

Hybrid 2nd Generation

Emergency Response Guide



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12 Camry Hybrid ERG REV – (11/22/11)

Foreword

In January 2010, Toyota released the 1st generation Toyota Camry gasoline-electric hybrid vehicle. To educate and assist emergency responders in the safe handling of the 1st generation Camry hybrid technology, Toyota published the 2010 Camry hybrid Emergency Response Guide.

With the release of the 2nd generation Camry hybrid in February 2012, a new 2012 Toyota Camry Hybrid Emergency Response Guide was published for emergency responders. While many features from the 1st generation model are similar, emergency responders should recognise and understand the new, updated features of the 2nd generation Camry hybrid covered in this guide.

High voltage electricity powers the electric motor, generator, inverter/converter and air conditioning compressor. All other automotive electrical devices such as the headlights, radio, and gauges are powered from a separate 12 Volt auxiliary battery. Numerous safeguards have been designed into the Camry hybrid to help ensure the high voltage, approximately 244.8 Volt, Nickel Metal Hydride (NiMH) Hybrid Vehicle (HV) battery pack is kept safe and secure in an accident.

The Camry hybrid utilises the following electrical systems:

- Maximum 650 Volts AC
- Maximum 27 Volts AC
- Nominal 244.8 Volts DC
- Nominal 12 Volts DC

2nd Generation Camry Hybrid Features:

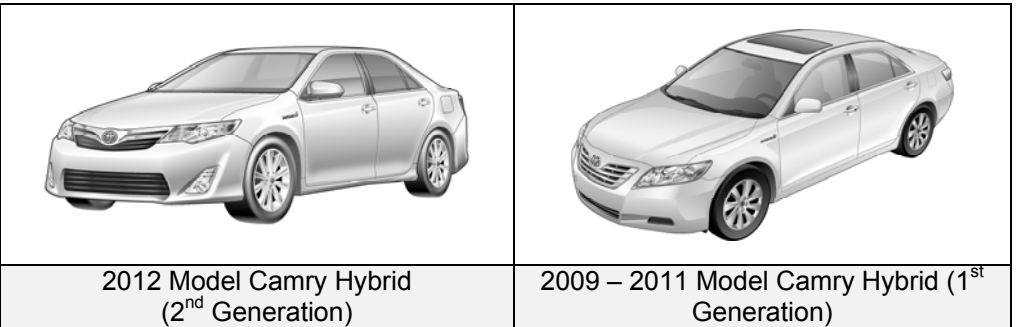
- Complete model change with a new exterior and interior design.
- An Electric Power Steering (EPS) assist motor rated at 27 Volts.
- A boost converter in the inverter/converter that boosts to 650 Volts the available voltage to the electric motor.
- A high voltage Hybrid Vehicle (HV) battery pack rated at 244.8 Volts.
- A high voltage motor driven Air Conditioning (A/C) compressor rated at 244.8 Volts.

- A body electrical system rated at 12 Volts, negative chassis ground.
- Supplemental Restraint System (SRS) –frontal airbags, driver knee airbag, front seat mounted side airbags, side curtain airbags, and front seatbelt pretensioners.

High voltage electrical safety remains an important factor in the emergency handling of the Camry Hybrid Synergy Drive. It is important to recognise and understand the disabling procedures and warnings throughout the guide.

Additional topics in the guide include:

- Toyota Camry hybrid identification.
- Major Hybrid Synergy Drive component locations and descriptions.
- Extrication, fire, recovery, and additional emergency response information.
- Roadside assistance information.



This guide is intended to assist emergency responders in the safe handling of a Toyota Camry hybrid vehicle during an incident.

NOTE:

Emergency Response Guides for Toyota hybrid and alternative fuel vehicles may be viewed at <http://techinfo.toyota.com>.

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About the Camry Hybrid

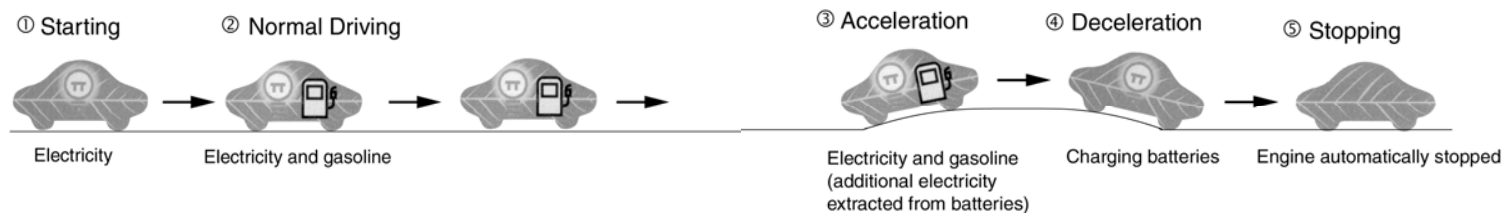
The Camry hybrid continues into its 2nd generation as a gasoline-electric hybrid vehicle. Hybrid Synergy Drive means that the vehicle contains a gasoline engine and electric motors for power. The two hybrid power sources are stored on board the vehicle:

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

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 Camry 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 Camry hybrid operates in various driving modes.

- ① During light acceleration at low speeds, the vehicle is powered by the electric motor. The gasoline engine is shut off.
- ② 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.
- ③ During full acceleration, such as climbing a hill, both the gasoline engine and the electric motor power the vehicle.
- ④ During deceleration, such as when braking, the vehicle regenerates kinetic energy from the front wheels to produce electricity that recharges the battery pack.
- ⑤ While the vehicle is stopped, the gasoline engine and electric motors are off, however the vehicle remains on and operational.



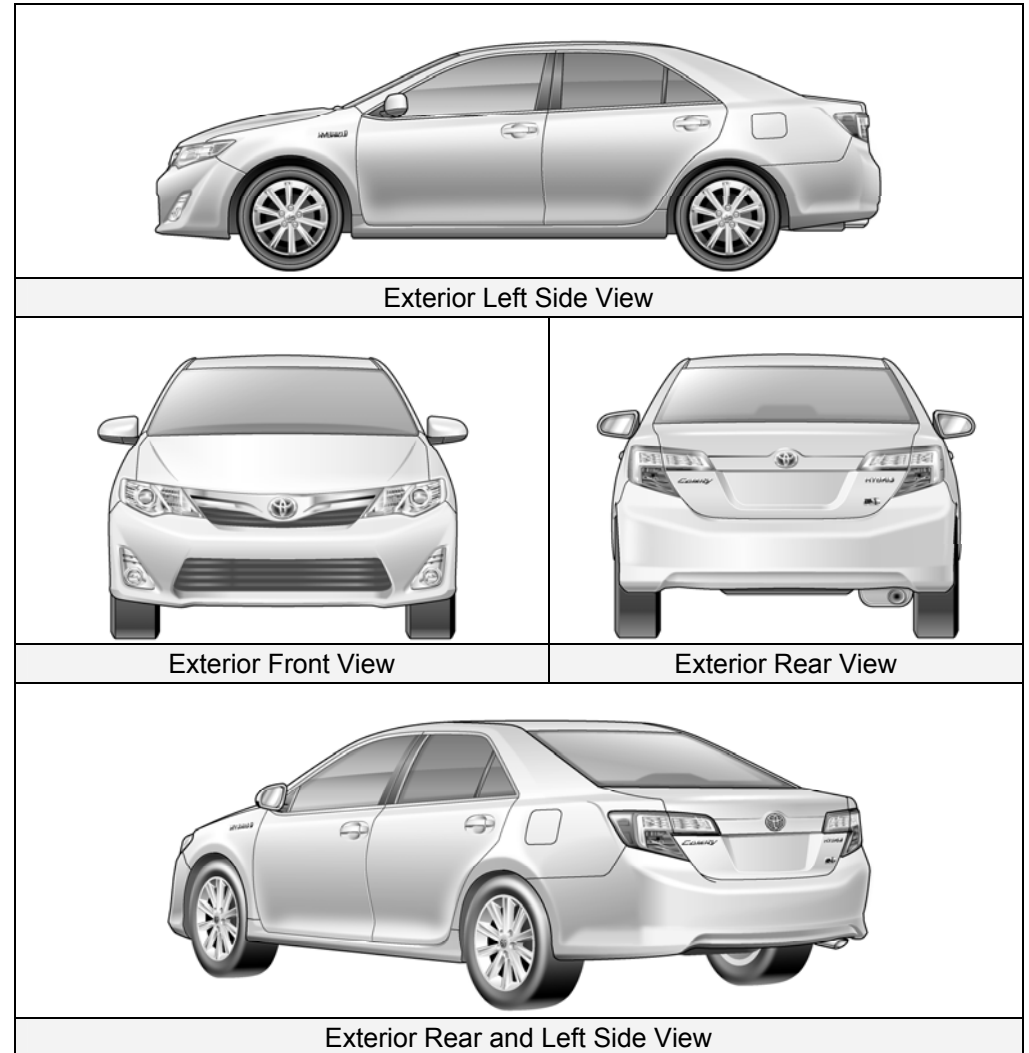
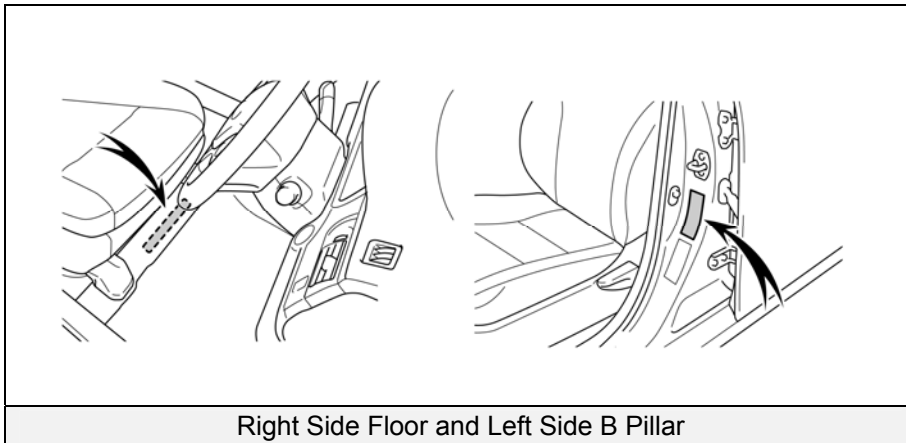
Camry Hybrid Identification

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


The alphanumeric 17 character Vehicle Identification Number (VIN) is provided under the right side front seat and left side door pillar.

Example VIN: 6T1BD3FKX0X123044

A Camry hybrid is identified by the first 8 alphanumeric characters **6T1BD3FK**.



Exterior

- 1 **HYBRID** and  logo on the boot lid.
- 2 **CAMRY** logo on the left side of the boot lid.
- 3 **HYBRID** logo on each front fender.
- 4 Gasoline fuel filler door located on the left side rear quarter panel.

Hybrid Synergy Drive Component Locations and Descriptions

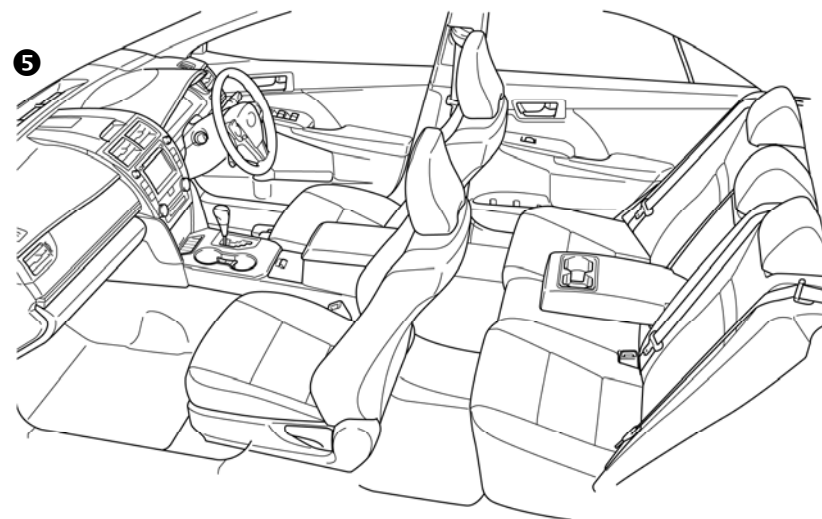
Interior

⑤ The instrument cluster (READY indicator and warning lights) located in the dash behind the steering wheel, is different than the one on the conventional, non-hybrid Camry.

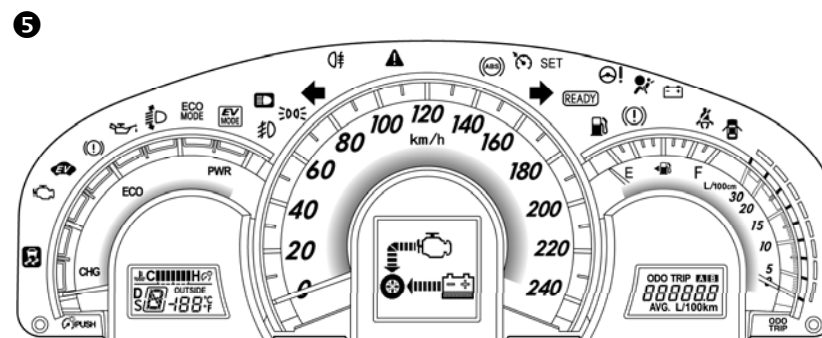
⑥ In place of a tachometer, a hybrid system indicator is used.

NOTE:

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



Interior View

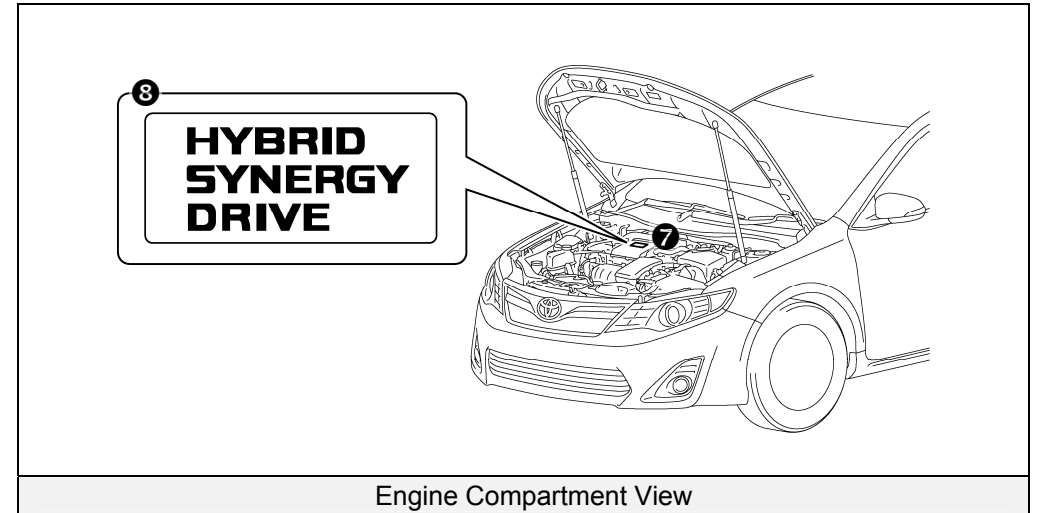


Instrument Cluster View

Hybrid Synergy Drive Component Locations and Descriptions

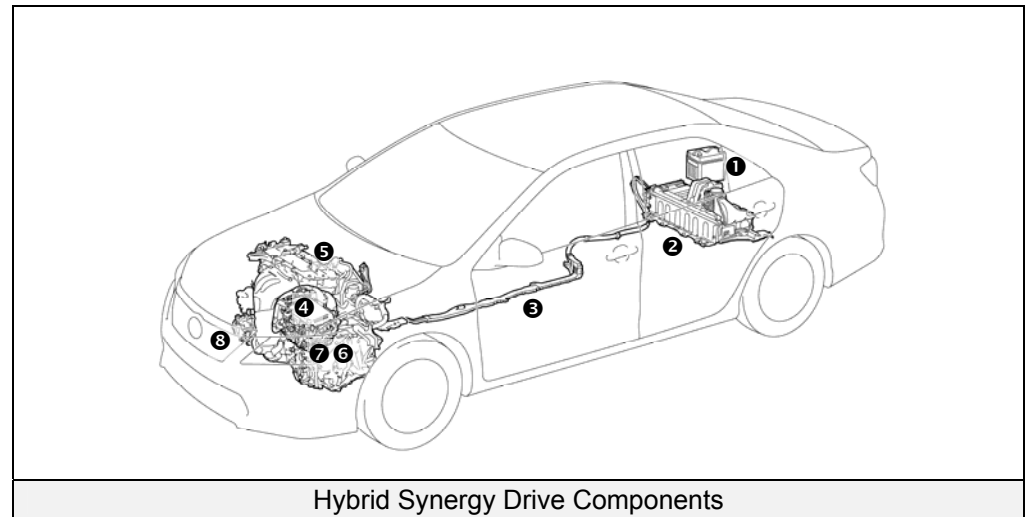
Engine Compartment

- ⑦ 2.5-litre aluminium alloy gasoline engine.
- ⑧ Logo on the plastic engine cover.

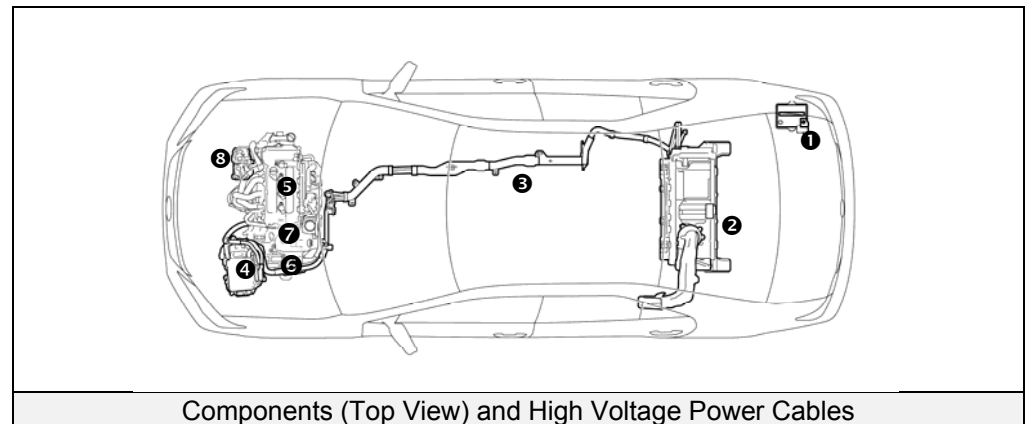


Hybrid Synergy Drive Component Locations and Descriptions

Component	Location	Description
12 Volt Auxiliary Battery ❶	Boot Passenger Side	A lead-acid battery that supplies power to the low voltage devices.
Hybrid Vehicle (HV) Battery Pack ❷	Boot Area, Mounted to Cross Member and Behind Rear Seat	244.8 Volt Nickel Metal Hydride (NiMH) battery pack consisting of 34 low voltage (7.2 Volt) modules connected in series.
Power Cables ❸	Undercarriage and Engine Compartment	Orange colored power cables carry high voltage Direct Current (DC) between the HV battery pack, inverter/converter, and A/C compressor. These cables also carry 3-phase Alternating Current (AC) between the inverter/converter, electric motor, and generator.
Inverter/Converter ❹	Engine Compartment	Boosts and inverts the high voltage electricity from the HV battery pack to 3-phase AC electricity that drives the electric motors. The inverter/converter also converts AC electricity from the electric generator and electric motors (regenerative braking) to DC that recharges the HV battery pack.
Gasoline 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.
Electric Motor ❻	Engine Compartment	3-phase high voltage AC motor contained in the front transaxle. It is used to power the front wheels.
Electric Generator ❼	Engine Compartment	3-phase high voltage AC generator that is contained in the front transaxle and recharges the HV battery pack.
A/C Compressor (with Inverter) ❸	Engine Compartment	3-phase high voltage AC electrically driven motor compressor.



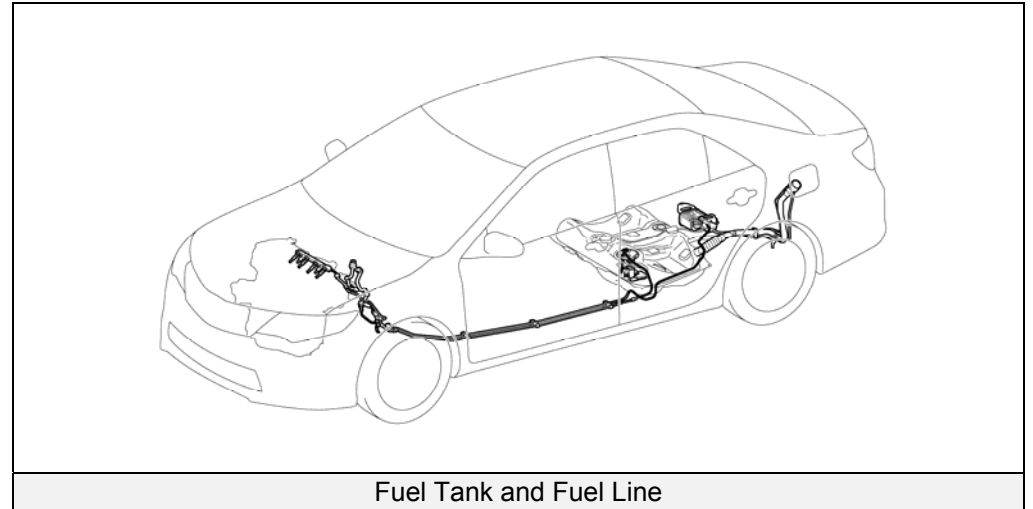
Hybrid Synergy Drive Components



Components (Top View) and High Voltage Power Cables

Hybrid Synergy Drive Component Locations and Descriptions

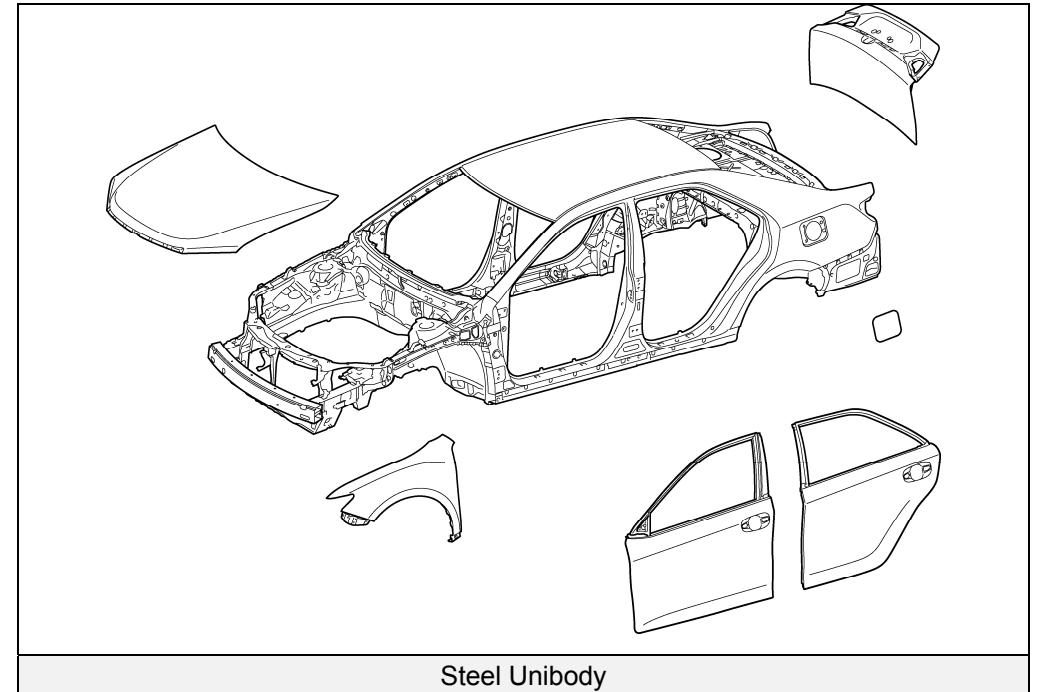
Component	Location	Description
Fuel Tank and Fuel Line ⑨	Undercarriage and Center	The fuel tank provides gasoline via a fuel line to the engine. The fuel line is routed under the center of the vehicle.



Hybrid Synergy Drive Component Locations and Descriptions

Key Specifications:

- Gasoline Engine: 158 hp (118 kW), 2.5-litre Aluminium Alloy Engine
Electric Motor: 141 hp (105 kW), Permanent Magnet Motor
Transmission: Automatic Only (electrically controlled continuously variable transaxle)
HV Battery: 244.8 Volt Sealed NiMH-Battery
Curb Weight: 3,441 lbs/1,561 kg
Fuel Tank: 17.2 gals/65.0 litres
Frame Material: Steel Unibody
Body Material: Steel Panels
Seating Capacity: 5 standard



Smart Key System

The Camry hybrid smart key system consists of a smart key transceiver that communicates bi-directionally, enabling the vehicle to recognise the smart key in proximity to the vehicle. Once recognised, the smart key will allow the user to lock and unlock the doors without pushing smart key buttons, and start the vehicle without inserting it into an ignition switch.

Smart key features:

- Passive (remote) function to lock/unlock the doors, unlock the boot, and start the vehicle.
- Wireless transmitter buttons to lock/unlock all 4 doors, and unlock the boot.
- Hidden metal cut key to lock/unlock the doors and glove box.

Door (Lock/Unlock)

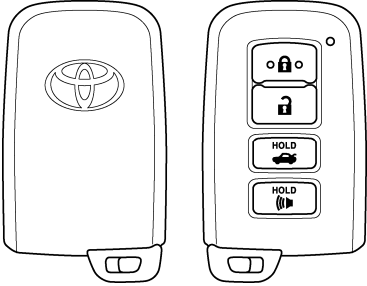
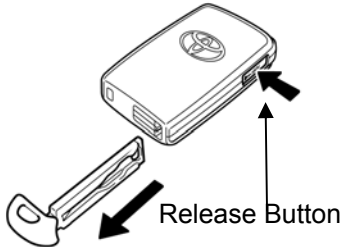
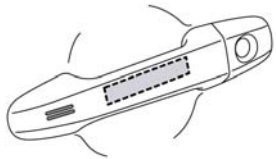
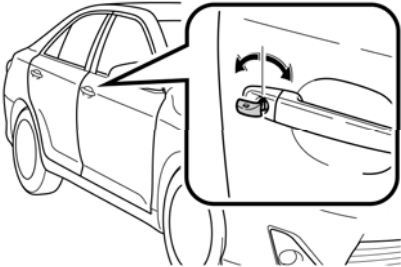
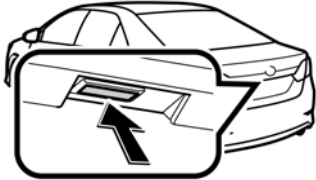
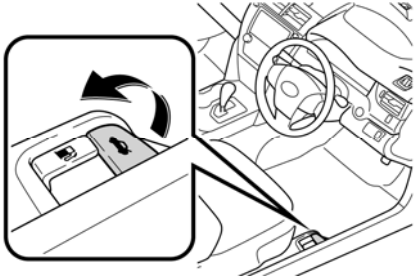
There are several methods available to lock/unlock the doors.

- Pushing the smart key lock/unlock buttons will lock/unlock all doors.
- Touching the sensor on the backside of either exterior front door handle, with the smart key in close proximity to the vehicle, unlocks the doors. Touching the lock sensor on either exterior front door handle locks the doors, with the smart key in proximity to the vehicle, locks all doors.
- Inserting the hidden metal cut key in the driver door lock and turning clockwise once unlocks the driver door, twice unlocks all doors. To lock all doors turn the key counter clockwise once. Only the driver door contains an exterior door lock for the metal cut key.

Boot (Unlock)

There are several methods available to open the boot.

- Pushing the smart key boot opener button.
- Operating the boot lock release lever located on the floor next to the driver seat.
- Pushing the boot opener switch with the smart key in proximity to the vehicle.

	
<p>Smart Key (Fob)</p>	<p>Hidden Metal Cut Key for Door Lock</p>
	
<p>Driver Door Unlock Touch Sensor and Lock Touch Sensor</p>	<p>Front Driver Door Lock</p>
	
<p>Boot Opener Switch</p>	<p>Boot Lock Release Lever</p>

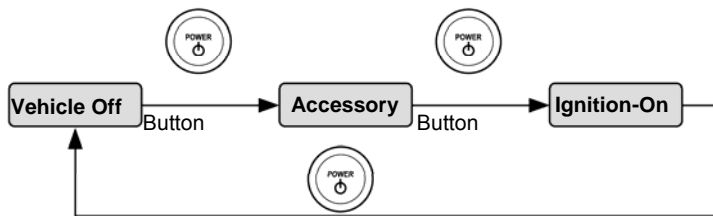
Smart Key System

Vehicle Starting/Stopping

The smart key has replaced the conventional metal cut key, and the power button has replaced the ignition switch. The smart key only needs to be in proximity to the vehicle to allow the system to function.

- With the brake pedal released, the first push of the power button operates the accessory mode, the second push operates the ignition-on mode, and the third push turns the ignition off again.

Ignition Mode Sequence (brake pedal released):



- Starting the vehicle takes priority over all other ignition modes and is accomplished by depressing the brake pedal and pushing the power button once. To verify the vehicle has started, check that the **READY** light is illuminated in the instrument cluster.
- If the internal smart key battery is dead, use the following method to start the vehicle.
 1. Touch the Toyota emblem side of the smart key to the power button.
 2. After the buzzer sounds, push the power button with the brake pedal depressed (the **READY** light will illuminate).
- Once the vehicle has started and is on and operational (**READY-ON**), the vehicle is shut off by bringing the vehicle to a complete stop, placing the gearshift lever in **Park**, and then depressing the power button once.
- To shut off the vehicle before coming to a stop in an emergency, push and hold down the power button for more than 3 seconds. This procedure may be useful at an accident scene in which the **READY** indicator is on, and the drive wheels remain in motion.

Ignition Mode	Multi-information Display (Instrument Cluster)
Off	-
Accessory	POWER ON
Ignition-On	POWER ON
Brake Pedal Depressed	Smart Key Symbol
Vehicle Started (READY-ON)	-
Malfunction	Warning Message

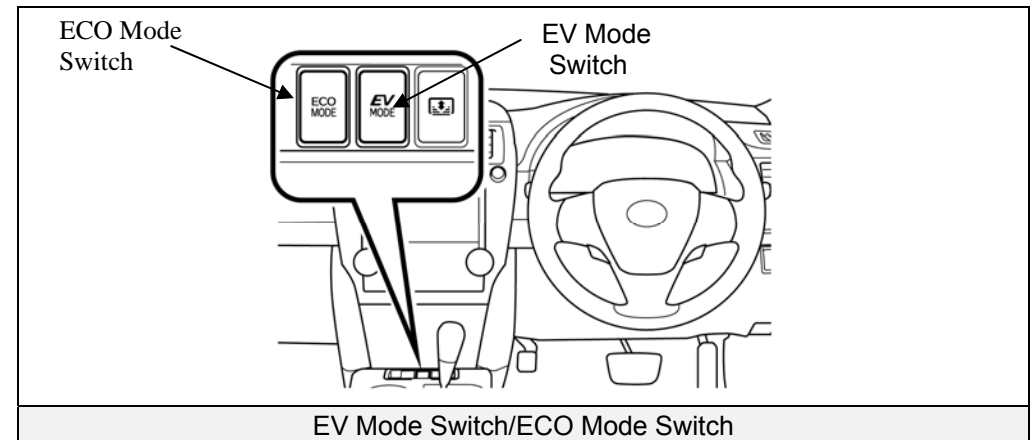
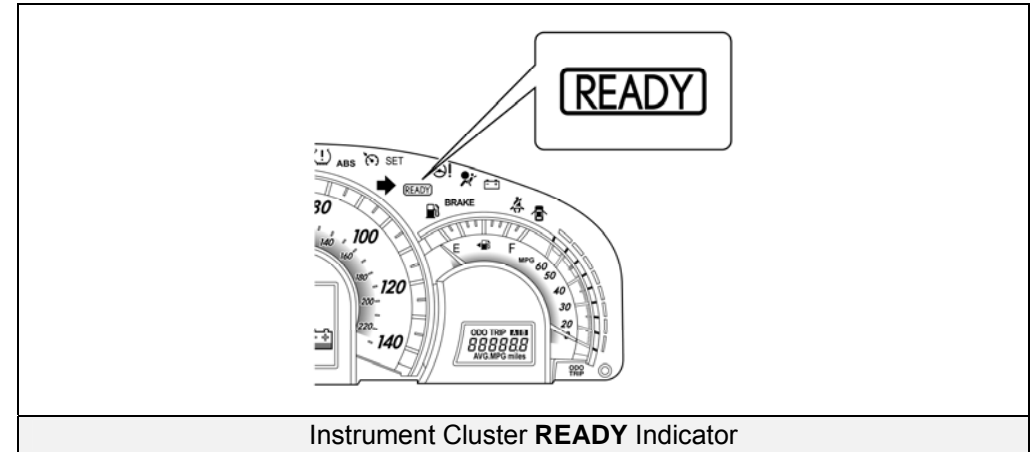
<p>POWER ON & Smart Key Symbol (Multi-information Display)</p>	<p>Ignition Modes (Brake Pedal Released)</p>
<p>Starting Sequence (Brake Pedal Depressed)</p>	<p>Smart Key Recognition (When Smart Key Battery is Dead)</p>

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 recognise and understand the **READY** indicator provided in the instrument cluster. When lit, it informs the driver that the vehicle is on and operational even though the gasoline engine may be off and the engine compartment is silent.

Vehicle Operation

- With the Camry 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 motors only.
 2. A combination of both the electric motors and the gasoline engine.
- The vehicle computer determines the mode in which the vehicle operates in order to improve fuel economy and reduce emissions. Two new features on the Camry hybrid are EV (Electric Vehicle) mode and ECO (Economy) mode:
 1. EV Mode: When activated, and certain conditions have been met, the vehicle operates with the electric motor powered by the HV battery.
 2. ECO Mode: When activated, this mode helps enhance fuel economy on trips that involve frequent braking and acceleration.



Hybrid Vehicle (HV) Battery Pack

The Camry 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 boot floor pan cross member behind the rear seat. The metal case is isolated from high voltage and concealed by fabric covers in the boot.
- The HV battery pack consists of 34 low voltage (7.2 Volt) NiMH battery modules connected in series to produce approximately 244.8 Volts. Each NiMH battery module is non-spillable and sealed in a resin case.
- The electrolyte used in the NiMH battery module is an alkaline mixture of potassium and sodium hydroxide. The electrolyte is absorbed into the battery cell plates and will not normally leak, even in a collision.

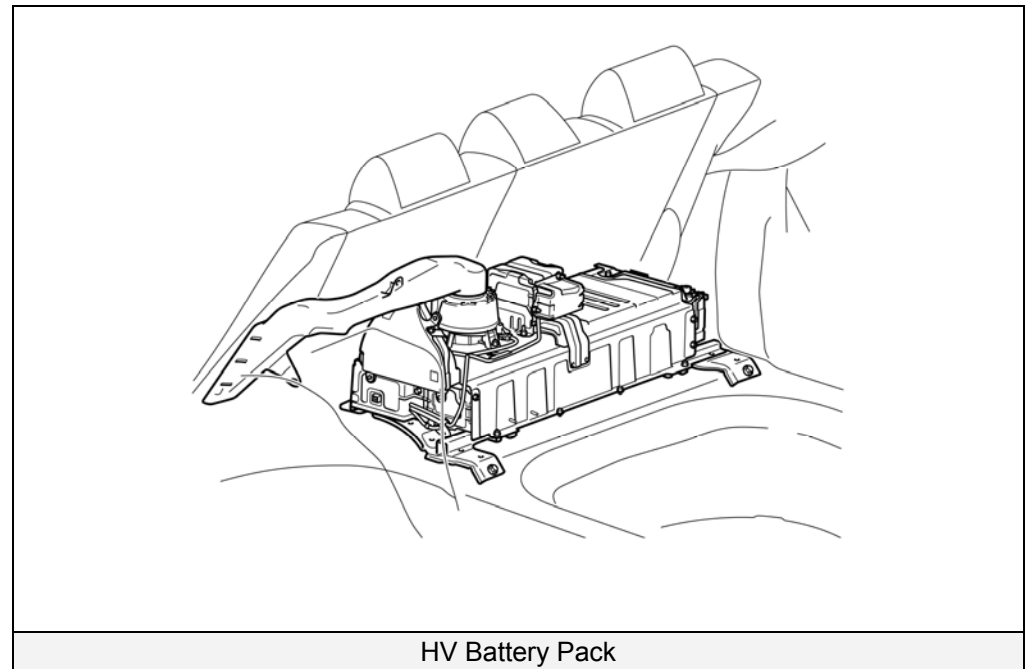
HV Battery Pack	
Battery pack voltage	244.8 V
Number of NiMH battery modules in the pack	34
NiMH battery module voltage	7.2 V
NiMH battery module dimensions	11 x 0.8 x 4.6 in (285 x 19.6 x 117.8 mm)
NiMH module weight	2.3 lbs (1.04 kg)
NiMH battery pack dimensions	35.8 x 19.1 x 12.5 in (909 x 486 x 317 mm)
NiMH battery pack weight	107 lbs (48.5 kg)

Components Powered by the HV Battery Pack

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

HV Battery Pack Recycling

- The HV battery pack is recyclable. Contact the nearest Toyota dealer.



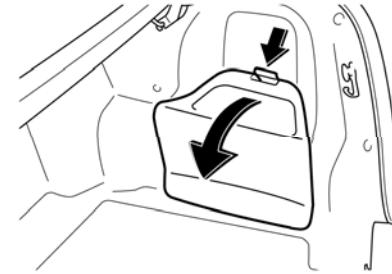
Low Voltage Battery

Auxiliary Battery

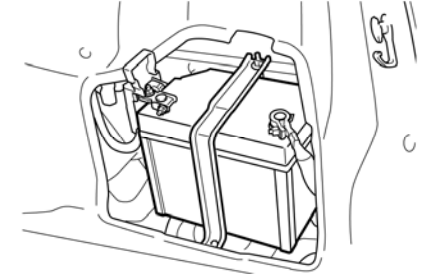
- The Camry hybrid contains a lead-acid 12 Volt auxiliary battery. The 12 Volt auxiliary battery powers the vehicle's electrical system similar to a conventional vehicle. As with conventional vehicles, the negative terminal of the auxiliary battery is grounded to the metal chassis of the vehicle.
- The auxiliary battery is located in the boot. It is concealed by a fabric cover on the passenger side in the rear quarter panel well.

NOTE:

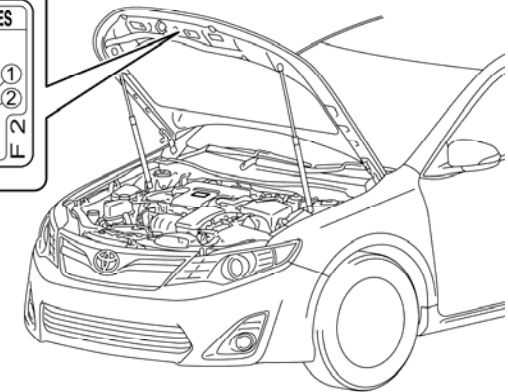
An under hood label shows the location of the HV battery (traction battery) and 12 Volt auxiliary battery.



Battery Cover



12 Volt Auxiliary Battery Mounted in Boot



Battery Location Label

High Voltage Safety

The HV battery pack powers the high voltage electrical system with DC electricity. Positive and negative orange colored high voltage power cables are routed from the battery pack, under the vehicle floor pan, to the inverter/converter. The inverter/converter contains a circuit that boosts the HV battery voltage from 244.8 to 650 Volts DC. The inverter/converter creates 3-phase AC to power the motor. Power cables are routed from the inverter/converter to each high voltage motor (electric motor, electric generator, and A/C compressor). The following systems are intended to help keep occupants in the vehicle and emergency responders safe from high voltage electricity:

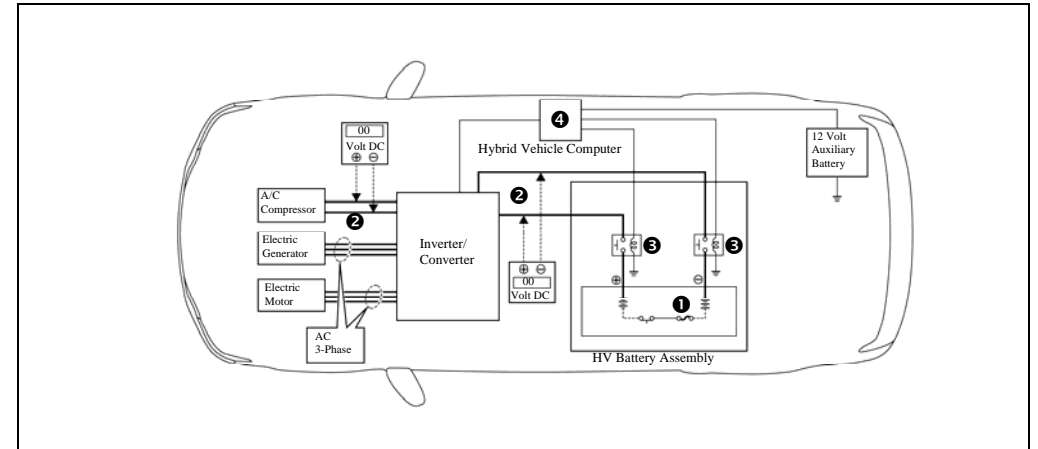
High Voltage Safety System

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

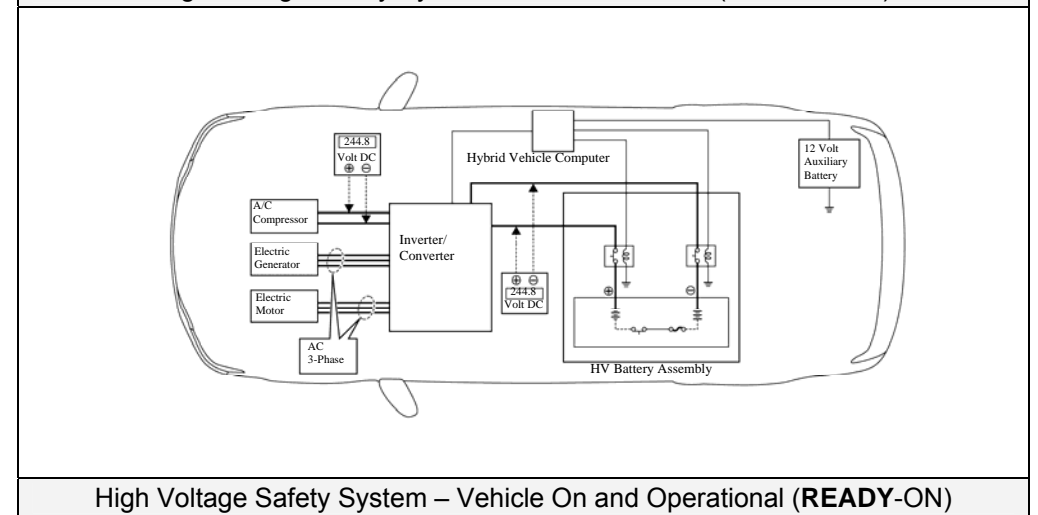
⚠️ WARNING:

The high voltage system may remain powered for up to 10 minutes after the vehicle is shut off or disabled. To prevent serious injury or death from severe burns or electric shock, avoid touching, cutting, or breaching 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 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 indicate “Check Hybrid System” on the multi-information display.



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



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

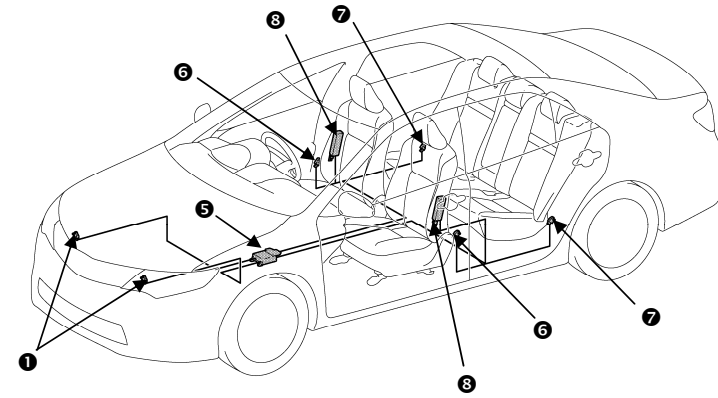
SRS Airbag & Seat Belt Pretensioners

Standard Equipment

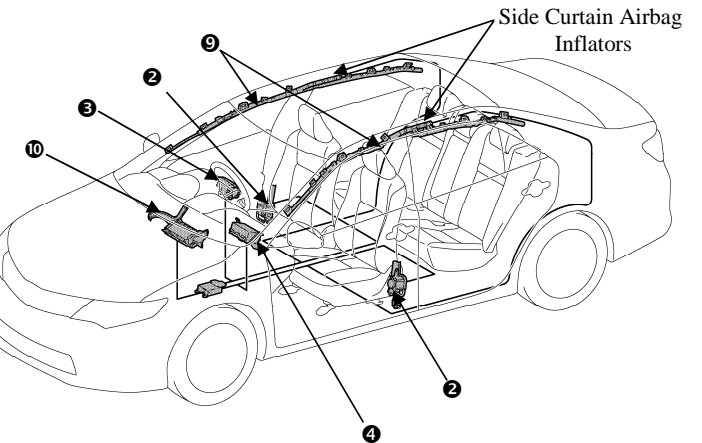
- Electronic frontal impact sensors (2) are mounted in the engine compartment ❶ as illustrated.
- Front seat belt pretensioners are mounted near the base of the B-pillars ❷.
- A frontal driver airbag ❸ is mounted in the steering wheel hub.
- A frontal passenger airbag ❹ is integrated into the dashboard and deploys through the dashboard.
- The SRS computer ❺, which contains an impact sensor, is mounted on the floor pan underneath the instrument panel, forward of the shift lever.
- Front electronic side impact sensors (2) are mounted near the base of the B-pillars ❻.
- Rear electronic side impact sensors (2) are mounted near the base of the C-pillars ❼.
- Front seat side airbags ❸ are mounted in the seatbacks.
- Side curtain airbags ❹ are mounted along the outer edge inside the roof rails.
- A driver knee airbag ❿ is mounted on the driver side lower portion of the dash.

⚠ WARNING:

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 breaching the SRS components.



Electronic Impact Sensors and Side Airbags



Standard Frontal Airbags, Seat Belt Pretensioners, Knee Airbags, Side Curtain Airbags

SRS Airbag & Seat Belt Pretensioners

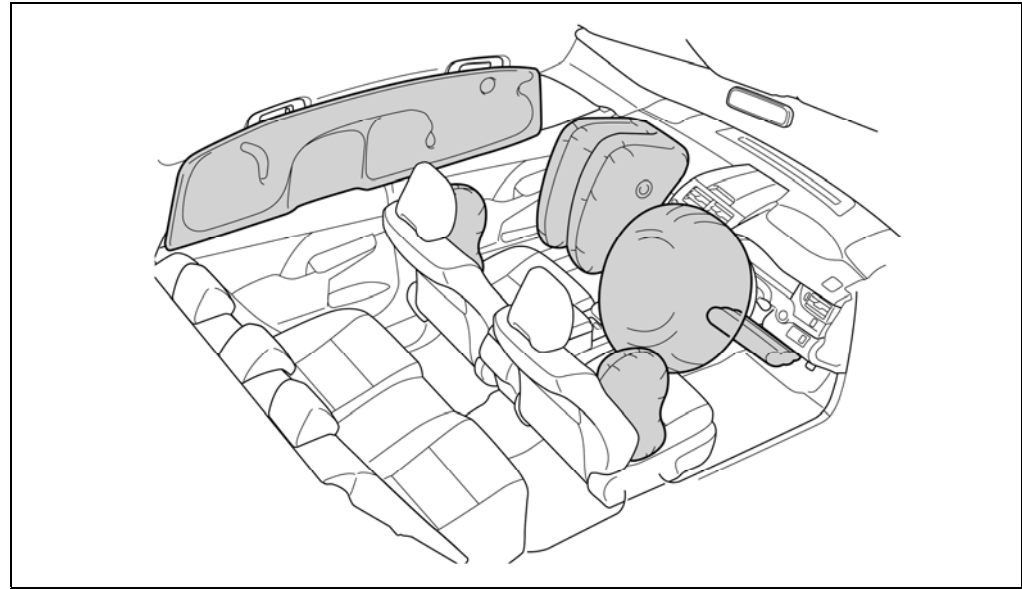
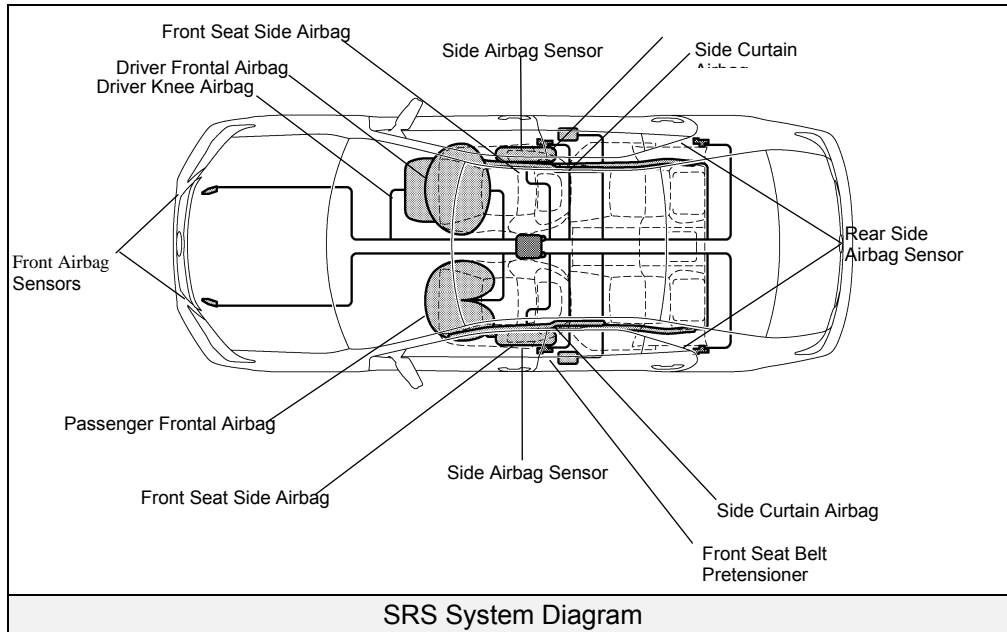
Standard Equipment (Continued)

NOTE:

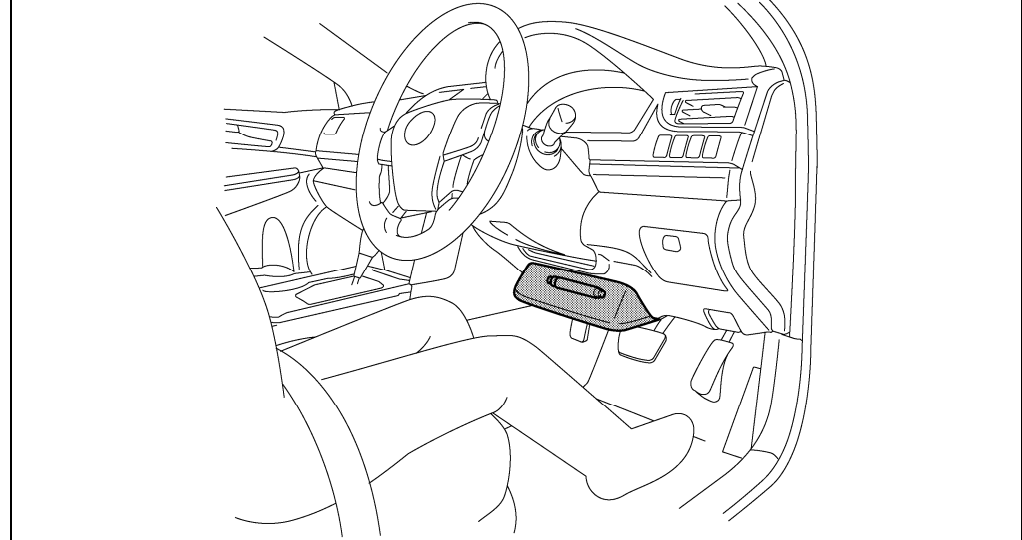
The front seatback mounted side airbags and the side curtain airbags may deploy independently of each other.

The driver knee airbag deploys simultaneously with the frontal airbags and seat belt pretensioners.

Electronic side impact sensors are installed in each front door to aid in side collision detection accuracy.



Frontal, Knee, Front and Rear Seatback Mounted Side, Side Curtain Airbags.



Driver Knee Airbag and Inflator

Emergency Response

On arrival, emergency responders should follow their standard operating procedures for vehicle incidents. Emergencies involving the Camry hybrid may be handled like other automobiles except as noted in these guidelines for Extrication, Fire, Overhaul, Recovery, Spills, First Aid, and Submersion.

WARNING:

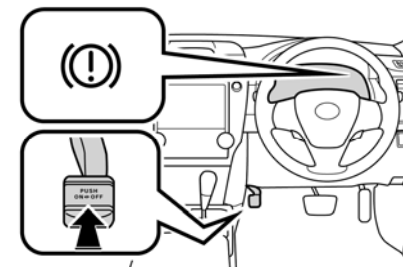
- **Never** assume the Camry hybrid is shut off simply because it is silent.
- Always observe the instrument cluster for the **READY** indicator status to verify whether the vehicle is on or shut off. The vehicle is shut off when the **READY** indicator is off.
- Failure to shut off the vehicle before emergency response procedures are performed may result in serious injury or death from the unintentional deployment of the SRS or severe burns and electric shock from the high voltage electrical system.

Extrication

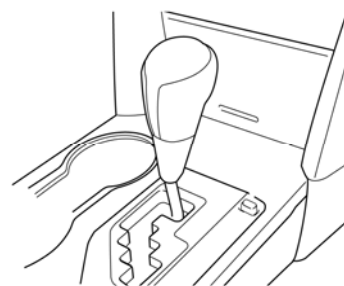
- Immobilise Vehicle
 - Chock wheels and set the parking brake.
 - Move the shift lever to the **Park** position.
- Disable Vehicle
 - Performing either of the following two procedures will shut the vehicle off and disable the HV battery pack, SRS, and gasoline fuel pump.



Chock Wheels



Set Parking Brake



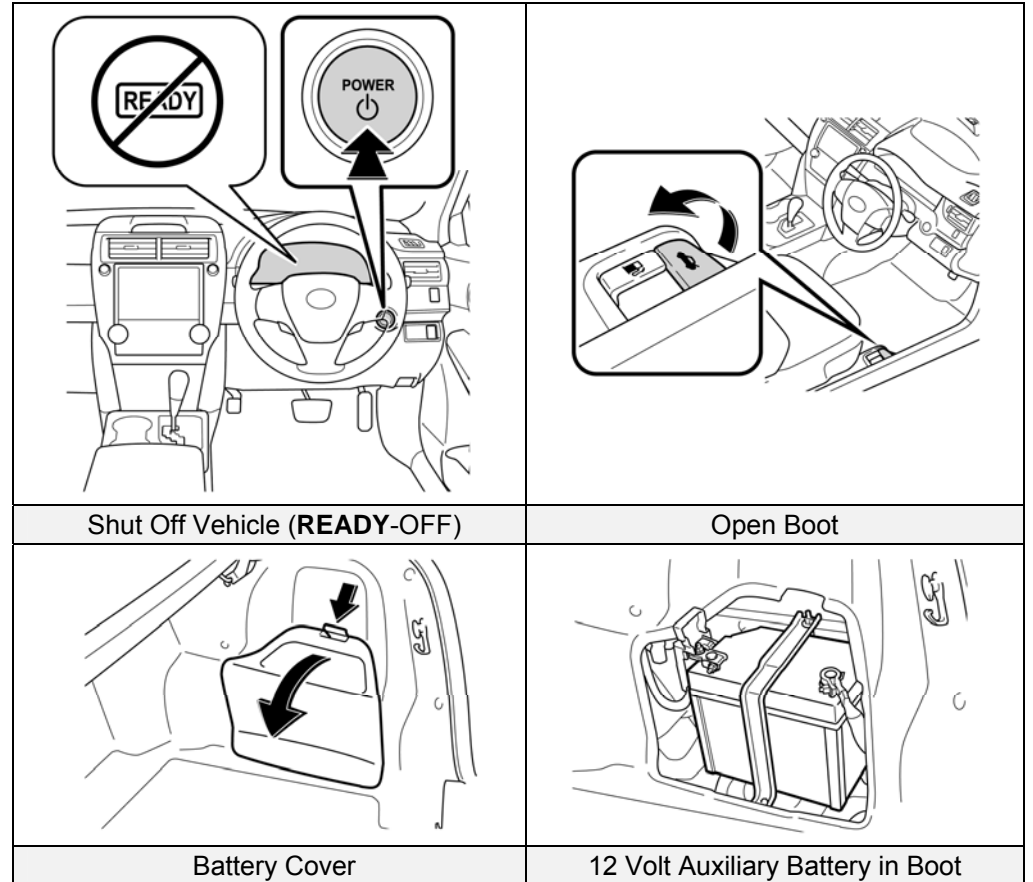
Shift Lever in Park

Emergency Response

Extrication (Continued)

Procedure #1

1. Confirm the status of the **READY** indicator in the instrument cluster.
2. If the **READY** indicator is illuminated, the vehicle is on and operational. Shut off the vehicle by pushing the power button once.
3. The vehicle is already shut off if the instrument cluster lights and the **READY** indicator are not illuminated. Do **not** push the power button because the vehicle may start.
4. If the smart key is easily accessible, keep it at least 16 feet (5 meters) away from the vehicle.
5. If the smart key cannot be found, disconnect the 12 Volt auxiliary battery in the boot to prevent accidental restarting of the vehicle.



Emergency Response

Extrication (Continued)

Procedure #2 (Alternate if power button is inaccessible)

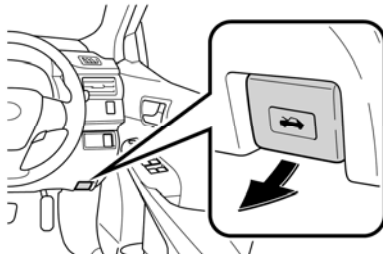
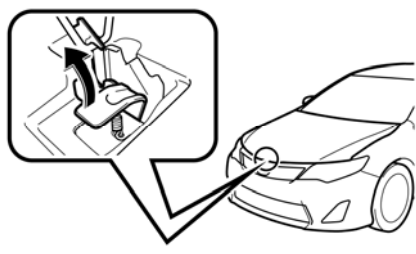
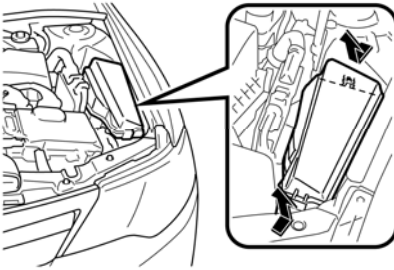
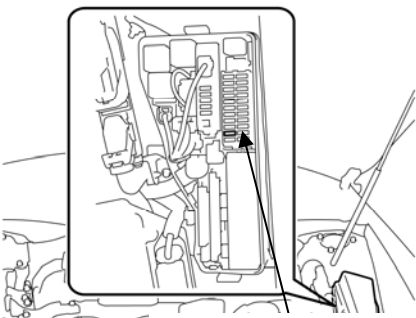
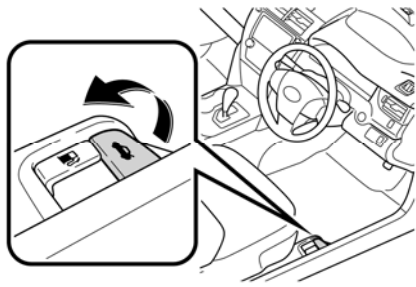
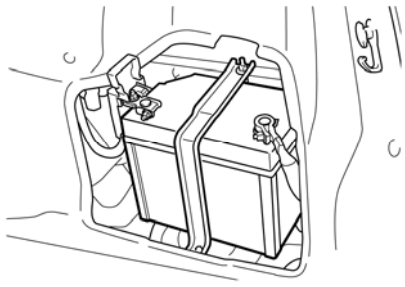
1. Open the hood and remove the fuse box cover.
2. Remove the **IG2 MAIN** fuse (25A clear colored) in the engine compartment fuse box (refer to illustration). If the correct fuse cannot be recognised, pull all fuses in the fuse box.
3. Disconnect the 12 Volt auxiliary battery in the boot.

NOTE:

Before disconnecting the 12 Volt auxiliary battery, if necessary, reposition the optional power seats, lower the windows and unlock the doors. Once the 12 Volt auxiliary battery is disconnected, power controls will not operate.

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 breaching any orange high voltage power cable or high voltage component.*
- *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 breaching the SRS components.*
- *If none of the disabling procedures can be performed, proceed with caution as there is no assurance that the high voltage electrical system, SRS, or fuel pump are disabled.*

	
Pull Hood Release	Hood Latch Release
	
Remove Fuse Box Cover	IG2 MAIN Fuse Location in Engine Compartment Fuse Box (25A Clear)
	
Open Boot	12 Volt Auxiliary Battery in Boot

Emergency Response

Extrication (Continued)

- Stabilise Vehicle

Crib at (4) points directly under the front and rear pillars.
Do not place cribbing under the high voltage power cables, exhaust system, or fuel system.

NOTE:

The Camry hybrid is equipped with a tyre pressure warning system that by design prevents pulling the metal valve stem with integral transmitter from the wheel. Snapping the valve stem with pliers or removing the valve cap and Schrader valve will release the air in the tyre.

- Access Patients

Glass Removal

Use normal glass removal procedures as required.

SRS Awareness

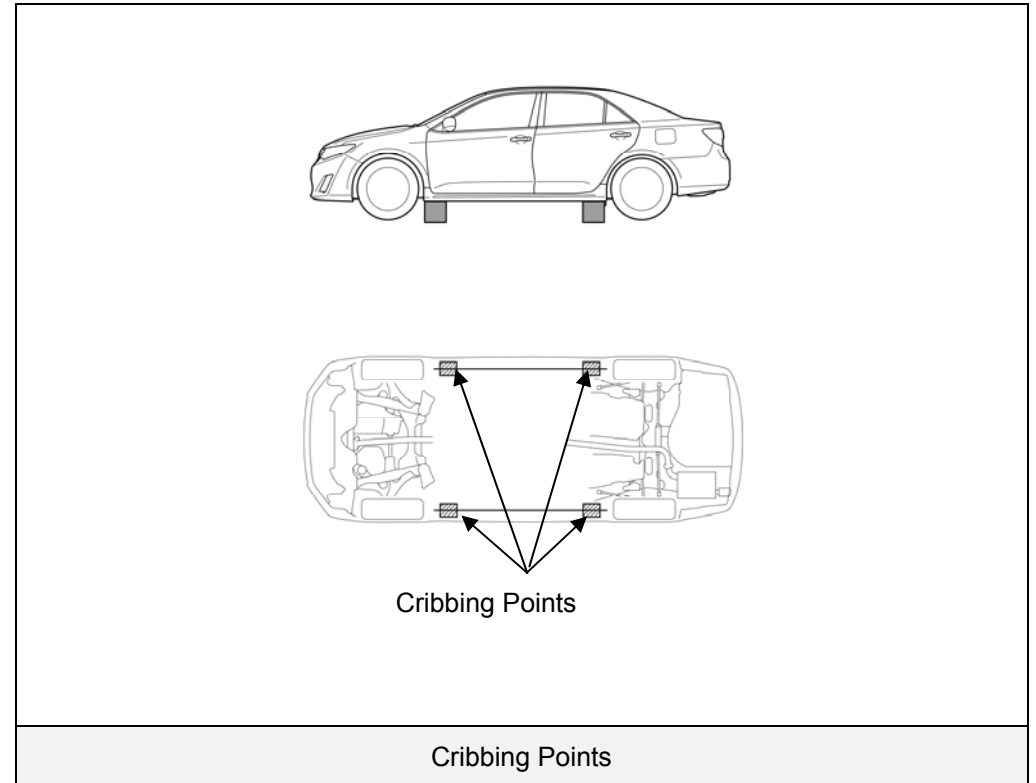
Responders need to be cautious when working in close proximity to undeployed airbags and seat belt pretensioners.

Door Removal/Displacement

Doors can be removed by conventional rescue tools such as hand, electric, and hydraulic tools. In certain situations, it may be easier to pry back the vehicle body to expose and unbolt the hinges.

NOTE:

To prevent accidental airbag deployment when performing front door removal/displacement, ensure the vehicle is shut off and the 12 Volt auxiliary battery is disconnected.



Emergency Response

Extrication (Continued)

Roof Removal

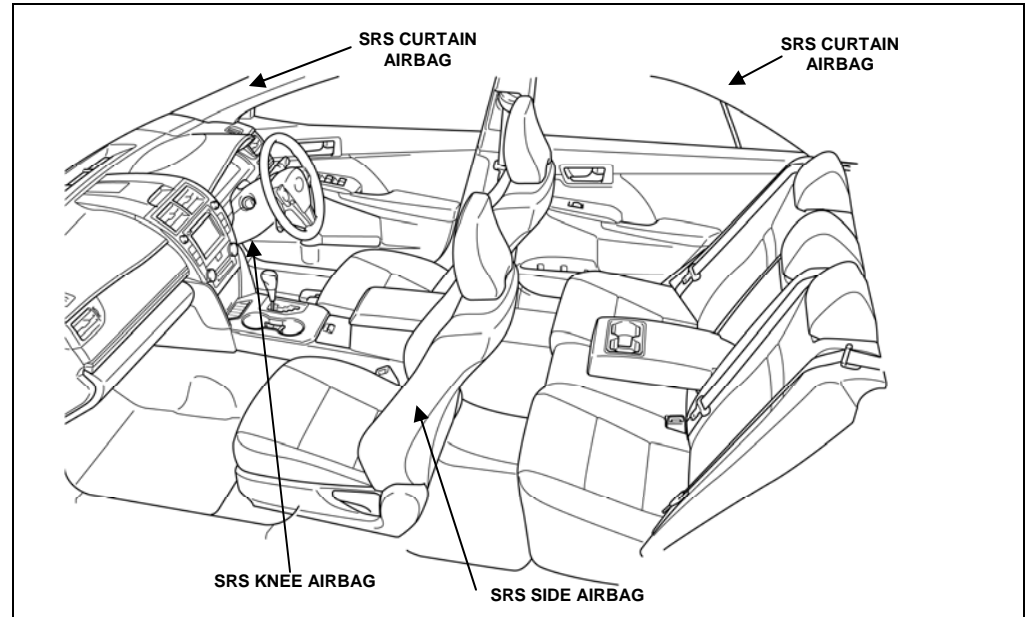
The Camry hybrid is equipped with side curtain airbags. When undeployed, total roof removal is not recommended. Patient access through the roof can be performed by cutting the roof center section inboard of the roof rails as illustrated. This would avoid breaching the side curtain airbags, inflators, and wiring harness.

NOTE:

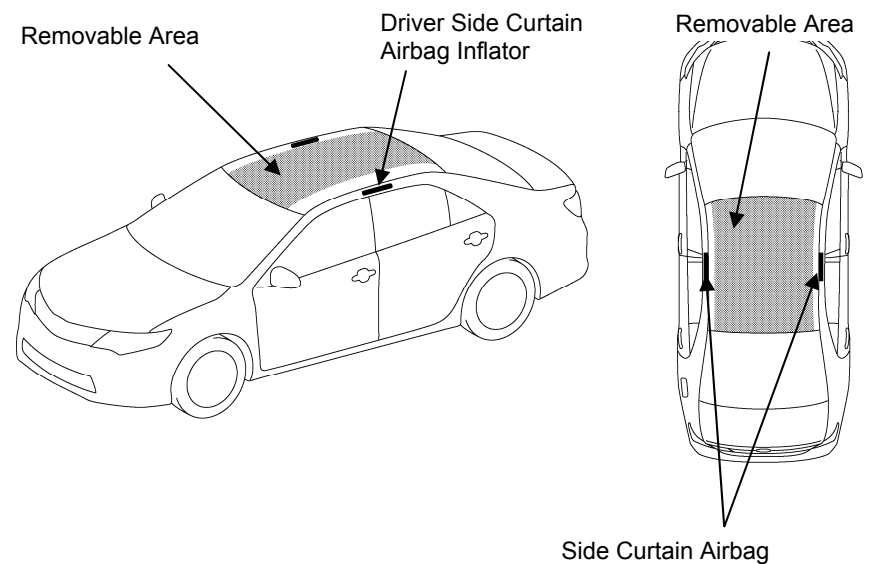
The side curtain airbags may be identified as illustrated on this page (additional component details on page 14).

Dash Displacement

The Camry hybrid is equipped with side curtain airbags. When undeployed, total roof removal is not recommended to avoid breaching the side curtain airbags, inflators, and wiring harness. As an alternative, dash displacement may be performed by using a Modified Dash Roll.



Side, Curtain, and Knee Airbag Identifiers.



Roof Removal Area

Emergency Response

Extrication (Continued)

Rescue Lift Air Bags

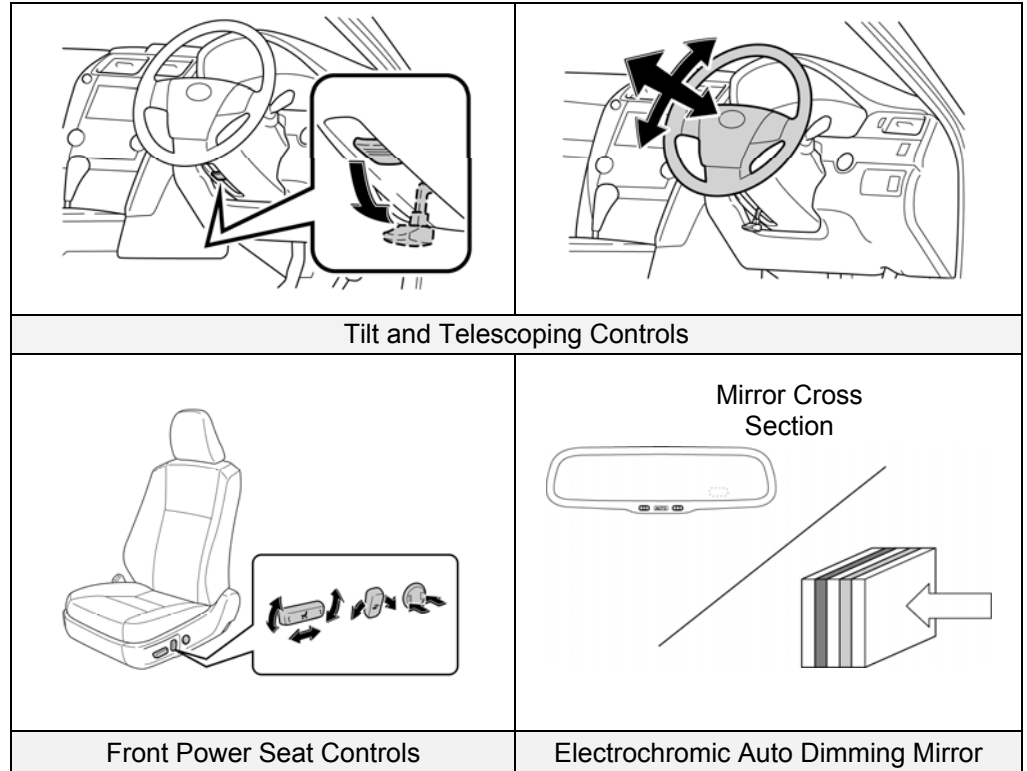
Responders should not place cribbing or rescue lift air bags under the high voltage power cables, exhaust system, or fuel system.

Repositioning Steering Wheel and Front Seats

Telescopic steering wheel and seat controls are shown in the illustrations.

NOTE:

The Camry hybrid may be equipped with an optional electrochromic auto dimming rear view mirror. The mirror contains a minimal amount of transparent gel sealed between two glass plates that will not normally leak.



Emergency Response

Fire

- Extinguishing Agent
Water has been proven to be a suitable extinguishing agent.
- Initial Fire Attack
Perform a fast, aggressive fire attack.

Divert the runoff from entering watershed areas.

Attack teams may not be able to identify a Camry hybrid until the fire has been knocked down and overhaul operations have commenced.
- Fire in the HV Battery Pack
Should a fire occur in the NiMH HV battery pack, attack crews should utilise a water stream or fog pattern to extinguish any fire within the vehicle except for the HV battery pack.

WARNING:

- *The NiMH battery electrolyte is a caustic alkaline (pH 13.5) that is damaging to human tissues. To avoid injury by coming in contact with the electrolyte, wear proper personal protective equipment.*
- *The battery modules are contained within a metal case and accessibility is limited.*
- *To avoid serious injury or death from severe burns or electric shock, **never** breach or remove the high voltage battery pack cover under any circumstance including fire.*

When allowed to burn themselves out, the Camry hybrid NiMH battery modules burn rapidly and can quickly be reduced to ashes except for the metal.

Offensive Fire Attack

Normally, flooding a NiMH HV battery pack with copious amounts of water at a safe distance will effectively control the HV battery pack fire by cooling the adjacent NiMH battery modules to a point below their ignition temperature. The remaining modules on fire, if not extinguished by the water, will burn themselves out.

However, flooding the Camry hybrid HV battery pack is not recommended due to the battery case design and location preventing the responder from properly applying water through the available vent openings safely. Therefore, it is recommended that the incident commander allow the Camry hybrid HV battery pack to burn itself out.

Defensive Fire Attack

If the decision has been made to fight the fire using a defensive attack, the fire attack crew should pull back a safe distance and allow the NiMH battery modules to burn themselves out. During this defensive operation, fire crews may utilise a water stream or fog pattern to protect exposures or to control the path of smoke.

Emergency Response

Overhaul

During overhaul, immobilise and disable the vehicle if not already done. Refer to illustrations on page 16, 17 and 18. The HV battery cover should **never** be breached or removed under any circumstances including fire. Doing so may result in severe electrical burns, shock, or electrocution.

- Immobilise Vehicle
Chock wheels and set the parking brake.
Move the shift lever to the **Park** position.
- Disable Vehicle
Performing either of the following two procedures will shut the vehicle off and disable the HV battery pack, SRS, and gasoline fuel pump.

Procedure #1

1. Confirm the status of the **READY** indicator in the instrument cluster.
2. If the **READY** indicator is illuminated, the vehicle is on and operational. Shut off the vehicle by pushing the power button once.
3. The vehicle is already shut off if the instrument cluster lights and the **READY** indicator are not illuminated. Do **not** push the power button because the vehicle may start.
4. If the smart key is easily accessible, keep it at least 16 feet (5 meters) away from the vehicle.
5. If the smart key cannot be found, disconnect the 12 Volt auxiliary battery in the boot to prevent accidental restarting of the vehicle.

Procedure #2 (Alternate if power button is inaccessible)

1. Open the hood and remove the fuse box cover.
2. Remove the **IG2 MAIN** fuse (25A clear colored) in the engine compartment fuse box as illustrated on page 18. If the correct fuse cannot be recognised, pull all fuses in the fuse box.
3. Disconnect the 12 Volt auxiliary battery in the boot.

NOTE:

Before disconnecting the 12 Volt auxiliary battery, if necessary, reposition the optional power seats, lower the windows and unlock the doors. Once the 12 Volt auxiliary battery is disconnected, power controls will not operate.

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 breaching any orange high voltage power cable or high voltage component.*
- *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 breaching the SRS components.*
- *If none of the disabling procedures can be performed, proceed with caution as there is no assurance that the high voltage electrical system, SRS, or fuel pump are disabled.*

Recovering/Recycling of NiMH HV Battery Pack

Clean up of the HV battery pack can be accomplished by the vehicle recovery crew without further concern of runoff or spillage. For information regarding recycling of the HV battery pack, contact the nearest Toyota dealer.

Emergency Response

Spills

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

Similar to the use of baking soda to neutralise a lead-acid battery electrolyte spill, a dilute boric acid solution or vinegar can be used to neutralise a NiMH battery electrolyte spill.

NOTE:

Electrolyte leakage from the HV battery pack is unlikely due to its construction and the amount of available electrolyte contained within the NiMH modules. Any spillage would not warrant a declaration as a hazardous material incident. Responders should follow the recommendations as outlined in this emergency response guide.

In an emergency, the NiMH battery part number G9280-33070 manufacturer's Material Safety Data Sheet (MSDS).

- Handle NiMH electrolyte spills using the following Personal Protective Equipment (PPE):
 - Splash shield or safety goggles. Fold down helmet shields are not acceptable for acid or electrolyte spills.
 - Rubber, latex or nitrile gloves.
 - Apron suitable for alkaline.
 - Rubber boots.
- Neutralise NiMH Electrolyte
 - Use a boric acid solution or vinegar.
 - Boric acid solution - 800 grams boric acid to 20 litres water or 5.5 ounces boric acid to 1 gallon of water.

First Aid

Emergency responders may not be familiar with a NiMH electrolyte exposure when rendering aid to a patient. Exposure to the electrolyte is unlikely except in a catastrophic crash or through improper handling. Utilise the following guidelines in the event of exposure.

WARNING:

The NiMH battery electrolyte is a caustic alkaline (pH 13.5) that is damaging to human tissues. To avoid injury by coming in contact with the electrolyte, wear proper personal protective equipment.

- Wear Personal Protective Equipment (PPE)
 - Splash shield or safety goggles. Fold down helmet shields are not acceptable for acid or electrolyte spills.
 - Rubber, latex or nitrile gloves.
 - Apron suitable for alkaline.
 - Rubber boots.
- Absorption
 - Perform gross decontamination by removing affected clothing and properly disposing of the garments.
 - Rinse the affected areas with water for 20 minutes.
 - Transport patients to the nearest emergency medical care facility.
- Inhalation in Non-Fire Situations
 - No toxic gases are emitted under normal conditions.
- Inhalation in Fire Situations
 - Toxic gases are given off as by-products of combustion. All responders in the Hot Zone should wear the proper PPE for fire fighting including SCBA.
 - Move a patient from the hazardous environment to a safe area and administer oxygen.
 - Transport patients to the nearest emergency medical care facility.

Emergency Response

- Ingestion
 - Do not induce vomiting.
 - Allow the patient to drink large quantities of water to dilute the electrolyte (never give water to an unconscious person).

First Aid (Continued)

If vomiting occurs spontaneously, keep the patient's head lowered and forward to reduce the risk of aspiration.

Transport patients to the nearest emergency medical care facility.

Submersion

A submerged hybrid vehicle does not have high voltage potential on the metal vehicle body, and is safe to touch.

Access Patients

Responders can access the patient and perform normal extrication procedures. High voltage orange color coded power cables and high voltage components should never be touched, cut, or breached.

Vehicle Recovery

If a hybrid vehicle is fully or partially submerged in water, emergency responders may not be able to determine if the vehicle has been automatically disabled. The Camry hybrid may be handled by following these recommendations:

1. Remove the vehicle from the water.
2. Drain the water from the vehicle if possible.
3. Follow the immobilising and disabling procedures on page 16, 17 and 18.

Roadside Assistance

Roadside assistance for the Toyota Camry hybrid may be handled like conventional Toyota vehicles except as noted in the following pages.

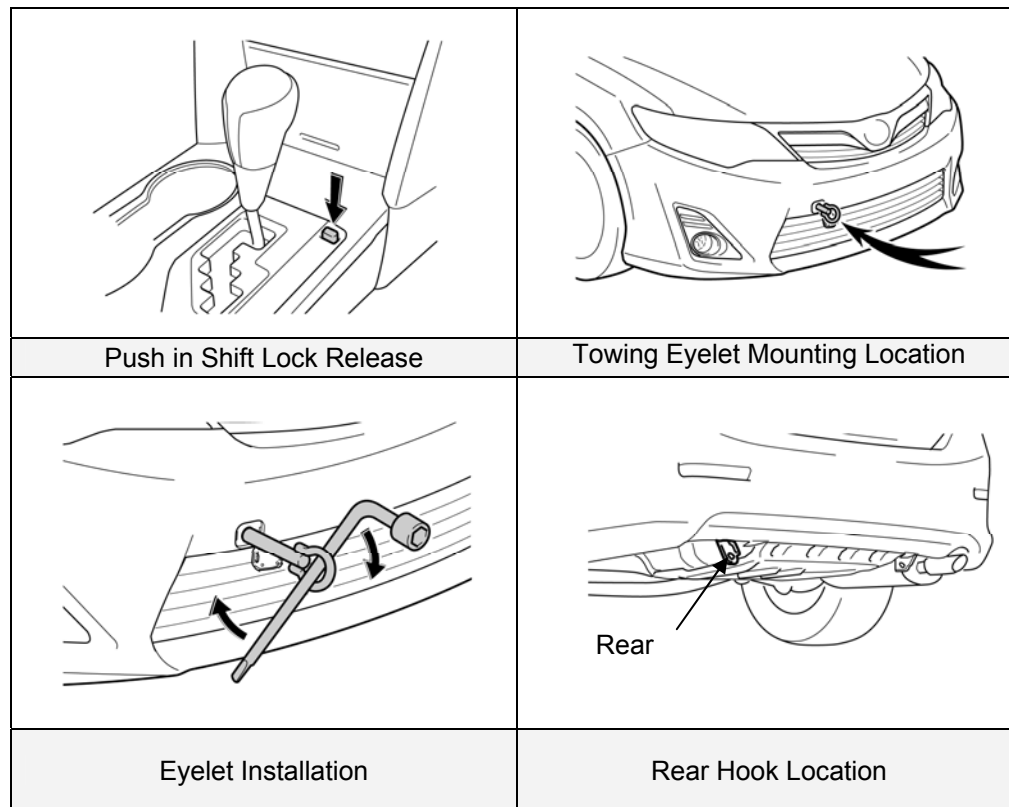
Shift Lever

Similar to many Toyota vehicles, the Camry hybrid uses a gated shift lever as shown in the illustration. However, the Camry hybrid shift lever includes a **B** position, allowing enhanced engine braking when driving down a steep grade.

Towing

The Camry hybrid is a front wheel drive vehicle and it **must** be towed with the front wheels off the ground. Failure to do so may cause serious damage to Hybrid Synergy Drive components.

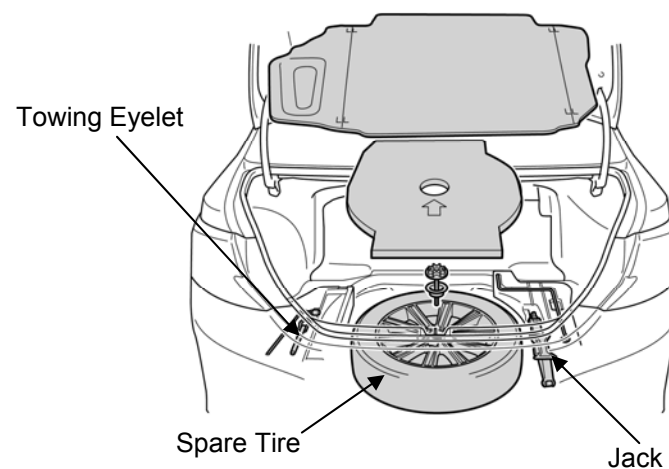
- A flat bed trailer is the preferred method of towing.
- The vehicle may be shifted out of **Park** into **Neutral** by turning the ignition-on, depressing the brake, then moving the gated shift lever to **N**.
- If the shift lever cannot be moved out of **Park**, a shift lock release button is provided under the cover near the shift lever as shown in the illustration.
- If a tow truck is not available, in an emergency the vehicle may be temporarily towed using a cable or chain secured to the emergency towing eyelet or rear hooks. This should only be attempted on hard, paved roads for short distances at low speeds (below 18 mph (30 km/h)). The eyelet is located with the tools in the cargo area of the vehicle, refer to the illustration on page 27.



Roadside Assistance

Spare Tyre

The jack, tools, towing eyelet and spare tyre are provided as shown.



Jack, Tools, Towing Eyelet and Spare Tyre in the Cargo Area

Roadside Assistance

Jump Starting

The 12 Volt auxiliary battery may be jump started if the vehicle does not start and the instrument cluster gauges are dim or off after depressing the brake pedal and pushing the power button.

The 12 Volt auxiliary battery is located in the boot. Open the boot using the remote boot release.

- Open the boot and remove the battery cover on the passenger side.
- Connect the positive jumper cable to the positive battery post following the numbered sequence.
- Connect the negative jumper cable to the metal boot latch following the numbered sequence.
- Place the smart key in proximity to the interior of the vehicle, depress the brake pedal and push the power button.

NOTE:

If the vehicle does not recognise the smart key after connecting the booster battery to the vehicle, open and close the driver door when the vehicle is shut off.

If the smart key internal battery is dead, touch the Toyota emblem side of the smart key to the power button during the start sequence. See the instructions and illustrations on page 9 for more details.

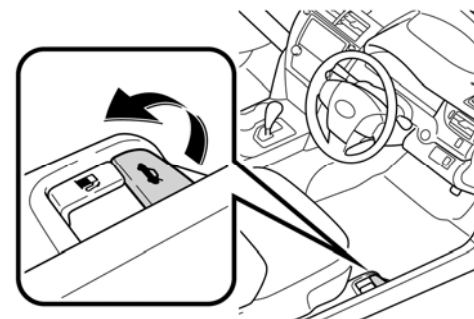
- The high voltage HV battery pack cannot be jump started.

Immobiliser

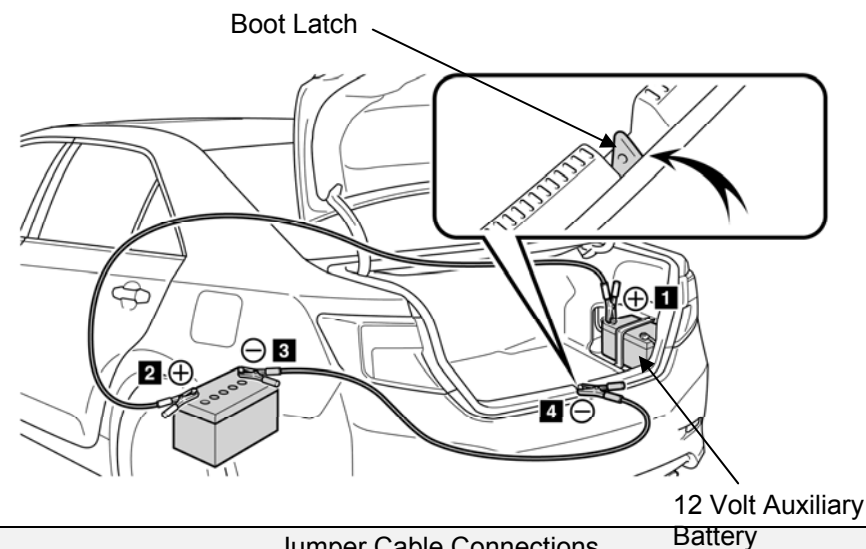
The Camry hybrid is equipped with a standard immobiliser system and anti-theft alarm.

- The vehicle can be started only with a registered smart key.

To disarm the anti-theft alarm, unlock the door by using the smart key button or door handle touch sensor. Turning the ignition-on or starting the vehicle will also disarm the anti-theft alarm



Open Boot



Jumper Cable Connections

12 Volt Auxiliary Battery

Product Safety Data Sheet

This product (a battery) is an "Article" pursuant to 29 CFR 1910.1200 and, as such, is not subject to the OSHA Hazard Communication Standard requirements for preparation of a Material Safety Data Sheets, (MSDS).
 This Product Safety Data Sheet is prepared only to provide information to our customers.

1. PRODUCT AND COMPANY IDENTIFICATION

1.1	Product name	Nickel Metal Hydride Battery (Module)
1.2	Applicable models	EV-MH type EV-MP095R15A (EV-95) EV-MP6R5R01 (GEN I) EV-MP6R5R02 (GEN II) EV-MP6R5R03 (GEN 2.5 8cells module type) EV-MP6R5R27 (GEN 2.5 12cells module type) EV-MP6R5R47 (GEN 2.5L 12cells module type)
1.3	Product use	Hybrid Vehicle Battery
1.4	Name of manufacturer	Primearth EV Energy Co., Ltd.
1.5	Address of manufacturer	20,Okasaki,Kosai-City,Shizuoka, 431-0422 Japan
1.6	Phone number of manufacturer	+81-53-577-3592 (Japan)
1.7	Post in charge	Enginnering Dept.
1.8	Name of person in charge	Osamu Takahashi
1.9	Issue number	P0251

2. HAZARD IDENTIFICATION

This product is not dangerous as long as it is used for prescribed purposes and in accordance with its designated usage. As the product is a storage device for electricity, it may give the user an electric shock. It has no adverse effect on human health or the environment unless the pack and cell casings are breached.

2.1	Physical and chemical hazard	This product does not constitute a physical and chemical hazard as long as it is used for prescribed purposes and in accordance with its designated usage. The alkaline electrolyte or materials in the battery may be dangerous if they leak out of the casing due to dismantling or breaching of the battery. This product may cause electric shock, fire, or injury if it is used for purposes other than those prescribed or without following the designated usage.
2.2	Hazard to human health	This product is not hazardous to human health in normal use. However, if the product dismantle or is breached, the alkaline electrolyte or materials that may leak out of the outer casing may adversely affect human health. This product contains both nickel compounds and cobalt, which are classified as carcinogens by IARC and NTP.
2.3	Hazard to environment	This product is not hazardous to the environment as long as it is used for prescribed purposes and in accordance with its designated usage. However, the contents of the product may have an adverse effect on the environment in the event of their leakage from the casing due to dismantling or

3. COMPOSITION & INGREDIENT INFORMATION

Chemical name	Chemical symbol	CAS. No.	Exposure limits in air	
			ACGIH	OSHA
Positive electrode, composed of:				
•Nickel hydroxide	Ni(OH)2	12054-48-7	0.2mg/m3	1mg/m3
•Nickel	Ni	7440-02-0	0.2mg/m3	1mg/m3
•Cobalt	Co	7440-48-4	0.02mg/m3	0.1mg/m3
Negative electrode, composed of:				
•Hydrogen absorbing alloy	*1			
•Iron	Fe	7439-89-6	NA	NA
Alkaline electrolyte	*2			

*1: Main contents contained in hydrogen absorbing alloy
 Nickel(Ni)-CAS#7440-02-0, Cobalt(Co)-CAS#7440-48-4, Manganese (Mn)-CAS#7439-96-5,
 Aluminum (Al)-CAS#7429-90-5, Rare earths [Lanthanum (La)-CAS#7439-91-0, Cerium (Ce)-CAS#7440-45-1,
 Neodymium (Nd)-CAS#7440-00-8, Praseodymium (Pr)-CAS#7440-10-0]

*2: Main contents contained in alkaline electrolyte
 Potassium hydroxide (KOH)-CAS#1310-58-3, Sodium hydroxide (NaOH)-CAS#1310-73-2,
 Lithium hydroxide (LiOH)-CAS#1310-65-2

4. FIRST AID MEASURES

In the event of the leakage of electrolyte or gassing of the battery, take the appropriate first aid measures from the following.

4.1	Eye contact	Contact may cause corneal injury and blindness. Wash eyes with large amounts of running water for at least 15 minutes. Seek medical treatment immediately. If appropriate actions are not taken, eye disorders may result.
4.2	Skin contact	Wash the contact area with plenty of water. Seek medical treatment immediately. Clothing, shoes, and socks, etc. which have come into contact with alkaline electrolyte should be taken off immediately. If appropriate actions are not taken, skin inflammation may occur.
4.3	Inhalation	Move the exposed person to fresh air area immediately. Cover up the affected person with a blanket. Seek medical treatment immediately.
4.4	Ingestion	Do not induce vomiting . Seek medical treatment immediately.

5. FIREFIGHTING MEASURES

In the event of a battery fire, take the following measures.

5.1	Extinguishing media and method	(1) Use a dry powder acrylonitrile butadiene styrene (ABS) fire extinguisher for fire-fighting. (2)Extinguishing a fire with a large amount of water may be an effective method . However, this should be considered as a supplementary means If there are no readily available large amounts of water, use dry sand instead; as the application of only a small amount of water may temporarily act as an accelerant and affect the fire adversely while the hydrogen storage alloy is burning.
5.2	Exposure controls and personal protection for fire-fighting	Use air-breathing apparatus as noxious fumes may be produced.
5.3	Fire spread prevention	(1) In the case of fire, remove surrounding inflammables immediately. (2) In the case of fire in peripheral devices, move the battery to a safe place immediately.

6. ACCIDENTAL RELEASE MEASURES

Take the following measures if the alkaline electrolyte has leaked out of the battery.

6.1		Wipe up the alkaline electrolyte with a cloth. Dispose of the cloth used to wipe up the electrolyte in accordance with applicable laws and regulations.
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7. HANDLING & STORAGE INFORMATION

Observe the following cautions and prohibited items. Handle the battery carefully.

7.1	Prohibited items	(1) Short-circuiting Short-circuiting may cause burn injury due to ignition or heating effect. (2) Dismantle or modification Alkaline electrolyte leaks when the battery (cell) is disassembled. (3) Overcharging or over-discharging Oxygen or hydrogen may be produced when the battery is overcharged or over-discharged. (4) Use in an airtight container The container may explode due to the gas produced from the battery.
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7.2	Cautions	(1) Do not stack a battery on another battery. (2) Do not store batteries on electrically conductive surfaces such as metals. (3) Wear protective glasses and rubber gloves while handling batteries.
8. EXPOSURE CONTROLS & PERSONAL PROTECTION		
Take the following measures in the event of leakage of the alkaline electrolyte or alkaline mixed gas from the battery.		
8.1	Facilities	(1) Store the product in a depository with local exhaust systems for ventilation. (2) Install an exhaust system or exhaust port when the product is used in a container.
8.2	Protective equipment	Wear protective glasses, protective gloves, and simple filter mask.
9. PHYSICAL & CHEMICAL PROPERTIES		
9.1	Physical state	Solid
9.2	Order	No order
9.3	pH	Not applicable (ELECTROLYTE : >12)
9.4	Freezing point	Not applicable
9.5	Boiling point	Not applicable (ELECTROLYTE : 100°C; Water)
9.6	Evaporation rate	Not applicable
9.7	Vapor pressure	Not applicable
9.8	Vapor density	Not applicable
9.9	Solubility (Water)	Not applicable (Electrolyte is soluble.)
10. STABILITY & REACTIVITY		
This product is stable as long as it is used for prescribed purposes and in accordance with its designated usage. However, short-circuiting, overcharging/over-discharging, and long-term storage in a high-temperature environment may lead to the ignition or explosion of the battery.		
10.1	Possible causes of fire	Sparks due to short-circuit. A large current is applied to a module or a cell.
10.2	Possible causes of explosion	The battery will not explode by itself unless the safety valve is frequently activated and the battery is kept in an airtight container, in which case the oxygen and hydrogen produced from the battery may trigger an explosion.
10.3	Possible causes of fire and explosion	(1) Overcharging or over-discharging (2) The temperature of the battery at 100°C or higher (3) Overcharging or over-discharging of the battery in an airtight container located close to a heat source
11. TOXICOLOGICAL INFORMATION		
This product is not hazardous as long as it is used for prescribed purposes and in accordance with its designated usage. If the battery disintegrates or is breached, the alkaline electrolyte or contents that have leaked out of the casing may adversely affect human health.		
11.1	Carcinogenicity	The nickel-plated iron of this product is not harmful as long as it is used for prescribed purposes and in accordance with its designated usage. This product contains both nickel compounds and cobalt, which are classified as carcinogens by the International Agency for Research on Cancer (IARC) and the National Toxicology Program (NTP).
12. ECOLOGICAL INFORMATION		
12.1		This product is not dangerous as long as it is used for prescribed purposes and in accordance with its designated usage. This product is not hazardous to the environment as long as it is used for prescribed purposes and in accordance with its designated usage. However, the contents of the product may have an adverse effect on the environment in the event of their leakage from the casing due to dismantling or breaching of the battery.
13. DISPOSAL CONSIDERATIONS		
13.1		Batteries should be disposed in accordance with designated provisions by vehicle manufacturers or dealers.

		<p>(4) US DOT(Department of Transportation)Title 49 CFR Parts 100-185 Subpart B—Table of Hazardous Materials and Special Provisions § 172.101 Purpose and use of hazardous materials table. Hazardous materials descriptions and proper shipping names * Batteries, nickel-metal hydride see Batteries, dry, sealed, n.o.s. for nickel-metal hydride batteries transported by modes other than vessel * Batteries, dry, sealed, n.o.s. § 172.102 Special provisions. * Transport by modes other than vessel : Special provision 130 * Transport by vessel : Special provision 340</p> <p>(5) Japan MLIT (Ministry of Land, Infrastructure, Transport and Tourism) Bulletin 1530 Notice 272 (Dec.22,2010) •UN Number 3496 Classes 9 •Dangerous Goods List Coluum 6(5) SP963 1 Shall be securely packed and protected from short circuit. 2 Tag plate or the name of goods are not required to be displayed. •Dangerous Goods List Coluum 10 SP963 1 Nickel-metal hydride button cells or nickel-metal hydride cells or batteries packed with or contained in equipment are not subjected to the provisions of this notice. 2 All other nickel-metal hydride cells or batteries shall be securely packed and protected from short circuit. They are subjected to other provisions of this notice provided that they are loaded in a cargo transport unit in a total quantity of less than 100 kg gross mass.</p>
16. OTHER INFORMATION		
16.1	Cautions	<p>(1)Cautions and prohibited items in this Data Sheet relate to only normal use. Take appropriate safety measures suited for the environment when the product is used for special purposes. (2)This Data Sheet provides only the information of the product, and is not to be taken as a warranty. (3)It is intended for use by persons with technical skills and at their own discretion and risk. (4)The user is responsible for determining that any usage of the data or information in this Data Sheet is in accordance with associated federal, state, and local laws and regulations.</p>
16.2	Date of creation/revision	November 10, 2011