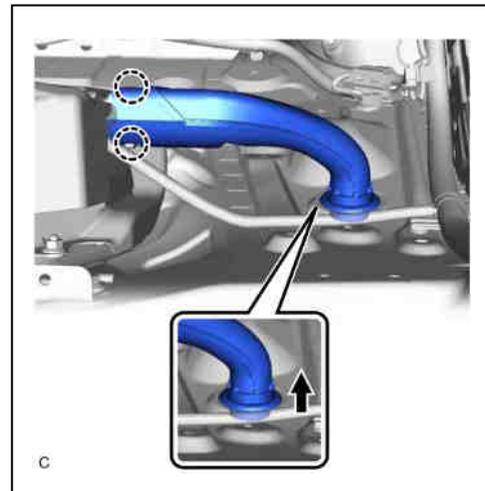
### 35. REMOVE NO. 1 HYBRID BATTERY EXHAUST DUCT (for NICKEL METAL HYDRIDE BATTERY)

- (1) Remove the clip.
- (2) Disengage the claw to remove the No. 1 hybrid battery exhaust duct from the HV battery.



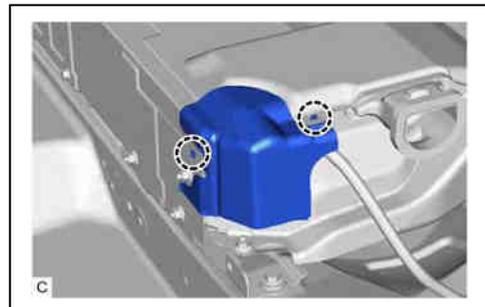
### 36. REMOVE HYBRID BATTERY HOSE ASSEMBLY (for LITHIUM-ION BATTERY)

- (1) Disconnect the hybrid battery hose assembly from the vehicle.
- (2) Disengage the 2 claws to remove the hybrid battery hose assembly from the HV battery.



### 37. REMOVE NO. 4 HV BATTERY PROTECTOR (for LITHIUM-ION BATTERY)

- (1) Disengage the 2 claws to remove the No. 4 HV battery protector from the HV battery.

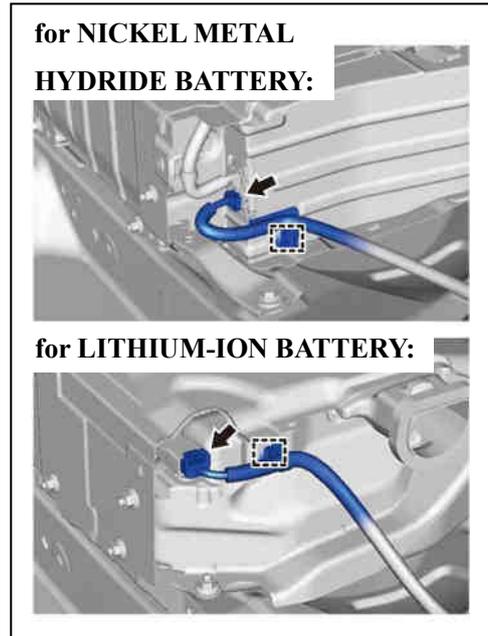


### 38. DISCONNECT FLOOR WIRE

**Caution:**

**Wear insulated gloves.**

- (1) Disengage the clamp.
- (2) Disconnect the connector.

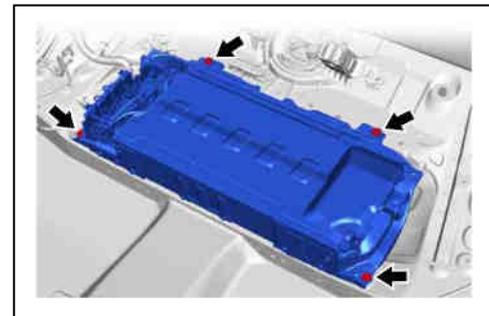
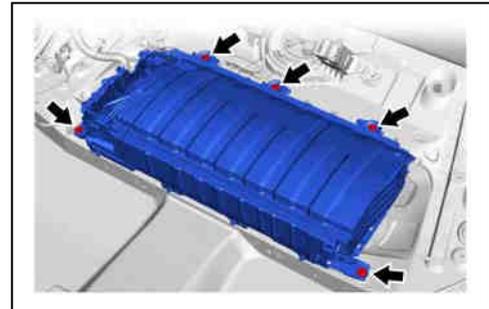


### 39. REMOVE HV BATTERY

**Caution:**

**Wear insulated gloves.**

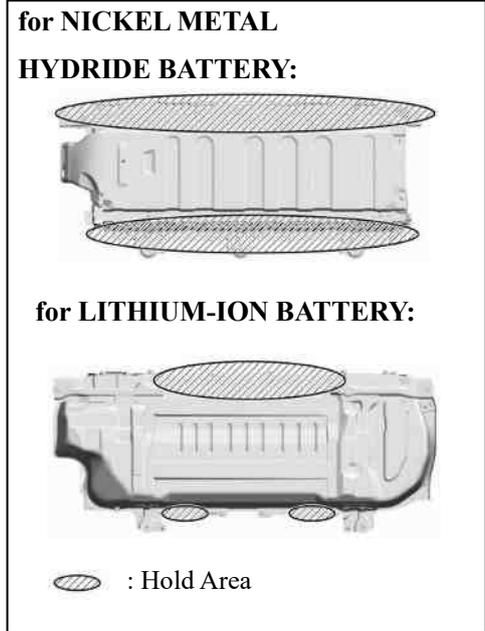
- (1) for NICKEL METAL HYDRIDE BATTERY:
  - a) Remove the 5 bolts and HV battery from the vehicle.
  
- (2) for LITHIUM-ION BATTERY:
  - a) Remove the 4 bolts and HV battery from the vehicle.



**Notice:**

- To prevent the wire harness from being caught, make sure to bundle the wire harness using insulating tape or equivalent.
- Since the HV battery is very heavy, 2 people are needed to remove it.
- When removing/ moving the HV battery, make sure not to tilt it more than 80°.
- Insulate the disconnected terminals or connectors with insulating tape.
- Do not touch any high voltage wire harnesses, connectors or parts with bare hands.

- Hold the areas shown in the illustration and lift the HV battery.



- Do not put your hands into the openings of the HV battery.

