

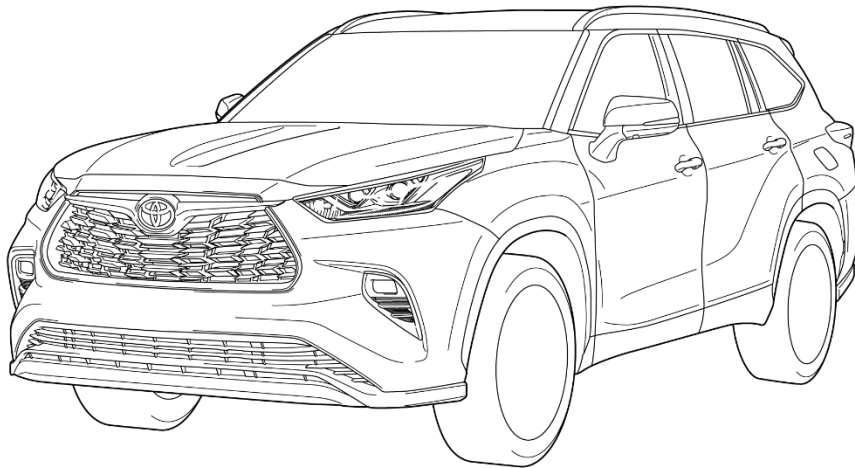


HIGHLANDER Hybrid
KLUGER Hybrid
CROWN KLUGER Hybrid

Gasoline-Electric

Hybrid Synergy Drive

HYBRID VEHICLE
DISMANTLING
MANUAL



Foreword

This guide was developed to educate and assist dismantlers in the safe handling of Toyota HIGHLANDER Hybrid/KLUGER Hybrid/CROWN KLUGER Hybrid gasoline-electric hybrid vehicles. HIGHLANDER Hybrid/KLUGER Hybrid/CROWN KLUGER Hybrid dismantling procedures are similar to other non-hybrid Toyota vehicles with the exception of the high voltage electrical system. It is important to recognize and understand the high voltage electrical system features and specifications of the Toyota HIGHLANDER Hybrid/KLUGER Hybrid/CROWN KLUGER Hybrid, 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 V auxiliary battery. Numerous safeguards have been designed into the HIGHLANDER Hybrid/KLUGER Hybrid/CROWN KLUGER Hybrid to help ensure the high voltage, approximately 288 V, Nickel Metal Hydride (NiMH) Hybrid Vehicle (HV) battery pack is kept safe and secure in an accident.

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

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

Additional topics contained in the guide include:

- Toyota HIGHLANDER Hybrid/KLUGER Hybrid/CROWN KLUGER Hybrid identification.
- Major hybrid component locations and descriptions.

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

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About the HIGHLANDER Hybrid/KLUGER Hybrid/CROWN KLUGER Hybrid

The HIGHLANDER Hybrid/KLUGER Hybrid/CROWN KLUGER Hybrid 5-door wagon joins the hybrid model for Toyota. Hybrid Synergy Drive means that the vehicle contains a gasoline engine and an electric motor for power.

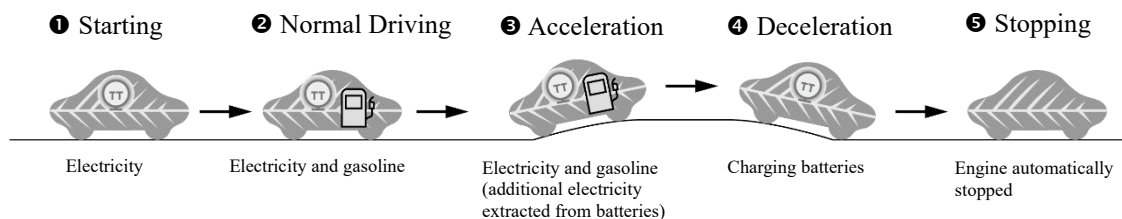
The two hybrid power sources are stored on board the vehicle:

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 HIGHLANDER Hybrid/KLUGER Hybrid/CROWN KLUGER Hybrid never needs to be recharged from an external electric power source.

Depending on the driving conditions one or both sources are used to power the vehicle. The following illustration demonstrates how the HIGHLANDER Hybrid/KLUGER Hybrid/CROWN KLUGER 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 the kinetic energy from the front wheel to produce electricity that recharges the battery pack.
- ❺ While the vehicle is stopped, the gasoline engine and electric motor are off, however the vehicle remains on and operational.



HIGHLANDER Hybrid/KLUGER Hybrid/CROWN KLUGER Hybrid Identification

In appearance, HIGHLANDER Hybrid/KLUGER Hybrid/CROWN KLUGER Hybrid is nearly identical to the conventional, non-hybrid Toyota HIGHLANDER/KLUGER/CROWN KLUGER. The HIGHLANDER Hybrid/KLUGER Hybrid/CROWN KLUGER Hybrid is a 5-door wagon. Exterior, interior, and engine compartment illustrations are provided to assist in identification.

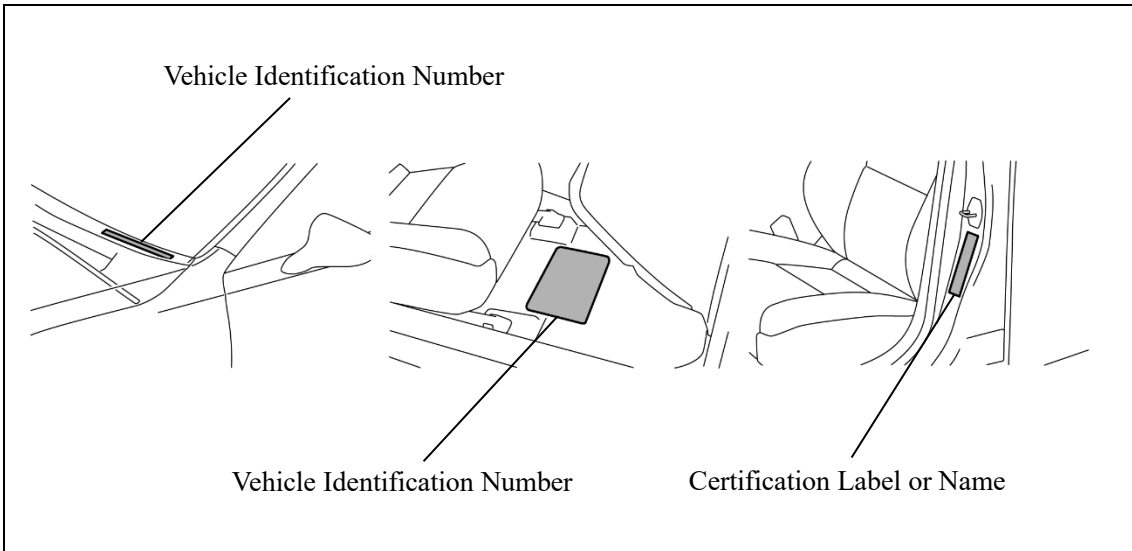
The alphanumeric 15 character Vehicle Identification Number (VIN) is provided on the left side windshield cowl, floor under the right side front seat and left side B pillar.

Example VIN:

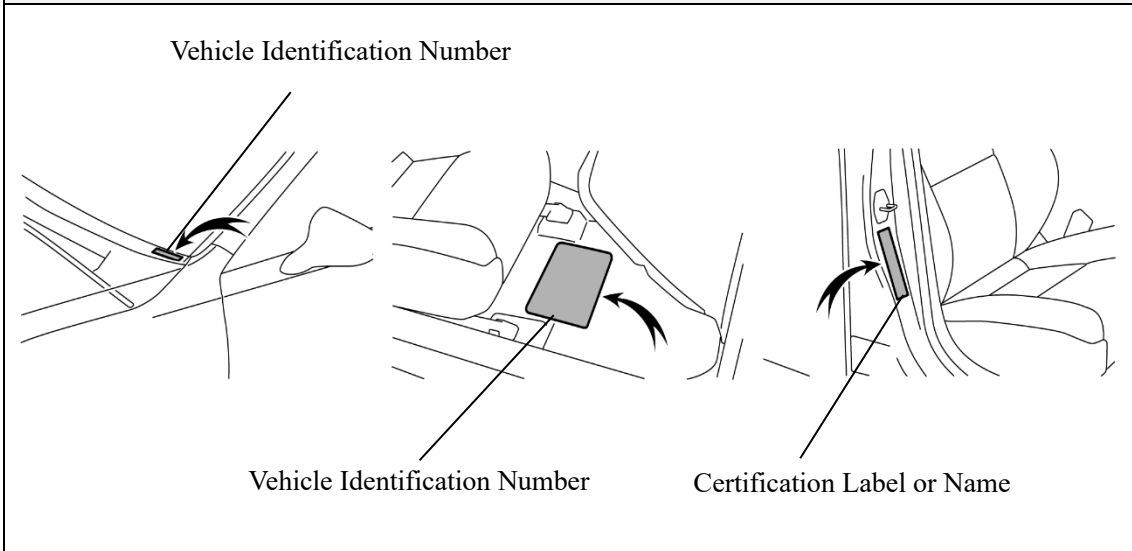
5TDZ <u>A</u> RAH 0000000 ①

A HIGHLANDER Hybrid/KLUGER Hybrid/CROWN KLUGER Hybrid is identified by the 5th alphanumeric character of the VIN.

①	Drive Type	Engine Series
A	2WD	A25A-FXS
B	AWD	A25A-FXS
C	AWD	A25B-FXS
E	2WD	A25D-FXS
F	AWD	A25D-FXS



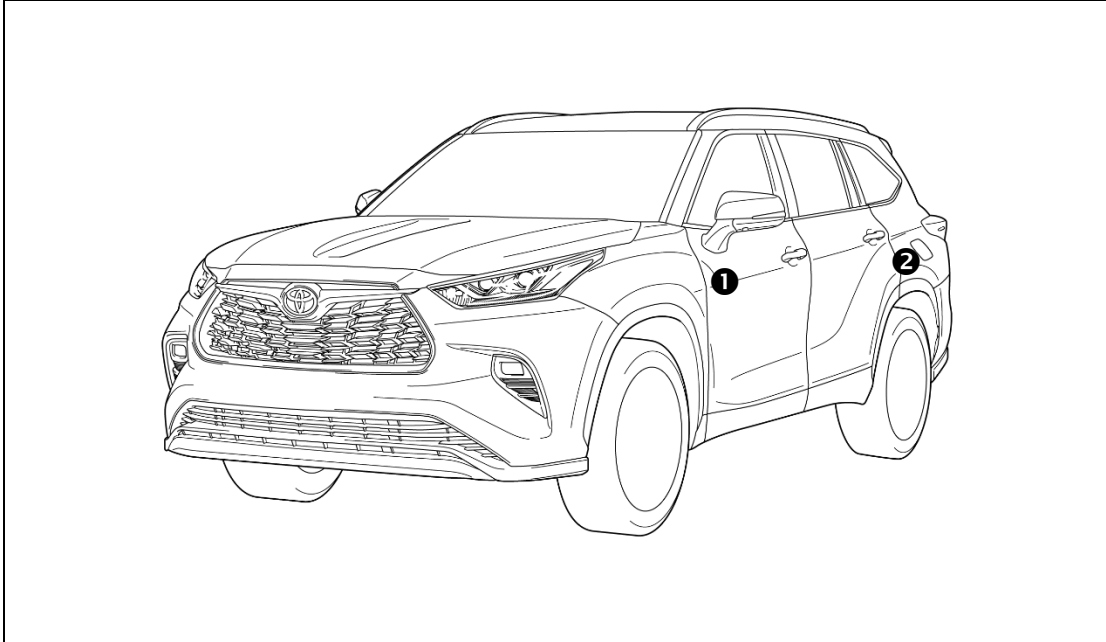
Left Side Windshield Cowl, Under the Right Side Front Seat and Left Side B Pillar
(except China)



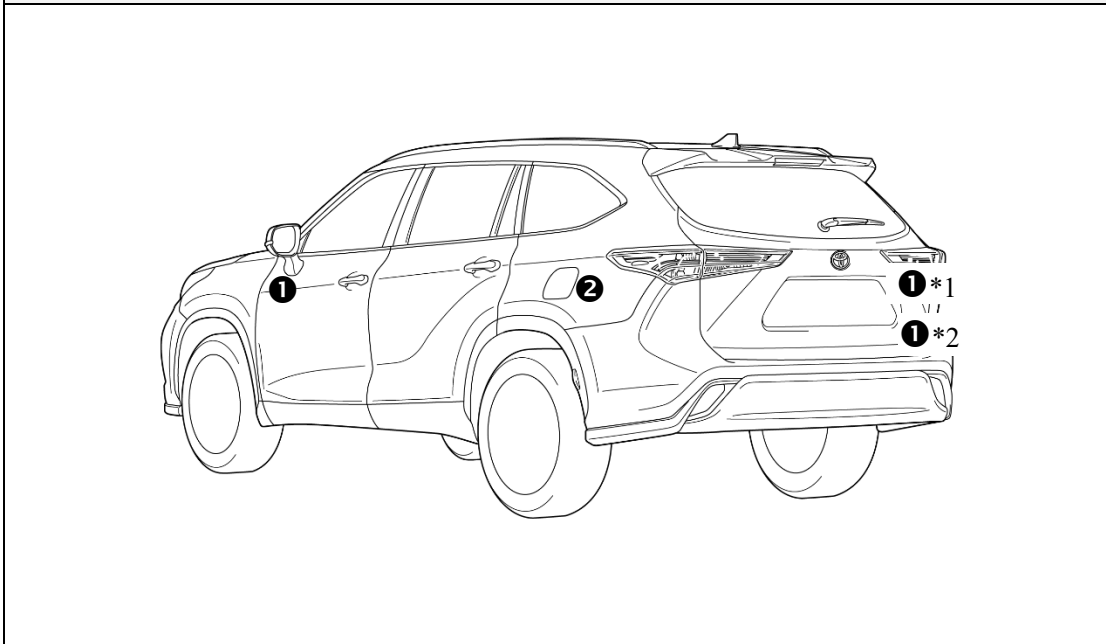
Left Side Windshield Cowl, Under the Right Side Front Seat and Right Side B Pillar
(for China)

Exterior

- ❶ **HYBRID** logos on the back door and each front fender.
- ❷ Gasoline fuel filler door located on left side rear quarter panel.



Exterior Front and Left Side View



Exterior Rear and Left Side View

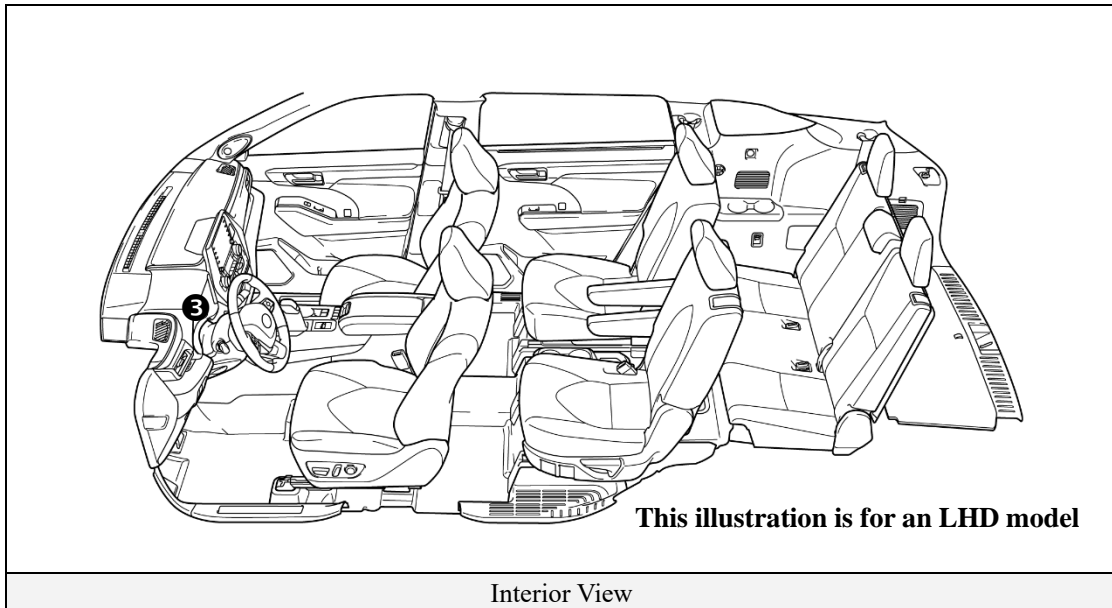
- *1: for Type A
- *2: for Type B

Interior

- ③ The instrument cluster (hybrid system indicator, **READY** indicator and warning lights) located in the dash behind the steering wheel, is different than the one on the conventional, non-hybrid HIGHLANDER/KLUGER/CROWN KLUGER.
- ④ In Place of a tachometer, a hybrid system indicator is used to show power output.

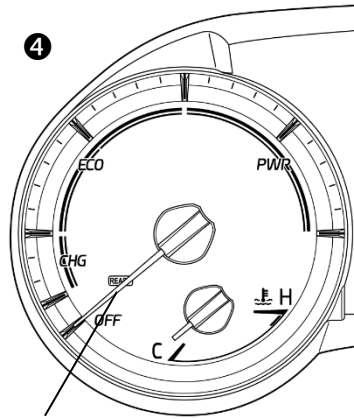
NOTICE:

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



3

for 7 Inch Multi-information Display



READY Indicator

Combination Meter View

3

for 12.3 Inch Multi-information Display

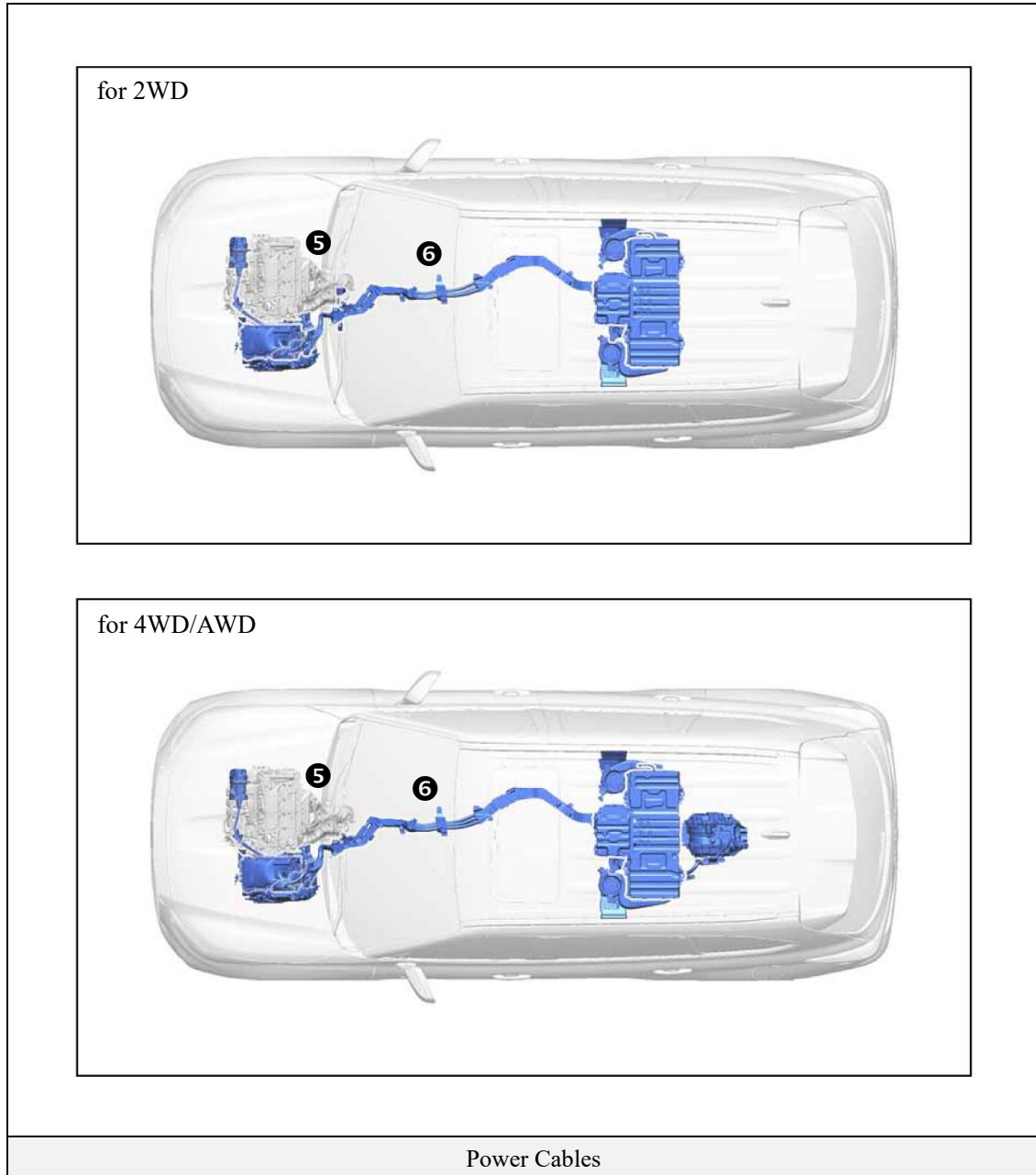


READY Indicator

Combination Meter View

Engine Compartment

- ⑤ 2.5-liter aluminum alloy gasoline engine.
- ⑥ Orange colored high voltage power cables.



Hybrid Component Locations & Descriptions

Component	Location	Description
12 Volts Auxiliary Battery ❶	Luggage Compartment Area	Supplies electricity to the electrical components.
Hybrid Vehicle (HV) Battery Pack ❷	Cabin Area, Mounted Under Rear Seat	<ul style="list-style-type: none"> •Supplies electrical power to MG1, MG2 and MGR*1 in accordance with the driving conditions of the vehicle. •Recharged by MG1, MG2 and MGR*1 in accordance with the SOC and the driving conditions of the vehicle.
Power Cables ❸	Undercarriage and Engine Compartment	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	Engine Compartment	<ul style="list-style-type: none"> •Converts the direct current from the boost converter into alternating current for MG1, MG2 and MGR*1, and vice versa (from AC to DC). •Boosts the HV battery nominal voltage of DC 288 Volts up to a maximum voltage of DC 650 Volts and vice versa (steps down DC 650 Volts to DC 288 Volts).
Gasoline Engine ❺	Engine compartment	Provides two functions: 1) Powers vehicle. 2) Powers generator to recharge the HV battery pack. The engine is started and stopped under control of the vehicle computer.
Front Electric Motor ❻	Engine compartment	<ul style="list-style-type: none"> •MG2, which is driven by electrical power from MG1 and the HV battery, generates motive force for the drive wheels. •During braking, or when the accelerator pedal is not depressed, it generates high-voltage electricity to recharge the HV battery.

Component	Location	Description
Electric Generator ⑦	Engine compartment	MG1, which is driven by the engine, generates high-voltage electricity in order to operate MG2, MGR*1 and charge the HV battery. Also, it functions as a starter to start the engine.
A/C Compressor (with inverter) ⑧	Engine compartment	3-phase high voltage AC electrically driven motor compressor.
DC-DC Converter for 12 Volts Auxiliary Battery ⑨	Engine compartment	Steps down the HV battery nominal voltage of DC 288 Volts to approximately DC 14 Volts in order to supply electricity to the electrical components, as well as to recharge the auxiliary battery.
Fuel Tank and Fuel Line ⑩	Undercarriage and Center	The fuel tank provides gasoline via a fuel line to the engine. The fuel line is routed under the center of vehicle.
Rear Electric Motor *1 ⑪	Under the Luggage Compartment	MGR, which is driven by electrical power from MG1 and the HV battery, generates motive force for the drive wheels.

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

*1: for 4WD/AWD

Specifications

Gasoline Engine: 137 / 139 / 141 kW, 2.5-liter Aluminum Alloy Engine

Electric Motors

Front: 134 kW, Permanent Magnet Motor

Rear: 40 kW, Permanent Magnet Motor (for 4WD/AWD)

Transmission: Automatic Only

HV Battery: 288 V Sealed NiMH-Battery

Curb Weight: 4,255-4,508 lbs / 1,930-2,045 kg

4,420-4,717 lbs / 2,005-2,140 kg (for 4WD/AWD)

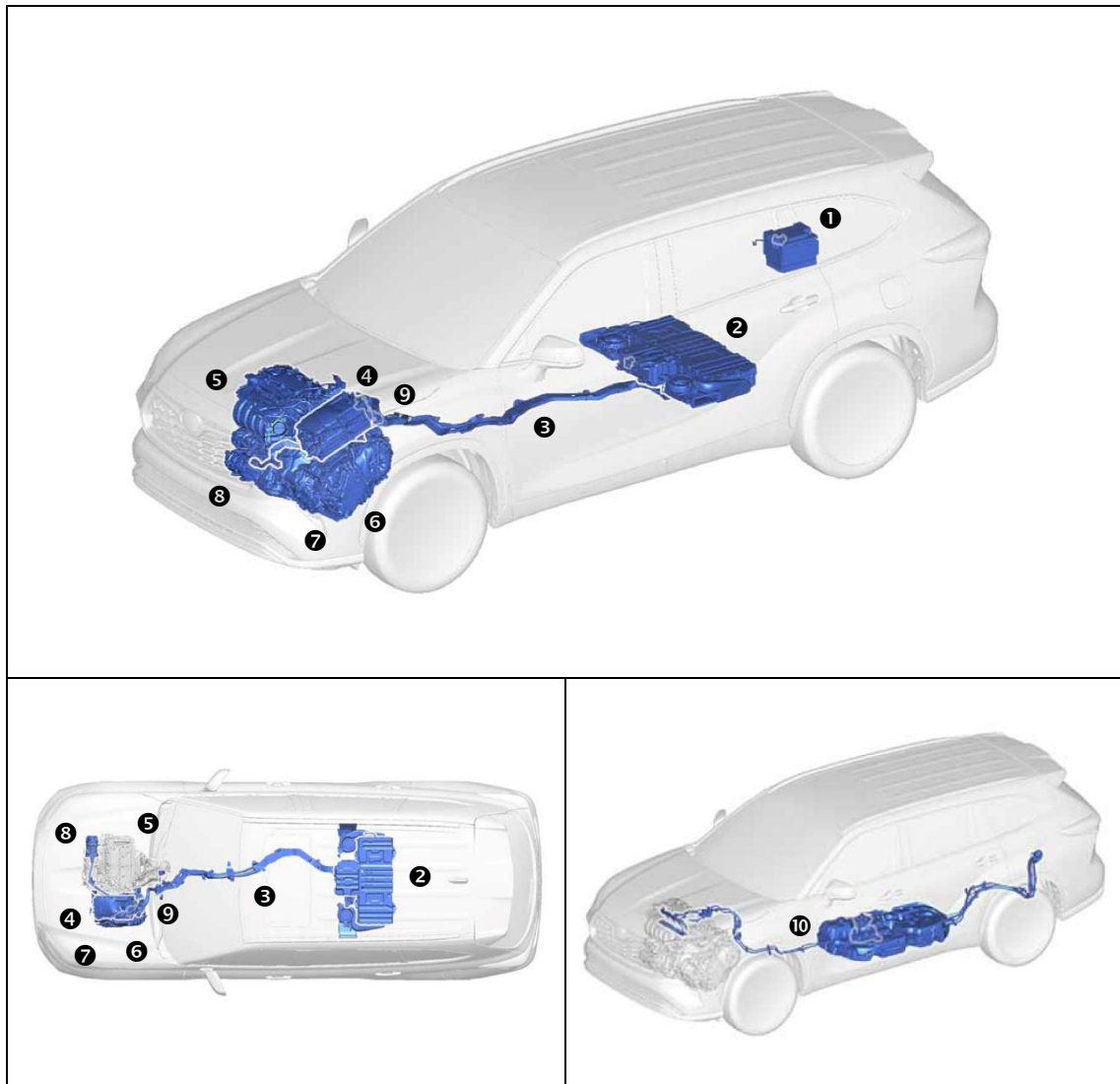
Fuel Tank: 14.2 Imp gals / 17.1 U.S. gals / 65 liters

Frame Material: Steel Unibody

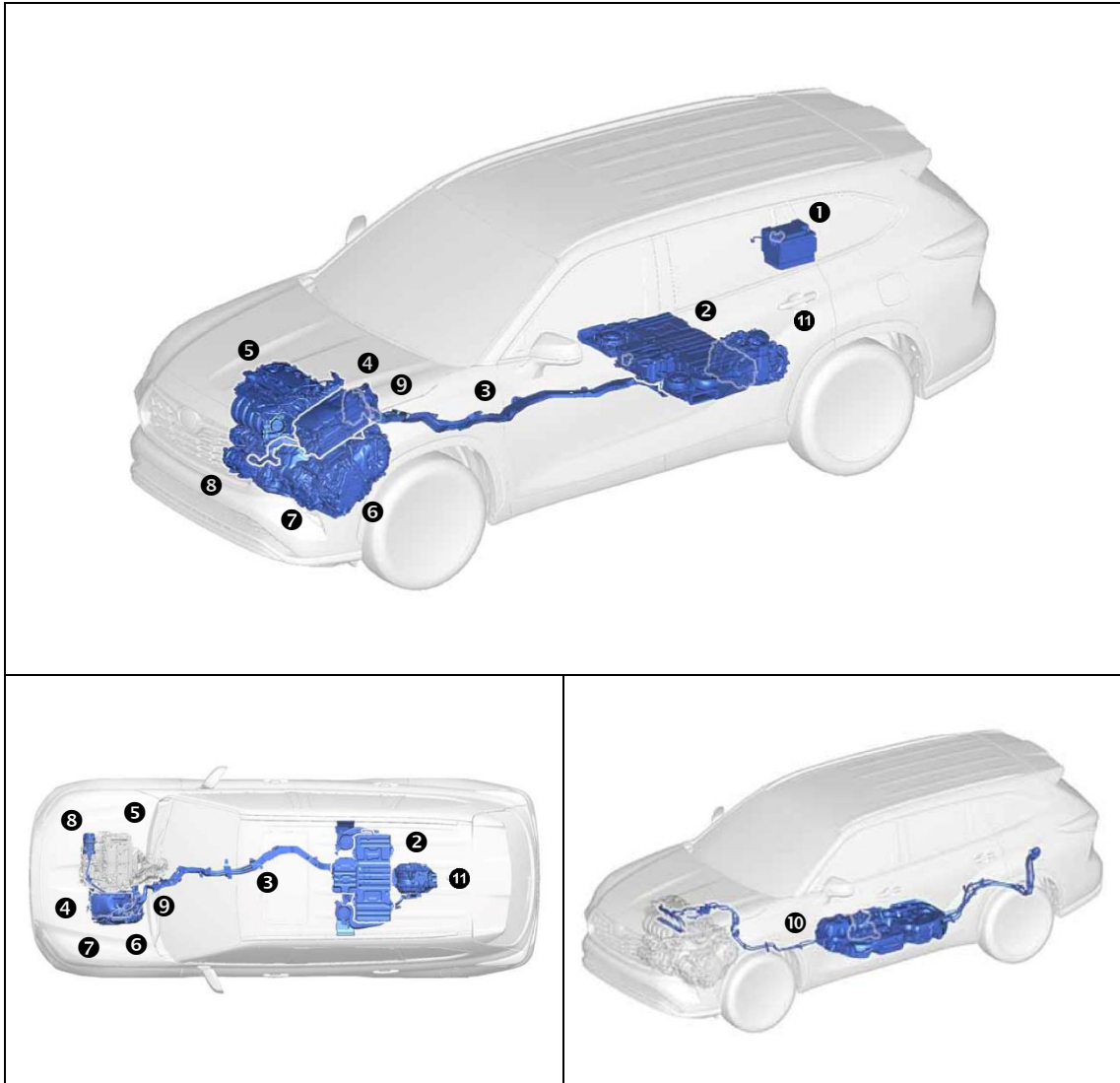
Body Material: Steel Panels

Seating Capacity: 7 / 8 passenger

for 2WD



for 4WD/AWD



Hybrid Synergy Drive Operation

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

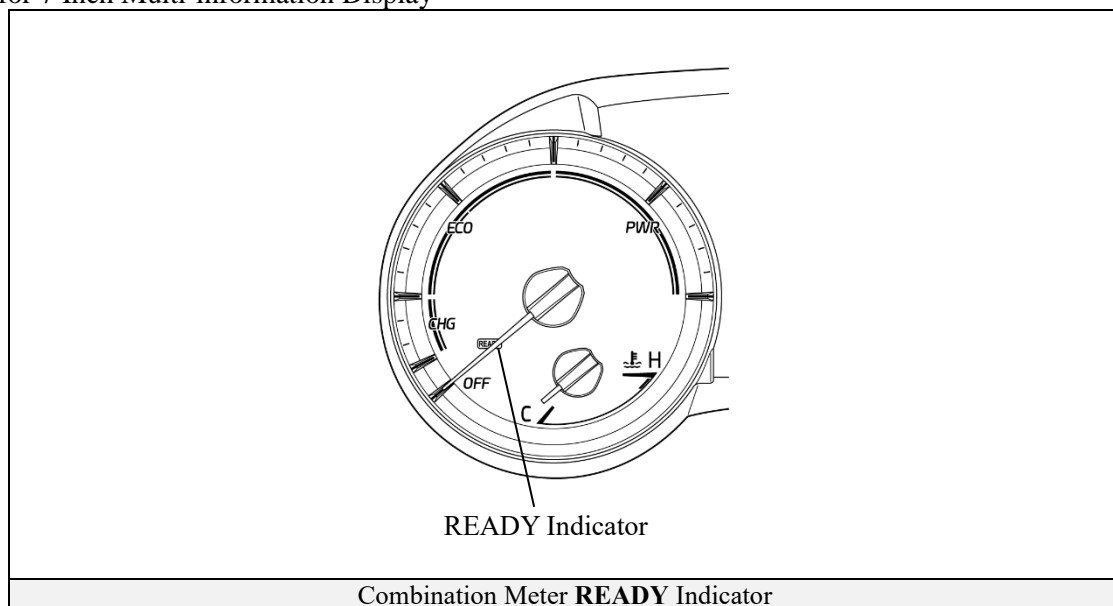
Vehicle Operation

- With the HIGHLANDER Hybrid/KLUGER Hybrid/CROWN KLUGER 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.

for 7 Inch Multi-information Display



for 12.3 Inch Multi-information Display



READY Indicator

Combination Meter **READY** Indicator

Hybrid Vehicle (HV) Battery Pack and Auxiliary Battery

The HIGHLANDER Hybrid/KLUGER Hybrid/CROWN KLUGER Hybrid features a high voltage Hybrid Vehicle (HV) battery pack that contains sealed Nickel Metal Hydride (NiMH) battery modules.

HV Battery Pack

- The HV battery pack is enclosed in a metal case and is rigidly mounted to the cabin area under the front seats. The metal case is isolated from high voltage and concealed by fabric covers in the cabin area.
- The HV battery pack consists of 40 low voltage (7.2 Volts) NiMH battery modules connected in series to produce approximately 288 Volts. Each NiMH battery module is non-spillable and sealed in a metal case.
- The electrolyte used in the NiMH battery module is an alkaline mixture of potassium and sodium hydroxide. The electrolyte is absorbed into the battery cell plates and will not normally leak, even in a collision.

HV Battery Pack	
Battery pack voltage	288 Volts
Number of NiMH battery modules in the pack	40
NiMH battery module voltage	7.2 Volts

Components Powered by the HV Battery Pack


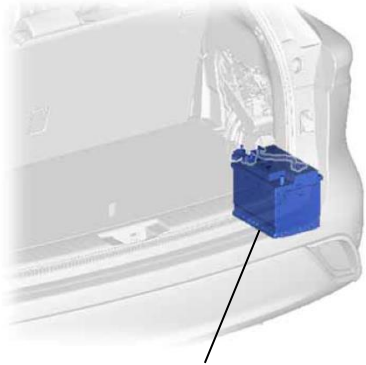
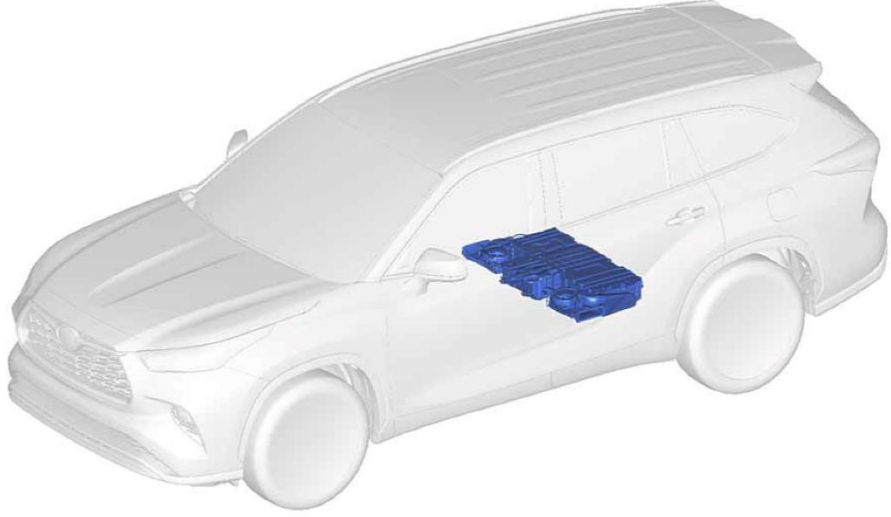
- Electric Motor
- Power Cables
- A/C Compressor
- Electric Generator
- Inverter/Converter
 - DC-DC Converter for 12 Volts Auxiliary Battery

HV Battery Pack Recycling

- The HV battery pack is recyclable. Contact either your Toyota distributor as mentioned on the caution label on the HV battery or the nearest Toyota dealer.

Auxiliary Battery

- The HIGHLANDER Hybrid/KLUGER Hybrid/CROWN KLUGER Hybrid also contains a sealed lead-acid 12 Volts battery. This 12 Volts 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 under the luggage compartment area. It is concealed by a plastic resin cover on the right side in the battery compartment.

	 <p>Auxiliary Battery</p>
288 Volts HV Battery Pack	12 Volts Auxiliary Battery Mounted in Luggage Compartment Area (Right Side)
	
HV Battery Pack Mounted in Cabin Area	

High Voltage Safety

The HV battery pack powers the high voltage electrical system with DC electricity. Positive and negative orange colored high voltage power cables are routed from the battery pack, under the vehicle floor pan, to the inverter/converter. The inverter/converter contains a circuit that boosts the HV battery voltage from 288 to 650 Volts DC. The inverter/converter creates 3-phase AC to power the motor. Power cables are routed from the inverter/converter to each high voltage motor (front and rear 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 Volts 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.***

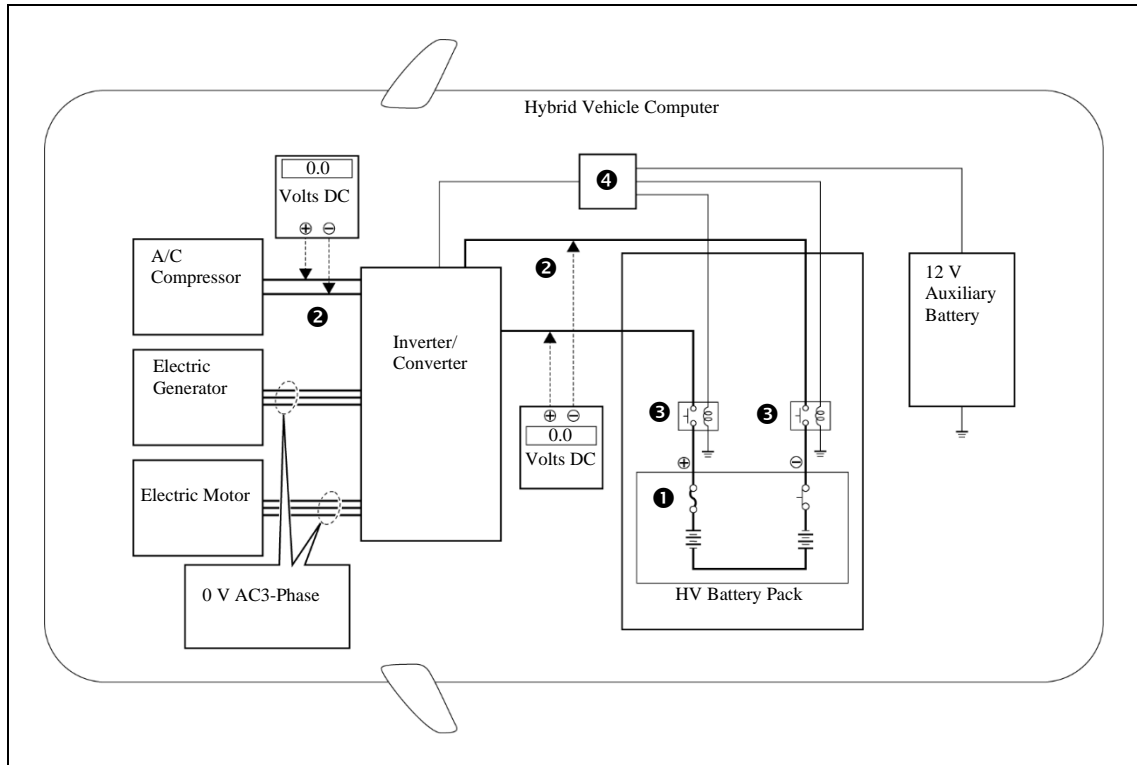
- Both positive and negative power cables ❷* are insulated from the metal body. High voltage electricity flows through these cables and not through the metal vehicle body. The metal vehicle body is safe to touch because it is insulated from the high voltage components.
- A ground fault monitor ❹* continuously 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.

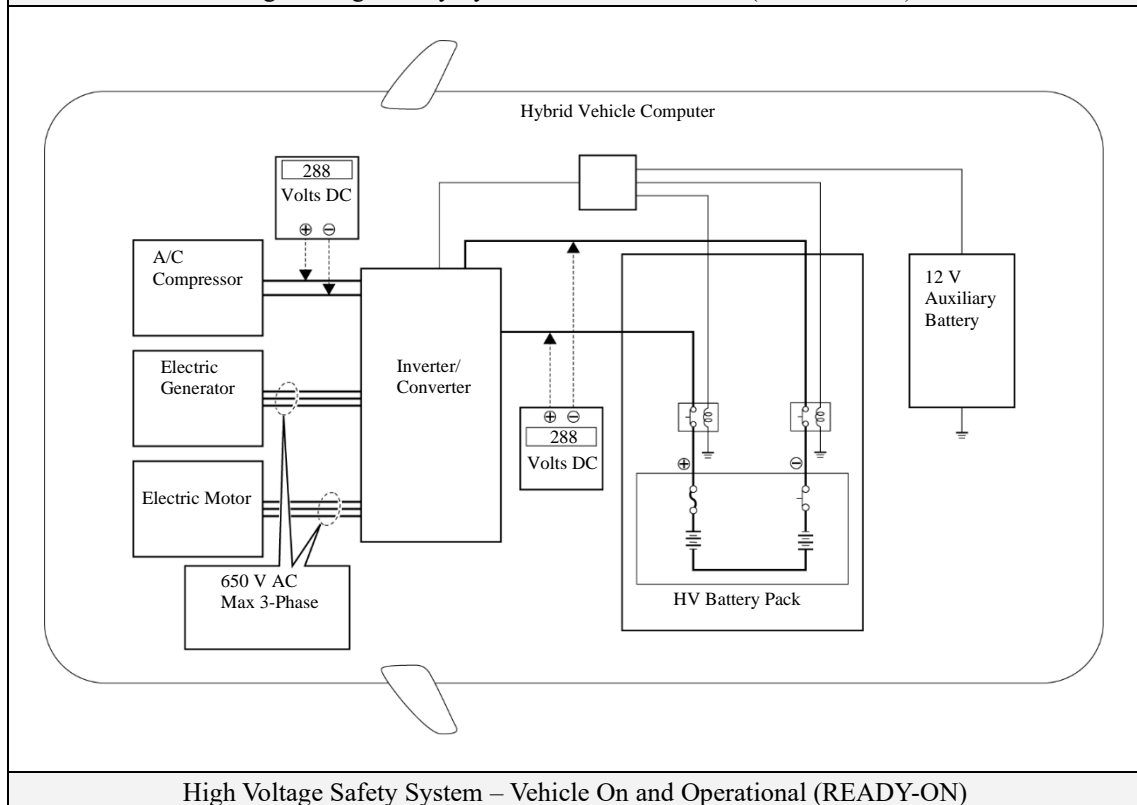
Service Plug Grip

- The high voltage circuit is cut by removing the service plug grip (see page 21).

for 2WD

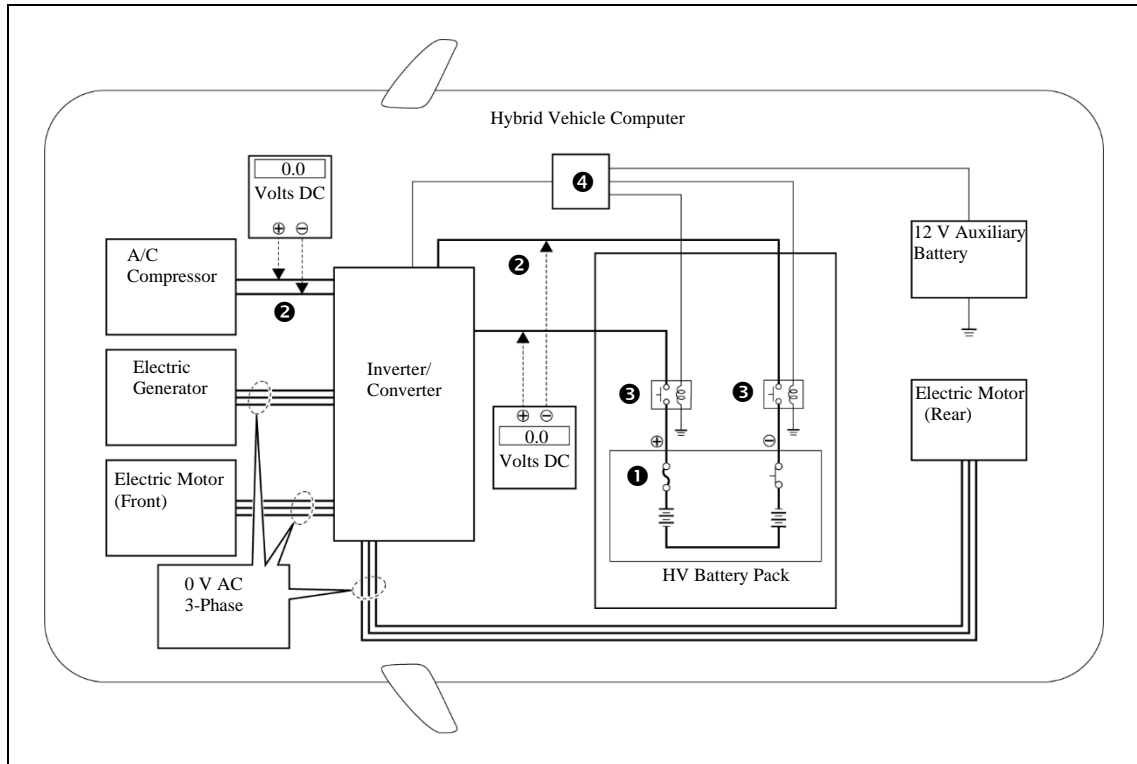


High Voltage Safety System – Vehicle Shut Off (READY-OFF)

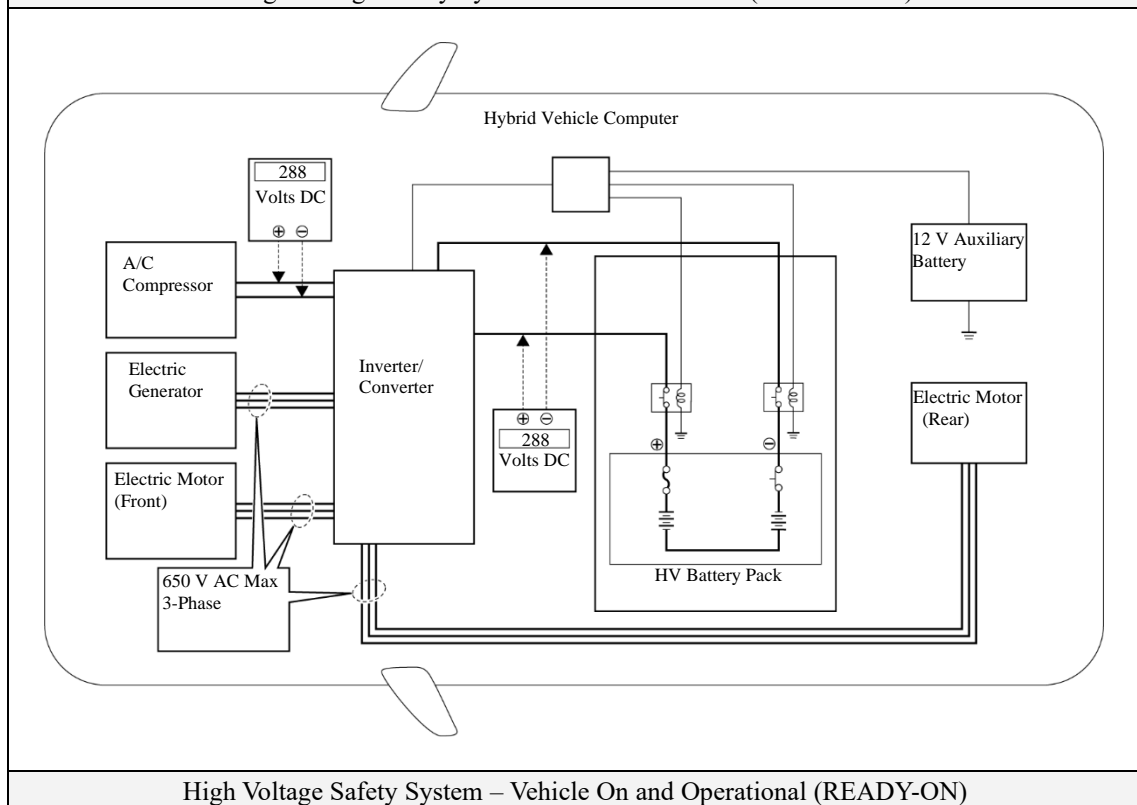


High Voltage Safety System – Vehicle On and Operational (READY-ON)

for 4WD/AWD



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



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

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 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.
- 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.

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

The HIGHLANDER Hybrid/KLUGER Hybrid/CROWN KLUGER 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 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.

- 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 5 pages contain general instructions for use when working on a HIGHLANDER Hybrid/KLUGER Hybrid/CROWN KLUGER Hybrid.

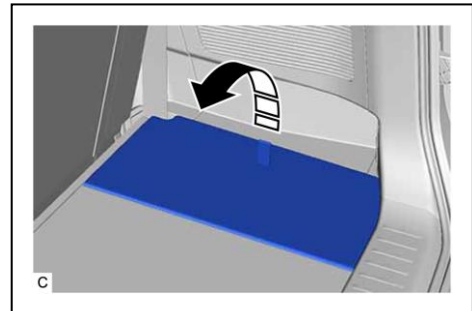
Read these instructions before proceeding to the HV battery removal instructions on page 26.



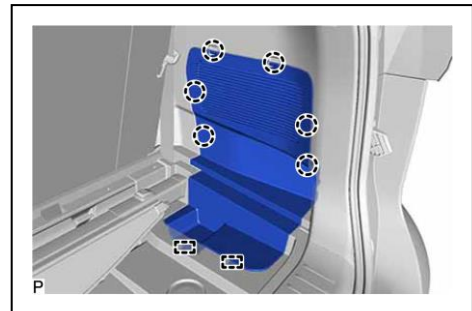
WARNING:

- ***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).
2. Remove battery service hole cover.
 - (1) Turn back the deck board assembly as shown in the illustration.

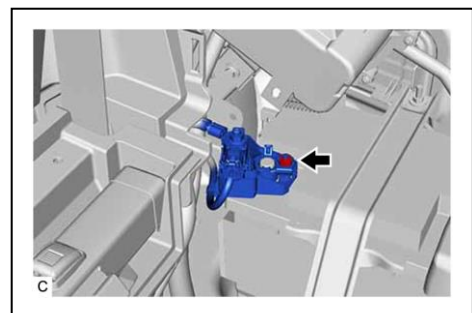


- (2) Disengage the 6 claws and 2 guides to remove the battery service hole cover.



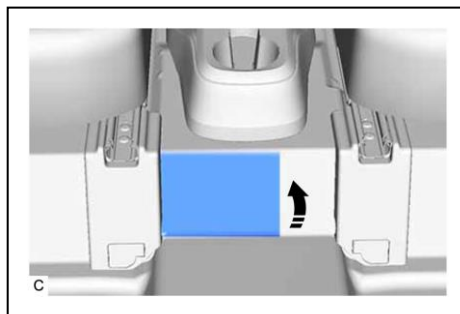
3. Disconnect cable from negative auxiliary battery terminal.

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

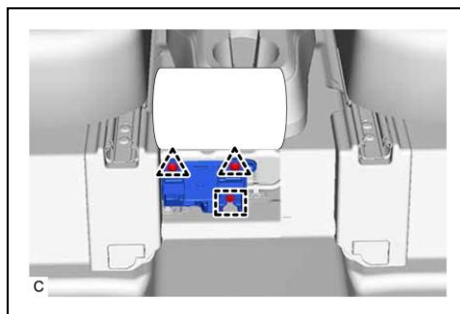


4. Remove hybrid battery service plug cover.

- (1) Turn back the front floor carpet assembly as shown in the illustration.



- (2) Remove the 2 clips.
(3) Disengage the clamp to remove the hybrid battery service plug cover.



5. Remove service plug grip.

CAUTION:

- Be sure to 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.



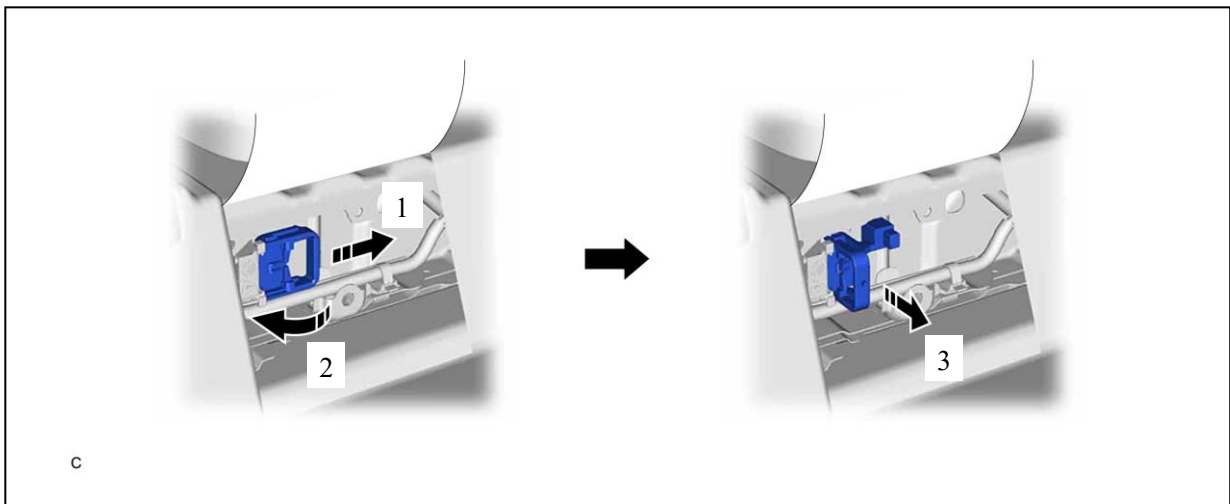
NOTICE:

- After removing the service plug grip, turning the ignition switch to ON (READY) may cause a malfunction. Do not turn the ignition switch to 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.

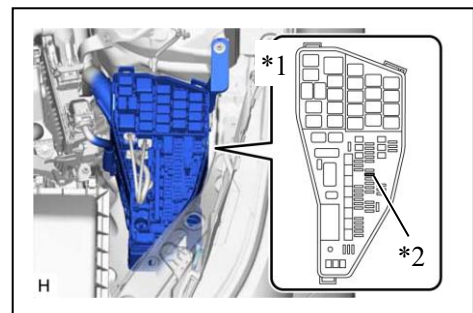
- (1) While wearing insulated gloves, rotate the handle of the service plug grip and remove the service plug grip as indicated by the arrows, in the order shown in the illustration.



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 25).
7. If the service plug grip cannot be removed due to damage to the vehicle, remove the **IG2-MAIN** fuse (25 A).

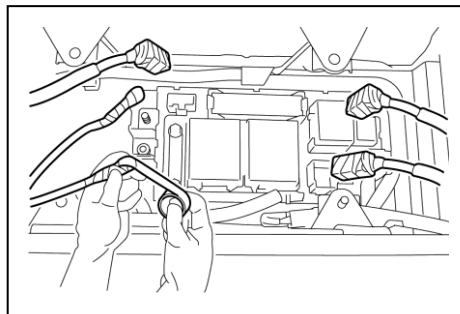
CAUTION:

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.



*1	No. 1 Engine Room Relay Block And No. 1 Junction Block Assembly
*2	IG2-MAIN Fuse

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



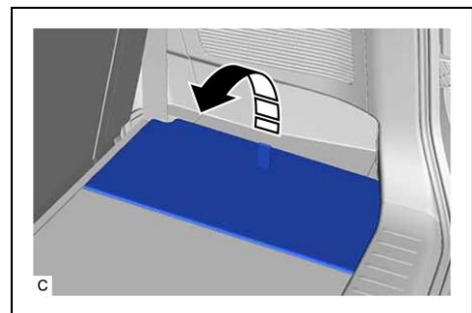
WARNING:

- *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.*

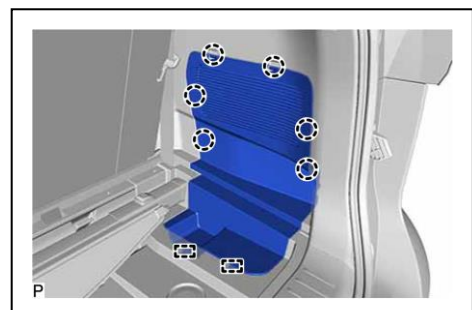
1. SHUT OFF IGNITION (**READY** indicator is off)

2. REMOVE BATTERY SERVICE HOLE COVER

- (1) Turn back the deck board assembly as shown in the illustration.

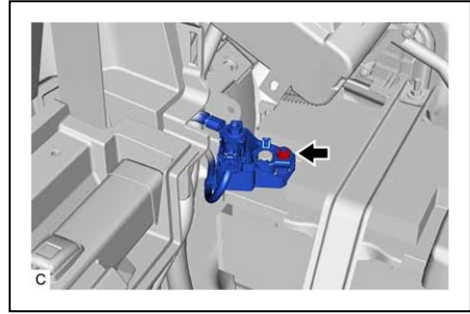


- (2) Disengage the 6 claws and 2 guides to remove the battery service hole cover.



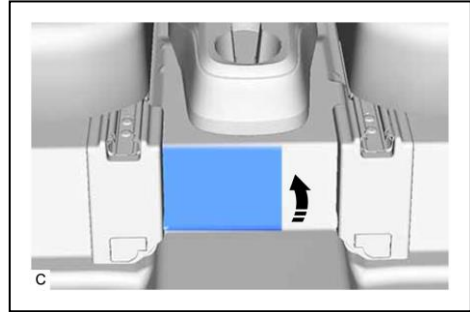
3. DISCONNECT CABLE FROM NEGATIVE AUXILIARY BATTERY TERMINAL

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

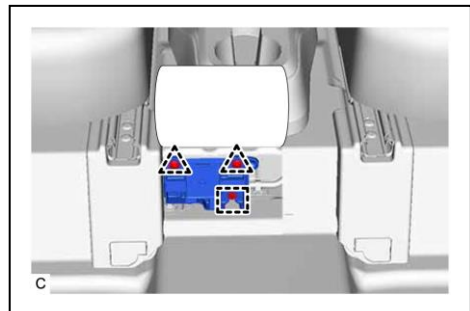


4. REMOVE HYBRID BATTERY SERVICE PLUG COVER

- (1) Turn back the front floor carpet assembly as shown in the illustration.



- (2) Remove the 2 clips.
- (3) Disengage the clamp to remove the hybrid battery service plug cover.



5. REMOVE SERVICE PLUG GRIP

CAUTION:

- **Be sure to 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.



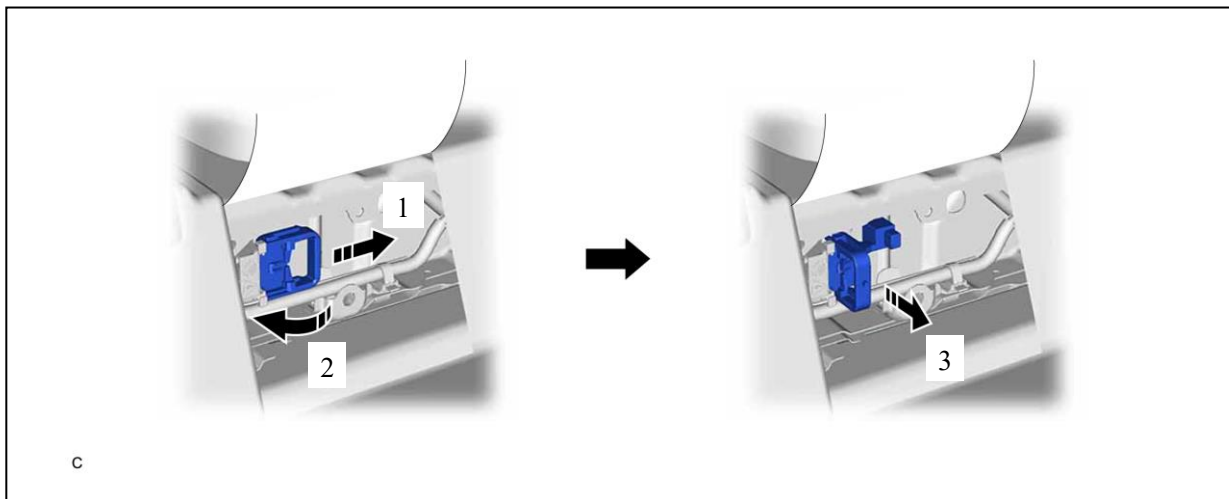
NOTICE:

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

HINT:

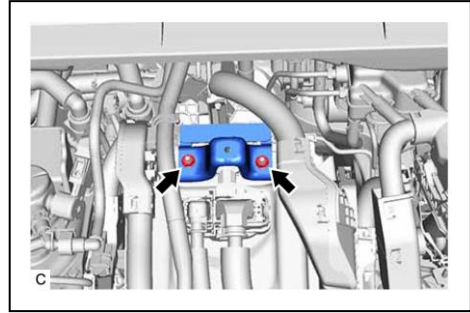
Waiting for at least 10 minutes is required to discharge the high voltage capacitor inside the inverter with converter assembly.

- (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.



6. REMOVE NO. 2 INVERTER PROTECTOR (w/ No. 2 Inverter Protector)

- (1) Remove the 2 nuts and No. 2 inverter protector from the inverter with converter assembly.



7. DISCONNECT ENGINE ROOM MAIN WIRE

CAUTION:

Be sure to wear insulated gloves.

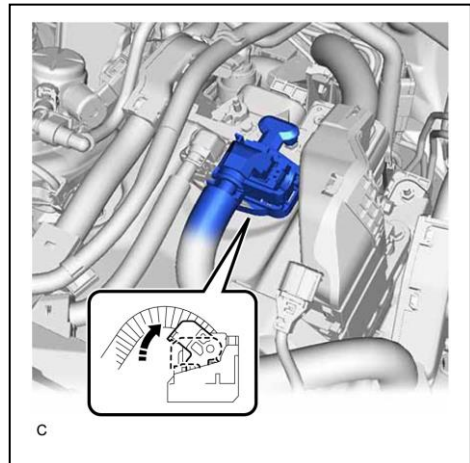
NOTICE:

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

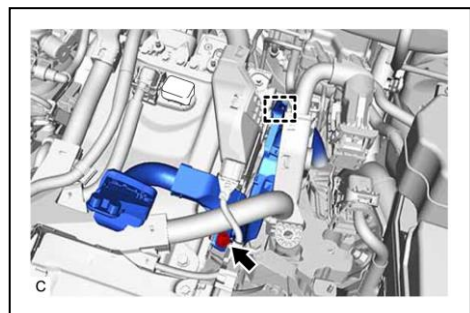
- (1) Move the lock lever while pushing the lock on the connector, and disconnect the inverter with converter assembly connector.

NOTICE:

- Do not touch the waterproof seal or terminals of the connector.
- Do not damage the terminals, connector housing or inverter with converter assembly during disconnection.
- 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 clamp and disconnect the engine room main wire.



8. REMOVE CONNECTOR COVER ASSEMBLY

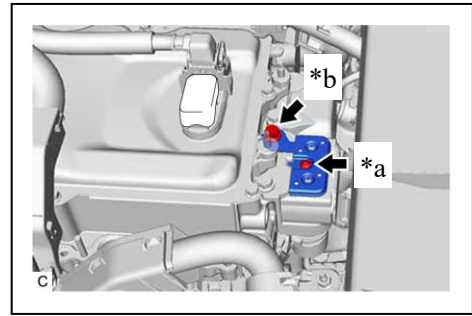
CAUTION:

Be sure to 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 touch the connector cover assembly waterproof seal.
- Do not allow any foreign matter or water to enter the inverter with converter assembly.



*a	Bolt (A)
*b	Bolt (B)

9. CHECK TERMINAL VOLTAGE

CAUTION:

Be sure to wear insulated gloves.

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

Standard Voltage:

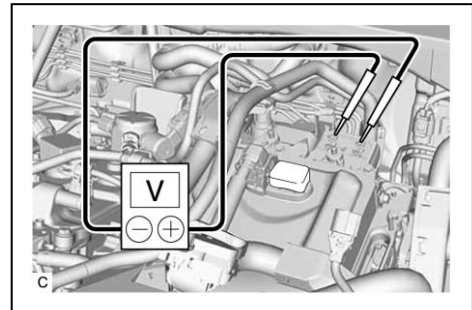
0 V

NOTICE:

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

HINT:

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

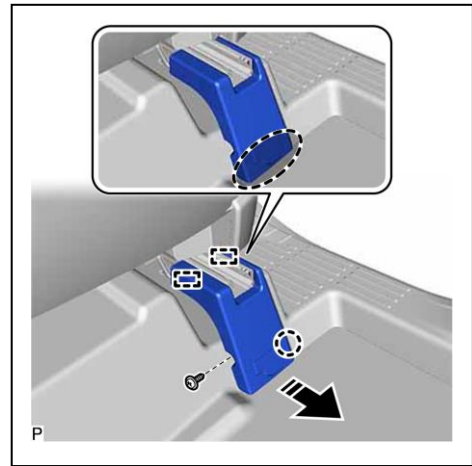




10. REMOVE REAR NO. 1 SEAT ASSEMBLY LH (for 60/40 Split Seat Type)

- (1) Remove rear seat headrest assembly.
 - a) Remove the rear seat headrest assembly.

(2) Remove front outer seat track bracket cover LH. (except China)

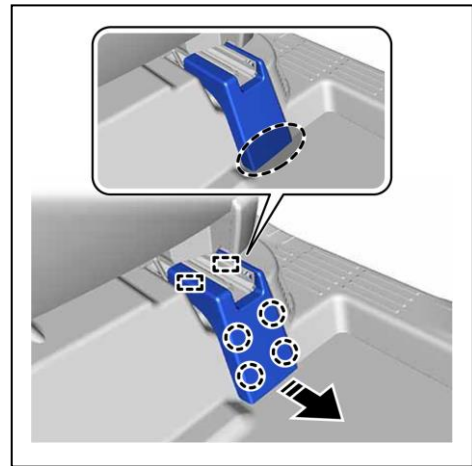
- a) Operate the seat track adjusting handle and move the rear No. 1 seat assembly LH to the rearmost position.
- b) Remove the screw.
- c) Disengage the claw and 2 guides as shown in the illustration to remove the front outer seat track bracket cover LH.





	Place Hand Here
	Remove in this Direction

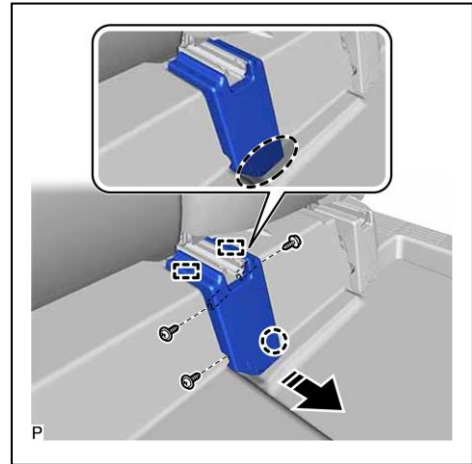
(3) Remove front outer seat track bracket cover LH. (for China)



- a) Operate the seat track adjusting handle and move the rear No. 1 seat assembly LH to the rearmost position.
- b) Disengage the 4 claws and 2 guides as shown in the illustration to remove the front outer seat track bracket cover LH.



	Place Hand Here
	Remove in this Direction

- (4) Remove front inner seat track bracket cover LH.
(except China)
- a) Remove the 3 screws.
 - b) Disengage the claw and 2 guides as shown in the illustration to remove the front inner seat track bracket cover LH.



	Place Hand Here
	Remove in this Direction

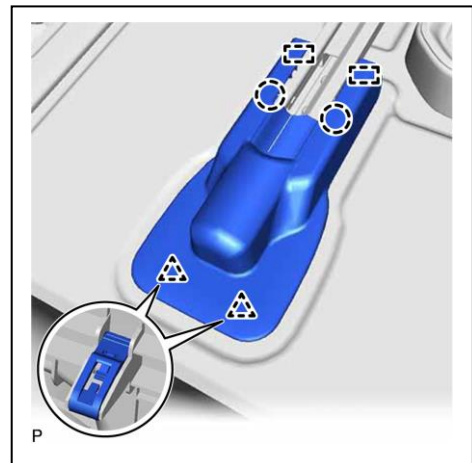
- (5) Remove front inner seat track bracket cover LH. (for China)

HINT:

Use the same procedure as for the front outer seat track bracket cover LH.

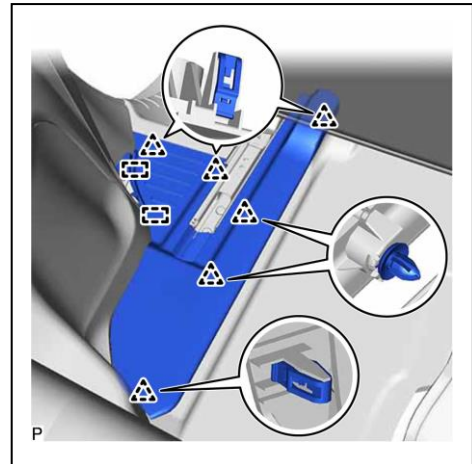
- (6) Remove rear inner seat track bracket cover LH.

- a) Operate the seat track adjusting handle and move the rear No. 1 seat assembly LH to the foremost position.
- b) Disengage the 2 claws, 2 clips and 2 guides to remove the rear inner seat track bracket cover LH.



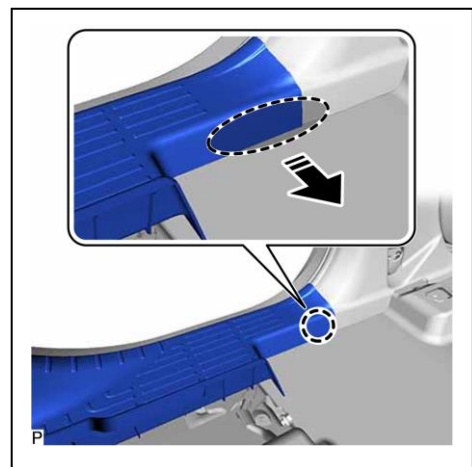
(7) Remove rear outer seat track bracket cover LH.



- a) Disengage the 6 clips and 2 guides to remove the rear outer seat track bracket cover LH.



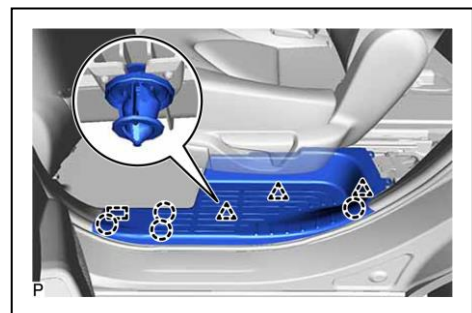
(8) Remove rear door scuff plate LH.

- a) Disengage the claw as shown in the illustration.



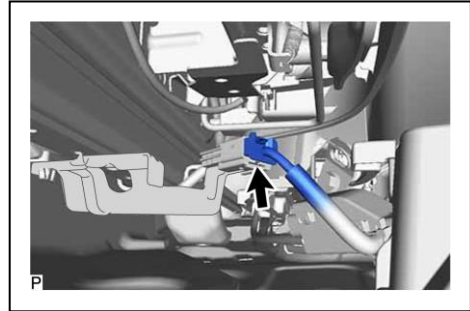
	Place Hand Here
	Remove in this Direction

- b) Disengage the 4 claws, 3 clips and guide to remove the rear door scuff plate LH.

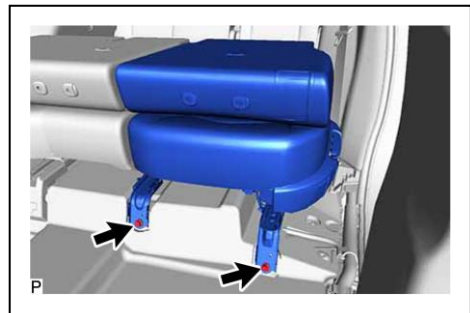


(9) Remove rear No. 1 seat assembly LH.

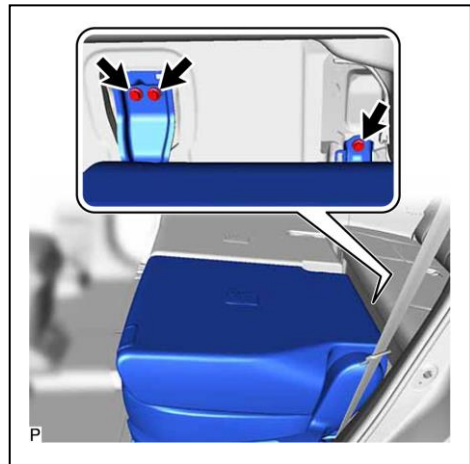
- a) Operate the seat track adjusting handle and move the rear No. 1 seat assembly LH to the rearmost position.
- b) Disconnect the connector.



- c) Remove the 2 bolts.
- d) Operate the seat track adjusting handle and move the rear No. 1 seat assembly LH to the foremost position.



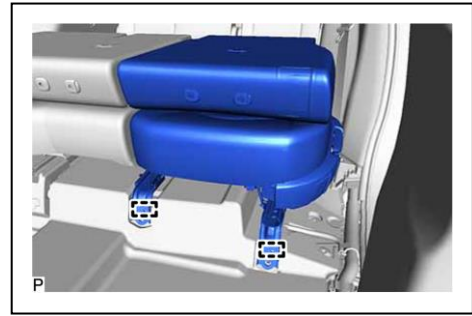
- e) Remove the 3 bolts.



- f) Disengage the 2 pins and remove the rear No. 1 seat assembly LH.

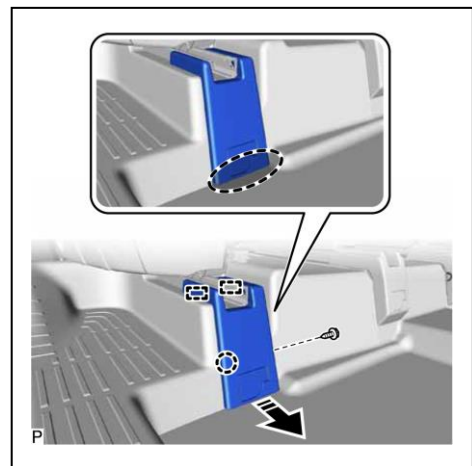
NOTICE:



Be careful not to damage the rear No. 1 seat assembly LH, vehicle body or vehicle interior.



11. REMOVE REAR NO. 1 SEAT ASSEMBLY RH (for 60/40 Split Seat Type)

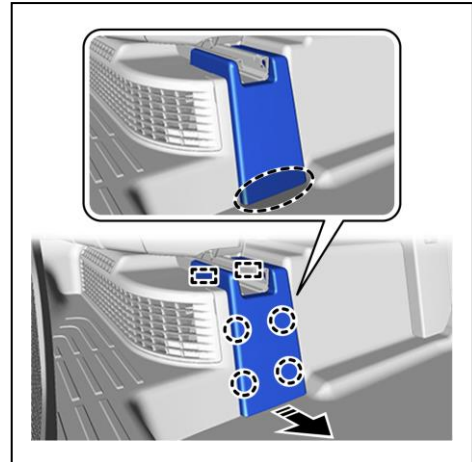
- (1) Remove rear seat headrest assembly.
 - a) Remove the rear seat headrest assembly.
- (2) Remove rear seat center headrest assembly.
 - a) Remove the rear seat center headrest assembly.
- (3) Remove front outer seat track bracket cover RH. (except China)
 - a) Operate the seat track adjusting handle and move the rear No. 1 seat assembly RH to the rearmost position.
 - b) Remove the screw.
 - c) Disengage the claw and 2 guides as shown in the illustration to remove the front outer seat track bracket cover RH.





	Place Hand Here
	Remove in this Direction

(4) Remove front outer seat track bracket cover RH. (for China)

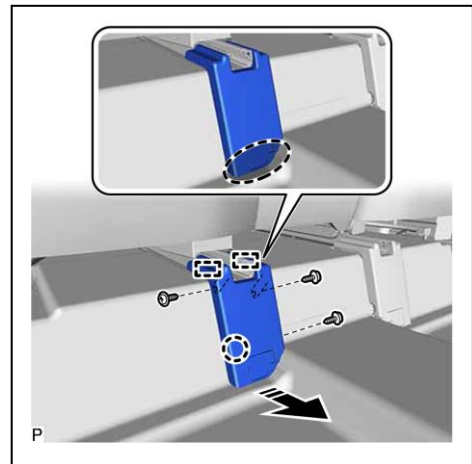
- a) Operate the seat track adjusting handle and move the rear No. 1 seat assembly RH to the rearmost position.
- b) Disengage the 4 claws and 2 guides as shown in the illustration to remove the front outer seat track bracket cover RH.





	Place Hand Here
	Remove in this Direction

(5) Remove front inner seat track bracket cover RH.
(except China)

- a) Remove the 3 screws.
- b) Disengage the claw and 2 guides as shown in the illustration to remove the front inner seat track bracket cover RH.



	Place Hand Here
	Remove in this Direction

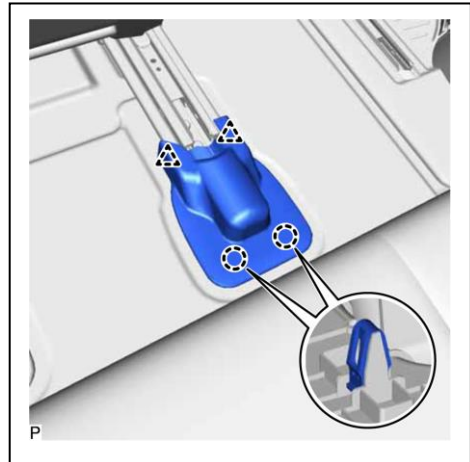
(6) Remove front inner seat track bracket cover RH. (for China)

HINT:

Use the same procedure as for the front outer seat track bracket cover RH.

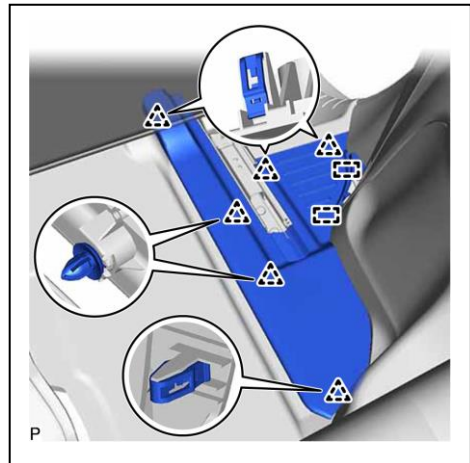
(7) Remove rear inner seat track bracket cover RH.

- a) Operate the seat track adjusting handle and move the rear No. 1 seat assembly RH to the foremost position.
- b) Disengage the 2 clips and 2 claws to remove the rear inner seat track bracket cover RH.



(8) Remove rear outer seat track bracket cover RH.

- a) Disengage the 6 clips and 2 guides to remove the rear outer seat track bracket cover RH.



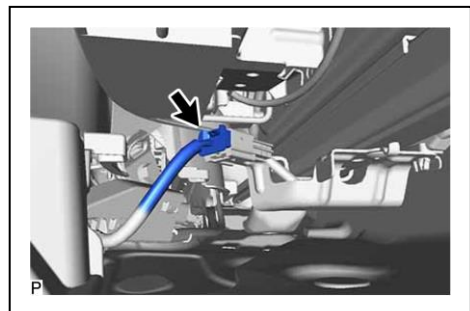
(9) Remove rear door scuff plate RH.

HINT:

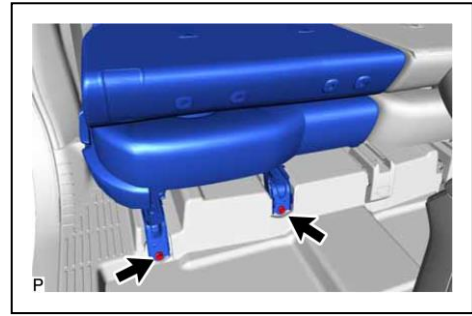
Use the same procedure as for the LH side.

(10) Remove rear No. 1 seat assembly RH.

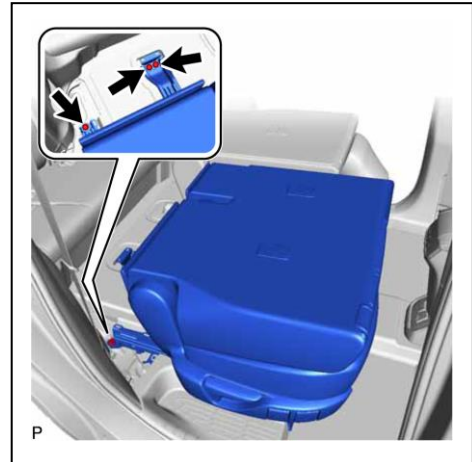
- a) Operate the seat track adjusting handle and move the rear No. 1 seat assembly RH to the rearmost position.
- b) Disconnect the connector.



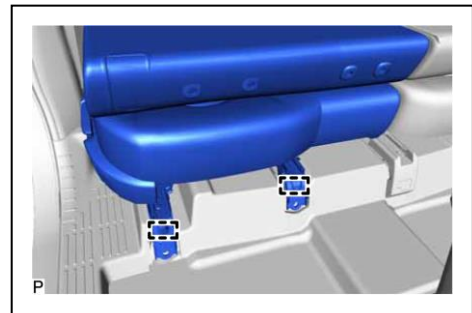
- c) Remove the 2 bolts.
- d) Operate the seat track adjusting handle and move the rear No. 1 seat assembly RH to the foremost position.



- e) Remove the 3 bolts.



- f) Disengage the 2 pins and remove the rear No. 1 seat assembly RH.



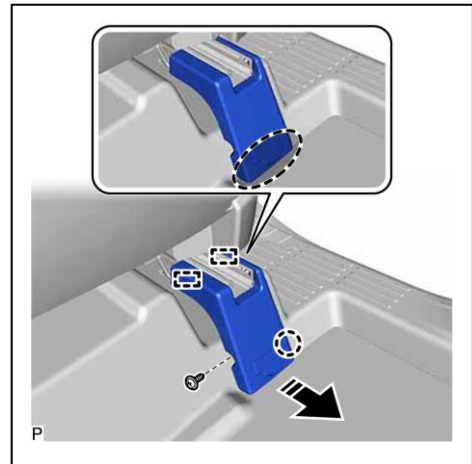
12. REMOVE REAR NO. 1 SEAT ASSEMBLY (for Captain Seat Type)



HINT:

- Use the same procedure for the RH side and LH side.
- The following procedure is for the LH side.

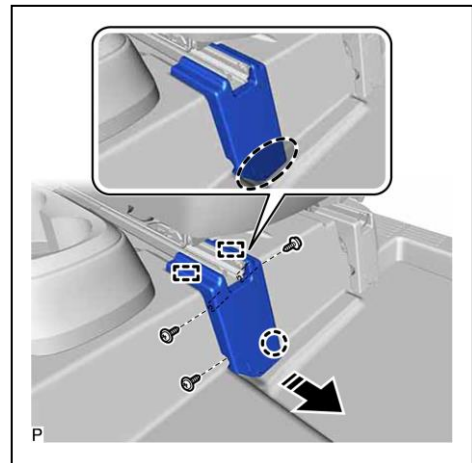
- (1) Remove rear seat headrest assembly.
 - a) Remove the rear seat headrest assembly.
- (2) Remove front outer seat track bracket cover LH.
 - a) Operate the seat track adjusting handle and move the rear No. 1 seat assembly LH to the rearmost position.



- b) Remove the screw.
- c) Disengage the claw and 2 guides as shown in the illustration to remove the front outer seat track bracket cover LH.



	Place Hand Here
	Remove in this Direction

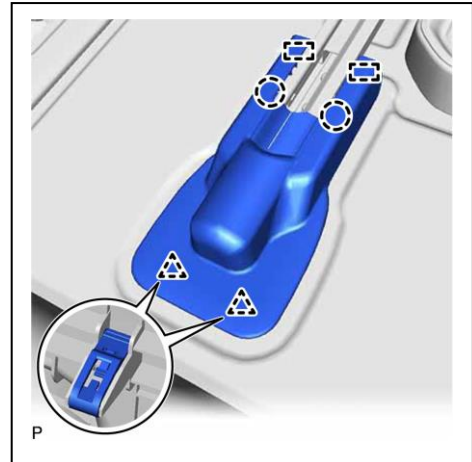
- (3) Remove front inner seat track bracket cover LH.
 - a) Remove the 3 screws.
 - b) Disengage the claw and 2 guides as shown in the illustration to remove the front inner seat track bracket cover LH.



	Place Hand Here
	Remove in this Direction

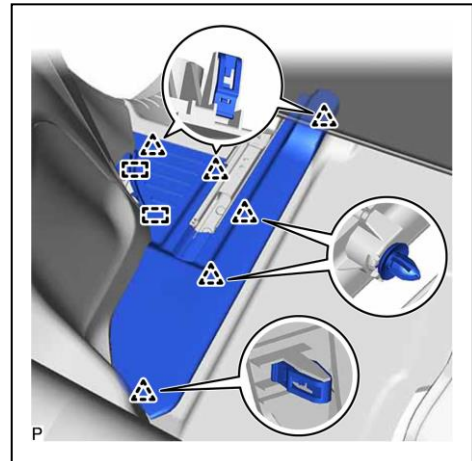
(4) Remove rear inner seat track bracket cover LH.

- a) Operate the seat track adjusting handle and move the rear No. 1 seat assembly LH to the foremost position.
- b) Disengage the 2 claws, 2 clips and 2 guides to remove the rear inner seat track bracket cover LH.



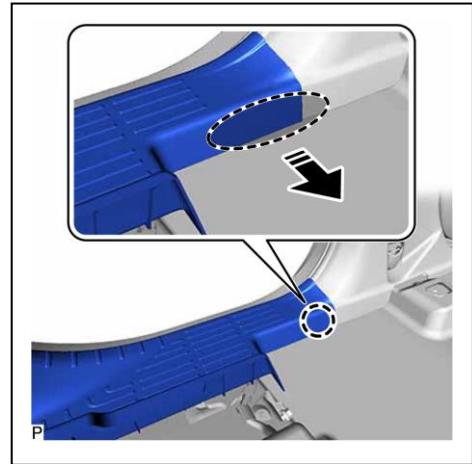
(5) Remove rear outer seat track bracket cover LH.



- a) Disengage the 6 clips and 2 guides to remove the rear outer seat track bracket cover LH.



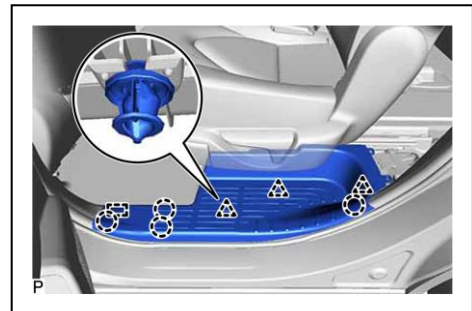
(6) Remove rear door scuff plate LH.

- a) Disengage the claw as shown in the illustration.



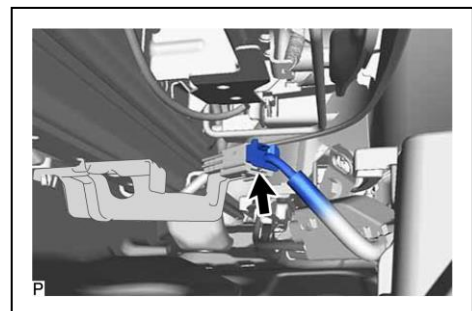
	Place Hand Here
	Remove in this Direction

- b) Disengage the 4 claws, 3 clips and guide to remove the rear door scuff plate LH.

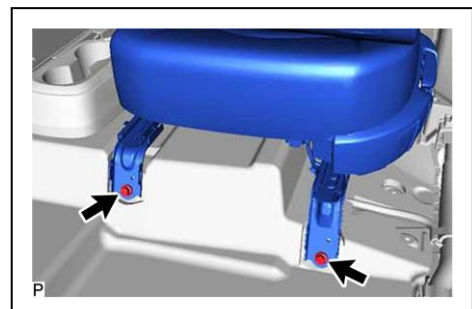


(7) Remove rear No. 1 seat assembly LH.

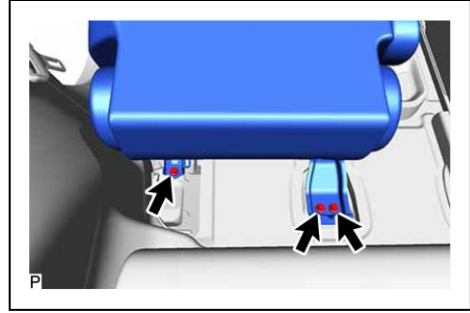
- a) Operate the seat track adjusting handle and move the rear No. 1 seat assembly LH to the rearmost position.
- b) Disconnect the connector.



- c) Remove the 2 bolts.
- d) Operate the seat track adjusting handle and move the rear No. 1 seat assembly LH to the foremost position.



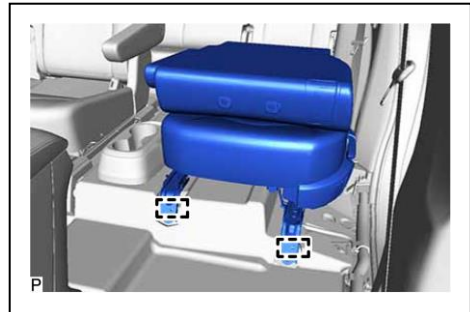
- e) Remove the 3 bolts.



- f) Disengage the 2 pins and remove the rear No. 1 seat assembly LH.

NOTICE:

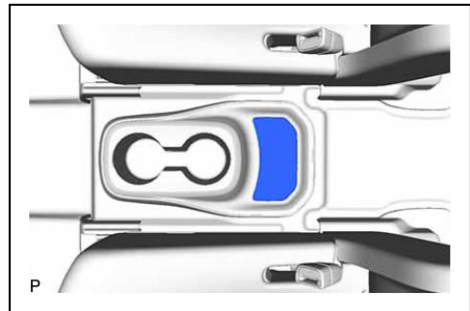
Be careful not to damage the rear No. 1 seat assembly LH, vehicle body or vehicle interior.



13. REMOVE REAR CONSOLE BOX ASSEMBLY (for Captain Seat Type)

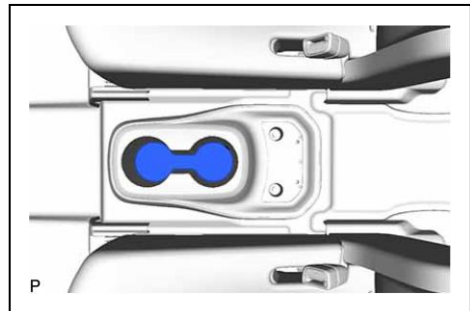
- (1) Remove rear seat under tray.

- a) Remove the rear seat under tray.



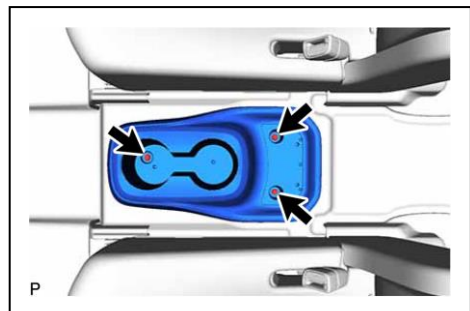
- (2) Remove cup holder tray.

- a) Remove the cup holder tray.



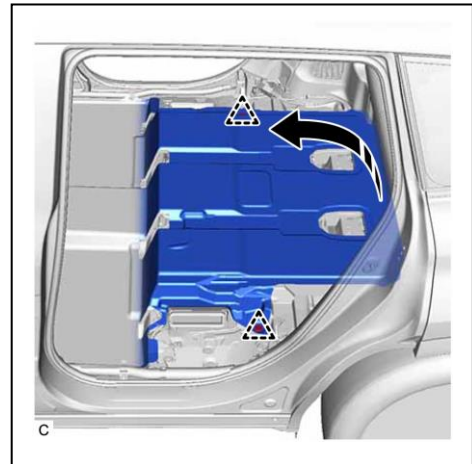
- (3) Remove rear console box assembly.

- a) Remove the 3 bolts and rear console box assembly.



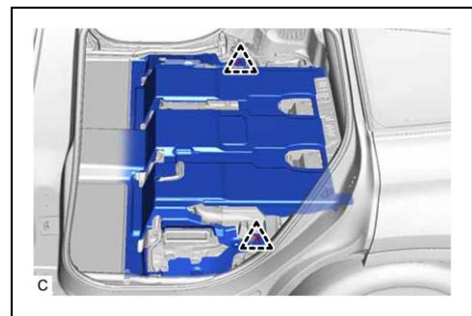
14. SEPARATE FRONT FLOOR CARPET ASSEMBLY

- (1) Remove the 2 clips.
- (2) Turn back the front floor carpet assembly to the point that the HV battery is visible.



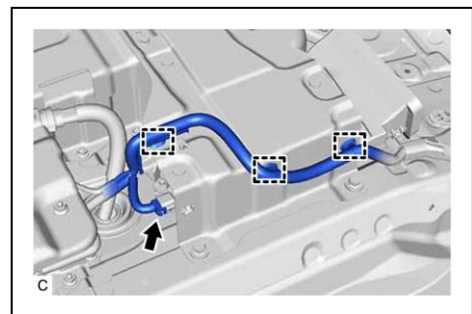
15. REMOVE REAR FLOOR SILENCER

- (1) Remove the 2 clips and rear floor silencer.

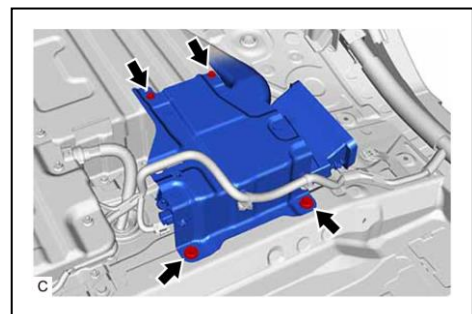


16. REMOVE BLOWER SUB-ASSEMBLY (for LH Side)

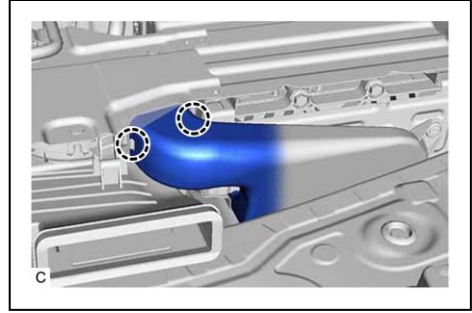
- (1) Disengage the 3 clamps.
- (2) Disconnect the battery cooling blower assembly connector.



- (3) Remove the 4 bolts.

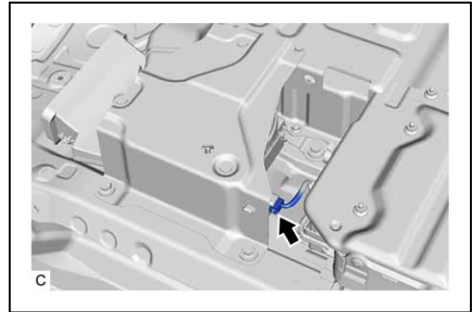


- (4) Disengage the 2 claws to remove the blower sub-assembly from the HV battery.

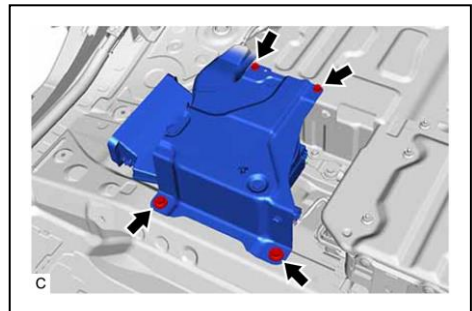


17. REMOVE BLOWER SUB-ASSEMBLY (for RH Side)

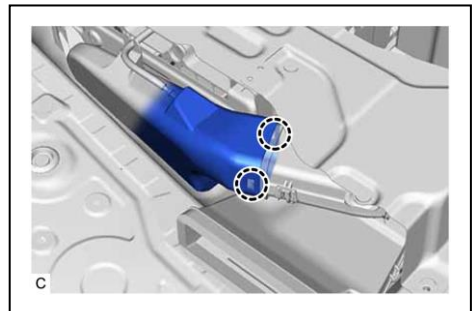
- (1) Disconnect the battery cooling blower assembly connector.



- (2) Remove the 4 bolts.

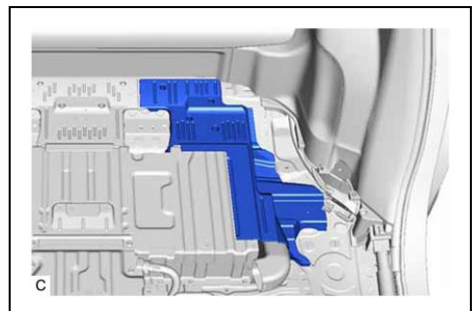


- (3) Disengage the 2 claws to remove the blower sub-assembly from the HV battery.



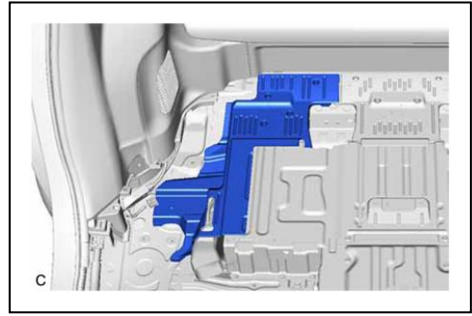
18. REMOVE NO. 3 FLOOR BOARD

- (1) Remove the No. 3 floor board.



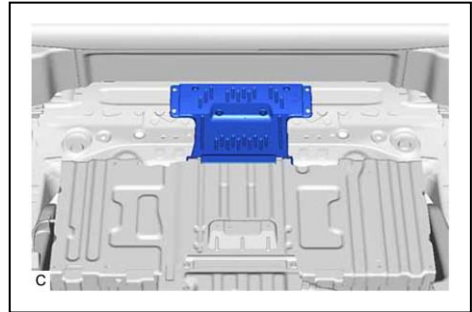
19. REMOVE NO. 2 FLOOR BOARD

- (1) Remove the No. 2 floor board.



20. REMOVE NO. 1 FLOOR BOARD

- (1) Remove the No. 1 floor board.



21. REMOVE DECK BOARD ASSEMBLY

- (1) Remove the deck board assembly.

22. REMOVE NO. 3 DECK BOARD SUB-ASSEMBLY (w/o Woofer)

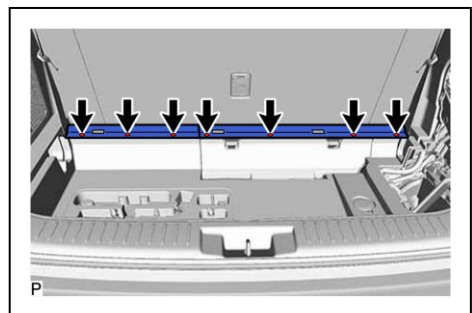
- (1) Remove the No. 3 deck board sub-assembly.

23. REMOVE TONNEAU COVER ASSEMBLY (w/ Tonneau Cover)

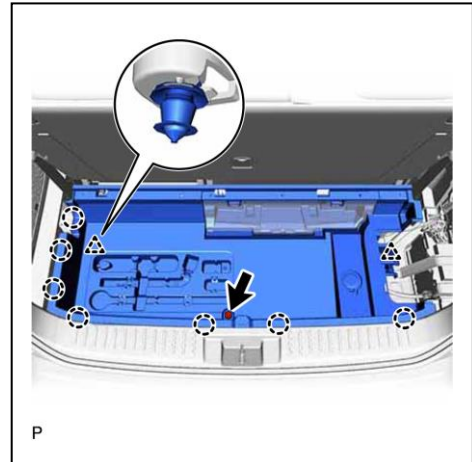
- (1) Remove the tonneau cover assembly.

24. REMOVE REAR DECK FLOOR BOX

- (1) Using a clip remover, remove the 7 clips.

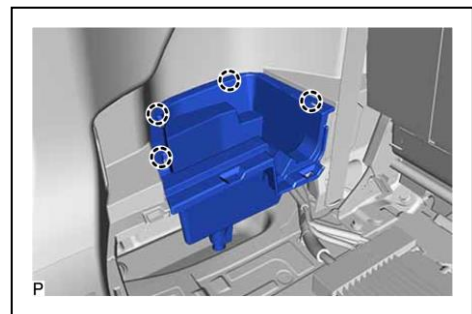


- (2) Remove the nut.
- (3) Disengage the 7 claws and 2 clips to remove the rear deck floor box.



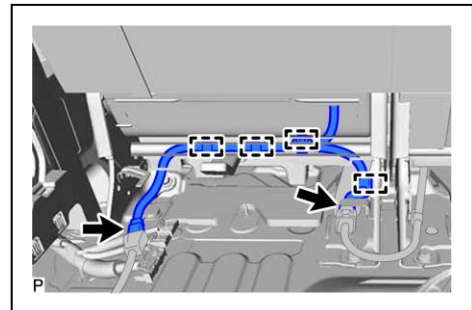
25. REMOVE DECK SIDE TRIM BOX LH (w/o Woofer)

- (1) Disengage the 4 claws to remove the deck side trim box LH.

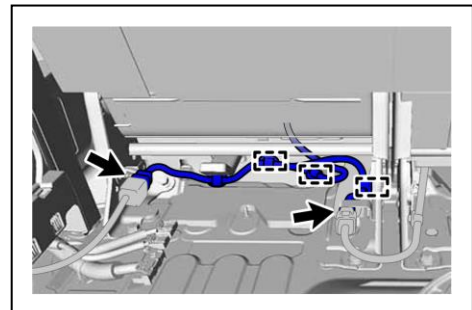


26. REMOVE REAR NO. 2 SEAT INNER BELT ASSEMBLY LH

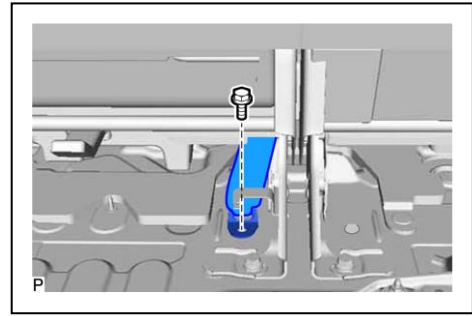
- (1) Disengage the 4 clamps. (except China)
- (2) Disconnect the 2 connectors. (except China)



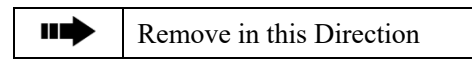
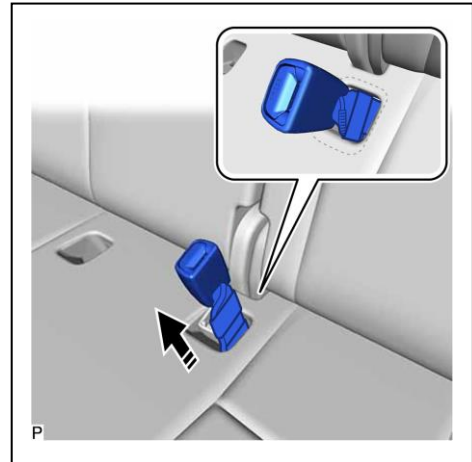
- (3) Disengage the 3 clamps. (for China)
- (4) Disconnect the 2 connectors. (for China)



(5) Remove the bolt.

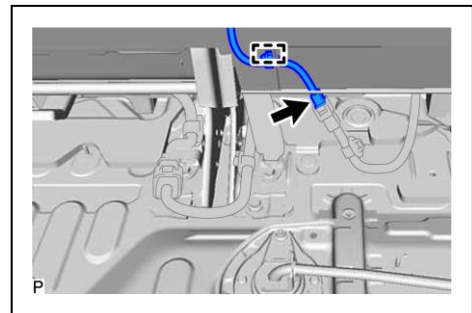


(6) Remove the rear No. 2 seat inner belt sub-assembly LH from the rubber band of the rear seat cushion assembly as shown in the illustration.

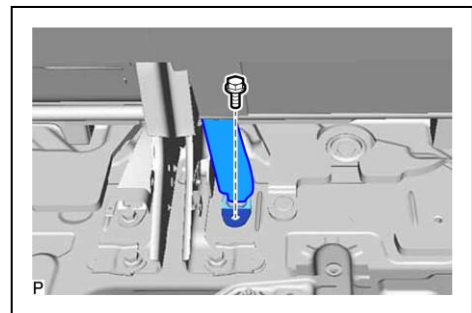


27. REMOVE SEAT INNER BELT SUB-ASSEMBLY (w/ Rear No. 2 Seat Inner Center Belt)

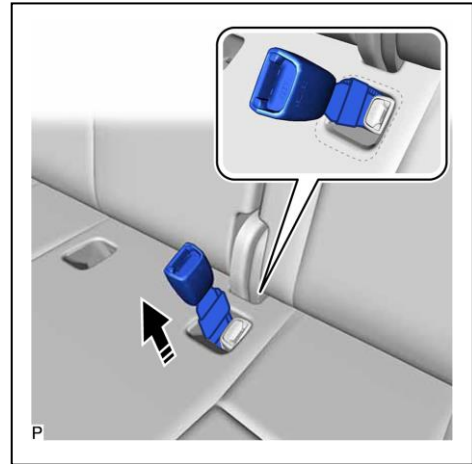
- (1) Disengage the clamp.
- (2) Disconnect the connector.



(3) Remove the bolt.



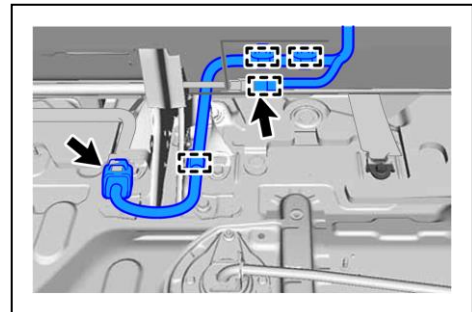
- (4) Remove the seat inner belt sub-assembly from the rubber band of the rear seat cushion assembly as shown in the illustration.



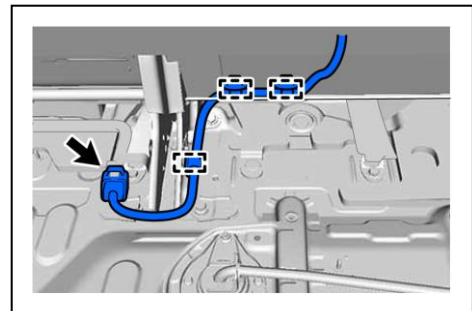
➡ Remove in this Direction

28. REMOVE REAR NO. 2 SEAT INNER BELT ASSEMBLY RH

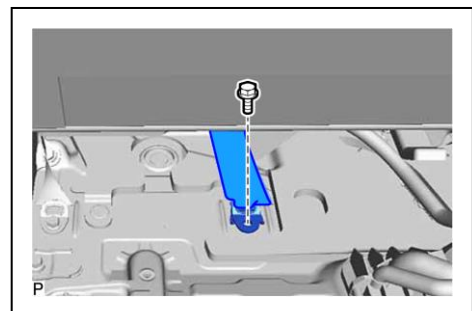
- (1) Disengage the 4 clamps. (except China)
- (2) Disconnect the 2 connectors. (except China)



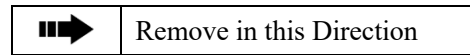
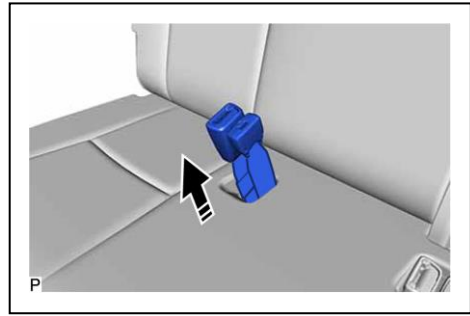
- (3) Disengage the 3 clamps. (for China)
- (4) Disconnect the connector. (for China)



- (5) Remove the bolt.

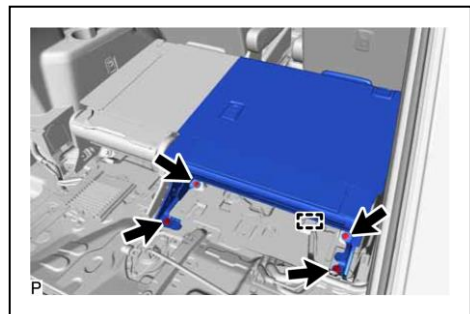


- (6) Remove the rear No. 2 seat inner belt sub-assembly RH from the rubber band of the rear seat cushion assembly as shown in the illustration.



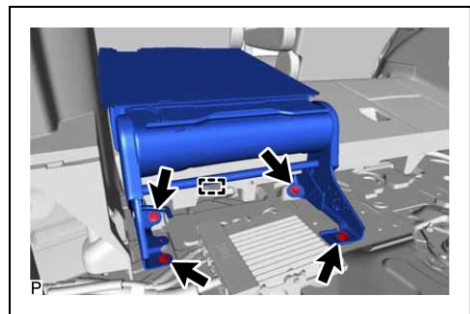
29. REMOVE REAR SEATBACK ASSEMBLY RH

- (1) Remove the 4 bolts.
- (2) Disengage the guide and remove the rear seatback assembly RH.



30. REMOVE REAR SEATBACK ASSEMBLY LH

- (1) Remove the 4 bolts.
- (2) Disengage the guide and remove the rear seatback assembly LH.

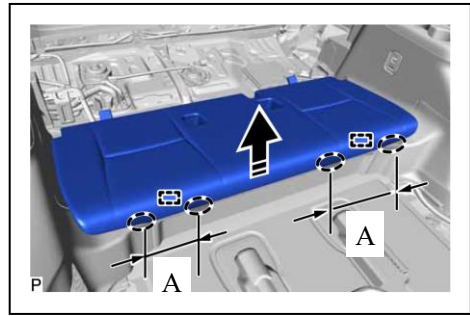


31. REMOVE REAR SEAT CUSHION ASSEMBLY

- (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 to remove the rear seat cushion assembly.

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.

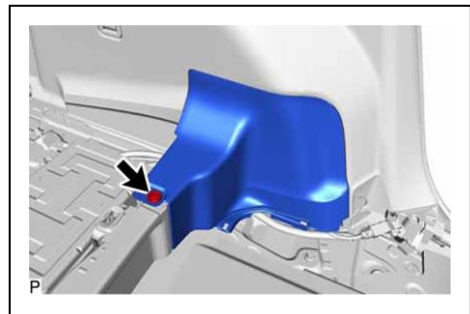


Standard Measurement:

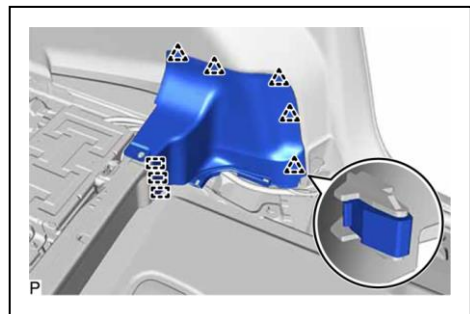
Area	Measurement
A	146 mm (5.75 in.)

32. REMOVE FRONT DECK SIDE TRIM COVER LH

- (1) Remove the clip.

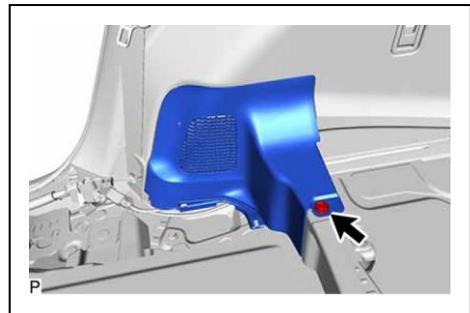


- (2) Disengage the 5 clips and 3 guides to remove the front deck side trim cover LH as shown in the illustration.

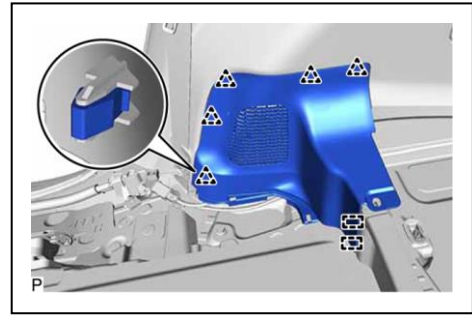


33. REMOVE FRONT DECK SIDE TRIM COVER RH

- (1) Remove the clip.

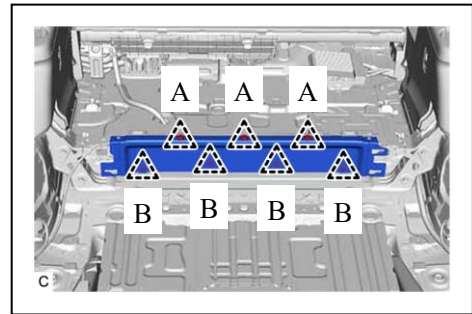


- (2) Disengage the 5 clips and 2 guides to remove the front deck side trim cover LH as shown in the illustration.



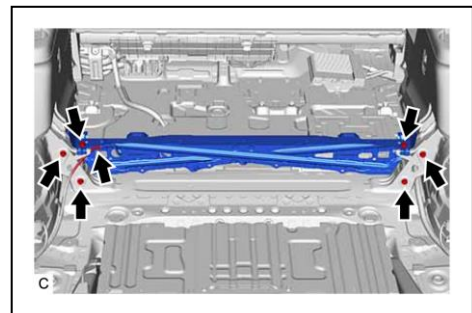
34. REMOVE CENTER PROTECTOR COVER

- (1) Remove the 3 clips (A).
- (2) Remove the 4 clips (B) and center protector cover.



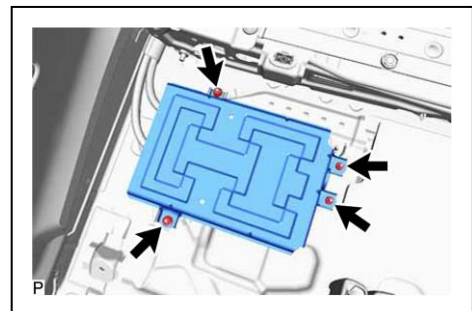
35. REMOVE REAR SEAT SUB FLOOR PANEL ASSEMBLY

- (1) Disconnect the connector.
- (2) Remove the 6 bolts and rear seat sub floor panel assembly.



36. REMOVE INVERTER UPPER COVER (w/ 1500w Voltage Inverter)

- (1) Remove the 4 nuts and inverter upper cover.



37. REMOVE VOLTAGE INVERTER ASSEMBLY WITH BRACKET (w/ 1500w Voltage Inverter)

- (1) Using a screwdriver, slide the green-colored lock of the connector (A) and (B) as shown in the illustration to release it and disconnect the 2 connectors.

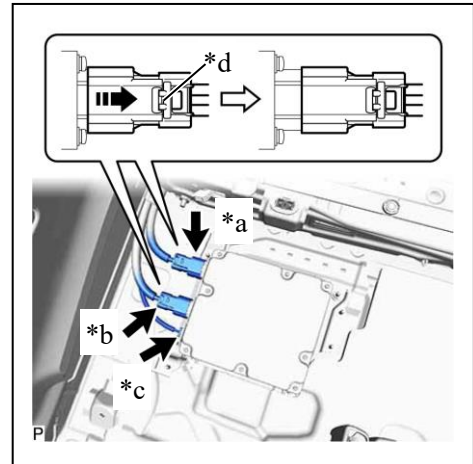
CAUTION:

Make sure to wear insulated gloves.

NOTICE:

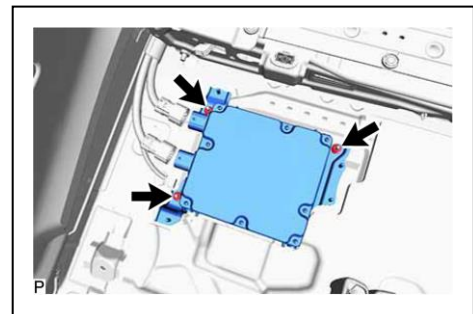
Insulate the disconnected terminals and connector with insulating tape.

- (2) Disconnect the connector (C).



*a	Connector (A)
*b	Connector (B)
*c	Connector (C)
*d	Green-colored Lock
	Slide

- (3) Remove the 3 nuts and voltage inverter assembly with bracket.

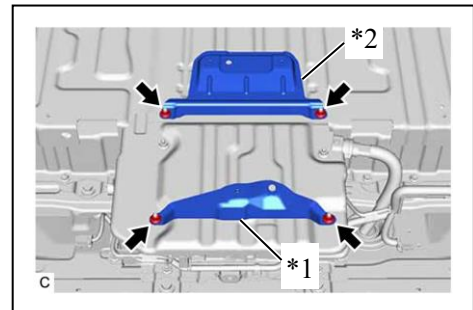


38. REMOVE NO. 10 HV BATTERY SHIELD PANEL

CAUTION:

Be sure to wear insulated gloves.

- (1) for Captain Seat Type:
 - a) Remove the 2 nuts and No. 3 console box mounting bracket from the HV battery.
 - b) Remove the 2 nuts and No. 4 console box mounting bracket from the HV battery.



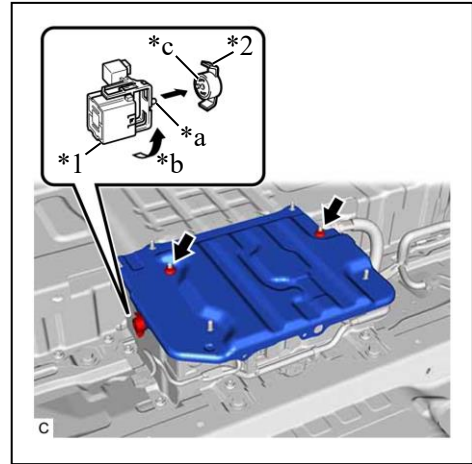
*1	No. 3 Console Box Mounting Bracket
*2	No. 4 Console Box Mounting Bracket

- c) 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.

- d) Remove the 2 nuts and No. 10 HV battery shield panel from the HV battery.



*1	Service Plug Grip
*2	Battery Cover Lock Striker
*a	Projection
*b	Turn
*c	Button

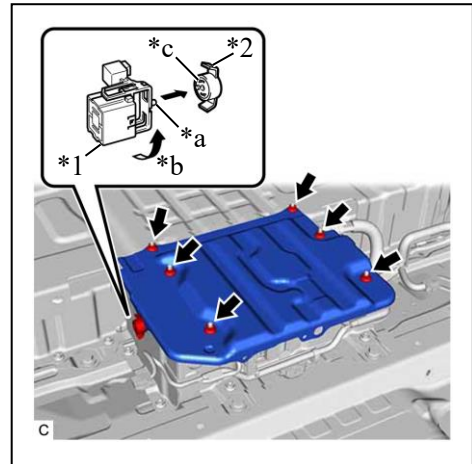
- (2) for 60/40 Split Seat Type:

- 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 6 nuts and No. 10 HV battery shield panel from the HV battery.



*1	Service Plug Grip
*2	Battery Cover Lock Striker
*a	Projection
*b	Turn
*c	Button

39. DISCONNECT HV FLOOR UNDER WIRE

CAUTION:

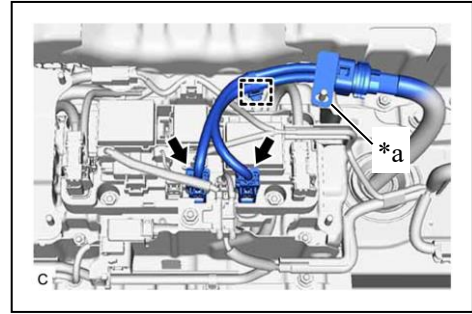
Be sure to wear insulated gloves.

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

NOTICE:

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

- (2) Disengage the clamp.
- (3) Disconnect the shield ground from the HV battery.



*a	Shield Ground
----	---------------

40. DISCONNECT FLOOR WIRE

CAUTION:

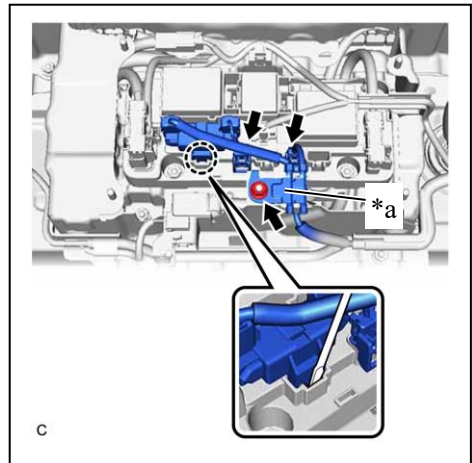
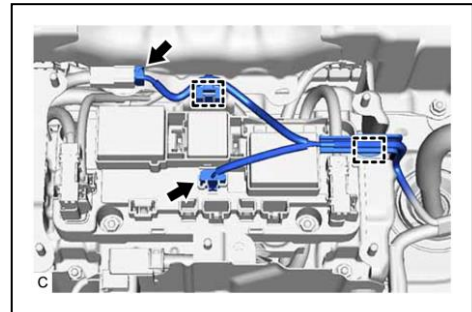
Be sure to wear insulated gloves.

- (1) Disengage the 2 clamps.
- (2) Disconnect the floor wire connector.
- (3) Disconnect the HV battery junction block assembly connector.
- (4) w/ 1500w Voltage Inverter
 - a) Disconnect the 2 HV battery junction block assembly connectors.

NOTICE:

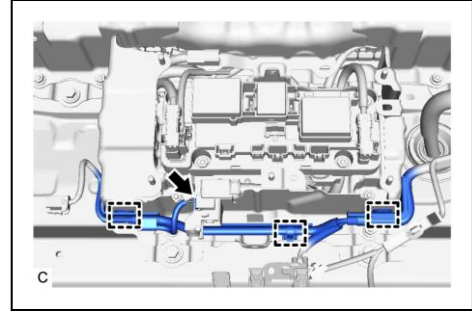
Insulate each disconnected high-voltage connector with insulating tape. Wrap the connector from the wire harness side to the end of the connector.

- b) Using a screwdriver disengage the claw.
- c) Remove the nut and disconnect the shield ground.



*a	Shield Ground
----	---------------

- (5) Disconnect the electric vehicle battery plug assembly connector.
- (6) Disengage the 3 clamps to disconnect the floor wire.



41. INSTALL NO. 10 HV BATTERY SHIELD PANEL

- (1) Install the No. 10 HV battery shield panel to the HV battery with the 6 nuts.

42. REMOVE HV BATTERY

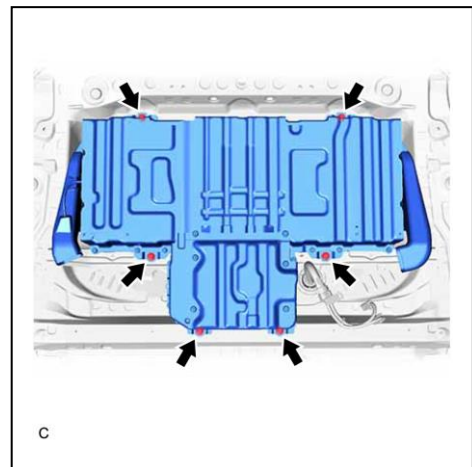
CAUTION:

Be sure to wear insulated gloves.

- (1) Remove the 6 bolts.

NOTICE:

- Do not allow foreign matter, such as grease or oil, to adhere to the bolts of the HV battery.
- To prevent the wire harness from being caught, make sure to bundle the wire harness using insulating tape or equivalent.
- Use cardboard or another similar material to protect the HV battery and vehicle body from damage.
- Since the HV battery is very heavy, 2 people are needed to remove it. When removing the HV battery, be careful not to damage the parts around it.
- When removing the HV battery from the vehicle, do not allow it to contact the vehicle.
- When removing/installing/moving the HV battery, make sure not to tilt it more than 80°.
- Insulate the disconnected terminals or connectors with insulating tape.

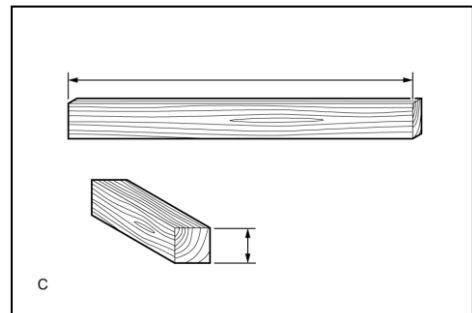


- (2) Prepare wooden blocks that will be used to pull out the HV battery.

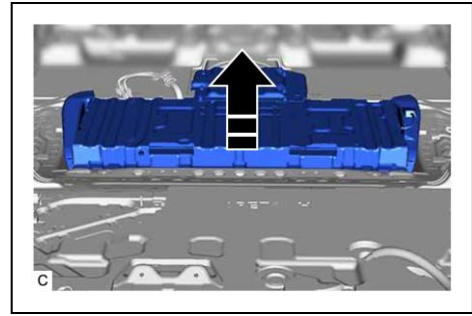
Wooden block	45 mm (1.7717 in.) x 45 mm (1.7717 in.) x 1000 mm (3.28 ft.)
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HINT:

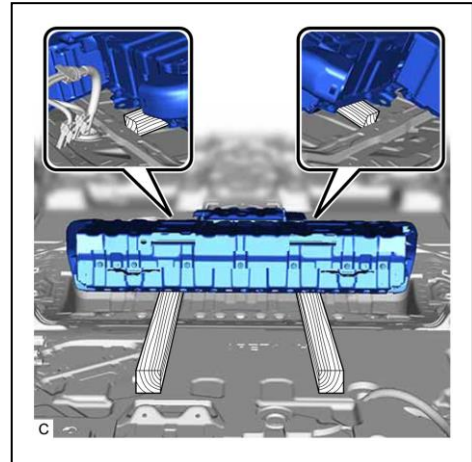
The wooden blocks dimensions are an approximation.



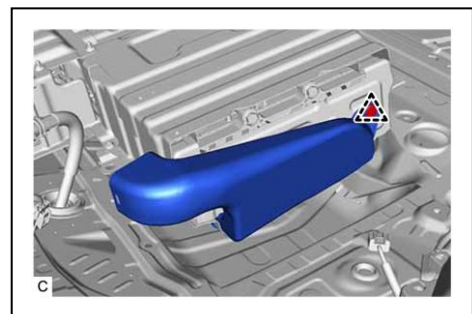
(3) Tilt the HV battery and place wooden blocks.



(4) Set the wooden blocks as shown in the illustration.



(5) Remove the clip and No. 2 HV battery intake duct LH from the HV battery.

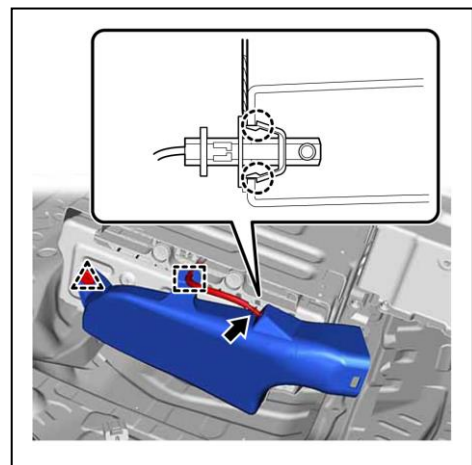


(6) Disengage the clamp.

(7) Using a screwdriver with its tip wrapped with protective tape, disengage the 2 claws and disconnect the HV battery thermistor from the No. 2 HV battery intake duct RH.

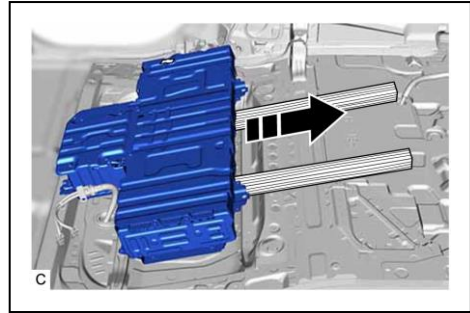
NOTICE:

- Be careful not to damage the HV battery thermistor.
- When disconnecting the HV battery thermistor, hold it gently and pull it straight out.

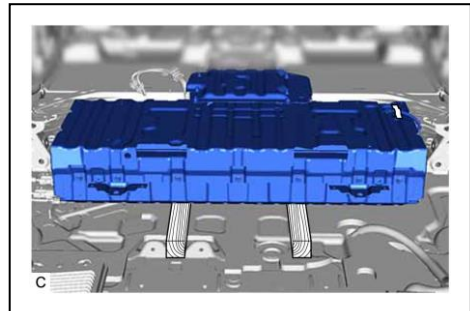


(8) Remove the clip and No. 2 HV battery intake duct RH from the HV battery.

(9) Pull out the HV battery to the rear of the vehicle as shown in the illustration.



(10) Pull out the HV battery to the rear of the vehicle at the positions shown in the illustration.



(11) Using a suitable adaptor such as straps, remove the HV battery while tilting it.

